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METROPOLITAN GROWTH AND LOCAL COOPERATION IN THE UNITED STATES AND KOREA

SCAG-DGI Joint Research



Contents

Preface by SCAG Executive Director	i
Preface by DGI President	ii
Part 1. Metropolitan Growth and Local Cooperation	1
Twenty Years of Regional Planning and Collaboration in Southern California <i>Simon Choi</i>	2
Economic Recession and Regional Population Projections <i>Simon Choi</i>	16
Cooperative Planning between Local Governments: The Case of Daegu Metropolitan Planning <i>Seong-Keun Lee and Yong-Jun Choi</i>	33
Promotion of Daegu Metropolitan Regional Transportation Plan <i>Ung-Ki Chung</i>	52
The Strategy for Regional Industry Development of Daegyeong Economic Region <i>Jung-Kyu Na</i>	69
Part 2. Urban Development and Participatory Planning	87
5th Cycle Regional Housing Needs Assessment <i>Simon Choi, Frank Wen, and Joe Carreras</i>	88
Regional Planning and Public Participation <i>Jung H. Seo</i>	108
Operation and Performance Management of Local Public Enterprises in Daegu and Gyeongbuk <i>Jongmu Kwak and Kwangseok Kim</i>	120
A Case Review of Public Participation Urban School in Town Planning for Training Residents Leaders at Daegu <i>Young-Eun Choi</i>	137
Construction of the New Provincial Capital of Gyeongsangbuk-do <i>Seong-Ho Lim and Yong-Jun Choi</i>	153

Part 3. Local Responses to Climate Change and Balanced Development	171
Greenhouse Gas (GHG) Emissions and Transportation in Southern California: Challenges and Responses	172
<i>Simon Choi, Frank Wen, and Hsi-Hwa Hu</i>	
Environmental Justice in Regional Planning	189
<i>Jung H. Seo</i>	
Climate Change Responding Plan of Daegu Metropolitan City	208
<i>Gi-Ho Kim</i>	
Change of Governmental Policy for Nakdong River and Nakdong River Restoration Project	225
<i>Woon-Ki Yeo</i>	
Relocation of Public Agencies to the Provinces and Construction of Innovation City: A Case Study of Daegu and Gyeongbuk	242
<i>Hyung-Cheal Ryu</i>	
Summaries and Prospects	259
<i>All Contributors</i>	
Contributors	274
Acknowledgments	275

Preface by SCAG Executive Director

I am pleased to support this research report on metropolitan growth and local cooperation in the United States and Korea, which is completed through the joint effort of researchers from the Southern California Association of Governments (SCAG) and the Daegu-Gyeongbuk Development Institute (DGI). The report is intended to expand understanding of urban and regional planning issues and challenges and encourage dialogue about the policy and planning options to address them. This joint research effort is well aligned with SCAG's vision as an international and regional planning forum trusted for its leadership and inclusiveness in developing plans and policies for a sustainable Southern California.

SCAG is the nation's largest metropolitan planning organization, representing six counties, 191 cities and more than 18 million residents. SCAG undertakes a variety of planning and policy initiatives to encourage a more sustainable Southern California now and in the future. The SCAG region faces diverse challenges: the region was among the hardest hit in the nation during the recent great recession, the region's freeways are the most congested in the nation and the region's air quality is the worst in the nation.

These challenges present a serious threat to the quality of life for current and future residents, however SCAG has made and will continue to make a coordinated planning and research effort to address these regional challenges. SCAG's Southern California Economic Recovery & Job Creation Strategy to improve the region's economic viability is among the agency's major initiatives aimed at improving the region's overall quality of life.

In addition to SCAG's work in the Southern California region, the agency plans to continue promoting global research and development (R&D) efforts by hosting a first-of-its-kind international conference in September 2013 to discuss emerging urban and regional issues and their policy implications and options. The conference will focus on aging and growth to provide insight from around the state and world on planning for regional growth. Additionally, this international conference will discuss metropolitan policy and planning implications of an aging population in a wide range of topic areas including housing and city design, transportation demand, labor force and the economy, government revenues and spending, education and training, immigration, land use, energy and climate change. Through this international conference we will share experiences of planning for growth and identify best practices. I look forward to hearing more about the advanced research conducted for this report at the upcoming conference.

I sincerely thank the members of SCAG's governing body, the Regional Council, for their leadership in setting SCAG's vision and facilitating staff's ability to implement that vision. I am equally thankful to DGI President Seong-Keun Lee, for his leadership in completing this report.

Hasan Ikhata, Executive Director
Southern California Association of Governments

Preface by DGI President

On January 19, 2012, the Daegu-Gyeongbuk Development Institute (DGI) and the Southern California Association of Governments (SCAG) signed an MOU at SCAG's office in Los Angeles, California. On that day, both agencies agreed on the first joint research project to publish a research report focused on empirical cases of metropolitan growth and cooperation between local governments in Korea and the United States.

DGI, which is funded by Daegu Metropolitan City and Gyeongsangbuk-do, is a comprehensive policy research institution that supports the administration of both local governments. The institution, one of fifteen institutions funded by local governments across the country, was established in conformity with the 「Act on the Establishment and Management of Local Government-Funded Institutions」 and endeavors to provide happiness, hope, and equal opportunity to local residents. Daegu-Gyeongbuk which is the research area of DGI was originally rooted in the same political/administrative/cultural bases located in the southeastern part of Korea, but was divided for local administrative purposes in 1981. The populations of Daegu and Gyeongbuk are about 2.5 million and 3 million respectively as of the end of 2012. Daegu has 8 districts (*gu*) while Gyeongbuk has 23 cities (*si*) and counties (*gun*).

The world's local governments are facing three great changes. First, they are facing globalization and regionalization. Globalization means the world is entering an era of endless competition. As the world becomes globalized, the world's societies are interconnected with the economy as the center through liberalization and exchange/cooperation. At the same time local governments must make concentrated development in their region voluntarily by discovering a new value at the local level. They should make efforts to produce effectively by controlling the function of production elements through economies of scale. Second, the changes local governments are facing are the development of participatory democracy and diversification of the demand for public services. Participatory democracy is developing as there is an expansion of public participation. This public participation manifests itself through increased voter participation and mass communication through social media. Efficiency must be improved by forecasting demand through optimal provision as demand for public services is diversified. Feedback on the public service agent is required through performance assessment. Third, there are climate and sustainable development changes that are taking place. Global efforts are needed to cope with the climate changes that are confronting the world, such as global warming, and to develop sustainably with the environment in mind.

This report is published with the purpose of information sharing through empirical cases regarding local and regional strategies of DGI and SCAG on these three important changes. The report is composed of 3 parts. Part 1 addresses metropolitan growth and local cooperation; Part 2 deals with urban development and participatory planning; and Part 3 discusses local responses to climate change and balanced development.

In conclusion, I would like to thank the mayor of Daegu Metropolitan City, the Gyeongsangbuk-do governor, the president of Daegu Metropolitan City Council, and the president of Gyeongsangbuk-do Council for their direct and indirect help in publishing this report. I also want to show my unbounded gratitude to researchers from both countries who participated in the research and writing. It is expected that mutual understanding of each other's regional planning and policy will be enhanced and policies can be explored through joint research based on this report. Both agencies are planning to make annual visits, conduct seminars, publish books, and have a vigorous exchange through the internet. I wish both organizations and both regions tremendous success. Thank you.

Seong-Keun Lee, President
Daegu Gyeongbuk Development Institute

PART 1.

METROPOLITAN GROWTH AND LOCAL COOPERATION



Twenty Years of Regional Planning and Collaboration in Southern California

I. INTRODUCTION

The American planning system has evolved within a decentralized and fragmented political framework. Suburbanization has continued to cross local jurisdictional boundaries. Metropolitan areas are formed and developed. Transportation congestion and air pollution are interrelated and should be addressed on a regional level. Current regional (metropolitan) planning in the United States is the by-product of the intergovernmental planning coordination efforts of the U.S. Congress and other governments on regional issues. Regional planning¹ generally has been performed by a Council of Governments (COG) and a Metropolitan Planning Organization (MPO).

Regional planning has changed significantly due to three major regional, state, and federal programs and initiatives (i.e., 1991 ISTEA, Regional Blueprint Program, and SB 375) that have been adopted over the past twenty years. The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) enhanced the role of MPOs, encouraged citizen involvement, and promoted the integration of land use, transportation, and the environment along with the 1990 Clean Air Act Amendments (CAAA). In the early 2000s, regional blueprint planning was initiated by the four largest MPOs (Los Angeles, San Francisco San Diego, and Sacramento) (Barbour and Teitz, 2006). Regional blueprint planning became a voluntary, competitive grant program of the State of California, which supported the regional planning agencies to select community preferred growth scenarios for the future. Through regional blueprint planning, MPOs made an effort to balance transportation planning with land use planning, housing needs, resource protection and other planning issues in order to achieve more sustainable regional growth patterns and improve the quality of life for Californians.

Finally, in 2008, the Sustainable Communities and Climate Protection Act, also known as Senate Bill 375 (SB 375), was signed by the Governor to target greenhouse gas emissions from passenger vehicles. The California Air Resources Board (CARB) was required to set regional emissions reduction targets from passenger vehicles. The MPO for each region is then required to develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land-use and housing policies to plan for the achievement of the emissions target for their region (http://en.wikipedia.org/wiki/SB_375).

The purpose of this paper is to review the regional planning and collaboration efforts of the Southern California Association of Governments (SCAG) over the last twenty years. This paper focuses on three major aspects of regional planning and collaboration efforts: SCAG's role and responsibility; collaborative framework and integration of plans and programs. The next section of

¹ In this paper, regional planning is used with regional transportation planning interchangeably.

the paper discusses the changing context of regional planning. The federal, state, and regional requirements and initiatives are discussed. The third section of the paper discusses the enhanced role of the Southern California Association of Governments (SCAG) in the plan preparation and project selection process. The fourth section of the paper discusses the regional and bottom-up approach toward regional planning, collaboration among stakeholders, and public participation. The fifth section of the paper discusses the integrated planning approach towards addressing land use, transportation, and environmental problems. The sixth and last section of the paper summarizes the paper.

II. REGIONAL PLANNING IN A CHANGING CONTEXT

Regional planning in America has many forms. Considering its historical background and development, there is more formal regional collaboration on the common interests of the region or metropolitan areas. Many different government agencies and related stakeholders participate in the regional planning and policy development process. The beginning of regional planning in America traces back to the early 1900s ((Friedmann & Weaver, 1979; McDowell, 1986 (a)).

A COG or a MPO conducts regional planning in the United States. Regional planning agencies are established by the federal or state legislatures, and provide local jurisdictions with diverse research, planning, programming, and related services (McDowell, 1986 (b) (c); Soule, 2009). The early COGs were formed through the intergovernmental demonstration programs in the 1950s, and were primarily developed in the 1960s. The majority of the 540 COGs have been voluntarily established by local governments in metropolitan regions. The main role of the COGs is determined by regional needs and performs diverse and specifically assigned functions of the federal, state, and local governments. In California, a COG is considered to be a Joint Powers Authority (JPA). A JPA is formed by any two or more governmental entities (federal, state or local) to provide a common service. Many JPAs are financing tools that let governmental agencies pool their scarce resources. The California Government Codes 6500-6536, also known as Joint Exercise of Powers Act, specifies the JPA's responsibilities, purpose, procedures, etc. Under the Joint Exercise of Powers Act, two or more public agencies may enter into a joint powers agreement, allowing them to jointly perform many duties that the agencies can perform individually.

States and the federal government recognized the regional nature of transportation infrastructure early in the 20th century (Giuliano, p1.). Modern regional transportation planning has been practiced since the Federal-Aid Highway Act of 1962, which established the famous 3C process (continuing, comprehensive, and cooperative) as the basis for current regional planning. This 3C process became the root of today's MPO requirements (Lewis and Sprague, 1997. p.29). MPOs were established due to the growing momentum of the highway program and the federal financing of the planning process (US DOT, 1988). Subsequent federal and state legislation complemented regional transportation planning practice and adjusted the role of MPOs in the regional decision-making process. The major metropolitan planning related acts and the role of

metropolitan planning organizations (or council of governments) were established primarily during the 1960s.

Metropolitan transportation planning processes are governed by federal law (23 U.S.C. §§ 134–135). An MPO is an agency created by federal law to provide local input for urban transportation planning and allocating federal transportation funds to cities with populations greater than 50,000. The Federal Highway Administration has identified 384 Metropolitan Planning Organizations (MPOs) (<http://narc.org/resource-center/cogs-mpos/what-is-a-metropolitan-planning-organization/>). Nearly half of the MPOs (178) operate as the Council of Governments serving the same general geography. Under federal law emanating from the 1973 Highway Act and the Urban Mass Transit Act, organizations in urbanized areas are designated by their Governors to perform significant planning and programming of federally funded highways and transit projects. Through the Long Range Transportation Plan and its link to the Transportation Improvement Program (TIP), MPOs are responsible for approving significant expenditures of federal dollars. Since MPOs function as regional planning agencies, they have no authority to levy a tax or charge a user fee. Federal law (22 U.S.C. §§ 104) requires that a MPO be funded to develop a regional transportation plan.

The following three major regional, state, and federal programs and initiatives of the last 20 years have changed the recent regional planning process in Southern California.

1. ISTEA (1991)

After a minimal role in transportation planning during the 1980s, MPOs were provided with an unprecedented opportunity to be a leader in regional transportation issues by ISTEA. Two major forces have driven the federal government's role in regional transportation: transportation funding and planning, and air quality protection. Transportation funding and planning is mandated by the ISTEA and overseen by U.S. Department of Transportation (US DOT), while air quality efforts are guided by the Clean Air Act and administered by the Environmental Planning Agency (EPA). The two efforts which were once separate are now coordinated on a variety of levels.

With the introduction of the ISTEA in 1991 and the Clean Air Act Amendment (CAAA) in 1990, the emphasis of the regional planning process has significantly changed. The federal law tends to move toward regionalism by providing the regional MPOs with more control over regional projects. MPOs were provided with increased funding as well as increased roles and responsibilities to select projects and mandates for new planning initiatives and to use federal funds flexibly among different transportation modes in their regions. The upgraded status of MPOs was reflected during the plan preparation process. State transportation officials, for the first time, were required to seriously consult with local representatives of MPOs' governing boards (Solof, 1996: 1). The empowerment of MPOs in key decision making was understood as a

revolutionary process (Howe, 1994: 11). The project selection and fiscal constraint requirements have also led to a planning process that is “more rational than political,” according to a 1996 Government Accounting Office survey of MPO officials (GAO, 1996: 1).

ISTEA also tried to promote collaborative planning process meeting local needs by placing significant emphasis on broadening public participation in transportation planning to include key stakeholders including the business community, members of the public, community groups, and other governmental agencies. This change challenges professional planners and elected officials because meaningful engagement of diverse interests can be difficult. (US DOT, 1995:5). Public participation is also emphasized for minority or low-income groups, relatively underrepresented during the planning process. Federal planning regulations and policies require that a wide spectrum of stakeholders have the opportunity to participate meaningfully in the planning process. Toward this end, the MPO places an emphasis on reaching out to the minority and low-income communities and the leadership that represents these communities.

Finally, ISTEA strengthened the integrated aspect of regional planning by developing alternative scenarios of visionary perspectives, establishing a clear linkage between the long-range plan and TIP, by coordinating land use and transportation and by linking transportation and air quality. By emphasizing the integration of major planning elements, ISTEA intended to produce a more coherent set of regional planning and programming. For example, a newly introduced concept is the relationship between transportation and air quality. According to CAAA, in areas failing to meet Federal air quality standards, transportation planning should be geared to improving air quality as well as mobility. (US DOT, 1995:5).

2. Regional Blueprint Program

The four largest MPOs (Los Angeles, San Francisco San Diego, and Sacramento) in California initiated regional blueprint planning in the early 2000s (Barbour and Teitz, 2006), and this regional blueprint planning process became a voluntary, competitive grant program of the California Department of Transportation (Caltrans) since 2005. Caltran’s regional blueprint program supported collaborative regional planning efforts across California through grants, support services and interagency coordination.

The program utilizes previously unallocated federal funding, as well as improving the comprehensive level of transportation/land use planning. The program contributes to the vision of the improved quality of life within California by addressing future growth on a twenty-year horizon through the integration of transportation, housing, land use, environmental resources, other infrastructure, and services (Sollenberger and Klein, 2007). The program encourages comprehensive scenario planning that results in consensus by regional leaders, local governments and stakeholders on a preferred growth scenario or blueprint.

The regional blueprint program emphasizes choices in transportation efficiency and environmental sustainability over the past practices that lacked these goals in both local and regional plans. SCAG's Compass Blueprint promotes civic engagement in transportation planning and provides a set of incentives and free services to do something positive about how we grow and change as a region.

The idea behind the Compass Blueprint in the SCAG region was to focus future development in just 2% of the land mass of the region. The focus is on areas well served by transit, near employment centers and well suited to encourage pedestrian friendly growth. Mixed use, mixed income and mixed tenure building solutions are encouraged to help protect existing single family neighborhoods and prevent leap frog ex-urban growth. It's about evaluating choices and growth scenarios based on local input, making the most of our transportation investments, and partnerships and public participation. This is a voluntary, collective strategy for meeting mobility, housing, employment, air quality and greenhouse gas emission challenges that face our state and region.

3. California Senate Bill 375 (SB 375)

The Sustainable Communities and Climate Protection Act (SB 375) was passed by the State legislature and signed by Governor Schwarzenegger in September 2008. It became effective on January 1, 2009 as a means for achieving AB 32 goals from cars and light trucks. This bill shows a significant effort of the State of California to implement the global warming goals of AB 32.

SB 375 requires eighteen MPOs in California to develop a Sustainable Communities Strategy (SCS) as a major element of the Regional Transportation Plan (RTP) to reduce GHG emissions. SB 375 acknowledges that the transportation sector makes a major contribution to the generation of GHG emissions, and it recommends that MPOs develop a SCS to reduce the GHG emissions from cars and light trucks through the integration of planning processes for transportation, land use, and housing. The development of the RTP/SCS depends on meaningful collaboration with local governments and stakeholders.

With the passage of SB 375, local, regional, and state planning and decision making is more closely linked with each other. The Regional Targets Advisory Committee (RTAC) of CARB acknowledged the importance of collaboration among the MPOs and CARB for the successful target setting under SB 375. The RTAC further suggested that CARB/MPOs work with Caltrans and the California Transportation Commission to update modeling and RTP guidance.

The RTAC recommended that CARB and MPOs use a bottom up approach to develop parameters for preparing sensitivity analyses and multiple scenarios to test the effectiveness of various approaches. The bottom up approach emphasizes the importance of input from regional and local officials and stakeholders. The local and regional input based parameters would help to identify

the most ambitious and achievable GHG emission reduction strategies for 2020 and 2035. Local input has been instrumental in identifying the land use scenario for development of the regional transportation plan. By using local input, the most current land use assumptions are implicitly incorporated in the regional transportation plan as mandated by federal law. MPOs had active participation in developing the regional GHG emission reduction targets as CARB's partner agency. Although SB 375 put CARB in charge of developing the statewide GHG emissions, CARB uses a bottom-up and regional approach toward developing the statewide GHG emission reductions target. MPOs have been working closely with local jurisdictions and stakeholders to find a technically sound approach and politically acceptable solution for target setting and SCS development.

SB 375 specifies the detailed public outreach processes for MPOs during the SCS development. The specific outreach requirements include: (1) the MPOs must conduct one or two informational meetings in each county for members of the board of supervisors and councils on the SCS. (2) each MPO must adopt a public participation plan, for development of the SCS that includes outreach efforts and workshops. (3) two or three public hearings on the draft SCS must be held. Local governments and the general public are expected to provide meaningful input during the planning process in an active way. As required by SB 375, each MPO must prepare a SCS, subject to the requirements of the Federal Transportation and Clean Air Acts, including the requirement to utilize the most recent planning assumptions considering local general plans and other factors. Local governments play a key role in developing successful SCS through the availability of the most current general plans reflecting the most recent planning assumptions and in implementing successful SCS related TOD projects through the flexible updating of existing general plans

III. SCAG'S ROLES AND RESPONSIBILITIES

1. History

With enactment of the Federal-Aid Highway Act of 1962, there was a movement for establishing a MPO in the nation's metropolitan areas. The State of California introduced a law to encourage local jurisdictions in the metropolitan areas to develop a MPO in 1963. According to the 1963 State law, the State of California would directly establish a MPO just in case that a MPO is not voluntarily formed within the specified timeline. Although local political leaders were concerned about the potential impact on the local home rule, they eventually decided to form their own MPO in Southern California. Local elected officials from 56 cities and five counties in the Southern California region first convened at the Biltmore Hotel in the City of Los Angeles and founded SCAG as a joint powers authority (JPA) under California law on October 28, 1965. Southern California localities were able to resist greater state control (Wilkstrom, 1977, pp. 43-44).

SCAG was initially governed by a 20-member Executive Committee, and its major responsibility was to develop growth projections and develop a regional plan for the region. Later SCAG

expanded its responsibility from transportation planning to other functional areas. SCAG is designated as a MPO under federal law and as a Regional Transportation Planning Agency (RTPA) and a COG under state law.

SCAG expanded its governing body, the Executive Committee, in 1992 to a 70-member Regional Council (RC) to help accommodate new responsibilities mandated by the federal and state governments, as well as to provide more broad-based representation of Southern California's cities and counties. With its expanded membership structure, SCAG created Regional Council districts to provide for more diverse representation. The districts were formed with the intent to serve equal populations and communities of interest. The RC currently includes 84 members. In addition to the six counties and 191 cities that make up the SCAG region, there are six County Transportation Commissions that hold the primary responsibility for programming and implementing transportation projects, programs and services in their respective counties. Additionally, SCAG Bylaws provide for representation of Native American tribes and Air Districts in the region on the Regional Council and Policy Committees. Through the expanded membership of the RC, SCAG increased its responsiveness and representativeness. SCAG comes close to a truly population-based method for allocating seats (Lewis and Sprague, 1997).

2. Governance

Under federal and state laws, SCAG is responsible for identifying SCAG region's transportation priorities through development of RTPs. SCAG has many other roles and authorities to develop short- and long-term regional plans for transportation, housing and air quality that conform to state and federal standards. It is also responsible for implementing the state Regional Housing Needs Assessment program on behalf of Southern California in an effort to establish goals for future housing needs. SCAG conducts extensive growth forecasting and provides local governments with critical land use and demographic data to strengthen their planning efforts.

SCAG is governed by delegates from every member jurisdictions through the General Assembly (GA), which annually brings together the official representatives of SCAG's membership and helps set the agency's course for the coming year (SCAG, 2012). Amendments to SCAG's Bylaws also may be considered at the GA. In addition, members of the GA consider adoption of SCAG's General Fund budget for the next fiscal year.

As SCAG's governing board, the Regional Council (RC) formally adopts SCAG's policies; implements the General Assembly's policy decisions; acts upon policy recommendations from SCAG policy committees and external agencies; appoints committees to study specific problems and programs; and amends, decreases or increases the proposed budget to be reported to the General Assembly (GA).

SCAG's policy-making process is guided by the work of three Policy Committees: Transportation; Community, Economic and Human Development; and Energy and Environment; and its operations are managed by the Executive/Administration Committee. First, the Transportation Committee (TC) examines regional policies, programs and other matters pertaining to roads and highways, transit, airports and seaports and other aspects of Southern California's transportation system. Second, the Community, Economic and Human Development Committee (CEHD) oversees the agency's efforts to develop regional policies for housing, economic development, land use, growth forecasting and other community development needs. Third, the Energy and Environment Committee (EEC) considers environmental and energy-related issues of regional significance, including air and water quality, solid and hazardous waste, habitat preservation, environmental justice and matters pertaining to the California Environmental Quality Act.

Executive/Administration Committee (EAC) is SCAG's core leadership team. In addition to their critical position in guiding SCAG's regional decision-making process, EAC members are SCAG representatives throughout the region as well as at the state and federal levels. The EAC addresses matters regarding human resources, budgets, finance, operations, communications and any other matter referred by the RC.

3. Responsibilities and Funding Sources

Local governments voluntarily established SCAG as a JPA in 1965 according to California Government Code 6500. SCAG is charged with addressing region-wide issues and developing regional plans and policies as a COG. SCAG is designated as a MPO, which is mandated to develop the long term regional transportation plans for the federal government. SCAG is also designated as a Regional Transportation Planning Agency (RTPA) according to the state law. SCAG is fully engaged with research and analysis, data collection, and policy development for developing the regional transportation plans and other related plans and programs.

The mandated regional collaboration is made possible through the federal and state laws. The federal government promoted more regional collaboration for developing the region-initiated transportation plan and policies by establishing and expanding metropolitan planning organizations over the last fifty years. The federal effort contributed to the improvement of transportation and environmental problems of the region through the regional collaboration. With an improved transportation system, the region eventually may result in the economically more competitive region.

The roles of SCAG are separately specified in the federal and state laws. First, the major federal and state laws specifying the SCAG's roles include federal transportation laws (23 USC §§134(g), 49 U.S.C. §5303(f)), Federal Code of Federal Regulation (23 C.F.R. §450), SAFETEA-LU (Pub.L. No. 109-59, Title VI, Section 6001(a), 119 Stat. 1989), Federal Clean Air Act of 1990 (176(c) (42 U.S.C. 7506(c)), and the California government codes (§§65080 and 65082) . Second, the Presidential

Order 12372 of 1982 designates SCAG as a certified agency to review the proposed program for the financial support and direct development of the federal government. This process is called Intergovernmental Review (IGR). Third, California Environmental Quality Act Guidelines (Sections 15125 and 15206) mandates SCAG to provide a professional opinion on whether the proposed regionally significant project is consistent with the regional plan and the city's socioeconomic projections. This IGR process is a useful tool to enhance the linkage of the regional plan and urban development. Fourth, California Health & Safety Codes (§40640(b), §40464) requires SCAG to develop land use, transportation programs, policies, and strategies as well as the regional growth projections of population, households, and employment as part of Air Quality Management Plan (AQMP) to be developed by South Coast Air Quality Management District (SCAQMD). Fifth, California Government Code §65584 specifies that SCAG, as the SCAG region's MPO and COG, must develop the Regional Housing Needs Assessment (RHNA) plan for local jurisdictions in the region. The RHNA process considers the urban growth and other important growth factors in determining the low income housing needs for each local jurisdiction. Due to the significant planning and policy implications for local jurisdictions, the RHNA process is very contentious, and requires strong collaboration between SCAG and local jurisdictions. Sixth, California Government Code §65580(b)(2)(C) specifies that SCAG develop a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan (RTP) to achieve greenhouse gas (GHG) emissions target. A SCS contains land use, housing, transportation strategies to reduce GHG emissions and emphasizes coordinated decisions on the environment, housing, and land use planning and strategies.

In short, SCAG develops regional plans to achieve the planning goals specified in the federal and state laws in a collaborative framework. The adopted regional plans are major tools for allocating federal and state funding for regional plan implementation.

SCAG's funding primarily comes from the federal government (68%), followed by local governments (22%), state government (6%), and membership dues (4%).

IV. BOTTOM-UP APPROACH

ISTEA of 1991 expected that MPOs would play a leading role in dealing with regional growth and transportation issues. The existing tradition is that the State of California tends to treat counties as regions. California legislation defines counties as regions (Lewis, 2001) and this makes a regional approach difficult.

The county level approach is generally beneficial to the county, because the county can effectively deal with county specific issues. However, regional issues are also important. One example is the daily trips of suburban commuters. According to the 2000 Census, approximately 30 percent of workers living in Riverside or San Bernardino counties commute to other counties every day.

Without an appropriate region wide approach, the region wide transportation system will get worse.

SCAG uses a bottom up process during the development of the plan. Local input is utilized for further disaggregation of the regional baseline forecast into smaller areas (e.g., TAZ). A major issue is that the regional baseline forecast total may be different from the regional total of local input. In general, local input tends to show a lower population total and a higher employment total than the baseline forecast. From a local perspective, population growth is generally unwanted because it induces more service burdens or costs to local jurisdictions. Conversely, employment growth is desired because it generates more revenue for local jurisdictions. This imbalance is corrected through the collaborative process.

The bottom-up process was effectively utilized to develop the regional SCS and the GHG emission reductions target. There has been close interaction between CARB and MPOs during the research, analysis and modeling process of the land use/transportation sectors and emissions. MPOs formed and frequently held meetings of a technical working group, which included CARB staff, to coordinate the development of various land use and transportation policy scenarios for CARB's target-setting process. These scenarios were developed to test the effectiveness of implementing various transportation and land use policies. The MPOs discussed technical issues including: land use and transportation strategies that could be tested in the MPO scenarios, different approaches to interregional travel, travel cost assumptions, and future revenue assumptions. A number of MPOs provided the initial results of their scenario analyses and target-setting approaches to CARB and the public in time for the final RTAC meeting on May 25, 2010 (CARB, 2010). The frequent exchange of technical information and modeling results among CARB, MPOs, and other stakeholders helped to develop a standardized approach on how to do analysis and modeling, and to draft regional GHG emission reduction targets. The collaborative process is also expected in the upcoming SCS development process. Extensive collaboration is required among local and regional stakeholders including CTCs, air districts, counties, cities, and others. The SCS development process was viewed in terms of a series of iterative discussions between MPOs, counties, cities, and CTCs with the collective goal of identifying GHG reduction strategies (SCAG, 2009).

V. INTEGRATED PLANNING

Traditional regional planning efforts focus on improving regional mobility and other related performance measures. As part of the federal transportation funding requirements, the RTP must also conform to the regional emission requirements. The Clean Air Act (CAA) was amended in 1990. It intends to reduce smog and air pollution by establishing air quality standards and planning requirements for various air pollutants. The amended CAA requires federally supported highway and transit project activities to meet federal air quality requirements. Under the U.S. Department of Transportation (DOT) Metropolitan Planning Regulations and U.S. Environmental

Protection Agency's (EPA) Transportation Conformity Rule requirements, the MPO's RTP needs to pass a regional emission analysis test. The analysis should demonstrate a conformity finding.

In addition to the federal efforts to improve both the regional mobility and air quality associated with the emissions of light and medium vehicles, California has focused on two major regional planning efforts: the regional housing needs assessment (RHNA) and the regional blueprint planning. The RHNA is intended to improve housing affordability for residents through the RHNA process and the resulting local housing element updates for several decades. The RHNA process establishes the minimum housing development capacity that cities and counties are to make available via their land use powers to accommodate growth within a short-term planning period. RHNA numbers are assigned to four income categories as guideposts for each community to develop a mix of housing types for all economic segments of the population.

The regional blueprint planning program was introduced to help MPOs develop alternative growth scenarios in the early 2000s. The program was intended to utilize previously unallocated federal funding, as well as to improve the comprehensive level of transportation/land use planning. The regional blueprint planning program is a voluntary, discretionary grant program that provides seed funding to MPOs to conduct regional blueprint planning. The program contributes to the vision of an improved quality of life within California by addressing future growth on a twenty-year horizon through the integration of transportation, housing, land use, environmental resources, other infrastructure, and services (Sollenberger and Klein, 2007). The regional blueprint planning is not required to be part of the RTP. Their impact on transportation funding decisions has been limited.

Two major federal programs and requirements (RTP and conformity analysis), two state programs (RHNA and Blueprint), and local general plans were loosely interlinked before SB 375. SB 375 strengthened the relationship among those programs and plans. The development pattern in an SCS must comply with federal law, which requires that any pattern be based upon "current planning assumptions" that includes the information in local general plans and sphere of influence boundaries. The SCS will not directly affect local land use decisions. The SCS does not in any way supersede a local general plan, local specific plan, or local zoning. SB 375 does not require that a local general plan, local specific plan, or local zoning be consistent with the SCS. An SCS is understood as a regional version of the local general plan (Choi and Choi, 2010)

VI. CONCLUSION

Over the last 20 years, the SCAG regional planning process has changed greatly due to three federal and state laws and programs. First, SCAG's regional planning process has become more collaborative and participatory by enhancing the cooperation between SCAG, state government, other regional agencies, and local governments, and by emphasizing region-wide public participation. Second, SCAG has become more representative and accountable by increasing the

number of regional council members and actively participating in major decisions. The plan has become more realistic by being financially constrained. Third, SCAG moved toward the integrated planning process. The efficacy of regional planning was promoted by properly linking long range plans with short range TIPs, by introducing visionary perspectives and alternative scenarios, and by integrating transportation and land use. In particular, growth forecasting and growth visioning played an important role in providing a possible solution to the regional transportation, air quality, and related regional issues.

With the introduction of SB 375, SCAG successfully developed the SCS as part of the RTP to attain and exceed the GHG emission reduction targets set forth by the CARB. The SCS outlines the plan for integrating the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. The SCS maximizes current voluntary local efforts that support the goals of SB 375, as evidenced by several Compass Blueprint Demonstration Projects and various county transportation improvements. Finally, SCAG has enhanced its role in the regional planning, programming and implementation process. The original purpose of MPOs was to bring together local politicians in a forum in order to confront regional problems and evaluate contrasting visions of the future. There was limited support for regional oversight and planning among citizens, state or local politicians. Federal involvement and requirements have bolstered the otherwise limited or absent regional role. New state initiatives (i.e., SB 375) further enhanced the role of SCAG in developing the consensus RTP/SCS. SCAG further initiated the Compass Blueprint Demonstration Projects program to support local efforts to seek creative, forward-thinking and sustainable development strategies that fit local needs and support shared regional values. The Compass Blueprint's primary focus is to provide custom planning tools and services to local governments and stakeholders. SCAG's Demonstration Projects program has partnered with more than 130 SCAG member jurisdictions on planning efforts that address local priorities and advance the regional vision of mobility, livability, prosperity and sustainability. Through these projects, SCAG provides free consultant services and sophisticated planning tools.

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Economic Recession and Regional Population Projections

I. INTRODUCTION

The late-2000s recession (or the Great Recession) was a severe economic recession that began in the United States in December 2007 and ended in June 2009 (as determined by the U.S. National Bureau of Economic Research)(http://en.wikipedia.org/wiki/Recession_of_2008). The impact continues and is hard to predict. There was serious consideration of this economic recession on the regional population projection process at SCAG. This study discusses how to produce reasonable short term and long term regional population projections through a Panel of Experts process.

Population projections play a key role in determining future community needs including housing and transportation in a regional planning context. Regional demographers and planners efficiently and regularly develop and update future population growth using diverse data sources including the US Census Bureau, state statistical agencies, and private vendors. Those federal and state agencies do not frequently update their demographic assumptions, and sometimes do not maintain the currency and reasonableness of their population projections. We recently have experienced an unexpected economic recession that began in December 2007 across the nation, which has affected regional population growth, in particular, migration, in the near term. The assumption of existing population projections quickly becomes questionable due to the economic uncertainty in the near term. The traditional long term perspective, which might not reflect the on-going economic trends and frequently updated short term economic forecasts, might result in a serious bias of short term and long term population projections.

A number of important sources of population projection error have been identified. They include: imperfect data on the demographic past and present, a limited understanding of demographic processes, and major events which are largely unpredictable (Wilson, 2009). The study identifies several sources of projection error observed during the recent population projection update process for development of the 2012-2035 Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS): 1) the unstable/uncertain nature of the key economic-demographic assumptions, in particular, unemployment rate and migration in the short term framework; 2) the currency and reasonableness of population projections (and assumptions) by the US Census Bureau and California Department of Finance (DOF); 3) a lack of relevant statistical data in a timely manner; and 4) the significant gap in population estimates between the US Census Bureau and CA DOF. The study presents two approaches for addressing projection uncertainty: an expert panel and economic growth scenarios. The study suggests a few ways of addressing the projections' uncertainty. They include: 1) more frequent update of the short term and long term population projections and related assumptions; 2) development of a range of population projections; 3) development of regional population projections reflecting regional demographic

characteristics and trends; and 4) development of an employment forecast as a reference. The study identifies the future challenges in a regional planning framework. They are 1) the need to meet diverse federal and state planning and regulatory requirements (e.g., currency, consistency) for developing regional population projections; 2) consideration of the economic outlook, and 3) the need to promote inter-agency collaboration, public involvement and participation, while improving the accuracy of population projections.

II. ECONOMIC RECESSION AND REGIONAL POPULATION PROJECTION

In February 2009, SCAG officially launched its growth forecasting process. At that time, the SCAG region had been heavily hit by the national economic recession (probably the greatest recession since the Great Depression!), which officially started in late 2007. One of the key causes of the recession was sub-prime loan losses and their impact on other risky loans and over-inflated asset prices (http://en.wikipedia.org/wiki/Late_2000s_recession). The SCAG region's foreclosure data during the period of 2007-2008 reflects the impact of the sub-prime loan losses (DataQuick, 2008). The number of foreclosed units increased from 3,779 units in July 2007 to 12,734 units in August 2008, an increase of 237%. The recent economic recession was so severe that it created uncertainty about the near term economic outlook (size of job loss, affected jobs by sector, labor force adjustment, unemployment rate, etc) and its related population impact.

In most metropolitan regions, the long term regional transportation plan is usually updated every three or four years as required by federal law. The regularly updated regional plan usually reflects current and updated planning indicators. Population projections, as a key indicator of future travel demand, are also revised upward or downward according to recent trends or updated expectation of future population growth.

When a metropolitan region is required to update its population projections during an economic recession, it immediately faces a few issues and challenges in moving forward with the population projections process. First, there is lack of timely information of relevant historical population trends, including components of growth (e.g., births, deaths, and migration). In particular, information of the regional birth rate, death rate, or migration rate by demographic characteristics is not available in a timely manner. The mid-year county population estimates and components of population change are often not available due to the processing time of administrative records from 6 months to 11 months, and are updated on an annual basis. The update of this demographic information is based on administrative records of 17 state and federal departments and agencies (CA DOF, 2009). (<http://www.dof.ca.gov/research/demographic/reports/estimates/e-2/2000-09/>). Due to the delay of the data availability, it is possible to miss significant demographic changes that occur during turbulent economic conditions.

Second, economic-demographic behaviors (e.g., unemployment rate, labor force participation rate, multiple jobholding rate) might be out of the normal range in the short term framework

(Campbell, 2008). In particular, the unemployment rate in an economic recession is extremely high and the population projection model should be able to reflect its impact on migration in the short term projection.

Third, there is a significant gap in population estimates between the US Census Bureau and CA DOF (Wheaton, 2009). The Census Bureau's July 2008 estimate for the SCAG region was 17,950,391, while CA DOF's estimate of population was 18,648,406. The Census Bureau's estimate of population is 698,015 persons or 3.9% lower than that of CA DOF. As expected, the major reason for the discrepancy is the estimation of domestic migration. Both agencies use different data bases to estimate domestic migration. The US Census Bureau mainly uses federal tax returns for tax filers to measure migration, while CA DOF mainly uses licensed driver's address change. The size of the difference varies by county. Los Angeles County (485,388) showed the most significant numerical difference in the population estimate between US Census Bureau and CA DOF. Other counties also showed a numerical difference: Orange (114,997), San Bernardino (45,367), Ventura (32,605), Imperial (13,848), Riverside (5,812). In terms of the percent change, Imperial County showed the most significant difference (8.4%). Other counties' percent change is as follows: Los Angeles (4.9%), Ventura (4.1%), Orange (3.8%), San Bernardino (2.3%) and Riverside (0.3%).

Fourth, the existing population projections and related demographic assumptions by the US Census Bureau (2008) or CA DOF (2007) could be outdated and should be carefully reviewed for their currency and reasonableness. For example, the US Census Bureau's international migration rates were developed using historical time series information. As with past projections, the international migration assumptions forecast for this series are not constrained to any current or proposed policy or administratively determined immigration levels. (US Census Bureau, 2008)(<http://www.census.gov/population/www/projections/methodstement.html>). Total annual average of net international immigration is projected to be 1,338,400 (2010-15), 1,434,400 (2015-20), 1,530,200 (2020-25), 1,626,000 (2025-30) and 1,721,600 (2030-35). The projected immigration is much higher than that of the recent historical trends (945,000 per year). As of writing this paper, the US Census Bureau (2009) released supplementary population projections with alternative net international migration assumptions.

III. UNCERTAINTY IN REGIONAL ECONOMIC AND POPULATION PROJECTIONS AND EXPERT OPINION

In a rapidly changing and volatile economic environment, the usual economic and population projection models do not produce accurate projections. This is particularly true of the short term projections due to the unstable nature of the economic and demographic assumptions. The average approach (e.g., average of the newly available economic or demographic projections) could be a preferred approach for updating the new short term economic and demographic projections (Smith et al, 2001). Timely developed private sources of the near term or long term

economic and demographic projections are available with a cost, although the demographic projections tend to rely on the most recent series of projections by the U.S. Census Bureau or the state statistical agency. The collective expert opinion could be a useful reference to reduce the short term and long term projection error. The following is a brief summary of the expert opinion on critical factors and key economic and demographic assumptions collected through three panels of experts meetings between 2009 and 2011.

1. The Panel of Experts Meeting (2009)

A first panel of experts meeting was held on May 15, 2009. The panel was composed of fifteen experts in the field of regional and national economics and demography. These experts have developed numerous economic or demographic forecasts or the agencies that they work for have produced economic or demographic forecasts. They represented a variety of public or private organizations. Nearly 50 percent of the panel members were from universities in California (e.g., University of Southern California, University of California Los Angeles, University of California, Riverside, University of California, Santa Barbara, California State University, Long Beach, California State University, Fullerton). Other panel members come from state or local government agencies (e.g., Los Angeles Economic Development Corporation, South Coast Air Quality Management District, California Department of Finance), private consulting firms (e.g., Regional Economic Models, Inc., Beacon Economics, DB Consulting). Experts were provided with a list of questions regarding assumptions with background information (e.g., historical data and a preliminary range of forecasts by the moderator), a few days before the panel of experts meeting. The survey questions focused on three major aspects of job and population projections: 1) short term economic outlook; 2) long term economic assumptions (e.g., regional share of the national job projections, retirement age of workers, labor force participation rate); and 3) long term demographic assumptions (e.g., fertility rate, life expectancy, and net international immigration). The survey questions included, but were not limited to: 1) How deep and how long will the recession be? How will the recession affect the economy and prospects for housing in 2020?; 2) After the recession ends, will national job growth be equal to, greater than, or less than the U.S. job growth rate from the current U.S. Bureau of Labor Statistics projection?; 3) Will workers retire at an older age in 2020/2035 than now?; 4) How will California's share of U.S. jobs change in the future?; 5) How will the SCAG region's share of California jobs change in the future?; 6) How does the panel evaluate the new Census Bureau U.S. population projections and related assumptions of fertility rates, life expectancy, and international immigration? and 7) Will labor force participation rates continue to increase for older workers?

First, the short term economic outlook is focused on understanding the timing of the bottom of the national and regional economic recession. According to the responses of the experts, the economic recession measured in job losses in the SCAG Region would most likely end in 2010 (2 respondents), 2011 (7 respondents), or 2012 (3 respondents). Once the economy has recovered from the recession, it might take several years for unemployment rates to return to a normal

range (5–8 percent). Five of seven responded that, after the recession ends, regional job growth would be equal to the annual average U.S. job growth rate (1.04 percent between 2006 and 2016) from the current 2007 US BLS job projection. Two respondents said that the regional job growth would be greater than the U.S. job growth rate from the current 2007 US BLS job projection.

Second, the regional share of the national job projections was surveyed through two different but related questions about 1) California’s share of U.S. jobs for 2020 and 2035 and 2) the SCAG region’s share of California jobs for 2020 and 2035. Twelve experts responded to both questions above. The survey results imply that the regional share of the national job projection ranges from 4.3 percent (minimum) to 5.3 percent (maximum) in 2020 and 3.8 percent (minimum) to 5.5 percent (maximum) in 2035. The gap between the minimum and maximum is much bigger in 2035 than in 2020. The median regional share remains constant at 5 percent for both 2020 and 2035, which is 0.2 percent lower than the most current regional share (5.2 percent). The overall survey responses are not optimistic about the SCAG region’s relative economic competitiveness in the national economy, although the survey questions did not directly touch on “the regional share of the national job growth”. The labor force participation rate (retirement) trends in the SCAG region will be consistent with the national projection, and will support the assumption that workers in the region will tend to retire at an older age in the future.

Third, there was no or little concern about the national and regional assumptions of the future fertility rates and life expectancy. The current regional average total fertility rate of 2.1 is assumed to decline slightly to 2.0 and 1.9 in 2020 and 2035, respectively, during the projection period. The regional life expectancy will increase consistent with the national life expectancy’s increase during the projection period. The national immigration assumptions are major concerns of the panel members. The US Census Bureau released one set of long-term population projections for the nation in August 2008. These baseline projections included higher immigration projections, which resulted in an increase in the projected population growth to 2050. The key question is whether SCAG will adjust the current international immigration upward in light of the higher Census Bureau projections. Ten of the thirteen panel members said No to the upward adjustment of the international immigration assumption.

2. The Panel of Experts Meeting (2010)

Two major projections from the US Census Bureau and US Bureau of Labor Statistics (BLS) were released since the previous year’s panel of the experts meeting. In December 2009, the US Census Bureau released alternative sets of population projections with different immigration assumptions. The 2009 national population projections are a supplemental series to the 2008 national population projections released on August 14, 2008, and provide results for differing assumptions of net international migration (<http://www.census.gov/population/www/projections/2009projections.html>). All other methodologies and assumptions of mortality and fertility rates are the same as those used in the 2008 national population projections. The lower

immigration assumption, which looks reasonable in light of the recent trends, results in a lower national population. When compared with the baseline projections released in August 2008, the gap between the low migration alternative and the baseline is 4.5 million (1.3 percent of the baseline population) in 2020 and 9.7 million (2.5 percent of the baseline population) in 2035. In December 2009, BLS released new job projections to 2018. These projections were based on the national population projections released by the US Census Bureau in August 2008. Since there is only a 1.3 percent difference in 2020 population between the low migration alternative and the baseline, the potential impact of the new low immigration alternative on job projections would be negligible. International immigration, in particular, unauthorized immigration shows a rapid decline from 11.8 million in 2007 to 11.6 million in 2008, and to 10.8 million in 2009. The decline in just one year between 2008 and 2009 is 800,000, which would be the likely impact of the recent economic recession.

A second panel of experts meeting was held on May 28, 2010, just one year after the first meeting held in 2009. Panel members, who participated in the first panel of experts meeting, were invited to the second panel of experts meeting. Eleven members attended the meeting to: 1) revisit the potential impact of the economic recession and recovery in the national economy on the regional economy; 2) provide input on the recent trends in immigration and U.S. population growth; and 3) review the recent trends in the region's share of the national jobs.

With those newly available data in mind, the panel members participating in the second panel of experts meeting provided input to SCAG staff. First, the panel thought that job losses in the region would end in 2010 or 2011 in the 2009 meeting. While panel members differed on the size and timing of the recovery, the panel did not think the recession would affect the size of the region in 2020 and 2035. Some panel members thought there could be a lingering impact on unemployment rates, income growth and housing markets.

Second, U.S. population growth affects the pool of people and jobs in the nation. For any given SCAG share of future growth, higher U.S. immigration and population growth will push the SCAG region growth higher and vice versa. U.S. immigration and population growth is likely to be maintained at the lower level for the next 5 to 10 years.

Third, job shares dropped in 2008 and 2009, and state and regional job losses were larger than in the U.S. The majority of panel members supported the downward revisions of the regional shares of the national jobs. We are not sure if these declines in the regional job shares are temporary, based on the sharp decline in construction. There is a possibility that these declines might be a permanent shift because of the result of long term demographic trends toward the aging of population, or because of the lack of the timely development and implementation of economic growth policy and strategy.

3. The Panel of Experts Meeting (2011)

A third panel of experts survey was conducted through email on May 2011. Most of the panel members, who participated in the first and second panel of expert meeting, were requested to answer survey questions on the demographic and economic trends and assumptions. Thirteen members responded to questions on: 1) economic recovery of the nation; 2) immigration assumptions at the national level; 3) the projected region's share of national jobs; 4) household projections. There was an overall consensus on the following few issues: 1) panelists expect the nation to be fully recovered by 2020 from the recession; 2) panelists expect U.S. unemployment to be between 4.5 percent and 6.5 percent; 3) panelists see no need to change the immigration assumptions from last year; 4) while not all panelists gave clear answers, no panelist said the relationship between projected jobs, population and households was not reasonable. When asked whether the SCAG region would see job growth faster than the nation, six of ten respondents said yes, while only two said no. The housing questions are particularly hard for short email answers. The question on whether household projections should be based purely on demographics was not clear to panelists. Some panelists wanted to comment on changing demographics and the implications for housing. Most panelists think demographics are the major determinant in the long run but had some concerns about 2020. Seven of 10 respondents agreed that market conditions would prevent "enough" housing from being built by 2020.

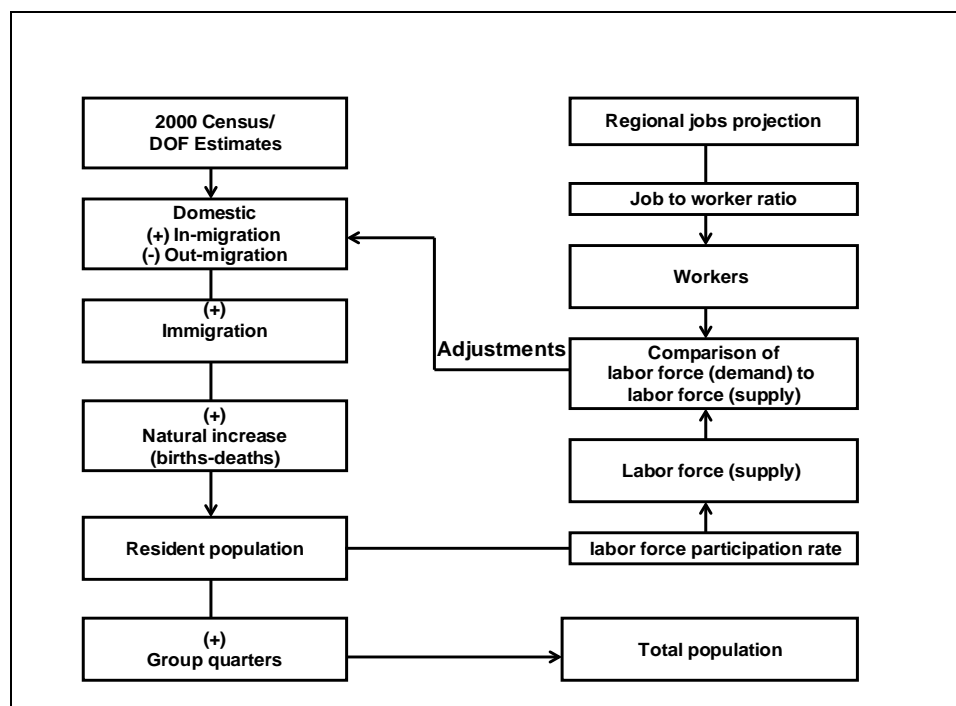
IV. SCENARIOS OF ECONOMIC RECOVERY AND A RANGE OF POPULATION PROJECTIONS

1. Regional Population Projection Model

Population projections are required as a key input to develop federal and state mandated plans and programs. Employment projections are also developed along with population projections because of their importance in developing regional economic strategy and measuring the traffic attractiveness of the destination areas. As a result, future population and employment size should be determined considering the relationship of the two variables. An example is to use population to employment (P/E) ratio to develop population or employment projections. The P/E ratio can be effectively used to link population to employment.

Given the requirements of developing both population and employment projections, SCAG has developed a type of economic-demographic model. The following is a brief description of the SCAG regional population projection model (SCAG, 1998) (See Figure 1).

Figure 1 Population Projection Model in an Economic-Demographic Model



Two major components and five minor components (births, deaths, net international immigration, domestic in-migration, domestic out-migration) account for population growth: natural increase (which is the balance between births and deaths) and net migration (which is the balance between the number of people entering and leaving the region). Net migration is further divided into three components: domestic in-migrants (people moving into the region from the rest of the country), domestic out-migrants (people moving into the rest of the country from the region), and net international immigrants (legal and unauthorized immigrants minus legal and unauthorized international emigrants).

SCAG initially develops regional population projections using cohort-component model. The model computes the population at the future point in time by adding to the existing population the number of group quarters population, births and persons moving into the region during a projection period, and by subtracting the number of deaths and the number of persons moving out of the region. Two region gross migration approaches are used to develop two domestic migration components for its theoretical soundness, reduced data needs, and easy applicability (Isserman, 1993). This process is represented as the demographic balancing equation.

$$P_t = P_0 + B - D + DIM - DOM + NIM$$

where P_t is the population at time t , P_0 is the population at time 0, B is births between times 0 and t , D is deaths between times 0 and t , DIM is domestic in-migrants between times 0 and t , DOM is

domestic out-migrants between times 0 and t, and NIM is net international migrants between times 0 and t.

The fertility, mortality and migration rates are projected in five year intervals for eighteen age groups, two sexes, four mutually exclusive ethnic groups: Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Asian and Others, and Hispanic. The birth rates are also projected by population classes: residents (domestic migrants) and international immigrants. The regional migrations are derived using: 1) three component approach (domestic in-migration, domestic out-migration and net international migration), 2) structural model for domestic migration, extrapolation for international migration, 3) bottom-up model linked to employment assumptions, and 4) two regional gross migration models. The future labor force supply is computed from the population projection mode by multiplying civilian resident population by projected labor force participation rates. This labor force supply is compared to the labor force demand based on the number of jobs by the shift share employment projection model. The labor force demand is derived using three step processes. The first step is to develop independent job projections using diverse economic models, including export-base models, input-output models, or shift-share techniques (Smith et al, 2001). The second step is to convert jobs into workers using the worker to job ratio. The application of the worker to job ratio is intended to reflect the proportion of workers holding two jobs or more. The third step is to convert workers into labor force demand using the ideal implied unemployment rate. If any imbalance occurs between labor force demand and labor force supply, it is corrected by adjusting the migration assumptions of the population projection model. This kind of equilibrium model is relatively less costly and easy to implement (George et al, 2004). The adjustment of the migration assumption is translated into total population changes using the established conversion ratio.

2. Economic Recovery Scenario

This study develops three alternative scenarios of economic recovery in light of employment growth with updated 2010 employment estimates for demonstration purposes (See a Set of S10 Scenarios in Table 1). First, S10-1 employment projections are based on the annual employment growth rate (2010-2035) from the 2009 regional employment projections (S09) released in August 2009. The employment growth pattern (e.g., the annual growth rate between 2010 and 2035) remains the same as the 2009 employment projections (S09). According to this economic recovery scenario, the loss of 250,000 jobs between 2009-2010 will not be recovered during the projection period (2010-2035). Second, S10-2 employment projections are based on the assumption that the economic recovery occurs in 2016, then maintains the annual growth rate (2016-2035) of the 2009 regional employment projections (S09). The loss of 250,000 jobs between 2009-2010 will not be recovered until 2016, when the economic recovery is completed. Third, S10-3 employment projections are based on the assumption that the economic recovery occurs in 2021, then maintains the annual growth rate (2021-2035) of the 2009 regional

employment projections (S09). The loss of 250,000 jobs between 2009-2010 will not be recovered until 2021, when the economic recovery is completed.

The resulting employment projections of the three sets of three different economic recovery range from 7.8 million to 8.5 million in 2015, from 8.2 million to 9.2 million in 2020, and from 9.1 million to 10.4 million in 2035. Focusing on the base case of three alternative employment projections, each of the three base case scenarios shows a differing growth rate for the three different projection periods: 2010-2015, 2015-2020, and 2020-2035. Three base case scenarios show an overall declining growth rate from the early projection period (2010-2015) to the late projection period (2020-2035). The S10-1 base case scenario (consistent with the growth pattern of S09 between 2010 and 2035) shows an annual growth rate of 2.0% (2010-2015), 1.3% (2015-2020), and 0.8% (2020-2035). The S10-2 base case scenario (complete economic recovery in 2016) shows an annual growth rate of 2.7% (2010-2015), 1.4% (2015-2020), and 0.8% (2020-2035). Although the S10-2 base case scenario shows a faster annual growth between 2010 and 2015 than the S10-1 base case scenario, the two base case scenarios' growth pattern of 2015-2020 and 2020-2035 looks similar. S10-2 base case scenario's annual growth of 2.7 percent for 2010-2015 is highest among the three alternative economic recovery and employment projections. The S10-3 base case scenario (complete economic recovery in 2021) shows an annual growth rate of 2.0% (2010-2015), 1.3% (2015-2020), and 1.1% (2020-2035). The growth pattern of the next five years is similar to that of S10-1, but the growth rate of 2020-2035 is higher than both S10-1 and S10-2. The S10-3 base case scenario looks optimistic in light of the potential job impact of the long term population aging. It is not clear whether the loss of 250,000 jobs during the 2009-2010 period will be fully recovered to the previous year's projection level during the projection period. Considering the uncertainty regarding future job trends and the long term population aging, the S10-1 base case scenario and related low and high scenarios might be a plausible range of scenarios among three alternative economic recovery and employment projection scenarios.

Table 1 Three Alternative Scenarios of Economic Recovery and Employment Projections

Scenario		2010	2015	2020	2035	% Change (2010-2015)	% Change (2015-2020)	% Change (2020-2035)
S09	Low	7,458	8,030	8,526	9,423	1.5%	1.2%	0.7%
S09	Base	7,458	8,192	8,735	9,783	2.0%	1.3%	0.8%
S09	High	7,458	8,501	9,172	10,426	2.8%	1.6%	0.9%
S10-1	Low	7,205	7,757	8,237	9,103	1.5%	1.2%	0.7%
S10-1	Base	7,205	7,914	8,439	9,450	2.0%	1.3%	0.8%
S10-1	High	7,205	8,212	8,861	10,072	2.8%	1.6%	0.9%
S10-2	Low	7,205	8,009	8,526	9,423	2.2%	1.3%	0.7%
S10-2	Base	7,205	8,165	8,735	9,783	2.7%	1.4%	0.8%
S10-2	High	7,205	8,478	9,172	10,426	3.5%	1.6%	0.9%
S10-3	Low	7,205	7,757	8,237	9,423	1.5%	1.2%	1.0%
S10-3	Base	7,205	7,914	8,439	9,783	2.0%	1.3%	1.1%
S10-3	High	7,205	8,212	8,861	10,426	2.8%	1.6%	1.2%

3. A Range of Population Projections

With a range of regional job projections given the economic recovery scenario, the cohort component model is used to produce a range of regional population projections. Domestic migration flows between the region and the rest of the nation would be adjusted to achieve the balance between regional population and regional employment. All of the other demographic and economic assumptions on fertility, life expectancy, foreign immigration, labor force participation rate, unemployment rate, and the double jobbing rate remain the same for the three alternative scenarios (See Table 2).

Table 2 Three Alternative Scenarios of Population Projections

Scenario		2010	2015	2020	2035	% Change (2010-2015)	% Change (2015-2020)	% Change (2020-2035)
S09	Low	19,020	19,795	20,684	23,044	0.8%	0.9%	0.8%
S09	Base	19,020	20,124	21,111	23,790	1.2%	1.0%	0.8%
S09	High	19,020	20,748	21,998	25,128	1.8%	1.2%	0.9%
S10-1	Low	18,936	19,150	20,087	22,378	0.2%	1.0%	0.8%
S10-1	Base	18,936	19,559	20,501	23,098	0.7%	1.0%	0.8%
S10-1	High	18,936	20,163	21,361	24,392	1.3%	1.2%	0.9%
S10-2	Low	18,936	19,682	20,680	23,045	0.8%	1.0%	0.8%
S10-2	Base	18,936	20,068	21,108	23,790	1.2%	1.0%	0.8%
S10-2	High	18,936	20,702	21,997	25,128	1.9%	1.3%	0.9%
S10-3	Low	18,936	19,150	20,087	23,051	0.2%	1.0%	1.0%
S10-3	Base	18,936	19,559	20,501	23,796	0.7%	1.0%	1.1%
S10-3	High	18,936	20,163	21,361	25,134	1.3%	1.2%	1.2%

The resulting population projections of three sets of three different economic recovery scenarios range from 19.2 million to 20.7 million in 2015, from 20.1 million to 22 million in 2020, and from 22.4 million to 25.1 million in 2035. Focusing on the base case of three alternative population projections, each of the three base case scenarios shows a differing growth rate for three different projection periods: 2010-2015, 2015-2020, and 2020-2035. In contrast to employment projection trends, three base case scenarios of population projections do not show an overall declining growth rate from the early projection period (2010-2015) to the late projection period (2020-2035). They show a completely different growth pattern. The S10-1 base case scenario (consistent with the growth pattern of S09 between 2010 and 2035) shows an annual growth rate of 0.7% (2010-2015), 1.0% (2015-2020), and 0.8% (2020-2035). The population growth is restrained due to the immediate impact of the economic recession and economic recovery. The regional implied unemployment rate improves from 12% in 2010 to 8% in 2015, and residents of the region would be able to take advantage of the job opportunities, while the domestic in-migrants might not be needed to accommodate the job growth.

As a result, there is no pressure for population growth relative to job growth during 2010-2015. The annual growth of approximately 120,000 people would be the lowest in recent decades. The S10-2 base case scenario (complete economic recovery in 2016) shows an annual growth rate of

1.2% (2010-2015), 1.0% (2015-2020), and 0.8% (2020-2035). The S10-2 base case scenario shows a fast annual growth between 2010 and 2015 than the S10-1 base case scenario, while the two base case scenarios' growth pattern of 2015-2020 and 2020-2035 looks similar. S10-2 base case scenario's annual growth of 1.2 percent for 2010-2015 is highest among the three alternative population projections. The relatively fast economic recovery and job growth pattern relative to other alternative population projections pushed the population growth in 2010-2015 upward. The annual growth of approximately 220,000 people for 2010-2015 would be a little higher than in recent years, but much lower than that of the early 2000s, when approximately 300,000 people were added annually to the region between 2000 and 2005. The S10-3 base case scenario (complete economic recovery in 2021) shows an annual growth rate of 0.7% (2010-2015), 1.0% (2015-2020), and 1.1% (2020-2035). The growth pattern of the next five years is similar to that of S10-1, but the growth rate of 2020-2035 is higher than both S10-1 and S10-2. The S10-3 base case scenario reflects the consistent economic growth from the longer term perspective.

The S10-1 base case scenario and related low and high scenarios is a plausible range of scenarios among three alternative population projections as long as caution is taken. In particular, the population growth of the period 2010-2015 is too low in light of the historical pattern, and could underestimate the inertia of the regional population growth due to the nature of the economic-demographic modeling practice. In the real world, a small change in the existing regional demographic assumptions such as reduction of unemployment rate from 8% to 6%-7% could allow for more population growth. The DOF population projections released in 2007 are comparable to the S10-1 high scenario. The DOF population projections are based on the traditional cohort-component model and tend to reflect the recent demographic trends with no or little consideration of employment projections. As shown in Table 2, we might need the high scenario of employment growth: 8.2 million jobs in 2015, 8.9 million jobs in 2020, and 10.1 million jobs in 2035, to accommodate the DOF population projections.

V. DISCUSSION AND CONCLUSIONS

While the economic recession officially began in December 2007 and has been getting more serious with no clear sign of economic recovery in terms of jobs, the SCAG region has been hit hard with loss of jobs and high unemployment rate. In February 2009, SCAG, as the largest MPO in the nation, began updating the existing population projections for diverse regional planning activities including the Regional Transportation Plan (RTP), Regional Housing Needs Assessment (RHNA), Sustainable Communities Strategy (SCS), etc.

Unlike the routine update of the regional population projections in the context of the usual economic or business environment, the serious economic recession increased the uncertainty of the immediate future economic outlook for job growth, unemployment rate, and population growth through migration. What would be the best practice of developing reasonable regional population projections? The uncertain and gloomy economic outlook will influence the population

projections primarily through domestic migration and partly through international migration. There are several challenges with the proposed regional approach to population projections. The first major challenge is to develop reasonable short term economic prospects for job growth, unemployment rate, and population growth. A range of the short term economic outlooks (e.g., job growth rate, unemployment rate) could be identified from a list of economic forecasts, a panel of expert meeting, and expert interview.

Second, there is a need to reassess the traditional top down approach and to promote the bottom up approach. In a usual projection environment, diverse demographic estimates, assumptions, and projections from the federal and state governments are widely used as a reference or a guide. They are of limited help in such an uncertain economic environment. The recent demographic data plays a limited role in understanding the immediate future status through the rapidly changing economic environment due to the unavailability of a timely data base. Currently available demographic assumptions and projections by the US Census Bureau, US Bureau of Labor Statistics, and CA DOF are also of limited use because they are already outdated or overestimated, and probably need to be updated. Rather than relying on authoritative federal and state data sources, regional planning agencies may need to be selective in using them and creative in interpreting the forces underlying the current economic recession and demographic changes. The regionally based bottom up demographic assumptions and projections could be the better practice because they reflect the more realistic trend and short term outlook than the pure top down approach based demographic assumptions and projections.

The successful example of using the bottom up approach is CA DOF's current practice of developing migration assumptions. California Department of Finance Demographic Research Unit (DOF) is designated as the single official source of demographic data for state planning and budgeting (<http://www.dof.ca.gov/research/>). The DOF develops population projections for the State and the counties for a 50 year projection horizon. The population projections are developed using cohort-component model and are available for age, sex, and race/ethnic groups. It is worth noting that the DOF depends on local input to develop county level net migration assumptions. Local input is usually provided by local or regional planners or demographers of local jurisdictions, COGs and MPOs in California. The local input process significantly reduced the gap in the long term population projections. For example, the most recent DOF population projections (July 2007) for the SCAG region were 24.3 million in 2035, while the SCAG regional population projections (July 2007) were 24 million in 2035. The difference in regional population projections was only 277,000 or 1.2%.

The study identifies the future challenges in a regional planning framework. First, SCAG is required to meet diverse federal and state planning and regulatory requirements (e.g., currency, consistency) for developing reasonable regional population projections. According to federal transportation and air quality laws, SCAG is required to use the most "current" planning

assumptions to develop the regional transportation plan. The currency requirement is not specifically defined in the law, but can be applied to the whole planning process and interpreted broadly. When this currency requirement is applied to the population projection process, demographic assumptions used for population projections should readily reflect the recent trend and the plausible growth trajectory. The reasonable and realistic demographic assumptions are easily found to be true or false within a short time period.

In addition to the currency requirement, the “consistency” requirement is also an important consideration for developing demographic assumptions in a regional planning framework. The first example is California Senate Bill 375 enacted in 2008. SB 375 is an implementation law of AB 32 – the Global Warming Solution Act of 2006. SB 375 integrates three key planning elements (SCS, RTP, and RHNA) to achieve regional Greenhouse Gas emissions target, and one set of demographic assumptions and population projections are required to consistently serve the above planning activities. The long-term transportation plan (planning horizon of minimum 20 years) and the short term housing needs allocation plan (8 year planning horizon) are linked to each other through SCS and prepared on the “same” planning cycle (every four years). Once these two different temporal perspectives (e.g., short term and long term) can be discussed together on the same planning cycle, the demographic assumptions and population projections can be dealt with in a more integrated way. The second example is a potential reconciliation process of population projections during the RHNA process. The reconciliation occurs if there is a significant difference in population projections between SCAG and DOF during the RHNA process. For example, if the total regional population growth of both agencies for the planning period (8.5 years) is within a range of 3 percent, SCAG’s population projections for RTP shall be the basis for calculating projected housing need in the region. If the total regional population growth of both agencies for the planning period is greater than 3 percent, SCAG will further discuss an appropriate methodology with Department of Housing and Community Development. If there is still no agreement between SCAG and HCD, then HCD bases the RHNA on the DOF projections, but may modify the projections as a result of its discussions with SCAG.

Second, SCAG’s regional population projections are found reasonable and accurate and are within an acceptable range of error. It is likely that the regular update of the regional population projections every three or four years might have helped in avoiding the further enlargement of the error. The population projection does not usually become an issue during normal economic conditions. In the economic recession, local communities are financially affected by a lack of building permits and housing construction and loss of retail and service sector jobs. In particular, the serious setback of construction is easily translated into lower population projections in terms of both the short term and long term perspectives. Economic aspects should be naturally embedded in the discussion of components of population growth, and should be used to develop a coherent growth story for local jurisdictions, subregions, and the region.

Third, SCAG should promote public involvement and participation during the population projection process, while maintaining the accuracy of the regional population projections. Public involvement and participation is vital to the regional planning process. Participation by local jurisdictions, the general public, the business community, community groups, and other governmental agencies is encouraged during the forecast and planning process. Public participation should be a proactive and meaningful public involvement process, including access to complete technical and policy information, timely notices, full access to key decisions, and support for early and continuing involvement in regional population projection development.

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Cooperative Planning between Local Governments: The Case of Daegu Metropolitan Planning

I. INTRODUCTION

Space planning in Korea was conducted under three framework plans prior to 2003: comprehensive plans for construction in the national territory by the 'Act on Comprehensive Plans for Construction in the National Territory', town planning by the 'Town Planning and Zoning Act', and utilization and management plans of the national territory by the 'Act on the Utilization and Management of the National Territory'. Comprehensive plans for construction in the national territory and town planning target the entire territory and urban area respectively, while utilization and management plans of the national territory target rural areas, aiming at efficient land use and the establishment of fair land transaction order.

These three frameworks have since been narrowed down to two. One is the comprehensive national territorial plans based on the 'Framework Act on the National Land' which was the amendment of the 'Act on Comprehensive Plans for Construction in the National Territory'. The other is the 'Act on Planning and Utilization of the National Territory'(later changed into the 'National Land Planning Act') which is an integrated act of the 'Town Planning and Zoning Act' and the 'Act on the Utilization and Management of the National Territory' to work out city plans combining urban/rural area and metropolitan area planning for large cities and smaller towns around them.

Metropolitan area planning focuses on devising plans including large cities and around Sis/Guns as well as metropolitan cities. The background and object of the planning in its initial stages was aimed to mediate rationally what was judged not to be coped actively with changes in conditions such as deteriorating settlement conditions of residents by development restriction zone¹ through the tough regulation of conduct by government. Currently metropolitan area planning has several fundamental limits in terms of balanced regional development: planning for each administrative district against actual life zones, planning focused on large cities, and establishing simple functional linkages between adjacent regions.

¹ Government established a basis for the designation of development restriction zones by amending the Town Planning and Zoning Act in 1971 to prevent the flat spread of cities and to conserve the natural environment around cities as many urban problems have occurred due to the urbanization tendency of the population in compliance with the growth-first policy after the 1960s. Starting from Seoul on 30 July of the same year, development restriction zones were designated in 14 city regions (Busan, Daegu, Chuncheon, Cheongju, Daejeon, Ulsan, Masan, Jinhae, Chungmu, Jeonju, Gwangju, Jeju) through eight times by April 18, 1977. The legal bases for those designations were the Act on Planning and Utilization of the National Territory and the Act on Special Measures for Designation and Management of Development Restriction Zone.

Therefore, the actual condition of management, limits, prospects and tasks of metropolitan area planning in Daegu area as a collaborative planning between local governments will be the primary focus of this study. First, this study investigates the significance, legal basis, main content, and limits of metropolitan area planning established through cooperation between local governments. Second, the content, actual condition of management, and implications of actual metropolitan area planning are introduced, using metropolitan area planning in Daegu area as an example. Finally, prospects and tasks are suggested based on limits and implications.

II. OVERVIEW: KOREA'S METROPOLITAN PLANNING

1. The Significance of Metropolitan Planning

a. Concept

Metropolitan Planning refers to the planning system designed to deal with outward expansion and conurbation of each Si/Gun (city/county) area and function by combining the relevant regions into a single planning zone for more efficient management. The purpose of this system is to prevent chaotic expansion of major cities and to improve the investment efficiency through economies of scale, employing such means as ensuring reasonable arrangement of metropolitan infrastructure through cooperation between local governments.

The Metropolitan Planning System was introduced through the following course of events. The 1970's witnessed rapid urbanization, co-urbanization and expansion which brought the wave of urban development to the areas surrounding each major city. This change bound the city center and the surrounding regions into the same living zone, which meant that it was no longer possible to solve the metropolitan problems with an urban planning focusing on a single city. There emerged a dire need for a solution for metropolitan problems caused by the discrepancy between actual living zones and administrative district boundaries. This led to the introduction of the Metropolitan Planning System into the revised 'Urban Planning Act' in 1991. However, this version of Metropolitan Planning focused on building and managing metropolitan facilities, and did not involve proposing future directions for urban development. To address this problem, the 'National Land Planning and Utilization Act' (hereinafter referred to as the 'Land Planning Act') was introduced along with the revision of the 'Urban Planning Act'. This new act set forth the structuring of city spaces, distribution of functions and arrangement of metropolitan facilities through cooperation between local governments.

The mutual cooperation between local governments as defined under the current Metropolitan Planning System requires two or more Special City, Metropolitan Cities, Cities or Counties (hereinafter collectively referred to as 'Si/Gun') that are adjacent to one another. The administrative unit thus created is called a 'Metropolitan Planning Zone'. Metropolitan Planning Zone refers to two or more administrative districts – or any parts thereof - bound into a single planning zone in order to connect their spatial structures and functions, preserve their

environment and maintain the relevant metropolitan facilities² in a systematic fashion. Its ultimate reason is to propose the direction for long-term development of the Area, prevent chaotic expansion of urban districts and seek appropriate an level of growth through a mutual connection of the functions of the relevant Si/Gun.

b. Necessity

Since many of the cities were designated as Si starting from the 1980's, the Si's and rural areas began to be separated with ever increasing speed in terms of basic urban planning. In 1995, the emergence of cities combining urban/rural forms³ announced the arrival of a new environment for basic urban planning.

Under this new environment, the basic urban planning began to cover a larger area, reaching into the newly included rural areas. The purpose of this expansion was to overcome the various problems of the time, such as the inappropriate installation of urban facilities, a discrepancy between living zones and administrative districts and difficulties in performing metropolitan administrative functions between the adjacent Si/Gun. This change, however, turned out to be flawed in its implementation, as there was no means to execute the contents of the Basic Plan regarding non-urban regions. This led to the introduction of the Metropolitan Planning System designed to establish and execute metropolitan plans for two or more Special City, Metropolitan Cities, Cities or Counties that are adjacent to one another.

The necessity of Metropolitan Planning is as follows. First, while today's urban spaces are divided into administrative structures, they often share deep economic/social connections and certain land uses are performed across their boundaries. In addition, recent cases of co-urbanization have led to the expansion of city areas as well as living zones. This trend warrants designation of 'Metropolitan Planning Zones' and the establishment of a unified plan for the relevant area. Second, metropolitan facilities for transportation, communication, tourism and leisure need to be planned in a metropolitan/comprehensive way in terms of their location and scale. Through such planning, it is possible to foster cooperation between local governments, prevent the chaotic installation of metropolitan facilities and promote the efficient use of local resources. The third reason is economies of scale. Limited land, resources and capital inadvertently lead to a small developmental outcome. Integrative development planning on a large scale, rather than individual development planning on a small scale, will be able to maximize its developmental outcome.

² This refers to those infrastructures in need of a wide-area maintenance system. This category consists of the facilities covering two or more districts and other facilities jointly used by two or more districts.

³ Cities combining urban/rural forms emerged as result of enactment of the 'Act on Establishment of Cities Combining Urban/rural Forms' in 1994.

It is therefore necessary to designate Metropolitan Planning Zones and to establish comprehensive / integrative development plans within the regions, and the Metropolitan Planning System offers that function.

c. Establishment Procedure

Metropolitan Plans related to national planning are established by the Minister of Land, Transport and Maritime Affairs (hereinafter referred to as the ‘Minister’), while Metropolitan City mayors, Do governors (hereinafter referred to as Mayor/Do Governor) or heads of Si/Gun are responsible for establishing other Metropolitan Plans. The relevant persons with authority to establish each type of Metropolitan Plan should hold a public hearing for the (proposed) Metropolitan Plan to hear the opinions of local residents or relevant specialists.

In case any of the proposed opinions is deemed reasonable, this opinion is incorporated into the Metropolitan Plan. The persons with authority to establish the Plan hear the opinions from the relevant local governments and consults with the local City Planning Commission before requesting approval from the Ministry of Land, Transport and Maritime Affairs (hereinafter referred to as the ‘Ministry’). Upon receiving the request, the Minister gives the approval after reviewing the procedure, consulting the chiefs of relevant central government agencies and having the plan reviewed by the Central City Planning Commission.

Table 1 Classification of Public Agencies to be Relocated by Region

Persons with Authority	Requirements
Heads of the relevant Do, Si/Gun	<ul style="list-style-type: none"> ◦ The Metropolitan Planning Zone belongs to the region of the same Do(province). ◦ For Do governors, when there is request from heads of Si/Gun in cases otherwise deemed necessary
Mayors/Do Governors of the relevant metropolitan cities and Do’s	<ul style="list-style-type: none"> ◦ The Metropolitan Planning Zone covers regions of two or more Si/Gun.
Governor of the relevant Do	<ul style="list-style-type: none"> ◦ There is no request for plan approval from the heads of relevant Si/Gun after 3 years from the date of Metropolitan Planning Zone designation ◦ The heads of the relevant Si/Gun requests after coordination.
Heads of the relevant Do, Si/Gun Minister of Land, Transport and Maritime Affairs	<ul style="list-style-type: none"> ◦ Metropolitan Planning related to a national plan. ◦ There is no request for plan approval from the relevant governors after 3 years from the date of Metropolitan Planning Zone designation ◦ The relevant governor requests after consultation, or the necessity is deemed reasonable on other grounds.

d. Establishment Procedure

Metropolitan Planning can be characterized as follows: First, in terms of spatial range, it covers areas spanning several administrative districts of local governments as its planning range. Unlike city-level individual plans, Metropolitan Plans can be characterized as area-wide plans involving multiple administrative districts, designed to coordinate each individual urban plan in a metropolitan perspective. In light of this, each individual basic urban plan must be consistent with Metropolitan Plans, and the latter supersedes the former in case of inconsistency. Second, Metropolitan Plans are the highest-level plans that provide guidance for lower-level plans. For example, Urban Management Plans should be based on basic urban plans or Metropolitan Plans. Third, as of February 2002, the 20-year restriction on the planning period was lifted, making it possible to change the planning period around 20 years. This change was introduced due to the need to constantly review and revise the Plan in accordance with its monitored progress. Metropolitan Plans can be revised, however, if there is a need to revise the plan in general due to drastic circumstantial changes within the planning zone. In addition, in case a Metropolitan Plan replaces the relevant Urban Basic Plan, the Metropolitan Plan may be reviewed for its viability every 5 years for revision. This means that the planning period of Metropolitan Plans is given flexibility to deal with ever-changeable future situations, which reflects the Plans' status as the highest-level plan in urban/Regional Planning.

Metropolitan Plans have the following functions. First, they are strategic plans to identify major policy tasks within the planning zone, set the strategic objectives to complete the tasks and propose relevant action plans, as opposed to proposing long-term future goals. Second, as policy plans, they propose action plans and programs to achieve their strategic objectives. Third, items set forth by Metropolitan Plans are executed as a part of its sub-plans such as Urban Basic Plans and Urban Management Plans, which means that the Metropolitan Plans function as guidelines for those sub-plans. The sub-plans, however, are not directly bound by the Metropolitan Plans. Instead, the Plans provide guidelines to be considered in establishing the sub-plans such as Urban Basic Plans and Urban Management Plans and authorizing individual development projects.

2. Legal Grounds

Metropolitan Planning is regulated by laws related to land use planning. The laws related to land use planning can be classified into the following categories in terms of their targets, scope and characteristics: 'Framework Act on the National Land'(hereinafter referred to as the 'National Land Act'), 'Land Planning Act' and 'other relevant acts'. Metropolitan Planning is founded on the 'Land Planning Act'.

The 'National Land Act' contains basic provisions for the establishment/implementation of plans and policies regarding national lands. Its purpose is to contribute to sound land development and the people's welfare. The Act is related to the following plans: Comprehensive Plan for national

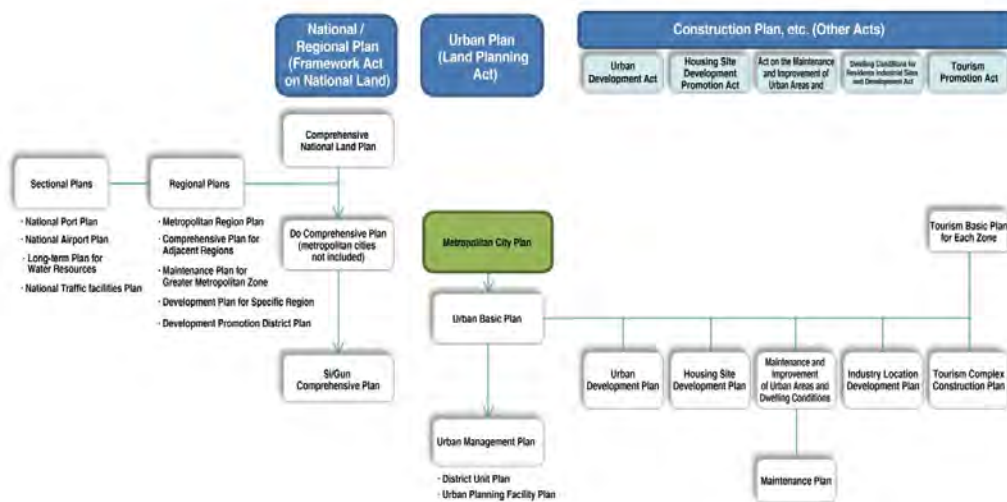
lands, Do Comprehensive Plans, Si/Gun Comprehensive Plans, Regional Plan and plans for each section.

The 'Land Planning Act' regulates the establishment and execution of plans for land use/development and preservation. Its purpose is to promote public welfare and improve the quality of people's lives. This Act is related to Metropolitan Plans, Urban Basic Plans and Urban Management Plans.⁴

'Other relevant acts' regulate the establishment of specific plans regarding each specialized project to be implemented in each region or city. Its purpose is to contribute to local development and people's welfare. These acts are related to plans for each project section - such as environment, tourism, industry, transport and housing - which target certain a region or city, as well as specific projects such as urban development projects and housing site development projects. Such plans and projects limit themselves to their own section, instead of covering various sections in a comprehensive way.

Of the plans mentioned above, the Metropolitan Plans are placed at the highest level within the urban planning system based on the 'Land Planning Act'. These Plans propose the long-term direction for two or more Si/Gun. The Urban Basic Plans are established to propose the vision for the city's future based on the higher-level plans. Finally, Urban Management Plans are established to implement the directions proposed at each level of plans into the urban space. The Metropolitan Planning System was established along with revision of the 'Urban Planning Act' in 1991. Before the revision, Metropolitan Plans could be established only for two or more adjacent

Figure 1 Location of Metropolitan Planning within National Land Space Planning System



⁴ As of April 12th 2012, the plans governed by the Land Planning Act have been revised to Metropolitan Plan, Do, Si/Gun Basic Plan and Do, Si/Gun Management Plan.

urban planning zones, limiting the plans' ability to efficiently deal with problems posed by metropolitan cities and other regions. This revision was adopted to fix this problem, resulting in the Metropolitan Planning System for more efficient metropolitan plans. After several revisions, the System has come to be based on the 'Land Planning Act' from 2003 to this day.⁵

3. Contents and Limitations of Metropolitan Planning

a. Contents of Metropolitan Planning

A Metropolitan Plan's purpose and its agenda for improvement should be provided through the spatial finalization of Metropolitan Planning Zones and considering their characteristics as well as any circumstantial changes. The standards⁶ for such planning can be summarized as follows.

First, the Plan should provide the visions for the areas and systemized strategies to achieve them, and should be linked to other plans including the comprehensive land plan. Second, the Plan should be established focusing on specific agendas currently discussed within the relevant Metropolitan Planning Zones, such as function sharing between the Special City, Metropolitan

Table 2 Contents of Metropolitan Plans (Establishment Guidance)

Classification	Contents
Purpose and Strategies	-
Status and Characteristics of Metropolitan Planning Zone	-
Structure Design	<ul style="list-style-type: none"> ◦ Circumstantial changes and prospect analysis ◦ Propose major indices ◦ Structure Design: set up development axis(growth axis), transport axis and green axis ◦ Set up living zones
Sectional Plan	◦ Function sharing plan, land use plan, culture & leisure space plan, green Management Plan, environment preservation plan, transport and distribution system, landscape plan and anti-disaster plan
Adjustment of development restriction zones	-
Plan for Execution and Management	-

⁵ In 2003, the 'Comprehensive Act on Land and Construction' was succeeded by 'the National Land Act'. The 'Act on Land Use and Management' and the 'Urban Planning Act' were also unified into 'the Act on Land Planning and Use', which is still in effect today.

⁶ This establishment standard is based on the Executive Ordinance of the Land Planning Act, Article 10 (Establishment Standard for Metropolitan Plans).

Cities and other Si/Gun, prevention of chaotic urban expansion, environment preservation and reasonable facilities arrangements. Third, the Plan should be comprehensive and general enough to ensure flexibility in dealing with any circumstantial changes. Plans focusing on specific sections, however, should be established in detail so that they may provide clear guidelines for other plans such as Urban Basic Plans and Urban Management Plans. Fourth, the Plan should be established fully considering the following factors: natural environments including green axes, ecosystems, forests and landscapes; superior agriculture land and use areas to be preserved. Fifth, sectional Plans should be designed to be linked with each other.

Based on these standards, the spatial structures of the Metropolitan Planning Zone should be designed fully considering such factors as the hierarchy and functions of the relevant cities, development axes, green axes and transport axes. Also, long-term plans need to be established for such sections as land use, transport, environment and green land for leisure and city facilities.

b. Limitations of Metropolitan Planning

Although Metropolitan Plans are placed at the highest level in the urban planning system, it is limited in its ability to cope with interest conflicts between local governments.

First, while the Metropolitan Planning System has paved the way for the plans of Si/Gun to be established with efficiency, the System turned out to be limited in its ability to cope with the conflicts of interest between adjacent local governments. Second, Metropolitan Plans focus on major cities and limits its contents to the functional connection between major cities and the surrounding cities, which renders them insufficient to be called 'Comprehensive Plans' covering metropolitan cities and Dos.⁷ They lack a Comprehensive Planning system based on an association of adjacent metropolitan governments even though there exist sectional plans and Regional Plans focusing on a specific section or region. Third, the System has been proven unsatisfactory in keeping up with the trend of metropolitanization, as the Metropolitan Plans have been established with existing administrative districts as their planning zones. Owing to national plans focusing on growth, the metropolitan zones were treated more as administrative districts in boundary revisions or partial reorganizations based on political/administrative convenience. This has resulted in a discrepancy between Metropolitan Zones and the residents' living zones, and this discrepancy has disrupted service provision by the local governments as well as participation of the local residents. Fourth, there is not a sufficient basis for local governments to establish unified plans. The local governments have difficulty in carrying out their roles because these plans are established based on the governments' needs. The relevant laws have required that the governments may establish joint plans when necessary, but there are no real-world cases of such planning.

⁷ The spatial scope of the plan is limited to the administrative district of each local government. Therefore, two local governments sharing a single living/economic zone have to establish separate plans.

III. CURRENT STATUS OF DAEGU METROPOLITAN PLAN

1. Spatial Characteristics

The total population of Si/Gun covered by Daegu Metropolitan Plan is 3.13 million, and the total covered area is 4,977.4 km². The area managed as a development restriction zone to prevent chaotic urban expansion – one of the key elements of the Metropolitan Planning System - is 518.5 km², which is 10% of the total area.

The Metropolitan Zones have provided the long-term direction for development by preventing chaotic urban expansion through designating development restriction zones around major cities and promoting appropriate growth through establishing functional connections between the cities. Daegu Metropolitan Plan's spatial scope covers Daegu and some other Si/Gun adjacent to it (7 Si/Gun: Gyeongsan-si, Yeongcheon-si, Goryeong-gun, Chilgok-gun, Cheongdo-gun, Seongju-gun, Gunwi-gun) rather than the entire Do of Gyeongsangbuk-do.

Figure 2. Spatial Scope of Daegu Metropolitan Region



Table 3. Overview on Si/Gun Covered by Daegu Metropolitan Plan

Si/Gun	Area of Administrative Districts (km ²)	Area of development restriction zones (km ²)	Population (thousands)
Daegu Metropolitan Zone	4,977.4	518.5	3135
Daegu Metropolitan City	884.1	404.3	2512
Gyeongsan-si	411.8	22.0	243
Yeongcheon-si	919.6	-	108
Chilgok-gun	450.9	72.1	117
Goryeong-gun	384.0	20.1	36
Seongju-gun	616.2	-	47
Cheongdo-gun	696.5	-	46
Gunwi-gun	614.3	-	26

Note : Daegu, Gyeongsangbuk-do, 2020 Daegu Metropolitan Plan have been partly revised. January 2010.

2. General Contents

As discussed above, the Daegu Metropolitan Plan was established with a planning period of 20 years, as the higher-level plan for Daegu Urban Basic Plan. After its establishment in 2005, the

Plan was partially revised in 2010 to adjust to certain circumstantial changes. The year of establishment of the Revised Daegu Metropolitan Plan is 1998, its goal year is 2020 and the planning period is from 2001 to 2020.

Table 4. Basic Objectives and Strategies of Daegu Metropolitan Plan

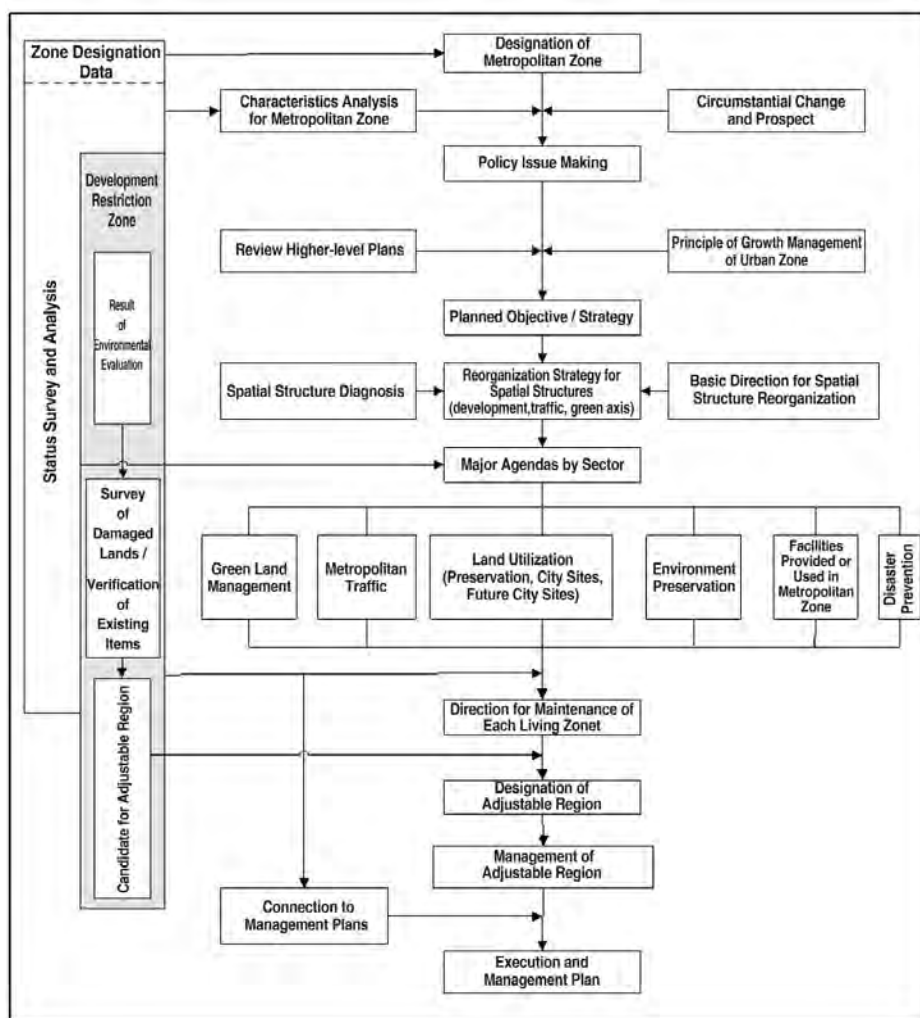
Basic Objective	Action Strategies	
open, international metropolitan region in line with the waves of globalization	renovation/globalization of urban functions	<ul style="list-style-type: none"> ◦ Expand the core management functions and global functions necessary to be the hub-city within the East-Sea Rim Economic Zone ◦ Expand the basis for promoting urban strategic industries including fiber, fashion, oriental medicine, high-tech and convention industries ◦ Build Digital Valleys and Technopolis to foster information technology industry
	Multi-focalization of spatial structures within the Area and development of local hubs	<ul style="list-style-type: none"> ◦ Form multi-focal spatial structure by developing sub-centers and local hubs ◦ Establish the basis for international exchange by building business complexes in the old industry complex sites ◦ Develop regions adjacent to express train and subway stations
	Establishment of an transport system open to domestic areas as well as abroad	<ul style="list-style-type: none"> ◦ Expand and repair international airports, while connecting them with sub-centers. ◦ Build the foundation for comprehensive logistics hubs
eco-friendly and sustainable development	Establishment of energy-saving spatial structure within Metropolitan Planning Zone	<ul style="list-style-type: none"> ◦ Aim for mixed land use and compressed city ◦ Place housing/business/commerce/service functions in adjacent spaces to reduce the volume of traffic demanded by each of them ◦ Vitalize multi-use redevelopment projects within city centers and the adjacent regions
	Preservation and planned development of green lands and waterfronts	<ul style="list-style-type: none"> ◦ Build metropolitan green network while considering accessibility on foot ◦ Establish leisure/entertainment spaces within waterfronts of Geumho River and Nakdong River ◦ Proceed with Nakdong River Canal Project.
	Establishment of transport system centered on public transportation	<ul style="list-style-type: none"> ◦ Build a transport system with a priority on public transportation including metropolitan subway system and light-rail system. ◦ Build an efficient transfer system between public transportation ◦ Establish pedestrian-centered transport environment
co-existential and balanced development within the Metropolitan Planning Zone	Establishment of self-sustaining basis for living in surrounding regions	<ul style="list-style-type: none"> ◦ Induce business/commerce to move to adjacent regions ◦ Establish a self-sustaining city with proximity between work places and housing
	Joint investment and joint use of metropolitan facilities	<ul style="list-style-type: none"> ◦ Provide metropolitan facilities in a fair and efficient way ◦ Set up principles for cost sharing between regions within the Metropolitan Planning Zones ◦ Operate a metropolitan coordination agency for relevant negotiation and coordination
environment-driven economic growth	Establishment of green industry clusters for green growth	<ul style="list-style-type: none"> ◦ Establish green industry clusters for sustainable growth ◦ Focus on research that connects green technologies with policies ◦ Seek active ways to cope with the future through fusion of various fields

The Daegu Metropolitan Plan has all of the major elements of Metropolitan Plans as set forth by the Land Planning Act: zone designation, status and characteristics, objectives and strategies, spatial structure design, and directions for organizing each living zone.

As can be seen on Table 4, the Daegu Metropolitan Plan sets out 4 basic objectives: 1) an open, international metropolitan region in line with the waves of globalization; 2) eco-friendly and sustainable development; 3) co-existential and balanced development within the Metropolitan planning zone and 4) environment-driven economic growth.

Based on the objectives above, the Plan proposes 9 action strategies which include: renovation/globalization of urban functions, formation of an energy-saving spatial structure within the Metropolitan Planning Zone, establishment of a self-sustaining basis for living and establishment of green-industry clusters for green growth.

Figure 3. Metropolitan Plan Establishment Process in Detail (eg: Daegu Metropolitan Plan)



3. A basic objective and strategy

The foundation of the Metropolitan Planning System was laid in January 2000 by the revision of the Urban Planning Act. The revision was followed by enactment of the 'Land Planning Act' (February 4th, 2002, Act No. 6655) in February 2002, which integrates the Land Use and Management Act and the Urban Planning Act.

On this foundation, the Daegu Metropolitan Plan was finalized and announced in January 2005 through a process described in the figure below which included designation of a Metropolitan Region and a proposal of sectional agendas such as green lands management, metropolitan

Table 5. Basic Objectives and Strategies of Daegu Metropolitan Plan

Year/Month	History
2008. Sep. ~ Nov.	Data collection and preliminary research
2009. Jan. ~ Apr.	Opinion gathering from relevant departments
2009. Apr. ~ Jul.	Review of sectional plans, including the land use plans
2009. May ~ Jun.	Preliminary explanation on additional undesignatable area from the Ministry
2009. Jun. ~ Jul.	Coordination between Daegu and Gyeongbuk regarding adjustment of total undesignatable area
2009. Jul.	Prior consultation regarding Revised Metropolitan Plan on such issues as finalization of additional undesignatable area - Consultation with Central Urban Planning Committee: Jul. 9 th (1st), Jul. 16 th (2nd), Jul. 23 rd (3rd)
2009. August 31 st	Public hearing (jointly held by Daegu Metropolitan City and Gyeongsangbuk-do)
2009. Sep.	Opinion hearing and resolution at local assemblies - Daegu(2009. Sep. 25 th), Gyeongbuk(2009. Sep. 8 th)
2009. Oct.	Consultation with local Urban Planning Committees - Daegu(2009. Oct. 16 th), Gyeongbuk(2009. Oct. 16 th)
2009. Nov. 6 th	Authorization request for the Revised Metropolitan Plan (Daegu → the Ministry)
2009. Nov. 10 th	Coordination between central agencies: (the Ministry)
2009. Dec.	Reviewed by the Central Urban Planning Committee - Reviews: Dec. 3 rd (1st), Dec. 10 th (2nd), Dec. 17 th (3rd)
2010. Jan. 8 th	Notification of authorization by the Minister
2010. Jan. 20 th	Finalization and announcement of Revised 2020 Daegu Metropolitan Plan (Daegu Metropolitan City)
2010. Jan. 20 th ~ Mar. 4 th	Revised 2020 Daegu Metropolitan Plan opens to public

transport and land use. In January 2010, a partial revision of the Plan was finalized and announced to account for certain circumstantial changes.⁸

The Plan was established under the supervision of the Minister, Daegu Metropolitan City and Gyeongsangbuk-do, while the planning work was jointly carried out by Korea Research Institute for Human Settlement and Daegu Gyeongbuk Development Institute, with participation from academic circles and research institutes.

The Metropolitan Planning Committee is organized and operated in order to settle any difference of opinions in the course of planning. Pursuant to the relevant provisions set forth in the Land Planning Act, the Plan is finalized through a process consisting of the following elements: public hearing, consultation with heads of Si/Gun, consultation with Si/Do assemblies, advice from local Urban Planning Committees, coordination with relevant departments and finally, authorization from the Minister. The partial revision of the Daegu Metropolitan Plan began in 2008, the public hearing was held in August 2009, and local assemblies of Daegu and Gyeongsangbuk-do passed the revision in September 2009. The revision was reviewed by the Central Urban Planning Committee in December 2009, authorized by the Ministry in 2010, and subsequently finalized and announced.

4. Current Status and Limitations

a. Space-related Aspects

The space covered by the current Daegu Metropolitan Plan does not include the entire Gyeongsangbuk-do region, but is limited to Daegu Metropolitan City and some other adjacent Si/Gun (Gyeongsan-si, Yeongcheon-si, Goryeong-gun, Chilgok-gun, Cheongdo-gun, Seongju-gun, Gunwi-gun). Due to this fact, the Daegu Metropolitan Plan cannot be considered as a true Comprehensive Plan for the entire Daegu and Gyeongsangbuk-do region, and is too limited to be called a plan based on communication and cooperation between local governments.

In addition, Urban Basic Plans (based on 'the Land Planning Act') and sectional plans (based on 'relevant acts') of 23 Si/Gun within Gyeongbuk region are being established separately in each Si/Gun. This illustrates how little communication or cooperation exists between local governments.

⁸ The need for partial revision emerges because we need to actively deal with various circumstantial changes in order to achieve sustainable development. In addition, we need plan revision when re-orienting the Urban Basic Plan, as Metropolitan Plans aim to implement the higher-level plans at local levels. Although Urban Basic Plans are lower-level plans, we need to keep consistency between high/low-level plans by giving feedback from the lower-level plans to Metropolitan Plans.

Table 6. Current Planning Stats: Daegu/Gyeongbuk

Classification	Section	Plan	Governing Law	Establishing Entity		Connection/cooperation between local governments
				Daegu	Gyeongbuk	
National Land	Land Space	Do Comprehensive Plan	National Land Act	-	○	-
	Land Space	City/County Comprehensive Plan	National Land Act	○	○	separate planning
Land Planning	Land Space	Metropolitan Plan	Land Planning Act	○		daegu + 7 adjacent Si/Gun
	Land Space	Urban Basic Plan	Land Planning Act	○	-	separate planning
	Land Space	Urban Management Plan	Land Planning Act	○	-	
Individual Plans	Industry	Green Growth Plan (2009-2013)	Green Growth Act	○	○	separate planning
		Development Plan for Specialized Industry (2013-2015)	Special Act on Balanced Development	○	○	
		5 Year Plan for Local Promotion of Science and Technology (2014)	Special Act on Science Technology Innovation	○	○	
	Traffic	Basic Plan for Road Management	Road and Traffic Act	○	○	
	Landscape	Landscape Plan	Landscape Act	○	○	
	Tourism	Tourism Development Plan(2012-2016)	Tourism Promotion Act	○	○	
	Environment	Plan for Climate Change (2012-2016)	Green Growth Act	○	○	
		Waste Management Plan (2012-2016)	Waste Management Act	○	○	
		Air Improvement Plan (2009-2013)	Air Environment Preservation Act	○	to be established	
		Environment Preservation Plan (2010-2019)	Environment Policy Act	○	○	
		Nature Environment Preservation Plan (2010-2019)	Natural Environment Preservation Act	○	to be established	
		Water Demand Management Plan (2012~2016)	Water Act	○	○	
	Disaster fighting	Comprehensive Plan for Reducing Damages Caused by Flood	Natural Disaster Act	○	-	
		River Basic Plan	River Act	○	○	
	:	:	:	:	:	

Note: As of September 10th, 2012

Furthermore, Si/Gun Comprehensive Plans⁹ of the 7 Si/Gun covered by the Metropolitan Plan must be based on two higher-level plans: Do Comprehensive Plan and Metropolitan Plan. This may lead to considerable confusion regarding overlapping projects between the two plans and their relationship.

b. Contents-related aspects

The need for communication between local governments in connecting local spatial structures (center and peripheral) has been pointed out very often. Urban-rural integration in 1995 has laid the foundation for efficient planning at the city/council level, and the formation of a complementary relationship between the cities and the surrounding rural regions was also discussed. Planning in Korea has been based on separate administrative districts rather than living zones or economic zones. Such planning based on administrative districts is bound to focus on stand-alone functions in each district rather than forming complementary relationships between local regions.

Daegu Metropolitan Plan is also established with Daegu Metropolitan City and 7 Si/Gun within Gyeongsangbuk-do as its planning units, and the Plan's purpose is to promote appropriate growth management by connecting spatial structures and functions of each city. The 7 Si/Gun, however, were not designated with living zones or economic zones in mind. The Plan has been reduced to a means of regulating development restriction zones by focusing on the regulation of development restriction zones, instead of addressing the issue of growth management through communication between local governments to deal with problems such as the unfair distribution of infrastructure and overlapping investment in urban facilities.

c. Administration system-related Aspect

Despite the fact the Metropolitan Planning is jointly carried out by metropolitan cities and their adjacent Si/Gun, inconsistency in the administrative hierarchy may cause the metropolitan cities to lead the planning. The limitation discussed above - focus of regulation on development restriction areas - may function as a factor that turns the Metropolitan Plans into plans established only by metropolitan cities without any need for communication between adjacent local governments.

In addition, Metropolitan Plans are jointly established by governors of the relevant cities/Dos or the Minister. The roles to be played by each establishing entity are also specified as can be seen on Table 7. But the relevant laws state that the heads of each Si/Gun, as well as Mayor/Do

⁹ The Si/Gun Comprehensive Plan is established pursuant to the National Land Act, Article 6 (Definition and Classification of National Land Plans), Paragraph 2, sub-section 3. The Plan aims to propose basic spatial structure and long-term direction for development within its target districts in Special City, metropolitan cities, Si/Gun(counties in metropolitan cities are not included), and is concerned with the district's traffic, environment, safety, industry, communication and information, health, welfare and culture.

governors, can be executing entities. The author would like to point out that this inconsistency may lead to a failure in efficiently settling conflicts and disputes in the case of conflicts of interest between adjacent local governments. Such failure may also derive from the conflict of interest caused by the fact that various entities are usually involved in plan execution and the mayors of

Table 7. Work Division for Plan Execution among Entities

Section	Work Description	Undertaking Entity		
		Government	Daegu/Gyeongbuk	City/Gun
Revision of Metropolitan Planning Zone	Observe the factors that change Metropolitan Planning Zones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Check compatibility between region designation and the plan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Realization of Objectives and Strategies	Residents mindset and acceptance of changes in higher-level plans		<input type="radio"/>	
	Detailed action strategies for achieving basic objectives			<input type="radio"/>
	Connection with Urban Basic Plans and Urban Management Plans		<input type="radio"/>	<input type="radio"/>
	Suitability evaluation and adjustment for various planning indices	<input type="radio"/>	<input type="radio"/>	
Metropolitan Land Use	Specification of the future direction for metropolitan land use and local connection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Specification of land use classification within metropolitan land use plan		<input type="radio"/>	
	Compatibility of lands to be urbanized in accordance with land use instructions		<input type="radio"/>	<input type="radio"/>
	Allowing new developments connected to development direction for Metropolitan Planning Zones and industry allocation strategies		<input type="radio"/>	<input type="radio"/>
	Review and authorization of large-scale housing site development	<input type="radio"/>	<input type="radio"/>	
	Step-by-step use plan for adjustable part of development restriction zone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Leisure Green Land	Establish leisure green land facilities along the green axes			<input type="radio"/>
	Expansion of green lands within living spheres of existing urban areas			<input type="radio"/>
	Establish landscape plans and operation instructions			<input type="radio"/>
Metropolitan Traffic	Review of economic viability of traffic facilities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Decision on location/route of traffic facilities		<input type="radio"/>	<input type="radio"/>
	Distribution and acquisition of resources for traffic facilities expansion	<input type="radio"/>	<input type="radio"/>	
	Installation and management of traffic facilities		<input type="radio"/>	<input type="radio"/>
Metropolitan facilities	Establish location/construction plan for metropolitan facilities		<input type="radio"/>	<input type="radio"/>
	Distribution and acquisition of resources for metropolitan facilities expansion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Environment	Consistent pollution monitoring			<input type="radio"/>
	Installation of environment facilities			<input type="radio"/>
Disaster Prevention	Establish prevention plan for each district			<input type="radio"/>
Living Zones Organization	Organization project for each living zone			<input type="radio"/>
	Measurement of discrepancy between living zones			<input type="radio"/>
Adjustment and Management of development restriction zone	Boundary setting for general adjustable areas		<input type="radio"/>	<input type="radio"/>
	Boundary setting for target cluster settlements		<input type="radio"/>	<input type="radio"/>
	Establish public development plan for adjustable area		<input type="radio"/>	<input type="radio"/>
	Designate settlement districts and establish stage-based maintenance plan			
	Maintenance of infrastructure within settlement districts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Execution and Funding	Organize cooperative organization between local governments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Attract civil/foreign investments		<input type="radio"/>	<input type="radio"/>

each Si/Gun are not allowed to participate during the establishment phase. Daegu Metropolitan Plan was also established through the cooperation between Daegu and 7 adjacent Si/Gun, and there were certain instances of conflict and disputes after its establishment. Furthermore, the Minister has the substantial power to decide on and authorize Metropolitan Plans even when the plans involve small-scale local governments with limited impact on the entire national land use.

Daegu Metropolitan City and 7 adjacent Si/Gun should first coordinate with each other to establish the plan, and then the Minister should finalize and authorize the Plan after consultation/review with each local government in terms of the Plan's impact on national land use. Decisions without consultation/review with local governments, is not compatible with the current trend of increasing empowerment of local governments in urban planning. The current establishment process puts too much restriction on local government functions even when the plan involves small-scale local governments with limited impact on the entire national land use, which may lead to such problems as neglecting those projects direly needed within the relevant regions.

IV. PROSPECTS AND AGENDAS

The time has come for local governments to seek promotion of sustainable local development in line with the trend of de-centralization. This change has resulted in an increasing need to ensure consistency and efficiency in local/urban policy implementation and connect spatial structures (center and periphery) of each region. We also need to consider the plan's practicality and realizability. This will lead to cooperation between local governments, economies of scale to settle the problem of under-populated regions and the movement for sustainable development where the competitive edge at the local level becomes the competitive edge at the national level. This type of development can be promoted through adopting new systems or reorganizing the existing system of Metropolitan Planning. The problems inherent in the system – conflict of interests between adjacent regions, non-existence of Comprehensive Plans covering metropolitan cities and Dos, plan establishment based on administrative districts, and the non-existence of Comprehensive Plans for local governments – are expected to be dealt with one by one in the coming years.

If we want the Metropolitan Plans to provide long-term direction for development of the metropolitan regions and promote sustainable local development and efficient utilization of limited local resources as the highest-level plan within the urban planning system, we need to solve the following problems to overcome the limitations discussed above. First, while urban areas and non-urban areas are managed within the unified planning system under the current system, which is an improvement for the problem posed by separate planning in each urban planning district or administrative district, we need to establish a joint establishment/execution system by forming a complementary partnership between executing entities – public corporations, private corporations and land owners – as well as establishing entities – the

Ministry, cities, Dos. We also need to have well-structured external/internal systems and regulations to settle conflicts and disputes between adjacent regions in an effective way, if we are to expect efficient execution of Metropolitan Plans of which necessity has repeatedly addressed appropriate growth management, internalization of external impacts, economy of scale and prevention of conflicts and disputes between local governments. To achieve this goal, we need a 'Plan Integration (tentative title)' system. Based on this system, we should propose development strategies for the whole Metropolitan Zone rather than administrative districts by establishing plans which view regard the Metropolitan Zone as a separate living zone, and promote unification and efficiency of urban planning on the foundation of shared mindset and shared direction for future development. Second, in terms of work division between the Ministry and local governments, the Si/Gun must be at the center of policies or plans regarding land use/regulation within Metropolitan Planning Zones, unless they are concerned with national projects, so that local situations can be reflected into the plans or policies as much as possible. The Ministry should provide constant support when self-planning or execution is not viable. This type of support will empower small-scale Si/Gun with insufficient planning/execution competence. Third, the Planning System needs to be diversified, by letting the Ministry directly decide on and authorize the plans with national-level impact, and letting the Mayor/DO governors decide on and authorize other types of plans. Fourth, Daegu Metropolitan City and Gyeongsangbuk-do should work as partners in their joint projects, reaching decisions for Metropolitan Plans through a mutual coordination process. The location of unpleasant facilities or profitable facilities must be decided based on the benefit to the entire Metropolitan Planning Zone, rather than to the individual Si/Gun. Cooperative planning between local governments is a great alternative for settling conflicts of interest between local governments, empowering each region through overcoming problems at each local government and the efficient distribution of local resources. Through such planning, we will be able to realize co-existential local development and enhanced local competitiveness.

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Promotion of Daegu Metropolitan Regional Transportation Plan

I. INTRODUCTION

A transportation plan has a variety of roles and types prescribed in current legislations as many as types of transport and policy tools. Official transportation plans of Korea can be classified by spatial range, applicable laws, preparers, target years, facilities and purpose.

There are various transportation plans prescribed in many legislations to realize a variety of traffic policy purposes, including the national major traffic network plan (the master plan with highest priority), the national railway network construction plan aiming construction of railway network covering the entire nation, the metropolitan regional transportation plan to solve transportation issues in a metropolitan area effectively in a metropolitan city level.

As a part of the joint research with Southern California Association of Governments (SCAG) to construct global network, the purpose of this study is to introduce a Daegu metropolitan case in the metropolitan regional transportation plan', which is a long term and comprehensive transportation plan to effectively deal with changes in metropolitan traffic.

This study first reviews the metropolitan transportation plan, presents status of the Daegu metropolitan transportation plan and promotion, forecasts its future and describes the future perspective and its major issues.

II. METROPOLITAN TRANSPORTATION PLAN: OVERVIEW

1. Background and Purpose

The plan has been proposed by the central government to solve metropolitan transportation issues caused by expanding metropolitan living areas. The metropolitan transportation plan, which is an official plan in accordance with the revised 'Special Act on Metropolitan Transportation Management'(2007.1), has been prepared to meet the necessity of systematic and sustainable long term master plan.

The purpose of the plan is to establish a long term and comprehensive transportation plan to deal with changes in metropolitan transportation environment effectively. It also aims to present instructions in preparation of metropolitan transportation implementation plan every 5 year and prepare a systematic approaching tool to solve metropolitan transportation issues in connection between the national and local plan

2. Characteristics and Scope of the Plan

The legal ground of the plan is Article 3 of the 'Special Act on Metropolitan Transportation Management'. According to the law, the minister of Land, Transport and Maritime Affairs establishes a metropolitan transportation plan every 20 year after hearing the minister of each corresponding department and the governor of metropolitan city and province who manages corresponding administrative districts.

The characteristic of plan is to solve metropolitan traffic problems, present the vision and promotion direction of metropolitan transportation project for balanced national development and provide detailed instructions including a metropolitan transportation implementation plan.

The plan is inferior to the national major traffic network plan, which deals with national transportation network, but superior to plans prepared by a local government in accordance with other legislations, such as a basic road maintenance plan or basic urban traffic management plan.

The spatial range of the plan can be divided into five metropolitan areas; the capital region (Seoul Metropolitan City, Incheon Metropolitan City, Gyeonggido), Busan and Ulsan region, Daegu region, Gwangju region and Daejeon region. The Daegu region covers following areas.

III. DAEGU METROPOLITAN TRANSPORTATION SYSTEM: PRESENT CONDITION AND PERSPECTIVES

1. Spatial Structure and Socio-Economic Indices

In the Daegu metropolitan area, Daegu and other neighboring cities are connected functionally as other urban and rural areas do not have sufficient resources for independent growth. Considering the spatial structure, all important functions are concentrated in Daegu and this causes traffic problems in the metropolitan area.

The population of Daegu metropolitan area is 3,175,000, as of 2005. The population of Daegu accounts for 79% of the total population with 2,511,000. The number of cars in Daegu

Figure 1. Spatial Structure of Daegu metropolitan area



metropolitan area is 1,099,000, as of 2005 and has been increased by 4.3% every year during the last five years. The percentage of cars in Daegu is 77.2% with 848,000.

Table 1. Change in Population of Daegu Metropolitan Area(Unit: 1,000, %)

Year	2000	2001	2002	2003	2004	2005	Average Annual Increase Rate
Daegu	2,524	2,525	2,526	2,530	2,525	2,511	-0.10
Other Cities	684	682	679	665	660	663	-0.61
Sub-Total	3,208	3,207	3,205	3,195	3,185	3,175	-0.21

2. Land Use

The whole area of the Daegu metropolitan area is 5,032.7 km², and of these, the area of urban areas is 1,313.6 km² which accounts for 26.1% of the whole area. The farming areas are 2,768.0 km² (55.0% of the whole); and the management areas are 654.3 km²(13% of the whole); and the natural environment conservation areas are 296.9 km²(5.9% of the whole).

In terms of land use according to land categories, forest lands account for a large proportion(66.2%, 3,331.6 km²); and farmlands are 17.2%(865.6 km²); and sites are 2.9%; and roads are 2.8%; and others are 10.9%. It is analyzed that the developable areas account for 17% of the whole area(855.6 km²), while undevelopable/development inhibiting/developed areas account for 83% of the whole area(4,177.1 km²).

3. Transportation: Present Condition

The public transport system of Daegu metropolitan area has some problems including the lack of regional railway system connecting Daegu and other neighboring cities, the lack of connectivity between the subway line 1 and 2, the lack of railway capacity, the lack of public transport network covering a development plan and the lack of integrated public transport management system between Daegu and other neighboring cities.

There are 8 urban arterial roads connecting Daegu and other neighboring cities. Traffic in these 8 arterial roads is relatively good with less than 1.0 of V/C (Vehicles/Capacity) with bottleneck at some sections of Yeongcheon Arterial, Gunwi Arterial, Gyeongsan Arterial and Waegwan Arterial.

The transport shares in Daegu metropolitan area are 45.6% of cars, 32.5% of buses, 4.9% of trains and 17.0% of taxis, as of 2005. The share of cars has increased by 6% while the share of buses has decreased by 6.8%, compared to 1999.

Arterial roads network of Daegu, the main city, suffers from inefficient processing of transit traffic due to the lack of ring roads, the lack of arterial roads and connection between them and the lack of road network maintenance and operation system. With these reasons, Daegu has the highest

average annual increase rate of traffic congestion cost among seven metropolitan areas, with 8.7%.

Table 2. Traffic in Arterial Roads in Daegu Metropolitan Area

Classification	Corresponding Road	Lanes	Traffic(Cars/Day)	V/C	
1	Yeongcheon Arterial	Local Road 909	2	5,960	0.45
		Daegu-Pohang Expressway	4	24,794	0.34
		National Road 4	6	47,715	0.86
2	Gyeongsan Arterial	National Road 25	8	55,318	0.66
		Local Road 919	4	32,301	0.89
		Gyeongbu Expressway	8	91,125	0.66
3	Cheongdo Arterial	National Funded Local Road 30	2	12,275	0.65
		Local Road 902	2	4,663	0.27
4	Changyeong Arterial	National Road 5	4	15,988	0.36
		Guma Expressway	4	34,176	0.51
5	Goryeong Arterial	National Road 26	4	12,548	0.28
		88 Expressway	2	15,842	0.69
6	Sungju Arterial	National Road 30	4	20,664	0.52
7	Waegwan/Gumi Arterial	Gyeongbu Expressway	8	110,282	0.79
		National Road 4	4	24,839	0.47
		National Funded Local Road 67	2	7,584	0.48
8	Gunwi Arterial	Jungang Expressway	4	34,852	0.47
		National Road 5	4	37,894	0.87
		National Funded Local Road 79	4	12,224	0.27

Table 3. The transport shares in Daegu metropolitan area

(Unit : %)

Year	Cars	Buses	Trains	Taxis
1999	39.6	39.3	4.0	17.1
2005	45.6	32.5	4.9	17.0

Table 4. Changes in Traffic Congestion Cost among Seven Metropolitan Areas (Unit: 100 Mil. KRW)

Area	2000	2001	2002	2003	2004	2005	Average Annual Increase Rate (%)
Seoul	47,141	50,867	53,100	56,403	57,237	60,190	5.01%
Busan	26,610	29,732	30,476	31,031	33,843	34,799	5.51%
Daegu	7,790	8,534	9,252	10,247	10,856	11,846	8.74%
Incheon	13,052	14,819	16,024	16,377	16,537	17,468	6.00%

Gwangju	7,111	8,050	8,769	9,287	8,005	7,229	0.33%
Daejeon	6,992	7,978	8,740	9,378	9,482	10,344	8.15%
Ulsan	2,795	3,228	3,483	3,838	3,891	3,767	6.15%
Nation	194,480	211,080	221,350	227,690	231,160	236,980	4.03%

4. Expected Future Environment of Transportation

It is expected that future spatial structure of Daegu metropolitan area will be rearranged to a multipolar system surrounding Dageu by 2026. The population will increase a little from 3,175,000 in 2005 to 3,302,000 in 2026. It is assumed that Gyeongsan Arterial, Yeongcheon Arterial, Waegwan/Gumi Arterial, Sungju Arterial Gunwi Arterial and Goryeong Arterial are needed to be reinforced according to the expectation of spatial structure in 2026. Arterial roads, which are subject to reinforcement, are selected the following criteria.

- Criteria 1 : Current Traffic Congestion
 - Arterial containing a road with higher than V/C 0.8 (Service Level D)
- Criteria 2 : Future Development
 - Arterial related to development projects including a happiness city, innovation city and industrial complexes
 - Arterial related to housing land development projects with more than 50 thousand populations
- Criteria 3 : Connection with Hubs and Support to Balanced Local Development
 - Selection of arterial roads in terms of local balance and connection in the metropolitan area

Figure 2. Future Reinforced Roads in Daegu Metropolitan Area

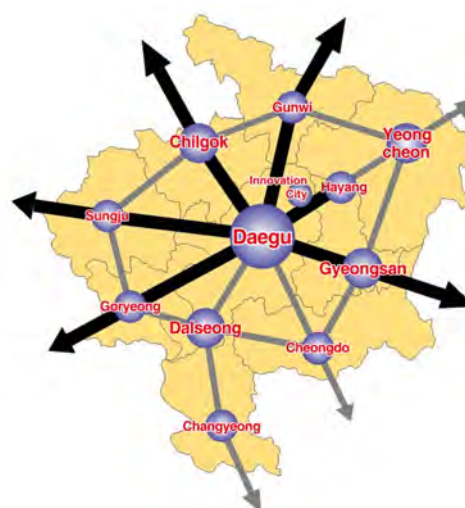


Table 5. Selection of Arterial Roads to be reinforced in Daegu Metropolitan Area

Arterial	Congested Section	Population (person)
Gyeongsan	National Road 25 (Suseong, Daegu - Gyeryang, Gyeongsan) Local Road 919 (Gyeryang, Gyeongsan- Jinryang, Gyeongsan)	52,369
Yeongcheon	national road 4 (Donggu, Daegu - Hayang, Gyeongsan)	55,500
Goryeong	88 Expressway (Sungsan - Okpo)	24,931
Sungju	National Road 30 (Dalsung, Daegu - Sungju)	30,689
Waegwan/Gumi	Gyeongbu Expressway (Gumho - Waegwan)	74,790
Gunwi	National Road 5 (Bukgu, Daegu - Dongmyeong, Chilgok)	22,680

IV. MAIN CONTENTS AND APPRAISAL OF METROPOLITAN TRANSPORTATION MASTER PLAN FOR THE DAEGU AREA

1. Promotion Details

The main agent of establishing metropolitan transportation master plan for the metropolitan area is minister of Land, Transport and Maritime Affairs; and the plan is decided and notified through discussion with heads of relevant local governments.

The contents of metropolitan transportation master plan for the Daegu area were comprised in the first metropolitan transportation plan for the five city areas in regions(02~06) in 2001 after the 'Enactment of special act on metropolitan transportation management for the metropolitan area(1997.4.10)'. As the 20 years of time-based 'Metropolitan transportation master plan for the metropolitan area' was legislated(Article 3 was established) in accordance with 'Partial amendment of special act on metropolitan transportation management for the metropolitan area(2007.1.19)' thereafter, the plan for the Daegu area was included in 'Metropolitan transportation master plan for the metropolitan area(2007~2026)' in 2007.

- Special act on metropolitan transportation management for the metropolitan area was enacted(1997.4.10)
- Ministry of Construction and Transportation-affiliated metropolitan transportation policy office was launched(1998.4.10)
- 5 years of time-based metropolitan transportation plan according to the regions was established
 - The first metropolitan transportation plan for the capital area(1999~2003), established in December 1998
 - The first metropolitan transportation plan for the five city areas in regions(2002~2006), established in December 2001
 - The second metropolitan transportation plan for the capital area(2004~2008), established in April 2004
- Partial amendment of special act on metropolitan transportation management for the metropolitan area was made(2007.1.19)
 - 20 years of time-based 'Metropolitan transportation master plan for the metropolitan area' was legislated(Article 3 was established)
- Research service for establishing metropolitan transportation master plan for the metropolitan area(2006.4~2007.3)
- Public hearing on the research service for establishing metropolitan transportation master plan for the metropolitan area was held(2007.3.28)
- Metropolitan transportation master plan for the metropolitan area(the proposal) relevant was discussed by authorities and local governments(2007.4.30~2007.5.9)
- Metropolitan transportation master plan for the metropolitan area(the proposal) was reviewed by the Commission on Sustainable Development(2007.7.4)

- Reviewed in writing by the practice committee on metropolitan transportation for the metropolitan area(2007.7.12 ~ 2007.7.20)
- Reviewed in person by the practice committee on metropolitan transportation for the metropolitan area(2007.10.2)
- Reviewed by the practice committee on metropolitan transportation for the metropolitan area(2007.11.21)
- Metropolitan transportation master plan for the metropolitan area(2007 ~ 2026) was decided and notified(2007.12.4)

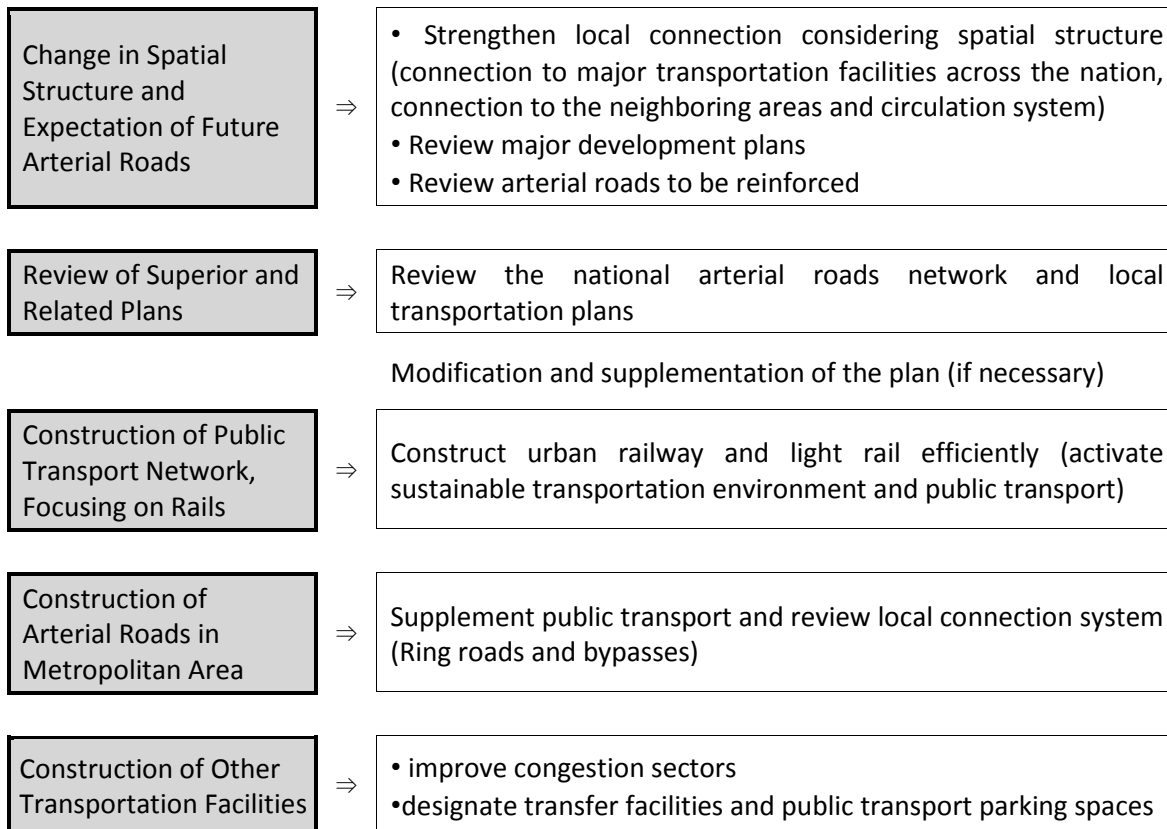
2. Basic Objectives

The basic objectives of metropolitan transportation master plan for the Daegu area are: first, a public transportation system construction through an integrated network buildup focused on the railway; second, a systematic metropolitan highway system construction according to the reorganization of spatial structure; third, an efficient operations management of metropolitan transportation facilities.

The traffic network shall be constructed in a mutual supplement system, rather than competition between public transport facilities and major road facilities. In addition, the time to start the project shall be decided, considering change in traffic environment development plans including housing sites and other plans.

Table 6. Objectives and Details of Promotion Plan

Objective	Details of Promotion Plan
Public transportation system construction focused on the railway	Constructing a systematic metropolitan public transportation network
	Offering a park and ride service
	Constructing a prompt and convenient public transportation service
Systematic construction of metropolitan highway	Constructing a metropolitan highway system to enhance regional linkage and distribute functions
	Resolving metropolitan congested spots
Efficient operations of metropolitan transportation facilities	Improving the safety and efficiency based on management
	Constructing a reasonable metropolitan transportation administration system

Figure 3. Flow Chart of Configuration Spatial Structure

3. Construction of Metropolitan Public Transport Network

As a part of the metropolitan public transport network project, three railway lines have been constructed (total length: 62Km), including extension of the urban subway 2 and dual lines project of Daegu railway line. Proposed additional metropolitan public network project¹ consisting of 9 lines (total length: 212Km) are being considered, including extension of the urban subway 1 (Ansim-Myeonggok) and construction of urban railway in Dalsunggun.

Metropolitan public transportation transfer facilities are designed to maximize convenience of customers in consideration of traffic features at major transfer points in heavy traffic arterial roads.

¹ Proposed additional project is not included in investment scope in the national financial operation plan but it is necessary to construct a metropolitan transportation network. It means that it can be promoted additionally according to change in financial policy or surrounding environment,

Table 7. Public transport network project in Daegu metropolitan area

Item	Name of Line	Section	Length (km)	Function
Promoted Project	① Extension of Line 2 of Daegu Metropolitan Transit Corporation	Sawoel - Yeongdae	3	Reinforce Gyeongsan Arterial
	② Dual Rails of Daegu Rail Line	Dongdaegu- Yeongchen	35	Reinforce Yeongchen Arterial
	③ Line 3 of Daegu Metropolitan Transit Corporation	Chilgok - beommul	24	Reinforce Gunwi Arterial
	Sub total		62	
Proposed Additional Projects	④ Electric Railways for Daegu Section of Gyeongbu Rail Line	Gumi - Cheongdo	84	Reinforce Waegwan/Gumi Arterial
	⑤ Extension of Line 1 of Daegu Metropolitan Transit Corporation	Ansim - Sabok	1	Reinforce Yeongchen Arterial
	⑥ Extension of Line 1 of Daegu Metropolitan Transit Corporation	Sabok - Cheongcheon	5	Reinforce Yeongchen Arterial
	Extension of Line 1 of Daegu Metropolitan Transit Corporation	Daegik - Myeonggok	2	Increase Local accessibility
	Urban railways of Dalsunggun	Myeonggok - Second Industrial Complex, Dalsunggun	27	Increase Local accessibility
	⑨ Light Rail between Gyeongsan - Hayang	Gyeongsan - Hayang	24	Increase Local accessibility
	⑩ Light Rail between Sungseo - Sungju	Sungseo - Sungju	18	Reinforce Sungju Arterial
	⑪ Light Rail between Wicheon - Goryeong	Wicheon - Goryeong	13	Reinforce Goryeong Arterial
	⑫ Line 4 of Daegu Metropolitan Transit Corporation	Circle	38	Increase Local accessibility
	Sub total		212	-

Note: 1. Types of metropolitan public transport network can be selected either urban railway or light rail according to future traffic and development condition.

2. The plan for each individual line is implemented by the central government, the local government or the private sector according the types and nature of project.

3. The time to promote additional projects can be decided later, considering development of the surrounding areas and change in policy.

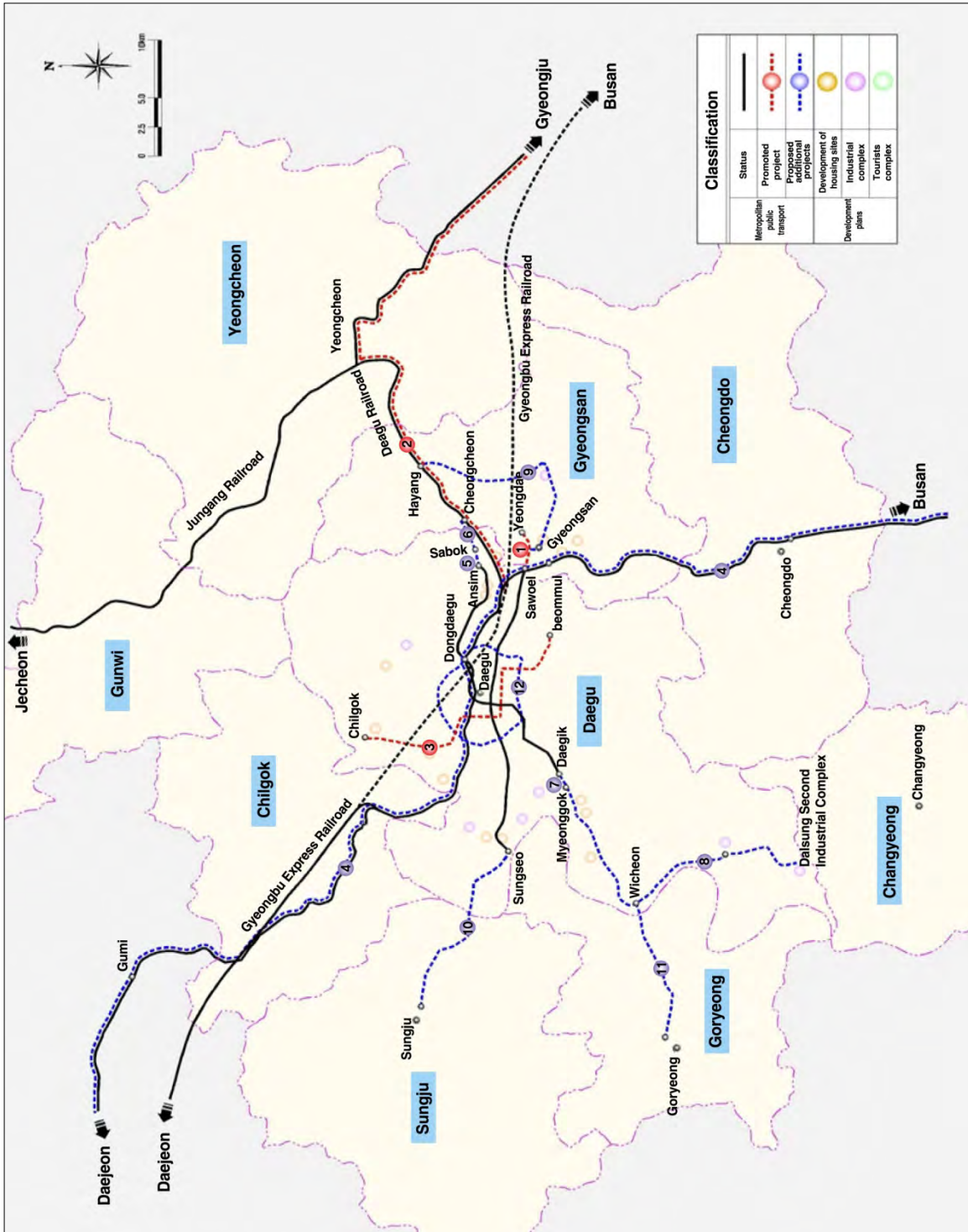
4. Construction of Metropolitan Major Road Network

The five metropolitan major roads have been constructed (total length: 220 km) including Gumho Riverside Expressway as a part of the metropolitan major road network construction project. Additional proposed projects are five major roads with total length 192 km, including a road between Hyenpung and Cheongdo and expressway between Daegu and Muju.

Table 8. Major roads construction projects in Daegu metropolitan area

Item	Name of Line	Section	No. of Lanes	Length (km)	Function
Promoted Project	① Jungbu Naeryuk Expressway	Gumi - Hyenpung	4	49	Increase Local accessibility
	② Gumho Riverside Expressway	Gumdan - Daerim	6	21	Reinforce Yeongchen Arterial
	③ Yeongchen - Sangju Expressway	Yeongchen - Sangju	4	72	Construct Outer Ring Road System
	④ The Fourth Ring Roads	Upnae - Ansim - Seobyeon	6~10	61	Construct Inner Ring Road System
	⑤ Gumho Riverside Expressway	Daerim - Gumho	6	17	Reinforce Yeongchen Arterial
Proposed Additional Projects	⑥ Road between Hyenpung and Cheongdo	Hyenpung- Cheongdo	4	27	Construct Outer Ring Road System
	⑦ Road between Yeongchen and Cheongdo	Yeongchen - Cheongdo	4	40	Construct Outer Ring Road System
	⑧ Daegu - Muju Expressway	Daegu - Muju	4	33	Reinforce Sungju Arterial
	⑨ Hyenpung Ring Road	Hwawon - Hyenpung - Sungseo	4	49	Construct Inner Ring Road System
	⑩ Road between Sungju and Gunwi	Sungju - Gumwi	4	43	Construct Outer Ring Road System

Figure 4. Public transport network project in Daegu metropolitan area



5. Management of Metropolitan transportation infrastructure

Plans for effective operation of the metropolitan transportation infrastructure are as followings.

The first thing is application of Transportation Demand Management (TDM). There four major contents; ① create urban environment to reduce traffic demand by integrating land use and transportation plans, ② absorb metropolitan traffic demand by increasing self-sufficiency of a new city and activate demand management program focusing on companies, ③ devise a method to designate a special traffic congestion management district and allocate congestion charge and adjust traffic by installing traffic demand responding metering system at a ramp of expressways, and ④ activate a business taxi system and apply a parking upper limit system to a severely congested area in spite of good public transportation system.

The second element is provision of metropolitan public transport information. To resolve metropolitan traffic problems and activate use of public transportation, quick and accurate public transport information system is prepared. The information can be provided to residents via Internet, PCS and PDA. People can check public transport information at home or office before they leave.

The third element is construction of a transportation administrative system. According to an agreement between governors of metropolitan cities and provinces, establishment and operation of a metropolitan transportation agency similar with that in the capital region will be promoted. The metropolitan transportation agency will delegated an authority to issue and license for metropolitan transportation sector such as issuing bus transportation business license and modifying public transport lines and independent human resourcing and financing authority.

6. Investment and Financing

a. Direction of Investment Policy

The metropolitan transportation investment policy of the central government contains the following four elements.

First, investment should be made on improvement of public transport with consideration of the quality. Priority is placed on provision of effective traffic information and construction of integrated transfer facility system for convenience of the transportation vulnerable

Second, investment should be made on improvement of efficiency. In other words, investment is made on improvement of metropolitan transportation service quality by focusing on metropolitan area with severe congestion to induce saving money and time.

Third, investment should be made on the basis of the principle of 'selection and focus'. Therefore, investment should be made to complete existing projects, rather than starting new projects, because existing projects suffer from the lack of budget.

Fourth, reasonable funding methods should be prepared between the central government and local governments. Funding for investment projects should be done by various matching funds² between them. The central government and local governments should make their best efforts to secure budget for such matching fund projects.

b. Expectation of Investment Amount

Proposed investment amount for entire metropolitan transportation infrastructure is KRW 116 trillion by 2026 and average KRW 5.8 trillion every year. KRW 3.6 trillion goes to the capital region and KRW 440 billion goes to the Daegu region

By agencies, the central government invests KRW 3.47 trillion, which accounts for approx. 60% of the average annual investment amount. A local government invests average KRW 1.29 trillion annually, which is 22% of the total annual investment amount.

c. Funding

According to analysis of financial operation plan of the central government and local governments, the available fund to expand the metropolitan transportation infrastructure is KRW 7.25 trillion, which is well over 5.8 trillion that is the proposed annual average investment amount.

Therefore, it is expected that there are enough money for the investment, considering available fund in the central government and local governments

7. Appraisal

As mentioned above, metropolitan transportation master plan for the metropolitan area (Daegu area) is mainly comprised of three issues: metropolitan public transportation network construction, metropolitan highway system construction, and metropolitan transportation facilities operations.

The metropolitan public transportation network construction means constructing public transportation system through an integrated network buildup focused on the railway, and three lines of railway network was planned. Five years after planning, 2012, one out of three projects has been completed, and two others are promoting as planned.

² National fund aiding percentage is decided, depending on how much a local government funds when the central government provide grant to it.

As for the construction of metropolitan highway system, five line construction project was planned. As of 2012, one project has been completed and two projects are in the works while two others have never been started.

With regard to the metropolitan transportation facilities operations, three things are planned. Among these three, metropolitan public transportation information offering has been actively promoted and achieved results. Traffic demand management has been promoted with a strong will but has not obtained great achievement. In terms of the metropolitan transportation administration system construction, metropolitan transportation organizations are established and operated in the capital area and Busan. Ulsan area, but has not yet been started in Daegu area.

As mentioned above, the metropolitan public transportation network construction project goes well due to strong support and will of the government according to the political base of environment-friendly green growth. On the other hand, the metropolitan highway system construction project suffers financial problems and does not go well because of lack of government supported expenditure in comparison with the metropolitan public transportation network construction.

V. Future Perspective and Major Issues

The amount of the national grant to the local government which performs construction or modification of metropolitan transportation infrastructure is prescribed in Article 12 of the ordinance of 'Special Act on Metropolitan Transportation Management'. More specifically, the national grant to metropolitan roads, metropolitan rails, major road rapid bus and associated facilities, metropolitan area parking space, public transport parking space and transfer facilities are 50%, 75%, 50%, 30%, 30% and 30%, respectively.

For Korea, revenue from local taxes is small and financial independence of a local government is low. Debt of a local government is mainly caused by construction of transportation infrastructure such as roads and rails. For the Daegu metropolitan area, construction of metropolitan public transport network is somewhat in progress according to the schedule. However, construction of metropolitan major roads is not yet started because of financial problems.

To solve this problem, it is important to increase the percentage of national grant amount against the total amount to be spent in construction of metropolitan transportation infrastructure and devise various financing methods. Financing methods are described in the below, considering feasibility.

The first method is diversification of investment sources, which include expanding investment fund by issuing debenture in addition to taxes and using revenues from metropolitan transportation infrastructure

The second method is activation of private investment projects. Private investment can be attracted by BTO (build-transfer-operate) method on existing infrastructure in accordance with the private investment act or other similar methods.

Third, the benefit principle should be applied to metropolitan transportation infrastructure strongly. This method strengthens the benefit principle by, for example, increasing metropolitan transportation infrastructure charge³, considering expenses on it when establishing a metropolitan transportation improvement plan.

³ The charge placed on an entity that performs housing site development projects, urban development projects, apartment development projects and house construction project in a metropolitan area in accordance with Article 11 of Special Act on Metropolitan Transportation Management.

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The Strategy for Regional Industry Development of Daegyeong Economic Region

I. INTRODUCTION

Since the late 20th century, economy activity space is globally integrated and expanding beyond the national boundary. As the spatial structure of the world economy has been reorganized to the block economy, the economy development model of global city regions including London and Tokyo or polycentric urban regions such as Landstadt in Netherlands has attracted attention (Kim et, al, 2008). In fact, cities or regions where economic activities are concentrated to are more important than a nation.

As the importance of a region as a new unit of new political and economic activities is increasing in the globalization era, local industry policies are also rearranged, focusing on a economic region, which can have global competitiveness and realize economy of scale. As a result, the Lee Myeong Bak administration, launched in 2008, has promoted the economic region policy as a new local development policy, responding to the trend of economic activities and production space.

This study reviews major background and status of industrial policy of 5+2 economic regions strongly promoted by the Lee Myeong Bak administration and presents the promotion background, purpose, progress and implication of policy about the leading industry in the Daegyeong economic region. This study can contribute to finding a new development direction for the future local industry by presenting direction the leading industry is heading to and problems to be solved.

II. OVERVIEW OF ECONOMIC REGIONS POLICY

1. Background

Since the introduction of a local self-governing system in 1990, the Korean government has promoted a local industry development policy with purpose of local economy activation including expanding local industrial foundation and creating jobs. A local industry development policy, which has been promoted from 1990, was promoted in some big cities, starting at Daegu, Gwangju and Gyeongnam. From 2000, the range of policy was expanded to 13 metropolitan cities outside the capital region. The Chamyeo administration, launched in 2003, strengthened capability of the local industry by constructing the local innovation system(Regional Innovation System: RIS) and the innovation cluster through the local strategic industry development project (2002) and the new growth engine promotion strategy (2006), focusing on the metropolitan cities and the provinces. The results show considerable achievement on a local industrial policy with local company support infrastructure including construction of Techno-Park and specialized local center.

However, due to the promotion of the industrial policy according to the classification of administrative districts without consideration of local features and potential, unreasonable isolated investment between local governments has happened. Because of this, there was duplicated designation between local industries. Moreover, excessive development competition between regions and regional self-centeredness significantly reduced connection and cooperation between industries. This causes decreased overall economic efficiency and weak competitiveness.

The Lee Myeong Bak government, launched in 2008, has introduced the concept of the economic region to overcome problems in existing isolated support between regions and industries and develop industrial structure with global competitiveness. The purpose was to integrate several administrative districts into one single spatial unit, which allows functional connection and complementation and between regions, to encourage cooperation and harmonized development between regions. In other words, the purpose of policy was to realize the economy of scale and strengthen local and national competitiveness through cooperation between regions and development of integrated economic region beyond the border of administrative districts. In sum up, the purpose of the economic region policy is to develop a spatial economic unit with economic efficiency and competitiveness to maximize growth potential of all areas in the nation.

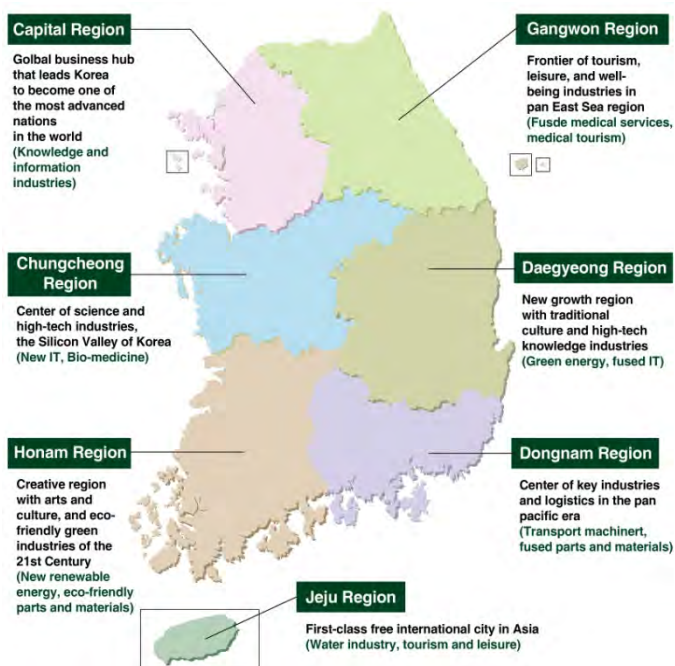
2. Status of Promotion

The Korean government decided 5+2 economic regions, considering local population, infrastructure, industry agglomeration, historic and cultural features and local sentiment. The 5+2 economic regions consist of 5 economic regions (the capital region, the Chungcheong region, the Honam region, the Daegyeong region and the Dongnam region) and 2 special economic regions (the Gangwon region and the Jeju Special Self-Governing Province). To take an advantage in competing with overseas economic regions, the economic regions have approximately 500 million populations to achieve economy of scale. The 5+2 economic regions are institutionalized as a spatial unit of a local policy and emerged as a key player in strengthening local competitiveness and balanced local development.

The Korean government placed the economic region promotion team under the Presidential Council on National Competitiveness for local industry development of the economic regions, recognizing that local competitiveness is the national competitiveness and reflecting new paradigms of local development policy, which are expansion, specialization and decentralization. In addition, the government revised 'Special Act on Balanced National Development' and prepared a special account and established the development plan of 5+2 economic regions based on the systems. According to the institution, existing innovation systems in administrative districts were rearranged and a leading project for each sector of industry, human resource and SOC was promoted to strengthen local competitiveness of the economic regions. In other words, the government decided and developed two leading industries, which were suitable for features and

circumstance of economic regions and could be a new growth engine and selected one university or two for each leading industry to produce excellent human resources. The government promoted total 30 SOC projects.

Figure 1. 5+2 Economic Regions



For the leading industry project of economic regions, 12 leading industries and 20 projects were decided for 6 economic regions excluding the capital region. The purpose was to develop new growth engine industries and create quality jobs through development of excellent companies. For each economic region, the green energy industry and the IT integration industry were selected as leading industries for the Daegyeong region. The Chungcheong region took the new IT industry and the medical bio industry and the Honam region had the new renewable energy and the environment friendly parts and components industry. For the Dongnam region, the transportation machinery industry and the integrated parts and components industry were selected. The government invested total KRW 1.3 trillion on technology development, human resource growth and marketing activities, mainly 12 leading industries. For this, 1,110 organizations (703 local companies and 407 non-profit organizations including universities, and public funded research centers) participated in expansion of the local foundation of future growth engine.

Second, for development of human resources to support the leading industries of the economic regions, investment has been made on 1 or 2 university(s) in each region, which has strong competitiveness in a corresponding industry. The government is going to invest KRW 500 billion on 19 universities across the nation for five years from 2009 to 2013.

Table 1. Status of 12 Leading Industries and 20 Projects and Human Resources Supplying Universities

Region	Leading Industry	Project	Industry Supporting Univ.	Region	Leading Industry	Project	Industry Supporting Univ.
Chungcheong	NEW IT	Wireless Communication	Korea Univ. of Technology and Education, Hoseo Univ.	Daegyeong	Green Energy	Solar Energy	Kumoh National Institute of Technology, Yeungnam Univ.
		Green Semi-Conductor	Korea Univ. of Technology and Education, Hoseo Univ.			Hydrogen Fueled Cell	Kumoh National Institute of Technology, Yeungnam Univ.
	Medical Bio	Practicalization of New Medicine	Soonchunhyang Univ., Chungnam National Univ.		IT Integration	Medical Equipment	Kyungpook National Univ., Keimyung Univ.
		Connection between Hubs	Soonchunhyang Univ., Chungnam National Univ.			Practical Robots	Kyungpook National Univ., Keimyung Univ.
Honam	New Renewable Energy	Solar Energy	Mokpo National Univ., Chonbuk National Univ.	Gangwon	Medical Integration	Medical Integration	Korea Maritime Univ., Changwon Univ.
		Wind Energy	Mokpo National Univ., Chonbuk National Univ.			Medical Integration	Korea Maritime Univ., Changwon Univ.
	Environment Friendly parts and components	Hybrid Cars	Chonnam National Univ., Chosun Univ.		Medical Tourism	Medical Tourism	Pukyong National Univ., Pusan National Univ.
		Optical Parts	Chonnam National Univ., Chosun Univ.			Medical Tourism	Pukyong National Univ., Pusan National Univ.
Dongnam	Transportation Machinery	Green Cars	Jeju Univ.	Jeju	Water	Water	Kangwon National Univ.
		Marine Plants	Jeju Univ.			Water	Kangwon National Univ.
	Integrated parts and components	Machine	Jeju Univ.		Tourism and Leisure	MICE	Hallym Univ.
		Safety and Convenience	Jeju Univ.			MICE	Hallym Univ.

Finally, the government promoted 30 leading projects as infrastructure projects for development of industries in each economic region. For the Daegyeong region, the Dongseo-6chuk (Sangju-Yeongduk), the Dongseo-5chuk (Yeongju-Uljin) and the Nambuk7chuk highway, the Daegu outer ring road and three cultural regions foundation construction projects were promoted as infrastructure construction projects.

III. MAIN CONTENTS OF INDUSTRIAL POLICY OF DAEGYONG ECONOMIC REGION

1. Leading Industry Project (2009-2012)

a. Background

The leading industry project for the economic regions was promoted in two different stages. For the leading industry project for the economic regions promoted during the first project stage (2009-2012), the purpose is to change the framework of local industrial policy from administrative districts to the economic regions, decide industries leading future local economy and establish specific development strategy. First of all, the leading industry should be the industry that significantly contributes on development potential and economy growth in the region and strengthens local development capability.

As a part of the project, two new growth engines were selected, considering circumstances and potential of the Daegyeong economic region. In addition, by designating a base university, which can be connected to the leading industry, the government concentrates on supplying industry oriented human resources from such university. Based on this, the government plans to maximize creation of value added in the region and develop the industries as global new growth engines through joint development of the front and rear industry from R&D to production.

b. History of Project Promotion

The history of leading industry project in the Daegyeong region can be briefly described in the next. In October, 2008, the Presidential Committee on Balanced National Development prepared "Preparation Instruction of Economic Region Development Plan" and delivered it to the 'Daegyeong Economic Region Development Committee'. According to the instruction, the 'Daegyeong Economic Region Development Committee' consisted of five sub-divisions; General, Industry, Urban and Transportation, Culture and Tourism and Local Development. The 'Daegyeong Economic Region Leading Industry Promotion Plan' was established by mainly the Industry sub-division among the five sub-divisions. Specific planning procedures are as followed;

Figure 2. Preparation Procedures of Daegyeong Economic Region Leading Industry Plan



The most difficult things in deciding leading industries were to reconcile various interests in the region. First, at the very first stage in preparing the plan, the energy and the mobile communication were selected as leading industries of Daegyeong Economic Region by mainly the Ministry of Knowledge Economy. However, this decision did not fully consider local industrial capability and future growth potential.

For more careful selection of a leading industry, Daegyeong Economic Region Research Team was formed, with mainly researchers from Daegu-gyeongbuk Development Institute, public officers from corresponding cities and provinces and civil consultants. The research team changed the leading industries to the green energy and IT integration, in consideration of circumstance and growth potential of the Daegyeong region. The leading industries were finally confirmed through practical discussion between Daegu and Gyeongsangbukdo and between vice-governors in two regions. The research team prepared the Daegyeong Economic Region Leading Industry Plan for three months from October, 2010, focusing on the green energy and the IT integration industry.

First of all, the project plan preparation stage focused on making the purpose clear to produce short term results during 3 years and private sector leading R&D projects to help local companies which had experienced difficulties in economic downturn. To reflect opinion from companies as many as possible during this process, the survey on the demand had been performed to analyze status of companies related to the leading industries in Daegyeong Economic Region for two months from

Table 2. History of Leading Industry Plan of the Daegyeong Economic Region

Date	Description	Remark
'08.10.13	Launched the Daegyeong Economic Region Research Team(mainly from Daegu-gyeongbuk Development Institute, 17 people) and the 1st Workshop	
10.20	Formed the Daegyeong Economic Region Research Team (8 people from corresponding cities and provinces and 9 people from the private sector) and the 2nd Workshop	
11. 5	The 3rd Workshop of the Daegyeong Economic Region Research Team and consulting with the work support team	
11.18	Presentation for Preparation of the Economic Region Leading Industry Development Plan	Samsung Economic Research Institute
11.19	The 4th Workshop of the Daegyeong Economic Region Research Team and consulting with the work support team	
11.25	Strategic meeting for development of a core university related to the leading industries	
11.28	Decision meeting of the leading industries (IT Integration industry, Green Energy Industry)	The Ministry of Knowledge Economy
12. 5	The 5th Workshop of the Daegyeong Economic Region Research Team and consulting with the work support team	
12. 8	Local discussion related to the Daegyeong Economic Region Leading Industry	
12.22-23	Economic Region Leading Industry consulting meeting.	The Ministry of Knowledge Economy
12.23	Announcement of the Planning and Economy Committee of the Gyeongsangbukdo Council and hearing opinion	Gyeongsangbukdo Council
12.29	Joint interim report of Economic Regions	Seoul
12.29-'092.27	Survey on the demand on the Daegyeong Economic Region Leading Industry (Total 507 participants)	Research Korea
'09. 1.16	The 2nd experts committee report to the Ministry of Knowledge Economy and hearing opinions	Daegu Metropolitan City Council
1.19	Conference with cities and districts (local community sector)	Daegu-gyeongbuk Development Institute
2.6 -13	Leading Industry expert consulting meeting hosted by the Ministry of Knowledge Economy (the green energy and the IT integration industry)	Daegu-gyeongbuk Development Institute
2. 27	Final joint report to the Presidential Committee on Balanced National Development	Building of the Ministry of Public Administration and Security
4. 7	Report of Daegyeong Economic Region development plan (draft) to Daegu Metropolitan City	Daegu Metropolitan City
4. 23	Report of Daegyeong Economic Region development plan (draft) to Daegu Metropolitan City Council	Daegu Metropolitan City Council
8. 31	Deliberation by the Daegyeong Economic Region development committee	

December, 2008. Human resources, the status of technology development, the policy demand of companies and cooperation relationship for the leading industries was well identified with the survey. In addition to this, Workshops, consulting meetings, a local discussion meeting and conferences were held for better reflection of local opinions.

In August, 2009, the Daegyeong Economic Region Development Plan including the Daegyeong Economic Region Leading Industry Plan was submitted to the local development committee. The local development committee collected, discussed and modified plans and prepared an integrated plan. The integrated plan was approved by the President after deliberation in the Cabinet Meeting. After that, the Economic Region Leading Industry Plan and development human resource programs started.

c. Result and Evaluation

The green energy (solar energy and fuel cell) industry and IT integration (medical equipment and robot) industry were selected as leading industries of the Daegyeong Economic Region. Currently, efforts to find two detailed projects for each industry are being made. The four projects promoted by 2011 are as followed;

First, for the solar energy industry and the fuel cell industry as core areas of the green energy industry, the project to strengthen global competitiveness of solar energy parts and components and the project to construct a global hub for hydrogen fueled cell are selected. For the IT Integration industry, the project to strengthen global competitiveness of IT integrated medical equipment and the project to strengthen the foundation of commercialization of IT integrated practical robots are selected, focusing on medical equipment and practical robots.

Table 3. Detailed projects for leading industries of the Daegyeong Economic Region

Leading Industry	Detailed Projects	Description
Green Energy	Project to strengthen global competitiveness of solar energy parts and components	<ul style="list-style-type: none"> ◦ Use and commercialize excellent R&D and human resource infrastructure related to green energy in the Daegu-gyeongbuk region. ◦ Develop solar ingots, wafers, cells, modules and circuit boards (peripheral devices)
Green Energy	Project to construct a global hub for hydrogen fueled cell	<ul style="list-style-type: none"> ◦ Develop core technology of hydrogen fueled cell earlier and Commercialize it to replace imported goods. ◦ Produce catalyst, separator membrane, stack, EBOP and MBOP domestically
IT Integration	Project to strengthen global competitiveness of IT integrated medical equipment	<ul style="list-style-type: none"> ◦ Develop and commercialize medical equipment using IT and mechatronics technology for replacing imported equipment ◦ Develop PET/CT/Cyclotron package and video diagnosis devices in connection with a big company outside the region
IT Integration	Project to strengthen the foundation of commercialization of IT integrated practical robots	<ul style="list-style-type: none"> ◦ Create a new market through development of core technology of practical robots and mobile integration technology ◦ Develop an actuator for robot (servo motor, decelerator) and medical robots

In addition, to grow excellent human resources necessary for development of the leading industries of the Daegyeong Economic Region, the human resource growth project has been implemented. The four human resources training center are placed to the Kyungpook National University, the Keimyung University, the Kumoh National Institute of Technology and the Yeongnam University to supply perfect people for sites of the leading industries and meet the demand of companies in the leading industries. To do this, opening of company specific lectures suitable for the leading industries, arrow technology development support, operation of exchange meeting, capstone design and industrial internship program have been implemented.

According to the results of the first project period of the leading industries in the Daegyeong region, active investment from related companies on the green energy industry and the IT integration industry, which are selected as the leading industries of the Daegyeong region, has been made. First, for the green energy industry, the solar energy industry and the fuel cell industry are intensively developed using IT and semi-conductor technology, which are strengths of the region. Together, it is planned to develop corresponding integrated products and increase exportation of such products, with earlier commercialization of green energy products. For the IT integration industry, IT integrated medical equipment, medical system and specialized robot sector using mobile technology, which is the advantage of the region, are intensively grown. Focus is placed on development of new products and growth of leading companies through developing high-tech robots and medical equipment using IT integration technology.

According to the results of the leading industry promotion in the Daegyeong economic region, independent and competitive industrial policy has been promoted in connection and cooperation with other region. As a result, effect of connection between local industries is visible and some level of infrastructure based on the leading industry has been constructed with increasing investment on local high tech industries. Especially, many organizations in the Daegu and Gyeongbuk region participated in the leading industry development project and showed significant results on creation of jobs and sales and exporting. Small and medium companies and middle standing enterprises led creation of jobs and employed 20-30 years old young people. The leading companies played a great role in reducing unemployment of the young generation.

However, short-term achievement is not very significant because of focus on futuristic industry without full consideration of current industrial condition while selecting leading industries of Daegyeong economic region. For example, the domestic solar energy market is not big enough and access to overseas markets is also difficult because of financial crisis in Europe. For the hydrogen fuel cell is delayed in industrialization and exporting as there are lack of international commercialization and not systematical R&D support.

With burden to produce visible results within 3 years, investment is concentrated on large companies and research institutes which have R&D capability and, as a result, the effect of project

on the entire economy has been reduced. Especially, the leading industry support policy focusing on large companies excludes most of the small and medium companies from the project, which led development of local economy. As a result, there is limitation on drawing practical project effects that help the local economy.

For selection of leading industry in each economic region, unnecessary competition between regions was caused due to duplicated leading industries. For example, competition between the Daegyeong and Honam region in the renewable energy sector, the Daegyeong and Chungcheong region in the IT sector and the Chungcheong, Daegyeong and Gangwon region in the medical sector decreased overall performance of leading industry promotion. In addition, there is lack of strategy to advance industry and university cooperation, which is an origin of local industrial competitiveness. Together, there are limitations such as the same pattern of industry and university cooperation including R&D and human resource development and conformist support pattern. In some cases, the development strategies of the leading industry and the strategic industry are not very different and the characteristics are also similar.

In other words, as the Daegyeong economic region leading industry developed by the current administration has been promoted without any efforts to solve problems in the strategic industry developed by the Chamyeo administration, the project to grow new industry makes poor local industry policy environment worse. Like this, the reasons why there is the lack of connection and consistency in the local industry development plans by the central administrations are the lack of an integrated control tower and organic cooperation between corresponding organizations related to development of local industry.

2. Leading Strategic Project (2013-2015)

a. Background

As the economic region leading industry and strategic industry promotion are completed in 2012, the necessity to present new future industrial map for a region that leads to the next 10 years is emerged. Especially, it is necessary to adjust a target industry of each economic region based on the results of local industry development policy promotion during the last 10 years, reflecting changes in economic and industrial environment such as industry integration and open innovation.

From this point of view, from June, 2011, the government (the Ministry of Knowledge Economy) started promoting the leading strategic industry project as a project in the second promotion period of the economic region leading industry. This is rearrangement of the local industry development system from existing the leading industry, the strategic industry and the specialized industry into the leading strategic industry and the specialized industry. The strategic industry of the government consists of 8 core business types in the four industrial groups per each economic

region. Among these, two industrial groups are selected as representative leading industries that are currently leading the local industries and other two industrial groups are designated as future growth engines that will lead the future local industries.

b. History of Promotion

In June, 2011, the Daegyeong economic region placed a practical task force team (TFT) under the Daegyeong economic region development committee to promote the project reasonably and effectively according to the leading strategic industry project of the government with 8 major business types including 4 future growth engine industries and 4 representative major industries.

The Daegyeong economic region development committee, the Daegu Gyeongbuk Development Institute, the leading industry support team of the Daegyeong economic region, Daegu city, Gyeongsangbukdo and Daegu and Gyeongbuk Technopark participated in the practical task force team (TFT) of the Daegyeong economic region. Corresponding local specialized centers, professional institutes and universities participated in the sub-divisions to support planning. The main roles of participating organizations are as followed;

Table 4. Organizations Participating in Practical TFT of Daegyeong economic Region

Participating Organizations	Main Roles
Daegyeong economic region development committee	<ul style="list-style-type: none"> ◦ the main body responsible for control preparation of a new regional industry development strategy and operation of the practical TFT ◦ support general issues including appointment of consultants
Leading industry support team of the Daegyeong economic region	<ul style="list-style-type: none"> ◦ perform analysis for establishment of an industry development strategy for the Daegu-gyeongbuk region and supply the results of analysis. ◦ participate in the practical TFT and sub-division TFT for detailed business types
Daegu Metropolitan City and Gyeongsangbukdo	<ul style="list-style-type: none"> ◦ adjust internal opinion for selection of a leading strategic industry ◦ share principles and standards for selection of a leading strategic industry and participate in the practical TFT
Daegu Gyeongbuk Development Institute	<ul style="list-style-type: none"> ◦ participate in the practical TFT by local industry experts ◦ participate in the practical TFT and sub-division TFT for detailed business types
Technopark	<ul style="list-style-type: none"> ◦ analyze, discuss and negotiate between the metropolitan city and province. for selection of a leading strategic industry ◦ provide data from performance analysis of existing local strategic industry and participate in the practical TFT
Local specialized centers	<ul style="list-style-type: none"> ◦ provide data from performance analysis of existing local strategic industry and participate in sub-division TFT

In selecting a leading strategic industry of the Daegyeong economic region, many experts consulting meetings, presentations and workshops for both internal opinion hearing and external consulting had been hosted from July to December, 2011. After configuration of the practical task force team (TFT) of the Daegyeong economic region, schedule, methods and roles of each organization were shared through the presentation hosted by the industry institute twice in preparing the Daegyeong Economic Region Leading Strategic Industry (Draft). In addition, reasonable and effective project planning was emphasized through share information between all participants

including the Daeyeong Economic Region Development Committee, Daegu Metropolitan City and Gyeongsangbukdo, the leading industry support team of the Daeyeong Economic Region and the Daegu and Gyeongbuk Technopark

The most difficult work was to decide 8 core business types in the Daeyeong Economic Region Leading Strategic Industry. Long negotiation period was essential because the plan is integrating the existing leading industries (the green energy and the IT integration industry) and the strategic industries (the textile, the IT and the automobile part industry). Various factors including global trend, vision and policy direction of national industry development and technology, industrial circumstance and potential of the Daeyeong region were considered in selecting specific leading strategic industry. First, specialty of local industries, growing capability, concentration, comparative advantage in the nation and labor productivity were considered as quantitative elements while compliance with the national policy, compliance with related plans, policy intention of local governments and opinion of local experts were included as qualitative elements.

With these procedures, two representative industries which can lead the current local industries and two future growth engines which can lead future local industries through a variety of reviews and hearings at both the central government and local government level and the practical TFT and sub-division of each business types participated by the metropolitan city and province.

c. Result and Evaluation

For the leading strategic industries selected through such strict process, the green energy and the IT integration industry as future growth engines and the smart equipment and parts industry and the high-tech integration components industry as representative industries were selected. For a core business type, solar energy and fuel cell for the green energy industry and practical robot and medical equipment for the IT integration industry were selected. In addition, smart mobile and smart automobile parts for the smart equipment component industry and high-tech metal-ceramic materials and high-tech textile materials for the high-tech integration component industry were selected as a core business type.

For solar energy (focusing on equipment) and fuel cells selected as core business types of the green energy industry, it is expected that more specific results can be achieved in the second stage of the period because they have been promoted during the first stage of the period. Especially, the solar energy sector can increase its economic and industrial effect in connection with the IT industry in Daegu and Gumi and the new materials industry in Pohang along with construction of solar energy belt from Sangju to Daegu via Gumi and Chilgok.

Table 5. Results of Selection of Leading Strategic Industry for Daegyong economic region

Classification	Industry	Core Business Type	Prospective Item
Future growth engines	Green energy	Solar energy	High efficient equipment, low cost equipment, long life equipment, production efficiency improving equipment
Future growth engines	Green energy	Fuel cell	Power generation fuel cell, fuel cell for building and backup, fuel cell for transportation, Hydrogen production, transformation and store system, fuel cell components, fuel cell hybrid power pack.
Future growth engines	IT integration	Practical robot	Professional service robot (medical and life care robot, construction support robot, agriculture and fishing support robot, disaster prevention robot, special environment support robot, education and entertainment robot and core robot parts
Future growth engines	IT integration	Medical equipment	Body function restoration equipment, rehabilitation equipment, medical image equipment, IT healthcare equipment, treatment equipment.
Representative industries	Smart equipment component	Smart mobile	mobile integrated equipment, mobile terminal parts/components, intelligent mobile integrated parts, next generation embedded solution, next generation broadcasting equipment
Representative industries	Smart equipment component	Smart automobile parts	steering/braking control equipment, intelligent sensor module, carbon composite outer plate light parts, V2X communication system, high bright lighting for cars
Representative industries	High-tech integration component	High-tech metal-ceramic materials	Nano-ceramic materials, new metal integrated materials
Representative industries	High-tech integration component	High-tech textile materials	Energy generation textile products, safety industry textile products, industrial part components, high performance and functional textile products, environment friendly textile products, light composite textile products

Source: Candidates for Daegyong region leading strategic industry excluding Daegu Metropolitan City/Gyeongsangbukdo, 2011

Note: V2X(Vehicle-to-Infra/Vehicle/Nomadic): All kinds of communication methods applied to road vehicles.

Second, it is expected that the medical equipment (mainly treatment/healthcare equipment) and the practical robot sector, which were selected core business types of the IT integration industry, also create high added value though integration with IT technology and other industries during the second stage of the period as they already produced significant results in the first stage of the period.

Third, the automobile parts and smart mobile sector were selected as core business types for the smart device and parts industry. Especially, it is assumed that the automobile parts can have high industrial and economic effect if it is connected to the Daegu-gyeongbuk Automobile Promotion Foundation, the Gyeongbuk Research Institute of Vehicle Embedded Technology located in Yeongcheon, the Green car parts project team located in Daegyong and ITS parts test center located in Daegu.

Finally, the high-tech metal-ceramic materials and the high-tech textile materials business were selected in the high-tech integration component industry. As intermediate goods, they are core elements to decide performance, quality and price competitiveness of the front industry, as well as core technology to create high added value with high compatibility. It is expected that they will make big contribution on activation of the local economy in the future.

IV. FURTHER PERSPECTIVE AND PROBLEMS

The local industry should be developed mainly by the region. Up to now, due to local industry development plans devised by the central government projects are duplicated and due to inefficient support between supporting agencies, competitiveness between the regions are more serious and it does not lead actual local industry development. From this point of view, it is necessary to focus on preparation of independent local industry promotion plans, considering local circumstance. In other words, it is necessary to introduce a bottom-up project from a local government to the central government, performed by a local government, rather than the central government. Especially, it is essential to prepare a local industry promotion plan to prevent excellent local human resources from flowing out of the local area after the leading strategic industry project promoted by the central government. An industry growth plan concentrating on the region should be prepared, based on consideration of the current local industry condition and potential. Avoiding support to hardware, a support to software, which can help and support systematic use of existing hardware, is required.

With promotion of the Daegyeong region leading industry policy for the last 5 years, the foundation for the local development has been prepared by expanding R&D capability, human resources and infrastructure, which may help development of local industries by the region. In spite of such tangible results, there are still many problems to be overcome in the local industry policy.

First, it is necessary to set up a clear medium and long term vision. The first stage of the project from 2009 to 2012 is soon completed and this year it was decided to start the second stage of the project from 2013 to 2015. Therefore, clear direction setting and preparation of road map are necessary in order for the project of the Daegyeong economic region to be promoted, irrespective of change in political circumstance.

Second, despite that the foundation for development of the local leading industries has been prepared, it is hard to say that the local industries have completed construction of a unified industrial technology innovation system beyond the regional boundary. Compared to companies located in the capital region, local companies still have many difficulties in securing excellent human resources, developing technology, using infrastructure and accessing to physical distribution. Especially, greeting with the globalization, integration and knowledge industrialization era, more policy considerations on local industries from the overall economic ecosystem point of view are necessary to help the local industries to have independent competitiveness in the global market. In addition to this, strengthening capability of metropolitan cities and provinces are essential in developing the leading industry in economic regions. To do this, it is necessary to change the leading industry policy for corresponding cities and provinces to propose a project and find a program independently

Third, the central government designates and supports two leading industries in each economic region as representative industries under the principle of 'Choice and Focus'. However, in this case, there is rigidity because support is provided every stage for three years, irrespective of performance and support is provided for long time without modifying and supplementing an object or contents. Although the current rigid targeting method has advantages in effectiveness, inefficiency may increase because rigidity prevents companies from taking an opportunity to adjust themselves to rapid changing global environment and bring duplicated investment between regions (the Ministry of Knowledge Economy, 2011a). Therefore, it is necessary to construct the Regional Enterprise Partnership (REP) to actively respond to rapidly changing industrial environment and focus on strengthening global competitiveness by supporting medium standing companies with excellent competitiveness in the local area.

Recently, a competition unit moves from a nation to a region and a large companies to a medium and small or venture companies. Many countries in the world places a value on a policy to make a company respond to rapidly changing needs to maintain national competitiveness. For example, U.K in 2012 changed its region development policy focusing on Regional Development Agency (RDA) to Local Enterprise Partnerships (LEP) focusing on small and medium companies to grow local industries. To do this, specific strategy, evaluation and management are essential to find and support good medium standing companies in the local area. First of all, it is important to make excellent business environment to help a small but strong company commercialize developed technology and settle down to the global market. In addition, company oriented support is required to be provided to help a company to be supplied professional and production human resources when they are needed and have competitiveness differentiated from companies in other regions. For most small and medium companies, they have little global experience and limited resources and, therefore, they have limitation on developing localized products. Therefore, a company should have aid from the cooperation network consisting of the central and local government, universities, research institutes, related support organizations to advance to the global market with differentiated core technology

Now, a region has an institutional foundation to promote an industrial policy independently because of the leading industry growth policy promoted by the central government for the last 10 years. From this point of view, independence and responsibility of a local government should be highlighted in promoting a local industry policy. The central government should keep its intervention minimize to help a local government develop the local industry independently. A life of a plan depending on financial resources and planning of the government would be short. In accordance with decentralization trend, the central government should change its system to support, evaluate and select project task after discussion with a local government and provide consulting to it. An advanced system to help a local government set vision of local industry development and lead a project should be introduced, based on this.

From this point of view, new concept of organizational structure should be introduced for continual promotion of the leading industry of the Daegyeong economic region. The 'Regional industry development committee' should be configured to increase efficiency of the economic region industry policy, which has been promoted until now. To do this, the Daegyeong Regional Development Committee and the Daegyeong economic region leading project support team should be integrated and delegated wide authority including deliberation and execution, as well as existing evaluation function. The 'Regional industry development committee' should have responsible for environment, culture, energy and physical distribution, which require cooperation between regions.

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PART 2.

URBAN DEVELOPMENT AND PARTICIPATORY PLANNING



5th Cycle Regional Housing Needs Assessment

I. INTRODUCTION

The State of California has made a diligent effort to improve the provision of housing and affordability for over four decades. The housing element law has placed a mandate upon local governments to adequately plan to meet the existing and projected housing needs of all economic segments of the community since 1969. The housing element law addresses the statewide concern of providing "decent housing and a suitable living environment for every California family" (California Department of Housing and Community Development, 2005) in part by facilitating increases in housing supply to accommodate the needs of the state's growing population. The law recognizes that the most critical decisions regarding housing development occur at the local level within the context of the general plan. In order for the private sector to adequately address housing needs and to meet demand, local governments must regularly update their general plans, zoning, and development standards to provide opportunities for housing development for all income groups.

Housing element law requires that the California Department of Housing and Community Development (HCD) quantify regional housing needs, and the Council of Governments (COG) allocate the region's share of the statewide need to cities and counties within their region. The share of the regional housing need allocated to each city and county is a short-term projection of additional housing units needed to accommodate existing households and projected household growth of all income levels by the end of the housing element planning period. The RHNA allocation process establishes minimum housing development capacity that cities and counties are to make available via their land use powers to accommodate growth within a short-term planning period. RHNA numbers are assigned by four income categories as guideposts for each community to develop a mix of housing types for all economic segments of the population. The process is also known as "fair share" planning. With the introduction of SB 375 in 2008, this fair share planning process is now more integrated with the regional transportation plan (RTP) and Sustainable Communities Strategy (SCS). A new SCS was introduced to achieve greenhouse gas emission reductions. SCAG is also mandated to prepare a RHNA allocation plan every eight years.

SCAG began the 5th cycle RHNA process in 2009. Following the RHNA determination of the SCAG Region by California HCD on August 17, 2011, SCAG developed the RHNA allocation for 191 cities and 6 counties, ensuring that minimum affordable housing goals are met. These goals were based on the latest 2005-2009 American Community Survey (ACS) income categories and are adjusted to meet fair share housing requirements. The current RHNA projection period is January 1, 2014 to October 1, 2021. The SCAG Regional Council adopted the 7 year and 9 month RHNA allocation plan on October 4, 2012. As a final step of the 5th cycle RHNA, HCD approved the SCAG RC adopted regional housing need allocation plan on November 26, 2012.

This paper explores how SCAG developed the 5th cycle RHNA allocation plan, 1/1/2014-10/1/2021, for 191 cities and 6 counties in the SCAG region. The paper reviews the SCAG approach toward developing the key elements of the RHNA allocation plan: process, methodologies, and social equity policy. In the next section, the paper reviews the California's affordable housing effort with an emphasis of the engagement of many stakeholders in the process. Sections III and IV describe the goal and the measurements of RHNA specified in the California housing law, and discuss the role of RHNA in local housing element updates, land use planning, transportation mobility, social equity within the California planning framework. Section V presents the RHNA development process used in the 5th cycle RHNA. Section VI describes the RHNA methodology and social equity policy. Section VII concludes the paper by identifying three major approaches toward a successful RHNA outcome and by discussing the important urban issues for further research in the future.

II. REVIEW OF THE CALIFORNIA'S AFFORDABLE HOUSING EFFORT

SCAG's participation in the Fair Share planning process has evolved since it began addressing Southern California's housing needs in the 1970s. SCAG started its regional housing needs planning initiatives with its advisory 1972 regional housing allocation model and has now completed its State mandated 5th cycle RHNA allocation plan.

During this 40 year period, the SCAG focus has shifted from aiding communities applying for federal community development and housing resources to providing state mandated regional housing planning targets by income group for communities updating their local housing elements and competing for discretionary state and federal housing or bond resources from State HCD. Over the last four decades, affordable housing has been provided more and more by community-based and regional non-profit housing developers (Weinheimer, 1999; National Congress for Community Economic Development, 2005; Melendez and Servon, 2007; Walker, 2002; Levy et al, 2001; Mayer, Neil. 2007.). This trend emerged and grew rapidly with the support and guidance of an array of private funding sources and federal and state tax credits in support of affordable housing.

On the other hand, national policy--supporting housing and community development funding and subsidies--has been in steady decline, while state and local governments have been asked to assume increasing responsibility for providing affordable, fair share housing opportunities that serve all economic groups (Hays, 1995; Erickson, 2004). A renewed national focus on promoting housing affordability is unlikely to return. With a lack of a secure and permanent funding source for providing affordable housing, local and state Housing Trust funds, along with even a National Housing Trust fund have been proposed.

The procedures for determining the local share of the regional housing needs allocation have been controversial and have been frequently updated over the last four decades (Mitchell, 1994; Warner, Dichoso, Markham, McLaughlin, and Stowell, 1997; Landis and Legates, 2000; Fulton and Shigley, 2005). The California housing element law started with no detailed statutory requirements in 1969 and now has become one of the most detailed and extensive set of planning requirements in the nation (Warner, Dichoso, Markham, McLaughlin, and Stowell, 1997). A major concern is abiding by the steps and process used to inform the public and communities how the Council of Governments (e.g., SCAG) or HCD where there is no COG determined the RHNA housing targets by income group.

The California housing element law may have contributed to developing many very good housing plans (Landis and Legates, 2000). But it has not been as successful in producing the needed affordable housing units (Baer, 1986; Mitchell, 1994; Connerly and Smith, 1994; Warner et al, 1997; Landis and Legates, 2000; Fulton and Shigley, 2005; Baer, 2008). Nor has a strong connection been established between non-compliant jurisdictions and the under production of needed market rate or affordable housing (Lewis, 2005).

Facing all RHNA criticisms, all parties involved in the process will agree that the RHNA processes at least accomplishes one thing: it brings many diverse interests in the development process together and engages them in a public discourse on current and future housing planning issues and challenges. This broad based public debate would not occur with the frequency and fervor it does today without the State Housing law and its fair share requirements.

III. WHAT IS RHNA?

The ultimate goal of estimating the local fair share of the regional housing market need is to develop a quantified target of affordable housing units which communities agree with. The local share of the regional housing needs allocation is a short-term projection of additional housing units needed to accommodate existing households and projected household growth of all income levels by the end of the housing element planning period. The RHNA allocation process establishes the minimum housing development capacity that cities and counties are to make available via their land use powers to accommodate growth within a short-term planning period. The RHNA numbers are assigned by four income categories as guideposts for each community to develop a mix of housing types for all economic segments of the population. The process is also known as "fair share" planning. The RHNA results should be consistent with other goals of the State Law: increasing the housing supply and the mix of housing types, tenure, and affordability in an equitable manner; promoting infill development and socioeconomic equity; promoting an improved intraregional relationship between jobs and housing; and allocating a lower proportion of housing need to an income category when a jurisdiction already has a disproportionately high share compared to the countywide distribution (California Government Code Section 65584 (d))

The RHNA is mandated by State Housing Law as part of the periodic process of updating local housing elements of the General Plan. The RHNA quantifies the need for housing within each jurisdiction during specified projection periods. The current projection period is January 1, 2014 to October 1, 2021. Communities use the RHNA in land use planning, prioritizing local resource allocation, and in deciding how to address identified existing and future housing needs resulting from population, employment and household growth. The RHNA does not necessarily encourage or promote growth, but rather allows communities to anticipate growth, so that collectively the region and subregion can grow in ways that enhance the quality of life, improve access to jobs, promote transportation mobility, address social equity, and meet fair share housing needs.

The RHNA consists of two measurements of housing need: existing need and future need. The existing need assessment examines key variables from the most recent Census to measure ways in which the housing market is not meeting the needs of current residents. These variables include the number of low-income households paying more than 30% of their income for housing, as well as severe overcrowding, farm worker needs and housing preservation needs.

The future need for housing is determined primarily by the forecasted growth in households in a community. Each new household, created by a child moving out of a parent's home, by a family moving to a community for employment, and so forth, creates the need for a housing unit. The anticipated housing needed for new households is then adjusted to account for an ideal level of vacancy needed to promote housing choice, moderate cost increase, avoid the concentration of lower income households and to provide for replacement housing.

IV. RHNA USE IN LOCAL HOUSING ELEMENT UPDATES

Every city and county in California must adopt a comprehensive "general plan" to govern its land use and planning decisions. All planning and development actions must be consistent with the general plan. The general plan housing element must be periodically updated using the latest RHNA allocation plan. A housing element must first include an assessment of the locality's existing and future housing needs. This assessment must include the community's "fair share" RHNA allocation for all income groups (very low, low, moderate and above moderate) as determined by the regional Council of Governments (COG).

The purpose of the Housing Element of the General Plan is to ensure that every jurisdiction establishes policies, procedures and incentives in its land use planning and redevelopment activities that will result in the maintenance and expansion of the housing supply to adequately house households currently living and expected to live in that jurisdiction. When a local government fails to adopt an updated housing element, or adopts an element that does not comply with the law, the general plan is invalid and a local government may not proceed to make land use decisions or approve development until it has adopted a valid housing element.

Housing Element Law requires quantification of each jurisdiction's existing and projected housing needs for all income levels. The housing element's requirements to accommodate projected housing needs are a critical factor influencing the housing supply and availability statewide and within regional housing markets. The local regulation of the housing supply through planning and zoning powers affects the State's ability to achieve the State housing goal of "decent housing and a suitable living environment for every California family," and is an important influence on housing costs.

The RHNA allocation process addresses this statewide concern, and reflects shared responsibility among local governments for accommodating the housing needs of all economic levels. The early attainment of this goal requires the cooperative participation of government and the private sector in an effort to expand housing opportunities and accommodate the housing needs of all Californians. While this law does not require local governments to provide housing to meet all of its identified need, it does require that the community plan for the needs of all their residents.

V. THE RHNA PROCESS

The SCAG's 5th cycle RHNA presented challenges as a planning process. In addition to meeting very strict and specific timelines in State law, processes such as consulting/coordinating with HCD on the region's share of statewide housing need, (e.g., conducting a coordination of the growth forecast for RHNA with the forecast for the Regional Transportation Plan (HCD has the discretion to reject the request, but did not), facilitating HCD discussion/debate regarding several elements of the allocation plan, collaborating and surveying all SCAG local jurisdictions (including 6 unincorporated county areas) on data input, planning factors and methodology questions, conducting public hearings, subregional briefings and administrative hearings on proposed revisions and appeals. The following is a summary of the 5th Cycle RHNA process (Southern California Association of Governments, 2012b).

1. Local Survey and Outreach

SCAG began the process of developing the 5th cycle RHNA Plan in May 2009, when SCAG staff began surveying each of the region's jurisdictions' population, household, and employment projections, as part of a collaborative process to develop the Integrated Growth Forecast. This would be used for all regional planning efforts including the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). These surveys continued through August 2011. During this time, SCAG staff engaged in extensive communication and data sharing with each jurisdiction in the SCAG region, including in-person meetings, to ensure the highest participation in gathering local input.

2. HCD Consultation and RHNA Determination

Beginning in January 2011, the RHNA Subcommittee held regular monthly meetings to discuss the RHNA process, policies, and methodology, and to provide recommended actions to the CEHD

Committee. SCAG and HCD officially started the consultation process to determine the total housing needs for the SCAG region on June 20, 2011. As a result of the consultation process, on August 17, 2011, HCD determined SCAG's regional housing need to be in a range of 409,060 to 438,030 units for the period between January 1, 2014 and October 1, 2021 (California Department of Housing and Community Development, 2011). SCAG is required to maintain the regional total need throughout the RHNA allocation process so that it is within the HCD range and is consistent with SCAG's Integrated Growth Forecast.

3. Adopt the RHNA Allocation Methodology

At its August 26, 2011 meeting, the RHNA Subcommittee recommended the release of the proposed RHNA Allocation Methodology to the CEHD Committee. The CEHD Committee reviewed, discussed and further recommended the proposed methodology to the Regional Council, which approved the proposed methodology for distribution on September 1, 2011. During the 60-day public comment period, SCAG met with interested jurisdictions and stakeholders to present the process, answered questions, collected input and held public hearings to receive verbal and written comments on the proposed methodology. After the close of the public comment period, on November 3, 2011, the RC adopted the RHNA Methodology.

4. Release the Draft RHNA Plan

On December 9, 2011, SCAG released the Draft RHNA Plan as part of the agenda for the RHNA Subcommittee meeting. The Draft RHNA Plan was recommended by the RHNA Subcommittee for approval by the CEHD Committee and the RC. The CEHD Committee reviewed and recommended the Draft RHNA Plan to the RC on January 5, 2012 and the RC reviewed and approved for distribution the Draft RHNA Plan on February 2, 2012. SCAG received various email correspondence from the cities of Calabasas, Ojai, and Oxnard related to revision requests or appeals, which were addressed and responded to as part of the respective revision requests and/or appeals processes. The Draft RHNA Plan acknowledged a total future housing need of 412,721 units for the SCAG region. In addition, on April 4, 2012, the RC unanimously approved SCAG's 2012-2035 RTP/SCS, including its jurisdictional level Integrated Growth Forecast.

5. RHNA Revision, Appeals, Trade and Transfers

The RHNA revision requests and appeals processes commenced immediately after the RC's approval for distribution of the Draft RHNA Plan. The RC delegated authority to the RHNA Subcommittee to review and to make final decisions on RHNA revision requests and appeals pursuant to the RHNA Subcommittee Charter, which was approved by the RC on June 2, 2011.

In this capacity, the RHNA Subcommittee was designated as the RHNA Appeals Board. On February 2, 2012 (and amended on May 3, 2012), the RC also adopted Procedures Regarding Revision Requests, Appeals and Trade & Transfers (the "Appeals Procedure") for jurisdictions wishing to request a revision to their allocated housing need, to appeal their allocated housing need, or to trade and transfer their allocated housing need.

The RHNA Appeals Board reviewed, discussed and considered the revision requests of 14 jurisdictions and the appeals of 12 jurisdictions. The RHNA Appeals Board approved a reduction of 544 units in revision requests of three jurisdictions and a 40-unit correction to the regional total for the City of Glendora. The RHNA Appeals Board approved zero reduction of units in appeals.

As the RHNA Appeals Board was delegated by the RC to review and make the final decisions regarding revision requests and appeals submitted by jurisdictions, these decisions are final, and are not subject to any further review by the CEHD Committee or the RC. The result of this correction and the revision requests and appeals processes adjusted the total regional housing need to 412,137 units. There were no trade and transfer agreements between participating jurisdictions.

6. Adopt the Final RHNA Plan

SCAG RC adopted the final RHNA Plan on October 4, 2012. HCD reviewed the final adopted RHNA allocation plan to determine the consistency with statutory requirements for identifying a regional need within a specified range approved in advance by State HCD for both the total need and its breakdown by income category. HCD approved SCAG's adopted RHNA plan upon finding it consistent with the HCD's August 17, 2011 RHNA determination on November 26, 2012 (California Department of Housing and Community Development, 2012).

VI. RHNA METHODOLOGY AND SOCIAL EQUITY POLICY

This section describes the integrated growth forecast process, methodology, and results that served as the framework and foundation for the 2012-2035 RTP/SCS development, and was used to produce the 5th Cycle RHNA Allocation Methodology (also referred to as "Allocation Methodology" herein), which was applied to distribute the regional housing need to produce a draft housing allocation to all local jurisdictions within the SCAG region. All key elements of the 5th Cycle RHNA Allocation Methodology including social equity policy are presented in detail in the later portion of this report.

1. RHNA Determination Methodology

HCD rendered its final determination of the SCAG region's housing need in the range between 409,060 and 438,030, and breakdowns by income group (very low, low, moderate, and above moderate) for the period January 1, 2014 through October 1, 2012 on August 17, 2011 (See Table 1). HCD considered household growth, vacancy need, and replacement need for the projection period (See Table 2).

HCD considered the extraordinary uncertainty regarding national, state, and local economies and housing markets for the range (California Department of Housing and Community Development, 2011). In particular, the RHNA low range (409,060) reflects the SCAG proposed household growth,

adjustment of household growth for tribal land and adjustment for high unit vacancies from the unusual turmoil in housing markets. The RHNA high range (438,030) is based on the more optimistic view of SCAG’s economic and demographic growth and related increase of housing demand, particularly among older age groups.

Table 1. HCD RHNA Determination for the SCAG Region by Income Category

Income Category	Percentage	Range of Housing Unit Need	
		Low Range	High Range
Very Low	24.4%	99,810	106,880
Low	15.8%	64,630	69,210
Moderate	17.5%	71,590	76,650
Above Moderate	42.3%	173,030	185,290
Total	100.0%	409,060	438,030

Table 2. HCD RHNA Determination for the SCAG Region by Component

	Range of Housing Unit Need	
	Low Range	High Range
Household Growth	468,595	448,010
Vacancy Need	13,445	12,850
Replacement Need	2,410	2,300
Adjustment for Absorption of Existing Excess Vacant Units	-75,390	-25,130
RHNA Determination	409,060	438,030

2. RHNA Allocation Methodology

Once the RHNA determination is made for the SCAG region, the regional RHNA figure is further allocated to local jurisdictions within the region. The local share of the regional housing needs is determined using a two-step process. The first step is to calculate the RHNA allocation by adding three major components: household growth, healthy market vacancy need, and replacement need, with an adjustment for the excess vacant units in the existing housing stock. The second step is to estimate the fair local share of the RHNA allocation by income category.

a. Population Projection and Household Growth

The major challenge of the 5th cycle RHNA process is to develop a realistic and accurate population projection for the 5th cycle RHNA. SCAG began developing the long term growth forecasts for the 2012–2035 RTP/SCS in the middle of the Great Recession (2007–2009). The traditional long term perspective, which may not reflect the on-going economic trends and the frequently updated short term economic forecast, could result in a serious bias in the short term population projections. The major sources of potential projection error include: (1) the unstable/uncertain nature of the key economic-demographic assumptions, in particular,

unemployment rate and migration in the short term framework; (2) the timing and reasonableness of population projections (and assumptions) by the US Census Bureau and CA DOF; (3) the lack of relevant statistical data in a timely manner; and 4) the significant gap in population estimates between the US Census Bureau and CA DOF. SCAG used the BULA (Balance, Uncertainty, Latest, and Adaptive) approach toward developing the regional growth forecasts to reduce potential projection error (Southern California Association of Governments, 2012a)

Population and households are projected using the widely used projection techniques and extensive local input as part of 2012-2035 RTP/SCS Integrated Growth Forecast development process. The projected household growth for each jurisdiction should be consistent with the 2012-2035 RTP/SCS Integrated Growth Forecast. This is to ensure that the RHNA is consistent with the development pattern of the RTP/SCS per SB 375.

b. Vacancy Need

Vacancy need is based on the concept that vacancies serve an important function in a community's housing market (Southern California Association of Governments, 1999). In brief, a certain number of vacant units are needed in the housing market to promote residential choice,

Table 3 Vacancy Rate Assumptions

Source	Owner	Renter
State of California ^a	2.00%	6.00%
State of Florida ^b	3.00%	8.00%
State of New Jersey ^c	2.50%	8.00%
State of Oregon ^d	1.75%-2.00%	5.00%-6.00%
Readings in Market Research for Real Estate ^e	4.00%	7.00%
Federal Housing Administration ^f	<u>5%+ Annual Growth</u> 1.50%-2.00%	<u>5%+ Annual Growth</u> 6.00%-8.00%
	<u>1%-5% Annual Growth</u> 1.00%-1.50%	<u>1%-5% Annual Growth</u> 4.00%-6.00%
	<u>Below 1% Annual Growth</u> <1.00%	<u>Below 1% Annual Growth</u> <4.00%

Note: a. Office of Planning and Research (1978), p.67.; b. Florida Department of Community Affairs (1987), p.35.; c. New Jersey Department of Community Affairs (1991), p. 183.; d. Housing Division (undated, circa 1985).; e. Singler (1985), pp. 92-03; Readings in Marker Research for Real Estate, pp. 85-101.; f. Federal Housing Administration (undated).

Source: Nelson, AC (2004), *Planner's Estimating Guide Projecting Land-Use and Facility Needs*. Planners Press, American Planning Association. p.25, Chicago.

moderate cost of units, and provide sufficient incentive for unit upkeep and repair. SCAG assigns a vacancy need equal to the net difference between the healthy market vacancy rate and the current number. The healthy market vacancy need for additional housing units is determined by applying a 1.5%-owner vacancy rate and a 4.5%- renter vacancy rate to each jurisdiction's projected household growth, split by the proportion of owner occupied units and renter occupied units from the 2010 Census.

The reasonable amount of vacant units in the housing market plays a big role in stabilizing the housing price across the region. There is no clear cut standard for the normal vacancy rate. The following is a range of vacancy rate assumptions by tenure used in many states and other agencies in the USA (Nelson, 2004) (See Table 3). U.S. Federal Housing Administration guideline suggests a flexible standard linked with annual growth rates of households. The similar approach was applied to estimate the normal vacant units in Southern California (Myers, 1993; Carreras and Choi, 1993). If the current number of vacant units is less than the normal number of vacant units, the current housing demand is stronger than the current housing supply. In the future, the additional housing supply for more vacant units needs to be available to meet the expected housing demand.

c. Replacement Need

While the need for housing construction is driven primarily by the demand generated by economic and demographic movements of households, the pace of housing removals also influences the need. Units may deteriorate with age, reach functional obsolescence, or changing local market conditions may lead to the removal and replacement of existing housing supplies (California Department of Housing and Community Development, 1999). A certain percentage of housing units are removed from the inventory due to fire, natural disasters, and obsolescence due principally to aging (Nelson, 2004). Some housing units are converted into other non-residential uses.

The replacement need is estimated at approximately 0.5% of the projected housing needs including household growth and healthy market vacancy needs during the RHNA projection period, reflecting 10 year housing unit losses for the period of January 2001 to January 2011 from the DOF database and SCAG demolition survey. The replacement need is determined by applying each jurisdiction's share of SCAG's historical demolitions to the region's housing replacement need, as determined by HCD. A jurisdiction's share of the region's demolitions is derived using historical demolition data (2000-2010) from the Department of Finance (DOF). The replacement need is then adjusted by applying the share to the jurisdiction's input gathered through SCAG's Housing Unit Demolition Survey.

d. Adjustment for the Excess Vacant Units

As the result of the nation's economic recession between 2007 and 2009, the SCAG region also experienced continuing housing market depression. According to the S&P Case-Shiller Home Prices Index, prices fell 5% from a year ago, with 19 of the 20 cities evaluated experiencing price drops (the SCAG reading was 167.77 in March 2011, -0.3% than in 02/11 and 1.0% lower than in 1/11, and 1.7% lower than the reading recorded a year earlier in 03/2010). The continuing housing market depression will have very negative impacts on economic and job growth. In contrast to a "U" shape recovery of the employment market, the UCLA Anderson Forecast has now reversed to a so-called "L" shape recovery for the job market. These factors all point to a persistently high level of vacancy rates, if not higher, in the foreseeable future. Given the current state of the housing market and employment conditions, the near-term outlook of the housing market in terms of vacancy rates in the next 1-3 years would be as follows: a double-dip recession in the housing market ends within the next 12-18 months, current vacancy rates are stable and no worse off, the market begins recovery mode and starts to absorb the vacant units currently on the market starting from January 2013.

Reflecting the uncertain future of the housing markets, there is an adjustment of the RHNA vacancy need due to the excess vacant units in their existing housing stock. The total excess vacant unit credit for the region is 75,390, which is divided into two components: (1) the excess vacant unit credit for effective vacancies (69,105); (2) the excess vacant unit credit for "other" vacant unit types (6,285), as determined by HCD. The excess vacant units for effective vacancies are defined as the housing units for sale and for rent in the existing housing stock that are above the housing units required to maintain the healthy market condition can be available as credits. The healthy market vacancy rates are defined as 1.5% for the owner rate and 4.5% for the renter rate as suggested for vacancy allowance. The other excess vacant units for "other" vacant unit types are determined by considering the absorption level (e.g., the share of excess "other" housing units to be converted from the excessive vacant housing unit category into the normal vacant housing unit category between January 2011 and January 2014). The absorption rate was determined at 10% using a relatively optimistic economic outlook.

Table 4. SCAG RHNA Allocation for the City of Los Angeles by Component

	Housing Unit Need
Household Growth	95,023
Vacancy Need	3,186
Owner	545
Renter	2,641
Replacement Need	0
Adjustment for Absorption of Existing Excess Vacant Units	-16,207
RHNA Allocation	82,002

e. Social Equity

California housing law establishes the definition of four household income groups used by communities in the RHNA process. It is based on a percentage relationship to the median household income in each county from the latest census: Very Low (0-50%), Low (51-80%), Moderate (81-120%) and Above Moderate (more than 120%). It then establishes a goal of moving every local jurisdiction toward the county percentage of households in each category in order to promote housing diversity and avoid the over concentration of any one income group in any one community. SCAG's Social Equity Policy for the 5th cycle RHNA process is to move each jurisdiction 110% of the way towards the county income distribution for each of the defined income categories.

A 110% Social Equity Policy was an extension of the 4th cycle RHNA practice that moved jurisdiction from 25% to 75% of the way toward the county average. The Social Equity Policy is designed to avoid the over concentration of households by income group, by way of a 110% of the way adjustment toward the county median income distribution applied against future growth except in impacted communities providing a disproportionately high share of lower income housing.

Table 5 demonstrates how to adjust the fair share allocation of local housing needs by income category utilizing the approved 110% fair share adjustment. Each jurisdiction will move 110% towards the county distribution in each of its four income categories. For example, based on county median household income in the 2000 Census, a jurisdiction's income distribution is Very low (29.5%), Low (16.8%), Moderate (16.6%), Above moderate (37.1%), while the county distribution is Very low (24.7%), Low (15.7%), Moderate (17.1%), Above moderate (42.6%). The City B's share of housing needs for very low income households is 29.5%, which is 4.8% higher than that of the County A. After multiplying the original difference of 4.8% by 110%, the adjusted difference becomes 5.3%. If 5.3% is subtracted from 29.5%, which is the original local share of housing needs for very low income households, the adjusted fair share of very low income housing needs is 24.2%. The same calculation procedure is repeated to produce the adjusted local share of housing needs for three other categories' households. Table 6 demonstrates the SCAG RHNA Allocation for the City of Los Angeles by income category.

Table 5. Adjusted Fair Share Allocation of Local Housing Needs by Income Category

Income Category	County A	City B original	City B adjusted
Very low	24.7%	29.5%	$29.5\% - (29.5\% - 24.7\%) \times 110\% = 24.2\%$
Low	15.7%	16.8%	$16.8\% - (16.8\% - 15.7\%) \times 110\% = 15.6\%$
Moderate	17.1%	16.6%	$16.6\% - (16.6\% - 17.1\%) \times 110\% = 17.1\%$
Above moderate	42.6%	37.1%	$37.1\% - (37.1\% - 42.6\%) \times 110\% = 43.1\%$
Total	100.0%	100.0%	100.0%

Table 6. SCAG RHNA Allocation for the City of Los Angeles by Income Category

Income Category	Percentage		Housing Unit Need
	Original*	Adjusted	
Very Low	29.6%	24.9%	20,427
Low	16.2%	15.2%	12,435
Moderate	16.2%	16.7%	13,728
Above Moderate	37.6%	43.2%	35,412
Total	100.0%	100.0%	82,002

Note: * based on 2005-2009 American Community Survey (ACS).

VII. CONCLUSIONS: SUCCESS AND CHALLENGES

Reflecting on the past four year experience of the SCAG's 5th cycle RHNA determination and allocation process, the following three creative and innovative approaches have played a key role in the unprecedented success in producing RHNA figures for local jurisdictions in the SCAG region. First, SCAG used the BULA (Balance, Uncertainty, Latest, and Adaptive) approach toward developing the regional growth forecasts to lower potential projection error. The regular update of the short term forecast through expert opinion was very effective, and the local input approach for local growth projections was also found to make a significant contribution to the successful RHNA allocation. Second, credits for excess vacant housing units from the existing housing stock and the absorption level of excess housing units into the healthy market vacant units were made available to reflect uncertain housing markets. The short term economic outlook played an important role in determining the absorption level of the existing excess vacant units into the normal vacant housing unit category. Third and last, the reasonable replacement allowance rate of the projected housing needs was made available during the RHNA projection period reflecting 10 year housing unit losses for the period of January 2001 to January 2011 from the DOF database and SCAG demolition survey. The new replacement rate was 0.5% (0.06% on an annual basis) of the projected housing needs, rather than 0.2% of an annual replacement rate used in the 4th cycle RHNA process.

The following issues were emerging during the RHNA process and could not be properly addressed, and need to be further studied in the future.

1. SB 375, Job Housing Imbalance, and Inter-Regional Collaboration

The 5th cycle RHNA allocation process in Southern California stresses land use integration with transportation and environmental planning. With State Law SB 375 mandating significant reductions in vehicle miles traveled and mobile emissions, land use planning has become part of the tool kit to reduce Greenhouse Gas emissions and provide for a sustainable, long term inventory of housing needed to support population and employment growth in the future. An emerging issue is correcting for job housing imbalance by broadening the regional or inter-regional geography for modeling housing and job sheds that cross metro areas, because it places

less urgency to plan locally for consequences of unbalanced growth. For example, a community may not adequately take into account commuter based housing demand from other regions, just as a neighboring region – such as San Diego - may not be fully taking into account the workforce housing demand generated by their employment growth on other markets or regions in adjacent metro areas. The California Blueprint Program may be a way to balance local self-determination with effective subregional and inter-regional policies and decision-making.

2. Conflicts between Fair Share and Transportation Efficiency

One of the emerging conflicts is the difference between transportation efficiency, GHG emission reductions associated with compact, center, and transit friendly land use patterns and the “fair share” principle of the RHNA process that requires all communities to take their fair share of affordable, lower cost housing, regardless of proximity to transit or employment centers. Better coordination and communications are needed between a fair-share based RHNA and a housing allocation plan designed for transportation efficiency. One solution is that the “Integrated Planning Process,” i.e., if Blueprints, RTP, and RHNA could be integrated into one planning process, it would result in one coordinated process and reconcile competing state housing and transportation goals for future development.

3. Gentrification and Health Issues

Another example of the conflicts between competing public policy goals is the adverse impacts related to gentrification. Compass Blueprint has taken a detailed look at infill, mixed-use and transit-oriented development but has not yet explicitly addressed the fact that infill often replaces existing workforce housing with more up-market housing products and displaces transit dependent populations unless inclusionary policies or replacement housing programs are adopted to mitigate housing stock conversions to amenity laden condos from apartments or subsidized housing to market rate units. Employment near transit may also be adversely affected with widespread conversion to residential use without proper planning to see if the economic job base is unduly reduced. Also largely unaddressed to date is the fact that much of the region’s affordable housing is located in areas with elevated public health risks and housing inadequacy or overcrowding. Compass Blueprint’s emphasis on housing near transportation and employment centers must be reconciled with the public health and safety risks these centers may pose. A transportation plus housing affordability index report prepared for SCAG evaluates these and other issues related to providing mixed income housing near transit, where combined transportation and housing costs are less burdensome on the family or household budget, and where improved access to transit can result in increased ridership (Center for Transit Oriented Development, 2008). The Index study for SCAG includes six community case studies: El Monte Transit Village, Platinum Triangle (Anaheim), Downtown Fullerton, Koreatown (Los Angeles), Downtown Glendale, and Downtown San Bernardino. The case studies examine different local government approaches to a paradox associated with dispersed growth - it appears to make housing more affordable, but often cancels any significant savings with high transportation costs.

The Affordability Index Toolbox synthesizes results from the case studies and recommends potential policy "tools" that local planners, elected officials and others can use to promote affordability in their Southern California communities (<http://www.compassblueprint.org/toolbox/affordabilityindex>)

4. Measuring Progress

Measuring progress in providing affordable housing is typically done by monitoring key federal and state resources targeted to working families: Low Income Housing Tax Credits; local Redevelopment; CA Housing Finance Agency programs and new Housing Element Progress Reports. There are general measures of housing market health: California Association of Realtors (CAR's) First Time Buyer Housing Affordability Index (FTB-HAI) (<http://www.car.org/economics/marketdata/ftbhai/>) and Rent/Wage research (National Low Income Housing Coalition, 2008)

Workforce Score Cards have also become popular. They are modeled after the Bay Area Council for the nine-county San Francisco Bay Area and Orange County Business Council efforts (<http://www.ocbc.org/research.html>) to monitor and create a methodology which attempts to measure how well communities are doing in promoting job and housing growth locally based on jobs created and local population growth during the housing element planning period. The concept is that a local government should "take care of their own" based on providing enough housing for natural increase and work force growth

Other way to look at fair share housing (RHNA) goal attainment is by looking at quantitative measures of production (percent of RHNA goals met through building permit issuance, for instance). This approach can be augmented by a qualitative set of measures that look at local housing/ land use policy promotion (density bonus, adaptive re-use, mixed use, permit streamlining, small site, town house ordinances, Housing Trust Funds and Inclusionary zoning policy adoption, etc.). State and local housing trust funds and finding a permanent source of affordable housing to support them is a major statewide initiative by HCD. Job housing balance funds as well as TOD/Infrastructure bond and other discretionary funds have been made available to local governments by the State HCD.

In conclusion, preparing a Regional Housing Needs Assessment under California law requires an extensive and very fragile fair share planning process that is not well received locally, but is very important to the social and economic well-being of the State. Making fair share planning real rather than conceptual takes more than unwieldy administrative requirements in law; or threats of lawsuits and suspensions of permitting authority locally; it takes a collaborative input process between state and local governments with the acknowledgement that real incentives are needed, and that high goals deserve a commensurate commitment by the State of California to provide funding and much more flexibility in the Fair Share Process.

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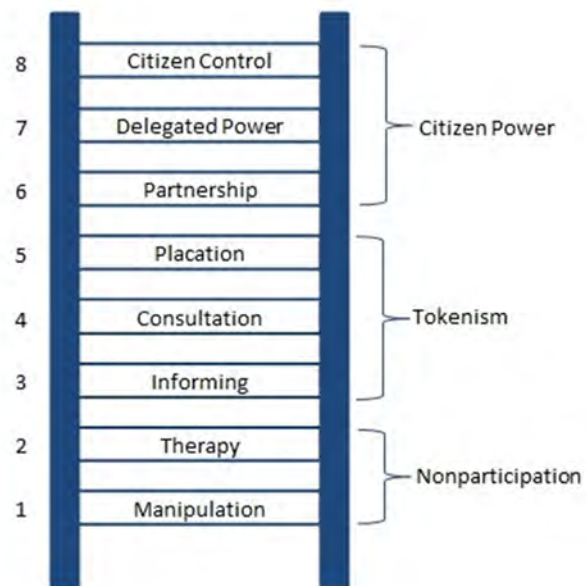
Regional Planning and Public Participation

I. INTRODUCTION

Public participation is a fundamental component of effective regional planning. Opportunities for public participation in the planning process can provide critical information to Metropolitan Planning Organizations (MPOs) in order to better understand and examine the potential impacts of plans and projects from the community viewpoint. Early and continuing public participation in the regional planning process allows MPOs to better understand potential issues, problems, and impacts, to discuss them more effectively and comprehensively, and to better address community concerns and needs. At the same time, public involvement helps the public gain a better understanding of the issues associated with regional planning.

Several studies and practices have been already conducted on public participation, from pioneering research and practices in the 1960s to recent research on the applicability of technology to the public participation process. Saul Alinsky, who is considered to be a founder of modern community organizing, described the theory and methods of organizing to the current generation of young activists in his well-known book, 'Rules for Radicals: A Pragmatic Primer for Realistic Radicals' (Alinsky, 1971). In his book, he methodically "showed the 'have-nots' how to organize their communities, target the power brokers and politically out-manuever them." Paul Davidoff criticized the ineffectiveness of unitary planning, traditional planning processes and physical planning. He argued that planning should be pluralistic and should address diverse interests, especially minorities (Davidoff, 1965). Sherry Arnstein described a typology of eight levels of public participation in her article, 'A Ladder of Citizen Participation,' as shown in Figure 1 (Arnstein S., 1969). In her article, she explored the different ways of public involvement in the decision making process. Archon Fung's study provides a comprehensive empirical analysis of effective participatory democratic governance (Fung, 2004). Fung concluded that "properly designed and implemented institutions of participatory democratic governance can spark citizen involvement that in turn generates innovative problem-solving and public action." Brenman and Sanchez, in a

Figure 1. The Ladder of Citizen Participation



(Source: Arnstein, 1969)

recently published book, argue that to participate meaningfully, communities must understand the consequences of, and alternatives to, proposed decisions, have the information and analysis to articulate the actions that best respond to their needs, and have it at a sufficiently early stage in the processes, when public input can still effect change (Brenman and Sanchez, 2012). They also argued that, at the same time, agencies must “build trust with community groups, ensure transparency about both process and substance, undertake analyses in a manner calculated to reveal new conclusions, rather than justify pre-determined ones, and genuinely listen to community recommendations (Brenman and Sanchez, 2012). There are a number of other studies on the development of new public participation techniques in response to technological developments, such as the internet, mobile phones, social networking sites, etc. (Hampton et al., 2009; Morozov, 2009; Shirky, 2008).

The goal of this study is to provide background information on federal and state requirements on public participation and also to explore the public participation plan and programs that the Southern California Association of Governments (SCAG) developed in preparation for the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (2012-2035 RTP/SCS). In addition, this study introduces references and resources for effective public participation techniques and practices.

II. PUBLIC PARTICIPATION REQUIREMENTS

To increase public participation and enhance collaboration between residents, state agencies, and local agencies in regional planning processes, a number of public engagement requirements have been instituted under federal and state laws. In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) required that, prior to adopting transportation plans and/or programs, the agency “shall provide citizens, affected public agencies, representatives of transportation agency employees, private providers of transportation, other affected employee representatives, and other interested parties with a reasonable opportunity to comment” (23U.S.C. 134 and 135). Subsequent legislation—the Transportation Equity Act for the 21st Century (TEA-21) in 1998 and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005—continued to broaden opportunities for public participation in transportation decision-making. TEA-21, which built upon ISTEA, required the planning process to include proactive public involvement and input gathering as well as providing complete information and timely public notice to communities, stakeholders, and interested parties. Under SAFETEA-LU, which succeeded TEA-21, MPOs are responsible for developing and utilizing a participation plan in consultation with interested parties that provides reasonable opportunities for all parties to comment on the contents of the Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP). SAFETEA-LU also requires that MPOs follow these requirements to enhance the public participation process (SCAG, 2012):

- Providing adequate public notice of public participation activities and time for public review and comment at key decision points, including but not limited to a reasonable

opportunity to comment on plans, and providing timely notice and reasonable access to information about transportation issues and processes;

- Employing visualization techniques to describe plans and make public information available in electronically accessible formats and means, such as the Internet;
- Conducting public meetings at convenient and accessible locations at convenient times;
- Demonstrating explicit consideration and response to public input received during the plan development process;
- Seeking out and considering the needs of those traditionally underserved by existing transportation systems, such as low-income and minority households, who may face challenges accessing employment and other services;
- Providing an additional opportunity for public comment, if the final plan differs significantly from the version that was made available for public comment and raises new material issues which interested parties could not reasonably have foreseen from the public involvement efforts; and,
- Coordinating with the statewide transportation planning public involvement and consultation processes.

In addition, Title VI of the Civil Rights Act of 1964 (Title VI) is the federal law that protects individuals from discrimination on the basis of their race, color, or national origin in programs that receive federal financial assistance. Title VI states that: “No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.” The Civil Rights Restoration Act of 1987 further clarified the scope of Title VI coverage to include all programs and activities of federal-aid recipients, sub-recipients and contractors whether such programs and activities are federally funded or not. This approach was further amplified in 1994 by Executive Order 12898 that provides “fair treatment and meaningful involvement of people of all races, cultures and income with respect to development, implementation and enforcement of environmental laws, regulations, programs and policies.”

Section 504 of the Rehabilitation Act of 1973 provides that “no otherwise qualified individual with a disability in the United States shall, solely by reason of her or his disability, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance or under any program or activity conducted by any executive agency or by the United States Postal Service.” The American with Disabilities Act of 1990 extends the prohibition of discrimination in federally assisted programs established by Section 504 of the Rehabilitation Act of 1973 to all activities of state and local governments, including those that do not receive Federal financial assistance. It prohibits discrimination on the basis of disability by public entities in services, programs and activities. Public entities are required to make programs accessible to individuals with disabilities including conducting meetings and hearings in ADA-compliant buildings. Special accommodations must be

provided to ensure that communications are equally effective for persons with disabilities in order to participate in meetings, planning and programming activities.

Title VI, Executive Order 13166 requires Federal agencies to examine the services they provide, identify any need for services to those with limited English proficiency (LEP), and develop and implement a system to provide those services so that LEP persons can have meaningful access to them. The Disadvantaged Business Enterprise Program (DBE) is a legislatively mandated US DOT program started in 1982 to ensure nondiscrimination in the award and administration of DOT-assisted contracts, to help remove barriers to the participation of DBEs in DOT-assisted contracts, and to assist the development of firms that can compete successfully in the marketplace outside of the DBE program.

In addition, California Senate Bill 375 (SB 375), which requires MPOs to develop a Sustainable Communities Strategy (SCS) with the goal of reducing Greenhouse Gas emissions, contains significant and robust processes for local government and public input into regional planning, including the following outreach requirements (SCAG, 2012):

- Conducting at least two informational meetings in each county within the region for members of the board of supervisors and city councils on the SCS;
- Adopting a public participation plan for development of the SCS that includes outreach efforts to encourage the active participation of a broad range of stakeholder groups in the planning process and at least one workshop in each county in the region to provide the public with the information and tools necessary to provide a clear understanding of the issues and policy choices;
- Preparing and circulating a draft SCS not less than 55 days before adoption;
- Holding at least three public hearings on the draft SCS.

III. SCAG's PUBLIC PARTICIPATION PLAN/PROGRAM

The public plays a key role in every aspect of SCAG's regional planning efforts. SCAG provides information, timely public notice and access to key decisions to support early and continuing public involvement in developing its regional plans. Public involvement is essential to ensure that stakeholders gain a clear understanding of SCAG, critical elements of the 2012-2035 RTP/SCS, and its development process. In addition, public involvement helps SCAG to better understand the needs and concerns of stakeholders.

In compliance with federal and state requirements, SCAG, as MPO for the Southern California region, has encouraged a wide variety of public participation in developing its regional transportation plans and programs. In 1993, SCAG's governing board, the Regional Council, originally adopted "Policies, Procedures and Guidelines for Public Participation and Interagency Consultation." As a result of changes in the metropolitan planning law in 2005, SCAG broadened its participation activities to engage a more extensive group of stakeholders in its planning and

programming processes, as reflected in SCAG's Public Participation Plan adopted by the Regional Council in October 2007. In December 2009, the Regional Council approved an amendment to the Public Participation Plan primarily to address new public participation requirements under state law (SB 375). The Public Participation Plan provides the direction for public participation activities, outlining the processes and strategies SCAG uses to reach out to a broad range of stakeholders and gain their input. SCAG's Regional Council adopted Amendment No. 3 of the Public Participation Plan in January 2012.

In preparation for the 2012-2035 RTP/SCS, which was adopted on April 4, 2012, SCAG maintained expansive outreach efforts to solicit comments and feedback from stakeholders and other interested parties in the SCAG region to engage in updating the Public Participation Plan and its specific 2012-2035 RTP/SCS strategies, procedures and techniques. This involved outreach to cities and counties, county transportation commissions, subregional organizations, transit operators, federal and state resource agencies, tribal governments, representatives of the disabled, representatives of pedestrian walkways and bicycle transportation facilities, environmental groups, and other interested parties through meetings, mailings, email correspondence, workshops, presentations, telephone communications, and videos and website postings, including the iRTP, an interactive RTP/SCS website that enhanced the capability to engage and involve the stakeholders and the public in shaping the 2012–2035 RTP/SCS in an unprecedented way. The section below describes the key SCAG's public participation and outreach strategies for the 2012-2035 RTP/SCS.

a. Planning Sessions with Local Jurisdictions

From January 2011 through March 2011, SCAG conducted 11 subregional planning sessions with local jurisdictions to gather critical data to develop the 2012–2035 RTP/SCS. This data gathering process was conducted to build upon the local jurisdiction's participation in the Integrated Growth Forecast exercise. SCAG worked with local jurisdictions to review, verify and provide the necessary input and most recent data in creating the RTP/SCS scenarios, including land use scenarios, local planning factors, sustainability factors and transportation demand management initiatives. Land use scenarios provided city-generated forecasts on where expected future



development would occur within the jurisdiction. In addition, inputs on local planning factors from jurisdictions affected their forecasted household growth and distribution. They include issues such as lack of capacity for sewer or water service, lands preserved from development under existing federal and state programs, or high housing cost burdens. In addressing SB 375 requirements, SCAG also surveyed the cities on environmental planning activities in the region, as well as interest in California Environmental Quality Act streamlining provisions. SCAG sought to obtain the most up-to-date information available of voluntary actions that cities themselves are taking to become more sustainable. This includes, but is not limited to—efforts directly targeting greenhouse gas emissions. SCAG surveyed each city’s past, current and future Transportation Demand Management policies and strategies that would reduce greenhouse gas emissions. This information was extremely valuable in planning the SCS thereby allowing SCAG to evaluate the entire region’s efforts to meet greenhouse gas reduction targets set by the California Air Resources Board. SCAG staff conducted outreach to cities within each of the fifteen subregions and offered to host survey workshops. Based on the responses, a total of 11 subregional planning sessions were conducted. SCAG utilized these planning sessions in order to continue building a regional plan from the bottom up.

b. Public Workshops

During the summer of 2011, SCAG held 18 public information workshops related to the 2012-2035 RTP/SCS. These workshops were held in each county and drew over 700 individuals. Some of the workshops were also available via video conference and teleconference. Announcements for the workshops were posted on the SCAG website, through emails, social media postings, and event flyers distributed at various outreach opportunities. Workshop participants were provided with a description of the four scenarios and how development location, neighborhood design, housing options and mix, and transportation investments within each scenario would impact greenhouse gas emissions, land use, fuel consumption, water consumption and other costs in the region. Residents, elected officials, representatives of public agencies, community organizations, and environmental, housing and business stakeholders truly made this a “bottom up” process.

SCAG also conducted two workshops and one public hearing in each county, after release for public review and comment of the Draft RTP/SCS in December 2011. Over 450 elected officials, business leaders and community stakeholders attended the workshops and public hearings. At each workshop, staff presented the components of the 2012-2035 RTP/SCS, including major investments and funding strategies, and outlined the benefits for the entire region. The public hearings provided opportunities for the public to provide input on the plan. SCAG also provided an additional opportunity to regional stakeholders by videoconferencing. All of the workshops and public hearings were properly noticed and advertised through newspaper ads and notices. SCAG also requested that member cities and stakeholders promote the hearings via email blasts, newsletter items and announcements via government access channel announcements.

c. SCAG Website and Social Media Networks

In order to establish a centralized information dissemination tool, a 2012–2035 RTP/SCS web page was created on SCAG’s website. This page was frequently updated in order to reflect current information on the RTP/SCS during the Pre- and Post-Draft period. During the Pre-Draft phase, the page contained information on how to get involved in the process. The RTP/SCS web page included Power point, videos and materials (agendas, handouts) used at all 18 Pre-Draft RTP workshops. The web page also included direct links on how to request an RTP presentation, sign up for the RTP email list, and submit a comment on the plan. The RTP/SCS page is part of SCAG’s website, which has many different links and pages that aim to educate the public about SCAG and SCAG initiatives, to keep the public informed of events and meetings, posted meeting agendas and minutes and provide access to related SCAG publications. In the Pre-Draft phase, SCAG used innovative public participation strategies in the development of a portion of the RTP/SCS. Much of the Active Transportation Plan, a component of the RTP/SCS, was developed online using a Wiki—a managed website that allows the collaborative creation and editing of web pages via a web browser. The Bike/Ped Wiki allowed anyone to comment on the Active Transportation Plan during the entire planning process. SCAG publicized the Wiki on its bike/ped Twitter account, with local bike/ped leaning blogs and with local news agencies. SCAG also provided on its website instructions on how to “Get Involved” in the RTP/SCS process by allowing the public to sign up for the agency’s email list, and providing links to follow SCAG on Twitter and Facebook. Updates of all SCAG-related activities and meetings are regularly provided on both social media networks. Also, a newly created interactive RTP website (iRTP) allowed visitors to directly comment on the 2012–2035 RTP/SCS and to download the 2012–2035 RTP/SCS documents. SCAG staff ensured that the information was timely, easy to understand and accessible and that the website is compliant with the Americans with Disabilities Act.

d. Consultation and Coordination with Resource Agencies and Tribal Governments

SAFETEA-LU requires that the RTP environmental mitigation program be developed in consultation with federal, state and tribal land management, wildlife, and regulatory agencies (Title 23 CFR Part 450.322(f)(7)). Additional consultation during development of the RTP is required, as appropriate, with state and local agencies responsible for land use, natural resources, environmental protection, conservation and historic preservation (Title 23 CFR Part 450.322(g)). Consultation shall involve the following, as appropriate: comparison of transportation plans with State conservation plans or maps, if available and comparison of transportation plans to inventories of natural or historic resources, if available. Further, in accordance with Title 23 CFR Part 450.322, the RTP must provide a discussion of potential environmental mitigation activities and areas, including those mitigation activities that might maintain or restore the environment that is being affected by the plan. This mitigation discussion must happen in consultation with federal, state and tribal land management, wildlife and regulatory agencies. Title 23 also requires that the metropolitan planning process be continuous, cooperative and comprehensive and

provide for consideration and implementation of projects, strategies and services to address the following factors:

- Protect and enhance the environment
- Promote energy conservation
- Improve the quality of life, and
- Promote consistency between transportation improvements and state and local planned growth and economic development patterns

On November 30, 2011, SCAG held a Resource Agency Consultation Workshop to provide an overview of the 2012–2035 RTP/SCS and highlight key topics that would be of interest to resource agency partners. The meeting drew 44 participants from a wide variety of agencies including FHWA, U.S. EPA, the California Department of Transportation (Caltrans), California Department of Fish and Game, the Governor’s Office of Planning and Research, and the California Regional Water Control Board. SCAG provided access to the workshop via web-meeting technology and from its five satellite offices in Imperial, Orange, Riverside, San Bernardino and Ventura County. On March 13, 2012, SCAG hosted a second Resource Agency Consultation Workshop. The workshop drew 31 participants including staff from key agencies such as U.S. EPA, California Department of Fish and Game, FHWA, and Caltrans. SCAG also held public scoping workshops to explain the environmental review process and solicit early input on areas of concern. During the development of a program-level Environmental Impact Report (PEIR), SCAG consulted with affected agencies on resource maps and inventories for use in the PEIR analysis. During the comment period, SCAG consulted directly with agencies and stakeholders with respect to environmental impact or mitigation measure.

e. Coordinated Outreach Efforts with Other Stakeholder Organizations

Together with subregional partners and other stakeholder organizations, SCAG staff notified interested parties of outreach efforts through traditional meeting announcements, newspapers, public service announcements, press releases, special mailers, website postings, social media postings, email communications and other opportunities as appropriate. Staff worked to ensure that the subregional organizations and transportation, air quality, environmental, and planning agencies participated in development of the 2012-2035 RTP/SCS. Staff also reached out to non-profit agencies, the general public, representatives of the disabled community, public transit advocates, urban and rural advocacy groups, bicycle advocates as well as other interested parties.

f. Outreach to Traditionally Underrepresented and/or Underserved Communities

SCAG staff coordinated with Subregional Coordinators and other regional stakeholders to identify underrepresented segments of the region. Coordinating with individuals, institutions and organizations, staff reached out to members in minority and low income communities to gain their participation at the workshops. SCAG provides assistance to people with disabilities, including individuals who are blind, have low-vision or are hearing impaired. SCAG also provides

language assistance to limited English proficient persons in Spanish and Chinese. SCAG provided Southern Californians with access to essential public information by producing a series of fact sheets and other outreach materials in English, Spanish and Chinese. To increase participation and ensure representation, SCAG targeted outreach to underrepresented communities, ethnic press and all federally recognized tribal governments within the SCAG Region.

g. Limited English Proficiency Services

SCAG is committed to helping people with limited English language proficiency understand the purpose of the 2012-2035 RTP/SCS and encourage their participation in the development process. With advance notice of a minimum of 72 hours, SCAG makes available translation assistance at its workshops and public meetings. During the RTP/SCS public workshops, SCAG was requested to provide Spanish language translators at three workshop locations—Palm Desert, Los Angeles, and Carson. In addition to providing interpreters, SCAG translated into Spanish key workshop materials, including the Outreach Workshop guide, Small Group Discussion Objectives Exercise, Workshop Polling Questions and Comments Form.

h. Evaluation of Public Participation Activities

To enhance its outreach program to better serve the underrepresented segments of the region, SCAG staff evaluated public participation efforts at the end of each phase of the planning process so that necessary modifications could be made for subsequent phases. As a result of this evaluation process, the Public Participation Plan was amended and adopted in January 2012.

The details of SCAG's public participation program and activities and SCAG's Public Participation Plan Amendment No. 3 are available in SCAG's 2012–2035 RTP/SCS Public Participation and Consultation Appendix (<http://rtpscsc.scag.ca.gov/Pages/2012-2035-RTP-SCS.aspx>).

IV. PUBLIC PARTICIPATION: TECHNIQUES AND PRACTICES

The FHWA and FTA provide the Public Involvement Techniques guide, introducing a wide variety of public participation techniques, on its Transportation Planning Capacity Building (TPCB) Program website. It includes the 14 techniques originally published in Innovations in Public Involvement for Transportation Planning. The guide is available at http://www.planning.dot.gov/publicinvolvement/pi_documents/toc-foreword.asp. Caltrans developed public outreach guidance to provide planners with useful strategies, tools, and techniques for effective outreach and consensus-building. This reference is available at http://www.dot.ca.gov/hq/tpp/offices/ocp/pp_files/Final_BMP_Full.pdf. In addition, the Institute for Local Government's (ILG) Public Engagement program introduces basics, best practices, and resources of public engagement. It has developed the key principles, strategies, and guides for effective and ethical public participation practice by local government. It also provides the overview of public participation efforts of California's 18 MPOs and their public participation plans. The ILG Public Engagement program is available at <http://www.ca-ilg.org/basics-best-practices>.

V. CONCLUSION

This study provided the background information on public participation and SCAG's public participation plan and programs. First, it explored the federal and state legislation on public participation in regional planning process, such as SAFETEA-LU, Title VI, SB 375, and other requirements. It also explained SCAG's public participation plan and the key public participation and outreach strategies developed to ensure that the various stakeholders have a reasonable opportunity to be involved in the 2012-2035 RTP/SCS planning process. In addition, it provided various resources on public participation techniques, guidance, and best practices.

In conclusion, the awareness and involvement of interested persons are critical to successful regional planning. The feedback from the public in the planning process helps assure that plans and projects address community needs. At the same time, the public gains a better understanding of the benefits and burdens associated with regional planning. SCAG has developed its public participation plan and strategies as guidance for the continuing, comprehensive and coordinated regional planning process among stakeholders. Since technology is especially important to public outreach, new public participation techniques, including the utilization of video, internet and social media, should also be developed for the effectiveness of outreach efforts in addition to the traditional methods and techniques. In addition, in order to improve and enhance its outreach efforts, it is essential to constantly evaluate the public participation strategies and approaches and to provide recommended strategies to better serve the underrepresented segments of the region.

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Operation and Performance Management of Local Public Enterprises in Daegu and Gyeongbuk

I. INTRODUCTION

With the introduction of regional autonomy system, the local or regional governments¹ have been establishing and utilizing the local public corporations to cope with residents' increasing needs for public services in wider range of areas. Since the public corporations are providing the services that are not only paid by those who are the direct beneficiaries, but also budgeted by local government, the performance management through the use of the performance appraisal of local public corporations is of importance in terms of measuring the efficiency in their managerial processes.

The local governments tend to actively make use of creativity of private sectors rather than directly launch and manage public enterprises² of their own, which often leads to establishing the public companies as their agents, letting them do their jobs instead. The scope and size of public utilities and services offered by local public corporations on behalf of local governments have been expanded, and the public welfare and interest as well as profitability in the nature of its business operation are considered to be important.

Although local governments consign the task of providing public services to their agents, the ultimate accountability for its services is attributed to the administrative authorities. That entails the local authorities to monitor periodically the performances of the public businesses, and make sure they are carrying out their assigned missions properly. The performance management for the public corporations is a very important affair in terms of having a direct effect on the welfares of the public in general, as well as influencing financial conditions of local governments.

Korean governments introduced the performance management system to the public sector in 1988, and began to appraise the performances of central and local governments based on the Act of Government Policy Appraisal, which is similar to the Government Performance and Results Act (GPRA) of U.S. In particular, with the launch of local autonomy system in the mid 1990s, the value and importance of the performance appraisal have been more emphasized than before. Since the beginning of the performance appraisal for local public development corporations in 1991, it has developed to become a comprehensive rating system for management administrations including the local public corporations in diverse sectors. A revision of relevant laws in 2002 put under the

¹ In this thesis, the author uses 'local government' as meanings of 'local' as well as 'regional' government comprehensively. But under the certain context, a local government means a low-level or municipal government, while regional denotes higher level government such as Metropolitan and Provincial government.

² In this thesis, 'enterprise' and 'corporation' are regarded as interchangeable, although their meanings are slightly different.

control of Minister of Public Administration and Safety the authority of management performance appraisal over local public corporations.

The ultimate goal of management appraisal is to raise the efficiency in managing corporations, and it is meaningful to guide local public corporations in the desirable management direction as resulted from the appraisal, and to appraise and compensate their performances by means of periodic assessments. The main objectives of this article are to introduce the status quo and practices of local public corporations in Daegu Metropolitan City and Gyeongbuk Province, Korea, and to search ways to improve the performances management system cooperatively with SCAG of U.S. to the benefits of both sides.

The major contents of this article is composed of reviewing the types and procedures for establishing local public corporations, describing their performances, analyzing empirically the performance appraisal system administered by the Ministry of Public Administration and Safety, and drawing the useful conclusions to improve the performance management practices.

II. OVERVIEW OF LOCAL PUBLIC CORPORATION SYSTEM

1. Significance of Local Public Corporation

A public corporation is a corporation created to perform a governmental function or to operate under government control, such as a municipal water company. A local public corporation means an entity that is created by the local government to carry out public missions and services. In order to carry out these public missions and services, a public corporation participates in activities or provides services that are also provided by private enterprise in some businesses. A public corporation is granted increased operating flexibility in order to best ensure its success, while retaining principles of public accountability and fundamental public policy.

A local public corporation is designed to perform some public benefit. It is a type of public-benefit corporations that takes on a more bureaucratic role, such as the maintenance of public infrastructures that often have broad powers to regulate or maintain public property. Authorities borrow from both Civil Act and Commercial Act. Other public-benefit corporations resemble private non-profit organizations, and take on roles that private corporations might otherwise perform. These corporations often operate in heavily regulated industries.

According to the current laws of Local Public Enterprises Act, eight businesses that are designated as being suitable for public businesses are as follows; tap water supply, water supply for industrial use, railway track operation, vehicle transportation, toll road operation, sewage treatment, housing, and land development. The local public corporation must consider both public interest and profit margins, not totally neglecting either one of them. The articles that prescribe specifically public interests include these. First, it should be confined to the domain of business in

which the civilians can hardly participate; second, it must contribute to the welfare of residents; third, it conduces to promoting local businesses and regional development; fourth, it should not intrude upon the environment. On the other hand, the criterion of business profitability requires that public corporations should pay more than 50% of current expenses from their business operations.

2. Legal Basis and Establishment Types of Local Public Corporation

The legal status of local public government varies from being a part of government to stock companies with a local government as a regular stockholder. The defining characteristics are that they have a distinct legal form and they are established to operate in commercial affairs. While it may also have public policy objectives, a public corporation should be differentiated from other forms of government agencies or national entities established to pursue purely non-financial objectives.

Local public corporations can be divided into directly managed and indirectly managed ones, depending on whether the local government has a comprehensive control over the operations of company. Public interest can be respected most when it is managed by administrative organizations or bureaus of local cities and counties for such public utility services as tap water supply, sewage treatment, public development projects, and local development funds management.

The local public corporation is an individual legal entity established to provide the public services based on the ordinances or regulations of local governments, has some merits in that it could secure superior manpower, expertise, managerial autonomy without much difficulty. The public corporations in operation locally, including subway corporation, urban development corporation, facilities management corporation, environmental management corporation, and many others are playing an important roles as either form of the public agent or trustee from local authorities.

The private and public joint venture means a third sector business that tries to enlarge the scope of public services in cooperation of local government with businesses in terms of finance, human resources, technology, etc., which is generally low in terms of public interest but high in profitability compare to other cases of public corporations. This type of business is derived from the needs to complement and overcome the shortness of public sectors by taking advantage of capital and technological knowhow from the private sector, and from the government initiative to reinvigorate local economy. Related law and regulation prescribe local government must have less than 50% in share in third sector business.

The main objective of performance appraisals for local public enterprises, consists in setting the management goals and suggesting desirable managerial directions in advance for the local public corporations to go ahead with; presenting the performance appraisal indicators to encourage

them to pursue as proposed in the management appraisal manual; compensating those who achieved excellent performances; and ultimately raising the level of welfares for the residents.

The local public corporation is subject to annual performance appraisal as specified at the first clause of Article 78 of Local Public Enterprises Act and Article 68 of its Enforcement Decree revised on March 25th in 2002, that is, Regulations on Management Evaluation of Local Public Enterprises(Guide 87 of Ministry of Public Administration and Security).

Types of providing the local public services can be divided into direct management, indirect management and 3rd sector joint management, which is based on the types of ownership and management control over the supply of public services to local residents as in <Table 1>

Table 1. Types of Organizations according to Establishment and Budgeting

Types of organization	Types of management	Budgeting and funding
Government bureau	◦ Direct management by local government	◦ budgeted by public enterprise account
Public corporation	◦ Established and directed by local government	◦ 100% fully invested by local government
3rd sector joint venture	◦ Joint management of government and private sector	◦ partially funded by local government

The establishment of local public corporation requires it should be based on Local Autonomy Act, Local Finance Act, and Local Enterprises Act. Among them, Local Enterprises Act stipulates specifically the articles relevant to establishing and operating local public corporations to rationalize the management of them. The articles 46 and 47 specify the steps and processes to follow in order to launch new public enterprises. The local government should complete the feasibility test from professional research agencies, which involves the viability test, income and expenditure analysis, organizational and personnel demands analysis, its influences on local welfares, local economy and local finance, in conformity with detailed rules and procedures prescribed by the Minister of Public Administration and Security.

Recently revised Local Enterprises Act states that Metropolitan City and Provincial governments must have a prior consultation with Ministry of Public Administration and Security before they decide to set up public corporations. The procedures to establish the local public enterprises are being stepped up to prevent an abusive establishment of the businesses by introducing the regulations that require to ask professional agency outside to review and reexamine the feasibility test reports. The specific procedures to establish the local public enterprises are composed of six steps from pre-decision making of policy to setup to final establishment.

Table 2. Legal Steps to Establishing Local Public Corporation

Steps	Contents
Prior to decision making on whether to establish	<ul style="list-style-type: none"> ◦ review of the nature and character of suggested business ◦ comparative analysis of the types of public corporations
decision making on whether to establish	<ul style="list-style-type: none"> ◦ preparation for review reports on the requirements, type of companies ◦ opinion gathering from the local city council about the launch ◦ decision making on the basic policy for establishment
review of feasibility	<ul style="list-style-type: none"> ◦ commissioning research service for feasibility test ◦ review and final decision to accept the feasibility report
deliberation on set-up	<ul style="list-style-type: none"> ◦ opinion gathering for local residents(public hearing) ◦ consulting with upper provincial government ◦ suggestion of review criterion and deliberation by the committee
ordinance enactment	<ul style="list-style-type: none"> ◦ decision by local governor to set up the corporation ◦ preparation of ordinance proposal and promulgation by local council
setting-up	<ul style="list-style-type: none"> ◦ arrangement of articles of association, recommendation of board members ◦ public recruitment and naming the board of directors
setting-up	<ul style="list-style-type: none"> ◦ registration of incorporation(within three weeks after capital payment) ◦ establishment report(within 10 days after registration)

The current law of Framework Act on Administrative Regulations specifies that the businesses and tasks related to the rights and obligation of its residents, and jobs that require discretionary administrative regulations of public official are not suitable for local public enterprises, but suitable for businesses that call for the professional expertise and knowledge from the private sectors and that could enhance the management efficiency through the scale of economy.

III. ACTUAL PRACTICES AND PERFORMANCE MANAGEMENT OF LOCAL PUBLIC CORPORATION

1. Current State of Local Public Corporations in Daegu and Gyeongbuk

As of 2012, the total of 306 local public companies are in operation nationwide and subject to annual performance appraisal by the central government, which includes 113 tap water supply enterprises, 71 sewage treatment enterprises, 44 facilities management corporations, 44 other unclassified corporations. Tap water supply and sewage treatment enterprises are run by local government bureaus. Daegu Metropolitan City has 5 local public enterprises of Waterworks Headquarters of Daegu Metropolitan City(WHDMC), Daegu Urban Development Corporation(DUDC), Daegu Metropolitan Transit Corporation(DMTC), Daegu Infrastructure Corporation(DIC), and Daegu Environmental Installations Corporation(DEIC), while Gyeongbuk Province has one corporation of Gyeongbuk Development Corporation(GDC) established by Provincial Office, and a total of 30 corporations that is specifically 14 tap water supplying

waterworks enterprises, 10 sewage treatment enterprises, 4 facilities management corporations, 2 unclassified corporations.

Table 3. Numbers and Types of Local Public Corporations in Daegu and Gyeongbuk

		Total	Tap water supply	Sewage treatment	Facilities management	Unclassified/Development
Nationwide	total	306	113	71	78	44
	Metro. City·Province	47	8	-	10	29
	City·County	259	105	71	68	15
Daegu	Metro. City·Province	5	1	-	2	2
Gyeongbuk	Province	1	-	-	-	1
	City·County	30	14	10	4	2

Note: above number notifies the number of local public corporations subject to management performance appraisal in 2012 by central government.

The five 3rd-sector corporations are located in Daegu and Gyeongbuk: Daegu Exhibition and Convention Center(EXCO), Gyeongbuk Corporation(GC) for trading agricultural products, KCfeed Co. for manufacturing animal feed, Uljin Lohas Korea(ULK) for manufacturing Kimchi, Uljin Agricultural and Marine Products Trading Company(UAMPTC). These companies were invested by local government with a share of between 25 to 50 percentage points. The main business of EXCO is to hold national and international trade fairs and expositions, promoting MICE industry in the region. Gyeongbuk Corporation was established in 1994 and invested by Gyeongbuk Province, Daegu City, local banks, and private investors. Their main business is to act as a business agent to promote exporting and importing agricultural, marine, livestock and forest products for the customers and to develop markets at home and abroad.

Table 4. Overview of 3rd sector businesses in Daegu and Gyeongbuk

company	year of establishment	local government	share* of government	Major Business
EXCO	1995	Daegu City	53.0%	holding trade fairs and expositions
GC	1994	Gyeongbuk Province	29.6%	acting as an agent to import and export agricultural products
KC Feed	1968	Gyeongbuk Province	14.9%	manufacturing animal feeds
ULK	2009	Uljin County	49.0%	manufacturing and distributing Kimchi
UAMPTC	2009	Uljin County	46.7%	processing, distributing and exporting agricultural products

* % of paid capital in total stock at the end of 2009

2. Status Quo of Local Public Corporation in Daegu and Gyeongbuk

Daegu Metropolitan Subway Co. is the biggest public enterprises in terms of size of its personnel as well as assets, except the tap water supply and sewerage management enterprises that are directly controlled and managed by local government. Facility management enterprises which assume the function of infrastructure management in major cities such as Daegu Facilities Management Corporation, Daegu Environmental Installation Corporation, Gumi Facilities Management Corporation have a large number of personnel. In terms of the assets possessed by those enterprises, Daegu Metropolitan Subway Corporation, Daegu Urban Development Corporation, Gyeongbuk Development Corporation were relatively big.

According to settlement of accounts for fiscal year of 2011, the debt ratio of local corporations goes up as high as 541%. The debt ration of Pohang Facilities Management Corporation(PFMC) is 541%, and other corporations with relatively high debt ratio are Andong Facilities Management Corporation(AFMC) of 224%, Mungyeong Tourism Promotion Corporation(MTPC) of 178%, Yeongyang Red Pepper Trade Corporation(YRPTC) of 136%, Daegu Urban Development Corporation of 141%. In terms of net profits during the term, Daegu Metropolitan Subway Corporation recorded 150,971 million won, while Daegu Environmental Installation Corporation 237 million won in net loss during the term. On the other hand, the Gyeongbuk Development Corporation earned 5,867 million won, with Daegu Urban Development Corporation 2,001 million won, Yeongyang Red Pepper Trade Corporation 1,354 billion won in net profit during the term. Cheongdo Public Business Corporation(CPBC) whose main business is to hold bull fighting matches is low in debts ratio, but recorded 2,128 million won in loss.

Daegu Metropolitan Subway Corporation, by which 3.3 billion passengers commute every day, is facing growing debts from unsettled construction costs as wells as growing operating deficits that occurred from lack of paid passengers and giving free rides tickets to senior citizen. Those debts of local corporation could be a financial burdens to local government and aggravates the budget strains.

The debts of local public corporations worsen the financial strains of local governments. Debts of 126,000 trillion won of local corporations invested more than 50% by government in 2005 have grown to 464,000 trillion won. As of the end of 2011, the debts jumped to 494,000 trillion won, which is nearly twice as much as 277,000 trillion won at the time of President Lee's Inauguration.

The increase in the debts of local public corporation is one of the reasons that aggravates the local government's financial conditions, in that local government should make up for the capitals of the public enterprises in financial crisis. This could cause a vicious circle of financial catastrophe in local governments when the real estate business and external economy circumstances are in bad situation.

Table 5. Overview of Operations of Local Public Corporation in Daegu and Gyeongbuk

Name of Corporations	Manpower	Financial Statements			Financial Performances		
Name of Corporations	Personnel	Assets	Debts	Capitals	Operating Profit	Ordinary Income	Net Profit during the Term
DMSC	2,061	3,281,862	466,142	2,815,720	-157,065	-150,971	-150,971
DUDC	141	1,076,044	629,486	446,558	2,096	3,673	3,001
DFMC	643	17,701	4,823	12,879	-646	200	170
DEIC	395	616,787	9,211	607,576	-303	-4	-237
GDC	89	649,641	325,199	324,442	3,898	7,634	5,867
MTPC	80	274	176	99	-	3	3
PFMC	102	1,281	1,081	200	-	-	-
AFMC	110	324	224	100	-	-	-
GFMC	318	12,679	8,047	4,632	178	294	280
YRPTC	24	23,177	13,337	9,840	1,668	1,711	1,354
CPBC	64	2,665	246	2,418	-2,128	122	122

Note : settlement of account for 2011

The large parts of debts of local public corporation are resulted from initiating unfeasible businesses in terms of its profitability without enough consideration for changing external circumstances. It can be curbed effectively by obliging them to perform a preliminary feasibility study and introducing a investment screening system for the business projects. The local government needs to use an annual management performance appraisal as an effective tool for checking and managing liabilities of local public enterprises.

3. Steps of Management Appraisal as a Tool for Performance Management

The legal grounds for performance management of local public enterprises in Daegu and Gyeongbuk region are coming from the Regional Public Corporations Act (Article 78 of the Act and Article 68 of corresponding enforcement ordinance). Local public enterprises established by a regional government, which means Provincial or Metropolitan governments, are directly evaluated by the Ministry of Public Administration and Security while local public enterprises established by a local or municipal government are evaluated and managed by a regional government.

Performance of public corporations is evaluated every year while public enterprises operated directly by a local government are evaluated every two years. In 2011, there were 6 local public

Table 6. Management Appraisal Indicators (2011)

Level 1 Classification Index	Level 2 Classification Index	Detailed Classification Index
Leadership/Strategy	Leadership	Leadership of Managers, Customer Oriented and Moral Management
Leadership/Strategy	Strategy	Vision, Mission and Management Plan
Management System	Management Efficiency	Organization, Human Resource, Labor and Financial Management
Management System	Major Business Activities	Major business activities index reflecting features of an organization (1~3)
Management Performance	Major Project Achievement	Major project achievement index reflecting features of an organization (1~3)
Management Performance	Management Efficiency Performance	Management Efficiency Performance index reflecting features of an organization (1~2)
Management Performance	Policy Compliance	Public enterprise policy compliance
Management Performance	Customer Satisfaction Performance	Result of customer satisfaction survey

Source: the Ministry of Public Administration and Security, 2011

enterprises evaluated by the evaluation of the Ministry of Public Administration, 11 local public enterprises were managed directly by regional government and 4 local public corporations evaluated by a regional government in the Daegu and Gyeongbuk region. All local public enterprises whose management performance is subject to evaluation of a regional government belong to Gyeongbuk Province. Local public enterprises established by local government in Gyeongbuk Province are evaluated by the Daegu Gyeongbuk Development Institute on the behalf of Gyeongbuk Provincial Office. The main contents to be evaluated are management principles including promotion of economic feasibility and public welfare, achievement of management objectives, work efficiency, public interests and customer service of a public enterprise. All local public enterprises are divided into five classes by the Commission of Public Enterprise Policy under the Ministry of Public Administration and Security and given incentives according to the evaluation results. The commission has additional sanctions for a public enterprise classified to the lowest class including 'no incentive payment', 'cutting annual salary of the head of a public enterprise by 5-10%', and 'performing management consulting' (the Ministry of Public Administration and Security, 2011). The management evaluation index has been prepared by the Evaluation Institute of Regional Public Corporations under the Ministry of Public Administration and Security.

In 2011, there were 6 local public enterprises evaluated by the evaluation of the Ministry of Public Administration, 11 local public enterprises were managed directly by regional government and 4 local public corporations evaluated by a regional government in the Daegu and Gyeongbuk region. All local public enterprises whose management performance is subject to evaluation of a regional

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The sequence of management evaluation activities performed in accordance with the procedures of the Ministry of Public Administration and Security are as followed. First, the institute prepared a management evaluation team consisting of professional members including research fellows, professors and certified public accountants on the evaluation request from the Ministry of Public Administration and Security. Then, the team participated in the national management evaluation members training session provided by the Ministry of Public Administration and Security. After that, documents evaluation and onsite visit evaluation was carried out and objection from a target public enterprise, if any, was received by the team. The evaluation score was confirmed after deliberation of objection in the national evaluation institutes joint conference and onsite visit evaluation result in the national joint review committee. Then, a management evaluation report was submitted together with a opinion of management evaluation from a public enterprise to be evaluated. Finally, the Ministry of Public Administration and Security decided an evaluation class of a public enterprise, report the result to the National Assembly, notified the resultant class and corresponding incentive to a public enterprise and performed management consulting.

4. Results of Regional Management Evaluation

According to the Year 2011 management evaluation results (the target year of evaluation is 2010), it is shown that evaluation ratings of local public enterprises in the Daegu-Gyeongbuk region are relatively low. Daegu Metropolitan Transit Corporation was classified as Class B, Daegu Urban Development Corporation was Class C, Gyeongbuk Development Corporation was Class D and Daegu Facilities Management Corporation was belongs to Class C. Public enterprises in the regions with good management environment received a good rating. Especially, for metropolitan transit corporations and urban development corporations, special circumstance surrounding local public enterprises, such as management environment, have significant effects on their evaluation rating

Table 7. Results of Rating Grades of Regional Public Corporations of Metropolitan and Provincial Government Nationwide 2011

Classification	Class A	Class B	Class C	Class D	Class E
Metropolitan Transit Corporation	-	Seoul Metropolitan Rapid Transit Corporation, Busan Transportation Corporation, Daegu Metropolitan Transportation Corporation	Gwangju Metropolitan Rapid Transit Corporation, Daejeon Express Transit Corporation, Incheon Transit Corporation	-	Seoul Metro
Urban Development Corporation	Busan, Daejeon	SH, Gyeonggi, Chungnam, Jeonbuk	Ulsan, Chungbuk, Gwangju, Daegu, Jeonnam, Incheon	Gyeongbuk, Gyeongnam	Gangwon
Facilities Management Corporation	Seoul	Incheon	Daegu, Busan, Ulsan	-	-

Source: the homepage of Evaluation Institute of Regional Public Corporation(<http://www.erc.re.kr/>)

Table 8. Results of Appraisal of Local Public Corporations in Gyeongbuk Province 2011

Types of Management Evaluation		No. of Enterprises	Average Scores	Score Range (2010)					Average of the Previous Year
				Higher than 90	85-89	80-84	75-79	Lower than 75	
Direct Controlling Enterprises	Sub-Total	11	75.21	-	-	3(27%)	1(9%)	7(64%)	69.77
	Water Service	8	76.38	-	-	3(38%)	1(13%)	4(50%)	70.21
	Sewage Treatment	3	72.09	-	-	-	-	3(100%)	69.23
Public Corporations	Sub-Total	4	89.49	3(75%)	-	1(25%)	-	-	86.55
	Other Corporations	2	87.70	1(50%)	-	1(50%)	-	-	86.39
	Facility Management Corporations	2	90.94	2(100%)	-	-	-	-	86.71

Note. Average of the previous year is a score before standardization by the Ministry of Public Administration and Security. For water service and sewage treatment agencies, it is the average score of all local public enterprises evaluated in the previous year as they are evaluated every two year.

Source: Gyeongbuk Provincial Office, 2011

According to the 2011 management evaluation score (target year 2010) of public enterprises established by local governments in Gyeongbuk Province, the average score of 11 direct controlling enterprises (water and sewage treatment agencies) was 75.21, falling into Class D.

On the other hand, the average score of 4 public corporations was classified into Class D, with 89.49. Average score of all items have been improved, compared to the previous year. For example, the average score of the water service agency and the sewage treatment agency was increased by 6.17 point from 70.21 in 2010 to 76.38 in 2011 and by 2.86 point from 69.23 in 2010 to 72.09 in 2011, respectively. For the same period, the average score of two public agencies and two public corporations was increased by 0.57 point from 86.39 to 86.96 and by 4.23 point from 86.71 to 90.94, respectively. In terms of the average scores, performance of local public corporations were managed independently was relatively good. However, it is revealed that it is necessary to make efforts improving management of direct controlling agencies (water service and sewage treatment) and review the evaluation criteria because of their significantly low average scores.

Table 9. Scores of Local Public Enterprises Established by Local Governments in 2011 by Items

Types of Public Enterprises	Management Evaluation Score (2010)				Score in Previous Year
Types of Public Enterprises	Total (100)	Leadership/Strategy (Points)	Management System (Points)	Management Performance (Points)	Score in Previous Year
Water Service (8)	76.38 (100)	8.23 (10)	26.02 (33)	42.13 (57)	70.21
Sewage Treatment (3)	72.09 (100)	8.27 (10)	24.55 (28)	39.27 (62)	69.23
other public corporations(2)	87.70 (100)	13.95 (15)	28.59 (30)	45.27 (55)	89.00
Industrial complex(2)	90.94 (100)	13.98 (15)	28.34 (30)	48.62 (55)	85.89

Note: The average of the previous year is a score before standardization by the Ministry of Public Administration and Security. For water service and Sewage treatment agencies, it is the average score of all local public enterprises evaluated in the previous year as they are evaluated every two year.

Source: Gyeongbuk Provincial Office, 2011

The reason why the average of water service and sewage treatment agencies is low is that many revised evaluation index uses the national average score as their evaluation standard. As a result, it is shown that Gyeongbuk Province with poor business environment has a low average score and rating. In addition, it is revealed that scores in the leadership/strategy and the management system item of local water service and sewage treatment agencies has low relationship with a score of management performance.

IV. PERSPECTIVES AND CHALLENGES

1. Perspectives of Performance Management for Local Public Enterprises

a. Impacts of Performance Management of Local Public Enterprises

The performance management system has influence on performance management activities of local public enterprises as the system keeps being applied for long time. The positive effects of the system are as followings. First, objective assessment for overall management performance of local public enterprises is possible. Resources to manage local public enterprises are secured through objective assessment for leadership/strategy, management system, management performance and customer satisfaction index. Of course, local public enterprises could be controlled through external auditing materials or financial statements in the past. However, the management evaluation provides more useful information for local public enterprises management as it can help to investigate qualitative achievement in detail.

Second, the management evaluation index has a role as a milestone providing a management direction for local public enterprises. In other words, the management evaluation criteria have a role as a desirable management practice and direction for local public enterprises to pursue, as well as an index for management performance measurement. Therefore, local public enterprises can identify management evaluation index as a future management direction and reflect it to their management practice. Especially, management evaluation index itself has a role as a guiding principle as it is improved and supplemented by reflecting changes in policy environment every year. As a result, local public enterprises establish systematic leadership/strategy and keep making efforts on construction of an effective management system based on it. The performance management system contributed to improvement of management performance of local public enterprises.

Third, it can help to find local public enterprises that have problems in their management structure earlier and promote management innovation through management evaluation. Occasionally, a local public enterprise falling into the lowest class is merged or removed according to management consulting and management improvement orders.

Fourth, a strong incentive system following the results of management evaluation motivated local public enterprises. Especially, because an incentive system has effects on the bonus of directors and employees, as well as an appointment of the president of a local public enterprise, local public enterprises pay much attention to and make efforts on improvement of management evaluation results.

Fifth, with management evaluation of local public enterprises, concern on management of local public enterprises has been initiated from the inside and outside of local public enterprises. Inside information that is hardly disclosed to local resident is open, as well as local public enterprise

rating by the management evaluation. Therefore, the press and the Assembly treat the results of management evaluation as an important policy issue and, as a result, management evaluation plays a role as a pressure factor for improvement of management.

b. Future Perspectives of Performance Management of Local Public Enterprises

Performance management for local public enterprises has been developed, responding to change in policy environment. It is expected that importance of performance management will be increased as a role of local public enterprises is expanding, their size becomes bigger and their effects on local residents' welfare is increasing. A local public enterprise is being established even for business which is directly performed by a local government to seek public interest and profitability at once. As local public enterprises perform important national or local projects, size and importance of local public enterprises are also increasing. Therefore, it is anticipated that performance management for local public enterprises will be strengthened in the future as followings. First, it is expected that the number of local governments that are subject to performance evaluation will increase as the performance management is enhanced in the future. There is significant trend showing that a local government establishes a local public enterprise to accommodate profitability and public interest related to a public project. From 2013, management evaluation for public enterprises directly controlled by a local government will be performed every year, which is currently performed every two years.

Second, it is taught that a performance management is going to be more professional and systematic as management evaluation index is becoming complicated and the number of public enterprises subject to evaluation is increasing. It is likely that a performance management of local public enterprises established by a regional government as well as a local government would be performed under a regional government's responsibility. Therefore, it is predicted that a management evaluation team in a local research institution of a local government that has many local public enterprises to be evaluated will be established. In addition, the current performance management is likely to be more specialized and efficient due to work distribution between the Evaluation Institute of Regional Public Corporations under the Ministry of Public Administration and Security and an evaluation team of a local research center.

Third, it is expected that management evaluation index will be more complicated. As a performance management for local public enterprises would accommodate a national policy direction, new management evaluation index is going to be added, which reflects current national concern such as green growth, energy saving and debt management. Because this trend can continue in the future, it is expected that management evaluation index will more complicated and an effort to make definition of new index will be strengthened.

Fourth, with complicated and specified index and increased number of local public enterprises to be evaluated, a performance management work would be decentralized and financial burden

made by performing management evaluation would be transferred to a local government. Currently, significant part of management evaluation work in a performance management has been already transferred to a local government and, therefore, a local government pays for it. As a result, financial burden on a local government will be increased by transferring related work to and expanding authority and responsibility of a local government.

Fifth, as a result of decentralization of a performance management for local public enterprises, it is assumed that the number of management evaluation indexes reflecting local features is increasing. Therefore, it is expected that a performance management will vary depending on provinces in long term.

2. Tasks of Performance Management for Local Public Enterprise

a. Problems and Challenges of Performance Management of Local Public Enterprise

There are many problems to be solved in a performance management although it has generated excellent achievement and had positive effects. First, relationship between a management system and management performance should be improved. Sometimes, it is found that score of Management Performance is low whereas score of Leadership/Strategy, Management System, and Customer Satisfaction are high. The main reasons are likely to include external factors such as economic environment change, effects of foreign exchange rate and bad harvest due to climate change and policy and politic factors such as control of public utility charge. Therefore, a management evaluation index should be supplemented to reflect these factors.

Second, receptiveness of public enterprise to be evaluated should be increased to improve management evaluation results. The fundamental purposes of management evaluation for public enterprises are to improve performance through revised management and contribute to local residents' welfare. If a target public enterprise does not have a sincere attitude to the original purposes of management evaluation and sticks to results and incentive, it is hard to achieve the purposes of a management evaluation system.

Third, the Ministry of Public Administration and Security still manages and controls management evaluation index setting, evaluation procedures and schedule and asks a regional government to pay for management evaluation activities although it has transferred a majority of work related to management evaluation to a local government. For management evaluation reflecting local features, independence of a regional government about management evaluation index setting, evaluation procedures and schedule should be provided, as well as budgeting if evaluation work is transferred to a regional government.

Fourth, it is likely to be shown that a management evaluation index does not reflect special objectives of local public enterprises, local features and organizational features. Therefore, it should respond to external change actively and contribute on finding effective management

structure by establishing efficient organizational structure (Jinwon Jeong, 2011). As a local public enterprise is established with special purpose in accordance with corresponding local ordinance, it has strong local features. Therefore, performance of a local public enterprise can be distorted if it is evaluated with unitary evaluation criteria although some performance indexes reflect features of an individual local public enterprise.

Fifth, management evaluation results should be used appropriately. However, providing feedback for overall management activities is rare. Variables that have significant effects on use of evaluation results include understanding of evaluation procedures, evaluation experience, trust to an evaluator and communication about results (H. J Kim et.al. 2011). These variables are also related to receptiveness of a management evaluation. Especially, if there is high possibility of distortion on evaluation criteria, it is likely to reduce creditability of evaluation results and interrupt operation of a normal feedback system

b. Future Directions for Improving Performance Management of Local Public Enterprises

The number of cases that the national government or a local government commissions a large national project to a local public enterprise is increasing. As a result, effects of efficient management of a local public enterprise on local residents' welfare, as well as local finance are stronger than before. It is necessary to operate a management evaluation as a part of performance management effectively for effective management of a local public enterprise. The local public enterprise management evaluation keeps being revised to overcome its shortcomings and limitations and has made significant achievement. However, if a management evaluation index (evaluation criteria) does not reflect establishment purpose of a local public enterprise, local difference and external effects, it could weaken receptiveness of a local public enterprise for the management evaluation and have negative effects on a performance management system of a local public enterprise. A harsh ranking system and excessive incentive while a local public enterprise is reluctant to accept a management evaluation system may make a local public enterprise focus on result and evaluation process unclear. Therefore, a management evaluation index and a method to calculate ratings should be improved to reflect establishment purpose of a local public enterprise, local difference and external effects. Excessively detailed management index can cause an error in evaluation process due to its complexity, make receptiveness of a local public enterprise weak and increase a local public enterprise's caused by evaluation.

If a management index reflects local features and difference and does not target ratings itself, not only transferring expenses to a local government but also commissioning management evaluation index setting, procedures, rating and follow-up use are necessary for an effective performance management system of a local public enterprise. A management evaluation system shall improve management practices of a local public enterprise and contribute to promotion of local residents' welfare by remove problems discovered actively and improving a long settled system.

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A Case Review of Public Participation Urban School in Town Planning for Training Residents Leaders at Daegu

I. INTRODUCTION

The scope of resident participation in town planning and designing is gradually expanding. Changes are occurring in the process of establishing city-related policies and plans that used to be carried out in a top-down manner with a specialist-centered deterministic approach. Since the expansion of resident participation in setting up the 2021 Cheongju General Plan in 2002, there has been an increase in the attention for and scope of resident participation in the stages of planning, not only in city master planning but also in the establishment of related plans.

However, in the process of preparing legal plans such as the urban general and management plans, the areas in which residents can participate are limited. Resident participation in the planning process is carried out as a formality due to various issues such as conflicting interest among those involved depending on the content of the policy and plan, and also immediate problems like the period of planning and preparation cost.

Nevertheless, a variety of resident participation cases are found in policies and projects related to town design, except for legal plans of comprehensive quality, such as city and village environmental improvement or street landscaping. Resident participation of various forms are carried out in matters not decided upon by professional city plans but are directly connected to the residence living such as improving village landscape, securing flexible parking space, demolition of residence fence, improving decrepit housing, and opening and using public facilities. Starting with the Stronghold Diffusion Residential Environment Improvement Plan (2007), the government has been carrying out pilot projects such as the 'Happy House' and the 'Making the Livable City.'¹ Moving away from being an onsite improvement plan focused on physical environmental improvements, the Stronghold Diffusion Residential Environment Improvement Plan implemented 12 pilot projects to transform resident participation into social regeneration. In 2009, the Presidential Commission on Architecture Policy implemented the Happy House pilot

¹ In March 2007, as an exemplary project related to village improvement, the central government, with the supervision of the Ministry of Land, Transport and Maritime Affairs, carried out a pilot project "Making the livable city" based on applications from local governments. For a successful execution of the "Want to live city-building" policy, the government carried out the following sub-projects: ① Publicity (Policy forum and workshop, documentary broadcasting-KBS); ② Study (Publication of domestic and overseas cases of Making the livable city cases, village improvement forum, publication of Our City textbook, etc.) ③ Pilot project (Selection and funding for model city and model town through application and evaluation) ④ Establishment of policy foundation (Enactment of City Day, set-up and operation of city portals, evaluation of village improvement candidates, etc.) ⑤ Establishment of support system (Organization of Making the livable city support committee). Ministry of Land, Transport and Maritime Affairs(2009). *Urban Review for Competitiveness Improvement and Specialty Development of City*.

project in three districts for the regeneration of sustainable residence through inventory management of housing in low-rise residence and village improvement projects².

Unfortunately, currently in 2012, these governments driven pilot projects have either converted into different types of project or are at a snail's pace due to challenges in raising funds to execute them. In addition, other challenges such low participation level of residents, doubts for project execution from the local government, and funding from the government are becoming the reasons for these projects to remain at planning stage.

Meanwhile, unlike projects that are led by the government, village improvement projects run by citizen organizations are in progress autonomically at various local self-governing bodies. A variety of projects are being introduced as successful cases. Yet, many projects led by nongovernmental entities show limitations in project effectiveness since they deal partially with residential living environment and not with environment as a whole. As described, despite the fact that publicly-led projects and privately-led projects are sufficiently equipped with their respective merits, the reason the expansion of project outcome are not being generalized can be attributed to the lack of comprehensive approach for residential environment improvement.

In order to draw successful outcomes from projects like village improvement, three components are needed; public support, autonomous involvement from private entities, and leaders committed to village improvement. From the point of improving existing environment rather than building new residence, projects should be carried out in the form of fusing public support with autonomous participation of the residents currently living in the area. Also, above all things, the lubricating role of the leader is vital for encouraging autonomous involvement of the residents and inducing appropriate public support.

As residents are growing more interested in their cities and villages, their intent to participate in projects related to city plan and design for building desirable villages is rising. However, for average residents, direct participation is challenging since they do not have the experience of and lack professional knowledge about the process of urban planning and design.

From 2008 to 2010, the government operated city colleges by area making efforts to vitalize resident participation and village improvement in terms of urban planning. The model city college operated by the Ministry of Land, Transport and Maritime Affairs was a project featuring program development for training resident leaders who will lead projects and expand resident involvement in the areas related to town planning. In contrast, the city college operated by the Green Gyeonggi 21 Action Council is a resident empowerment project that trains resident leaders on the private level³.

² Presidential Commission on Architecture Policy(2011). A Study on Policy Direction for Integrated Neighborhood Regeneration of Working-class Low-rise Housing Area.

³ Since 2004 and until now, the Council operates a city college for regular citizens.

In order to generalize village improvement movements that are planned and implemented by residents themselves, investment is needed for the three components mentioned earlier; autonomous participation of residents, public support, and resident leader. To induce autonomous participation from residents, it is necessary to select projects that are targeted for people directly related to the residents and can draw the attention of the residents. Public support means financial assistance for project implementation and plays a supplementary role in realizing proposed projects. The most important component is the resident leaders, who motivates voluntary participation of the residents and provide opportunities that will induce public support.

Resident leaders perform a decisive role in discovering village improvement projects and in joining residents and bringing public attention to these projects. In order carry out village improvement projects, it is necessary for the key members to have an understanding of areas related to urban planning and design, and the knowledge about and experience in the ways to carry out the projects. Therefore, orientation related to urban planning and design for resident leaders is vital condition for expanding village improvement projects and developing them into resident movement.

Hence, resident leader education on a resident empowerment level is needed as a prerequisite for the residents to improve their living environment and maintain and develop them as a sustainable village. This article introduces a resident empowerment program in Daegu which was developed for resident leaders and for the realization and expansion of village improvement. Reviewing the case of the Public Participation Urban School, which was a short-term educational program for training leaders of village improvement, it examines the direction for implementing village environment improvement projects with private and public collaboration and ways for effective support from the public sector.

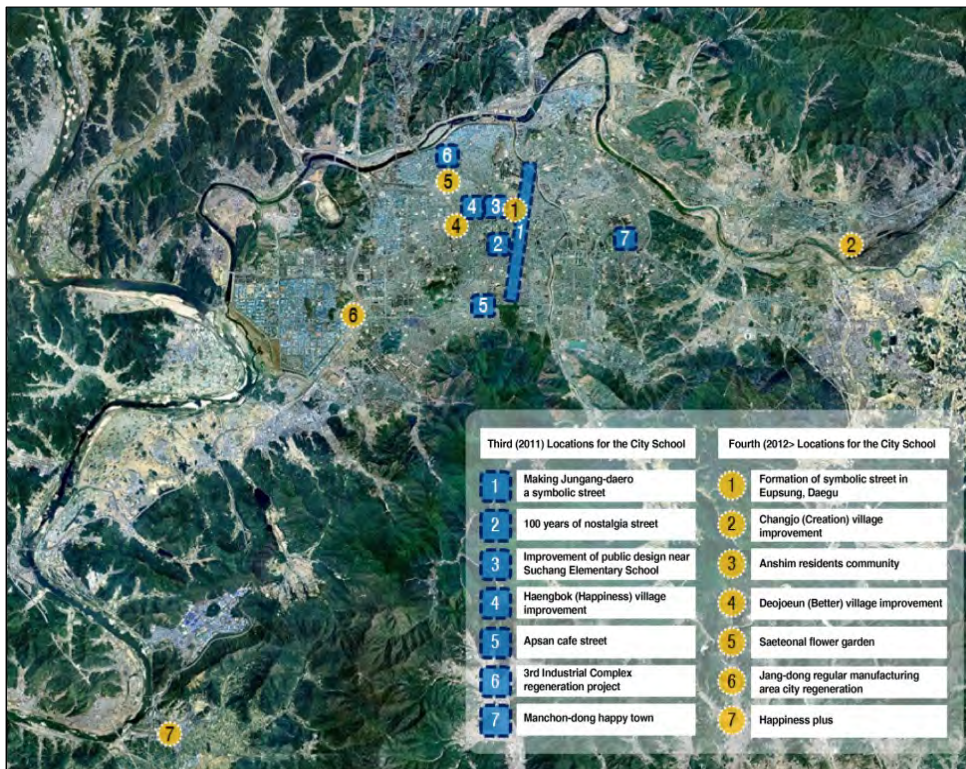
II. SIGNIFICANCE AND FEATURES OF THE PUBLIC PARTICIPATION URBAN SCHOOL

1. Concepts and the necessity of the Urban School

The goal of the Urban School is to overcome the limits of resident participation found in the course of existing urban planning. The Urban School, which launched in 2009, proceeded with its fourth project in April 2012.

The purpose of the Public Participation Urban School is to educate resident leaders and inspire civic consciousness through education about urban design and regeneration. As a short-term resident training program, the Urban School was carried out through a studio format program focused on practical training. Residents who participated in the school will develop the competence to solve problems in their villages and communities and work as community leaders.

Figure 1. Location distribution of the Third & Fourth Public Participation Urban School



Focusing on cases that are currently being implemented or in the planning stage by the local governing bodies, the themes selected for the Urban School were contents that are highly likely to become projects. Also, as for each theme, a variety of contents were selected such as urban village environmental improvement, community operation, specialized street formation to discuss contents that residents may find interesting and would enrich the urban environment.

In 2011, the Urban School changed its name from Daegu Gyeongbuk Region Urban School to Public Participation Urban School, and was operated by Daegu City and Daegu Gyeongbuk Development Institute without central government support. By having the local government autonomously plan and operate the school, the Urban School was intended as an organization that develops and operates educational programs that will train resident leaders who are right for the actual circumstances in Daegu. As a resident educational program run by public entities, it is expected that the Urban School will increase the residents' interest in and attachment for their own village and urban environment and also provide an opportunity to expand the scope of resident involvement in the city planning process.

2. Characteristics of the School

In 2009 and 2010, the first and the second urban schools were operated under the title of 'Urban College' as part of the central government plan for city colleges by area. The third and the fourth

urban schools, respectively carried out in 2011 and 2012, were cases that were autonomously operated by the Daegu Gyeongbuk Development Institute under the supervision of Daegu Metropolitan city separately from the central government urban college project.

The Urban School is not a participation program intended to complete a project. Rather, it is a education-focused program operated with a goal to empower the residents. The Urban School was operated in a studio format in which participants worked on solving problems and drawing improvements for a given location. The plan for a given location from each studio was prepared with the guidance of the advising professors assigned to the studio.

The Urban School is composed of school managers and participating students. The school managers were composed of each studio team which operates its own studio, and the operation team that is in charge of the overall operation of the school and the management of the program. Participating students consisted of resident representatives, urban planning and design workers, and public officials who voluntarily participated in the program.

Residents who participated as students were recruited in two ways; one by individual registration through a recruitment announcement made for a certain period of time, and another by group registration according to themes selected by the basic local governing bodies. Advising professors for each studio were invited for participation from specialists suitable for the subjects requested by the overall operation team. Also, staffs who helped with the operations of the school and the studios were university students, majoring in various fields relevant to urban planning, architecture, and housing. They voluntarily registered to participate in the program.

The School was carried out as 8-week program. Throughout the four years, the programs were partly adjusted to suit the circumstances at the time of operation and the participants such as the advising professors, helping staff, and special lecturers were newly organized each time. The educational programs were generally composed of contents such as problem recognition, location confirmation, field trips to other regions, and preparation of plan.

In order to enhance understanding for urban planning and design, theory lectures were provided 6 to 8 times each year. Field trips and preparation of plan were carried out by each studio. Each year, 5 to 7 studios were operated. A prepared plan by each studio was gone through interim presentation and final presentation prior to completion. The final plans were evaluated and then awarded with grand or outstanding achievement prize.

III. OPERATIONAL INFORMATION OF THE PUBLIC PARTICIPATION URBAN SCHOOL

1. Composition of the curriculum and operation stages

The Urban School was carried out in three stages; planning (preparation) stage, operation stage, and evaluation stage. Overall, it took 5 to 6 months for each school year. The planning stage, which is an advance preparation step for the operation of the school, took about two months and included details such as organization and recruitment of participants, selection of locations and themes, preparation of educational program, and selection of studio practical training location. The operation stage refers to the step when the school is in progress and included details such as providing the basic educational courses and operation of studios. Basically, the Urban School was operated for 8 weeks (2 months). The evaluation stage took about a month and included activities such as presentation of result report and balancing the budget. The Urban School was operated mainly on weekends but each studio flexibly organized the schedule under the direction of the supervising professor and taking into consideration the circumstances of the participants in order to freely have classes on weekdays as well.

Figure 2. Operation stages of the Urban School



The overall curriculum was divided into five courses. The first course was for group member fellowship, which was carried out as an orientation on the Urban School. The second course was for understanding the location, which included checking the location and identifying problems. The third course involved field trips to the selected locations and to other relevant cities. The fourth course involved diagnosing problems that were found at the selected sites and finding ways solve the problems. It was carried out by each studio and included mainly of preparing alternative solutions. The fifth course involved wrapping up and final presentation.

Figure 3. Procedure of the educational program

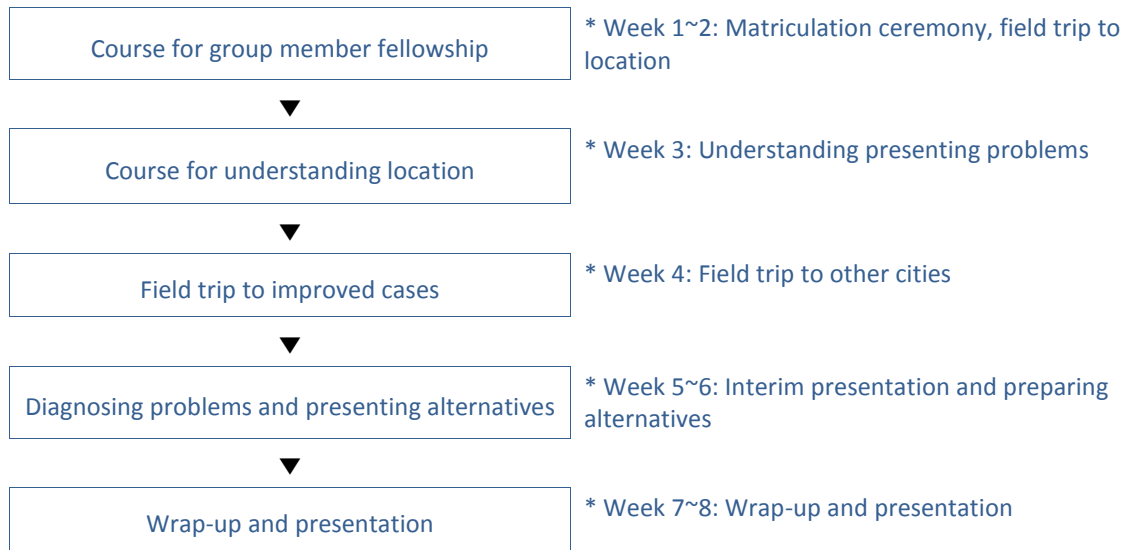


Figure 4. The Fourth Public Participation Urban School Matriculation and Completion ceremonies



a) Matriculation Ceremony



b) Completion Ceremony

Figure 5. Activities at the selected location by each studio (The 4th year, location check)



Figure 6. Other city trip (the 4th year)



Figure 7. Scenes from studio lesson (the 4th year)

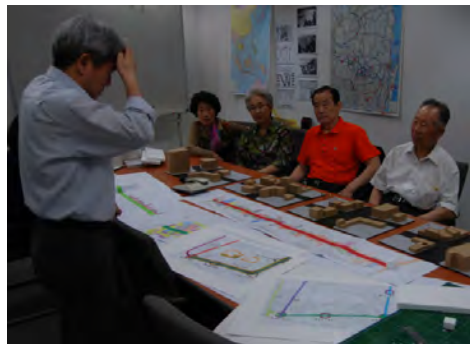


Figure 8. Interim presentations (the 4th year)



Figure 9. Final presentation (the 4th year)

2. Composition of participants

Participants of the Urban School consisted of participating students and managers. Participating students were regular residents who had registered for the Urban School and were composed of citizens with a variety of experience and age group. The managers were composed of school managers, studio managers, and outside supporters. School managers included the principal and the managers; studio operation team included the advising professors assigned to each studio and the lesson helpers; and the outside supporters included the special lecturers who were in

Table 1. Urban School participants by year (Unit: person)

Category of participating students	1st Year (2009)	2nd Year (2010)	3rd Year (2011)	4th Year (2012)
Total	89	37	49	64
Resident representatives & regular residents	45	12	24	27
Business representatives	-	-	10	6
Public officials	8	15	5	19
University students	31	-	-	-
Related specialists	-	1	1	10
Other	5 (Member of the City Council & Professor)	5 (District representative & City Building Center assistant administrator)	9 (District representative, nun, elementary school steering committee member)	2 (District representative)

charge of theory lectures and the relevant departments at the local-governing offices. The advising professor and lesson helpers were selected considering the characteristics and theme of the locations. The majors of the advising professors included housing, architecture, and city planning.

In 2009, residents, public officials, and students participated in the program. In 2010, the participation rate of public officials from the basic local governing offices slightly increased. In 2011 and 2012, university students did not participate in the Urban School. Also, while the participation rate of public officials decreased, a lot of residents with various work experience participated in the program. Importantly, participation rate was relatively high for residents, who were strongly connected to the theme of the selected locations, and included people like business representatives, nuns, elementary school steering committee members, and citizen autonomy committee members.

3. Results of studio operation

Work results were prepared on a panel and PPT report and submitted. Interim and final presentations were given by each studio representative elected by the participating students. In order to secure objectivity, presentations were evaluated by invited outside specialists.

Work results from the studios went through final evaluation and were awarded with grand or outstanding prize. The evaluation not only considered the quality of the plan but also comprehensively took into account residents' involvement level and satisfaction level for studio operation. Evaluation at the Urban School encouraged residents involvement more than the excellence of the plan and was utilized as a strategy to induce positive activities from the students during the process of preparing the plan and operating the program.

According to the results of operating the 8-week program, completion rate of the participating

Table 2. Composition of the Urban School by year (Unit: unit, person)

Category		1 st year (2009)	2 nd year (2010)	3 rd year (2011)	4 th year (2012)
Number of studio		6	5	7	7
Participants	Total	122	63	84	94
	Students	89	37	49	64
	Advising professor	6	5	7	7
	Lesson helpers	12	10	14	14
	Managers	3	2	6	3
	Outside support	12	7	8	6
Completion rate (%)		-	-	78	88

students was about 85%. The completion rate for the 1st and 2nd year was not identified, but in the 3rd and the 4th year, completion criteria was determined within the range recognized by the advising professor and taking into consideration participant's attendance percentage.

Figure 10. 2012 Grand prize plans



a) Haengbok (Happiness) Plus, Gamamasil blooms

b) Palgongsan (mountain)/Geumhogang (river) surroundings Changjo (Creation) village building

IV. OPERATION OUTCOME OF THE PUBLIC PARTICIPATION URBAN SCHOOL

1. Training residents as village improvement leaders

The purpose of the Urban School was to provide the residents the experience of planning and executing by themselves improvement activities for their community and village. Considerable effort and time must be supported for the residents who completed the training at the Urban School to be able to plan and operate a project in reality.

The experience at the Urban School enhances the understanding for city and village with a urban planning perspective. Therefore, it is expected to provide an opportunity to draw residents' attention and autonomous involvement to relevant policy promotion and project implementation by the city.

In reality, the majority of residents who participated in the Urban School were representatives of residents' associations or leaders of communities they are respectively involved with. It is believed that these people, as future community leaders, will indeed make use of their experience

at the Urban School and that the experience at the Urban School will be especially beneficial for the public officials in building relationship with the residents.

2. From studio results to policy projects

The results proposed at the Urban School over the past four cycles (years) are becoming projects in various ways led by Daegu Metropolitan government and applicable basic local government. Recently, in the case of government funded projects⁴, elements related to resident participation such as residents' involvement in the planning process and their determination to carry out the project are becoming important factors for pilot project selection. Hence, the proposed projects from the Urban School are receiving a lot of attention from the local government.

Table 3. The status of the Urban School results becoming policy projects

Studio	1st year (2009)	2nd year (2010)	3rd year (2011)	4th year (2012)
Project in progress	<ul style="list-style-type: none"> ◦ Jong-ro physical facility project ◦ Jongno program project ◦ Namgu culture avenue project 	<ul style="list-style-type: none"> ◦ Daegu Eupsung project ◦ Apsan with a story 	<ul style="list-style-type: none"> ◦ Making Jungang-daero a symbolic street ◦ Seogu Haenbok village improvement ◦ 3rd Industrial Complex regeneration project ◦ Manchon-dong happy town 	<ul style="list-style-type: none"> ◦ Formation of symbolic street in Eupsung, Daegu ◦ Naedang-dong Deojoeun village improvement
Project under review	<ul style="list-style-type: none"> ◦ Suseonggu Bokgaecheon ◦ Namgu Apsan recreation: Beulsaemi village 	<ul style="list-style-type: none"> ◦ Bukseong-ro environmental improvement ◦ Formation of culture & customs avenue in US Army surrounding stop area ◦ Gyeongnam Namcheon Residents contact-type river project 	<ul style="list-style-type: none"> ◦ Catholic church pilgrimage road project ◦ Suchang Elementary School area public design improvement ◦ Apsan cafe street formation 	<ul style="list-style-type: none"> ◦ Palgongsan-Geumhogang surrounding Changjo village improvement project ◦ Anshim residents community vitalization ◦ Bisan-dong Saeteonal flower garden ◦ Jang-dong regular manufacturing area city regeneration ◦ Hyeonpung Happiness plus

⁴ A representative government funded project related to village improvement is the Urban Revitalization Improvement Local Development Project.

The 3rd and the 4th year Urban School showed prominent examples of the local government taking an active interest in the operation of the Urban School. The local government selected in advance the themes and locations that could be discussed at the Urban School and induced residents' participation. This proactive step is considered to be a way for the local government to check residents' opinion about the project idea that is in progress at the local government and to fulfill the requirements to be selected as a government funded project.

With the local government's active interest in the Urban School, the work results of the school have the advantage to be realized. Although residents were involved in the school through inducement rather than autonomous participation, the significance of the Urban School is highly positive in that the satisfaction of level was high for the residents who participated in the program and that it secured an opportunity to realize the ideas of residents.

3. Training of participating professionals

The effects of the Urban School are expected to be twofold: first, in the training of resident leaders, and second, in the expanding the experience of professionals who are leading and supervising the process of resident involvement. Planning through resident involvement are undertaken in various ways in the field of architecture, urban planning, and landscaping, but such practice has yet to be generalized. Nevertheless, the Urban School which involves not only the participating residents but also professionals of related fields in the designing process is beneficial in advancing the experience of the professionals for residents-involved designing process.

In addition, for the students participating as lesson helpers, the Urban School provides beneficial learning opportunities to improve their capabilities as professionals by training them in the residents-involved designing process and giving them the experience of consultation process with residents. Experiencing trial and error found in the operation of the school and studios, and the preparations and arrangements needed for writing up the final plan will all be valuable assets for these students who are studying urban planning and design.

V. PROSPECT AND TASKS⁵

1. Public support for stable operation of the Urban School and participant orientation

Institutional grounds for public support must be established so that programs like Public Participation Urban School aimed for the empowerment of resident leaders in village improvement can be operated consistently. Through continuous operation of the program subsequent efforts should be exerted on developing and generalizing a manual that fits the general and unique features of Daegu resident participation. In addition, a stable financial

⁵ This section summarizes the content from "The Operational Assessment and Improvement Directions for Public Participation Urban Schools in 2011" published in Journal of Daegu Gyeongbuk Development Institute.

resource must be secured in order to operate studio-format programs like those at the City School. A stable public support for the settlement of a desirable village-improvement policy unique to Daegu must be provided by expanding the use of residents' planning results drawn from the Urban School as well as the opportunity to participate in the planning process to more residents.

Public support is needed to systematize orientation for the Urban School participants. Some of the greatest outcomes of the Public Participation Urban School include: residents who have been involved in the Urban School will serve as leaders in village improvement based on their experience at the school; the advising professors will gain the know-how for residents-participated planning procedures; and the lesson helpers will gain the opportunity for training in the participation process.

In order to maximize the effects of participant empowerment, an orientation suitable for the characteristics of the participants is required at a preliminary stage prior to regular program participation at the Urban School. It will be extremely helpful for the participant empowerment through the Urban School when the following training or support are carried out: training the participating residents about the basic knowledge and method necessary for conducting studio work; supporting the advising professors and specialists with instructional strategies such as studio operation skills; and on-board training for lesson helpers to become participating professionals.

In reality, it is quite challenging to differentiate training time and course according to each studio in the Urban School, which is operated as a short-term organization. However, it is possible to consider various ways of differentiating the operation mode of each studio. For example, onsite training time can be operated flexibly while lectures and seminars suitable for the theme of each studio can be carried out directly at the studio. Concurrently, consistent supplementation for the Urban School format instructional method should be carried out angled at the level of the residents.

2. Management of existing participants to expand participation

According to the survey⁶ about participation route to the Urban School, items that showed high response were promotion at community gathering, recommendation by existing participants, and promotion by local government. As the survey results indicate, in order to increase citizen participation of the Urban School various channels of publicity are needed. In addition, since the

⁶ According to survey question about participation route to the 4th Urban School, 6% of the participants responded to "promotion at neighborhood meeting or residents' association gathering," 32% responded to "recommendation by existing participants," 14% responded to "voluntary participation intent through city portal webpage," 30% responded to "promotion by related institution such local agenda," and 18% responded to "other routes."

friends and families of those who participated in the Urban School can serve as publicity outlets⁷, it is necessary to provide information and continuous training to past and current participants.

Continuous support and follow-up education is needed in order to have residents who had participated in the Urban School work as resident leaders. Towards this end, the Urban School operation organization should function permanently. Also it is necessary to have related departments in the local government that are exclusively responsible for the affairs. In order to have the participants at the Urban School improve their competence as village improvement leaders, a foundation should be arranged to provide various services such as mailing service of village-improvement related information, information about the operation of the Urban School, updated information about project progress of the Urban School work results, and participation opportunities in related planning execution.

3. Efforts towards realizing drawn ideas

Efforts towards realizing village improvement related contents discussed at the Urban School should be expanded on a public level. A great number of plans drawn by each studio at the Public Participation Urban School are in progress as projects. The ideas that have been reviewed and proposed at the Urban School are characteristically resident-initiated public projects. Accordingly, compared to other projects, they hold great advantages in terms of project validity.

It is necessary for the local government to conduct internal reviews and develop a rationale for project validity to realize the plans proposed at the Urban School. In order to hold a superior position in the competition among local governments that is increasingly become more intense, the local government should strive to expand residents-involved planning process such as the Urban School and to strengthen its ability to sort and select proposed ideas.

⁷ According to survey (4th Public Participation Urban School Survey) question about whether the participant will recommend the Urban School program to relatives and friends, 37% of the participants responded that they would actively recommend the program, 60% responded that they would recommend the program, and 3% responded that they will think about it.

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Construction of the New Provincial Capital of Gyeongsangbuk-do

I. INTRODUCTION

The competitiveness of a country is improved based on the competitiveness of regions. Our country's reform of administrative system in the past was carried out as part of a national policy to draw national development and the unity of the people by improving the competitiveness of regions.

The administrative system of Gyeongsangbuk-do was reformed by enforcement of 「Act on the Erection of Daegu City and Incheon City」 on July 1, 1981. Daegu-si was dispatched from the administrative district of Gyeongsangbuk-do as it was raised to be the city controlled directly by central government, and as a result, Gyeongsangbuk-do provincial office has been located in Daegu-si which is other administrative district. Gyeongsangbuk-do still performs the central functions regarding politics, economy, culture, and education in Daegu in condition that the seat of provincial office is in discord with the jurisdiction. This has been an obstacle to creating the sense of unity between local residents, providing self-governing administration and administrative service, and improving the development and status of the region. Furthermore, as Gyeongsangbuk-do provincial office is located in Daegu Metropolitan City¹ even though the residents' expectation and demand on local administrative service and interest in the regional economy have increased, the core managerial function has been difficult to be performed and the financial power has been deteriorated.

A province is a wide-area administrative district, and it is characterized by a relatively broad jurisdiction and lower population density compared to a metropolitan area. In addition, a provincial office has functions of directing, supervising, integrating and controlling self-governing communities due to the coexistence of cities, agricultural communities and fishing villages within the jurisdiction. On the other hand, the wide area jurisdiction and low density poses difficulties in the expansion and retention of social overhead capital and various convenience facilities, and regional development by its own exertions is limited due to the lack of its own financial capacity except for some local autonomous bodies.

The seat of provincial office is especially the one of critical issues to the provincial office located in other administrative district since it has a significant locational importance to perform a pivot role in supporting regional development and effective use of the resource of the whole Do in order to lead the development of Do. By moving provincial office to the jurisdiction, fundamentally independent and autonomous provincial administration can be performed, and the efficiency of

¹ Daegu Direct-Controlled City was renamed Daegu Metropolitan City due to the reform of the 「Local Government Act」 in 1994.

administration and residents' satisfaction can be improved by securing the identity of Do and residents' pride and providing more neighboring service to residents.

Therefore, the New Town of Gyeongsangbuk-do Provincial Office has its significance in that it plays a central role in supporting the regional development and efficient utilization of the overall provincial resources to promote the development of the province. In this regard, the construction of the Gyeongsangbuk-do New Provincial Capital needs to be identified in detail.

II. CHANGE IN LOCAL ADMINISTRATIVE SYSTEM AND PROVINCIAL OFFICE RELOCATION

1. Change in Regional Administrative System and Provincial Office Relocation

Reorganizations of local administrative district have occurred frequently based on a high level of economic growth in Korea since 1980s. Sizable Eups with a population of fifty thousand and areas for the local office of urban development under the direct control of Do were raised to the status of Sis; smaller Eups in the countryside, Myeons with a population of twenty thousand, and Myeons with county offices were raised to the status of Eups; and Gus were erected in big cities.

Excessive Gus in Seoul Metropolitan City were divided into 5 new Gus as autonomous Gu system has been implemented owing to the wave of local government by 1988. In addition, 1 Metropolitan City, 5 Direct-Controlled Cities, 9 Dos, 67 Sis, 137 Guns, 179 Eups, and 1,260 Myeons were erected as Daejeon-si was raised to the status of Direct-Controlled City in 1989.

The regions combined Si and Gun and Guns in the form of city with a population over fifty thousand could be raised to the status of Si combined with forms of rural and urban communities with the enactment of the 「Act on the Erection of Si Combined with Forms of Rural and Urban Communities」 in 1994. As a result, former Direct-Controlled Cities were renamed Metropolitan Cities according to the 「Local Government Act」 in 1995, and now 6 Metropolitan Cities exist as Ulsan-si was raised to the status of Metropolitan City in 1997. Jeju Special Self-Governing Province was pushed forward as the existing primary local government of Jeju-do was abolished in 2006, and Changwon-si, Masan-si, and Jinhae-si were integrated into Changwon-si as primary local governments were merged all over the country in 2010.

In the rapid change of local administrative system reform, Jeollanam-do, Chungcheongnam-do, and Gyeongsangbuk-do remained the only provinces where the provincial office, which is a regional administrative agency, is located in Metropolitan City. The administrative districts of the provinces were dispatched as Daegu-si was raised to be the Direct-Controlled City in 1980 and Gwangju-si and Daejeon-si was raised to be the Metropolitan City in 1995. Currently in Jeollanam-do, provincial office relocation project, from Gwangju to Muan-gun, is in its final stage; in Chungcheongnam-do, provincial office relocation, from Daejeon to Hongseong and Yesan-gun, is in

progress; and also in Gyeongsangbuk-do, phased relocation of provincial office, from Daegu Metropolitan City to Andong and Yecheon-gun, is being pushed forward.

The seats of provincial office in these three provinces have endured economic and social losses since their jurisdictions exist in other Metropolitan Cities even though they are the spaces which perform a pivotal role in provincial administration proposing the central image of each Do.

2. Previous Cases of Provincial Office Relocation

a. Gyeongsangnam-do

Under the background that the seat of a provincial office is pointed out to be an inappropriate location as the center that considers daily lives of residents, an issue to move the provincial office building to the jurisdiction of Gyeongsangnam-do, not Busan Metropolitan City was raised with the promulgation of the law related to the direct control of the government in 1963. In April 1974, it was officially announced that Changwon city was finalized as the industrial base development and promotion region, and the new provincial office was opened (July 1983) in the seat of Gyeongsangnam-do province office in accordance with the decision of the Legislative Council of National Defense in March 1981.

As local agencies of government institutions and branch offices of public enterprises were situated in Busan, the comprehensive administration system of Gyeongnam was not strengthened, and the increasing number of population in Changwon led to rapid population decline in other areas of Gyeongnam. In addition, the movement to separate administrative districts from Gyeongnam due to the growth of cities was detected, and as a result, the provincial office came to be located in the planned city of Changwon.

b. Jeollanam-do

The removal of a provincial office to new location was determined in accordance with a special statement of the president in May 1993. The location of Namak-ri, Samhyang-myeon, Muan-gun, Jeollanam-do was selected as the seat of a provincial office in January 1999, and new city with planned population of 150,000 people was constructed in the development area of 14.5 km²(4,400,000 square meters). In October 2005, the provincial office was moved into the provincial office building of new address after conducting the ground-breaking ceremony of new provincial office building in December 2001.

A future vision of the new city promotes a central city of administration and business leading a balanced development, a center aimed at international trade with China and Southeast Asia and a high-tech city that promotes information, communication and knowledge and a tourism and marine hub behind the J project.

Figure 1. Domestic practices on the New Provincial Capital (Gyeongsangnam-do provincial office, Jeollanam-do provincial office) plans



There still remains an issue of the connection with residential and commercial facilities as well as surrounding areas in addition to basic infrastructure, but the new city project has its advantageous characteristics of relieving the financial burden resulting from the urban development of local governments by minimizing the issuance of the municipal bond (100 billion won) due to favorable sales in lots caused by the residential land development and the government support for the entire cost of new provincial office construction in the process of the development project. In addition, as the seat of a provincial office comes to be located in the central area for the J project (construction of a hub city for tourism, leisure and business) of Jeollanam-do, it is expected that the linkage of functional and urban space with surrounding areas will be the basis of the growth of Jeollanam-do New City in the future.

3. Promotion Details

The discussions about the change the address of Gyeongsangbuk-do provincial office came to be started with the separation of Daegu city from Gyeongsangbuk-do due to the enforcement of 『Act on the installation of Daegu and Incheon directly governed-cities (Act No. 3424)』 on July 1st, 1981. In particular, the location of Gyeongsangbuk-do provincial office outside the jurisdiction resulted in a variety of problems with the revival of the local autonomy system in March 1991. To solve these problems, a provincial assembly composed " a special committee for provincial office removal" in April 1992 and selected 6 regions (Andong, Gumi, Pohang, Yeongcheon, Gyeongju, Uiseong) as candidate sites, but it failed to select the final candidate due to the overheated competition between cities and counties and conflicts between regions and came to relegate the authority to determine the candidate site to the government.

In July 1999, Muan-gun, Jeollanam-do was determined as the proposed site for Jeollanam-do provincial office, and discussions about the provincial office removal came to be reignited. In a related move, Gyeongsangbuk-do provincial government proposed 『provincial office site selection promotion committee ordinance』 in December 1999, but a provincial assembly

reserved the enactment of the ordinance on the ground that the proposed ordinance requires a in-depth review, thereby disconnecting the discussions about the change in the address of the provincial office.

As Jeollanam-do provincial office moved to Muan-gun in November 2005, and Hongseong and Yecheon were finalized as the proposed sites for Chungcheongnam-do provincial office in February 2006, Gyeongsangbuk-do became the only region with an unsolved issue related to the removal of a provincial office within the jurisdiction, which aroused public opinion that the provincial office removal cannot be delayed any more. As a result, the discussions about the provincial office were resumed with a public commitment of the 4th popularly elected provincial governor, and a municipal ordinance related to the provincial office removal proposed by 32 members of a provincial assembly was officially proclaimed (Ordinance No. 2964) in April 2007. Among 12 cities and counties, 11 regions (Andong·Yecheon, Chilgok, Gunwi, Uiseong, Gyeongju, Yeongju, Yeongcheon, Gimcheon, Sangju, Pohang, Gumi) were accepted as candidates sites, and the entire area of Andong-si·Yecheon-gun was finalized as a proposed site through evaluation on the candidate sites in September 2008 through. Later on until 2012, the construction of the Gyeongsangbuk-do New Provincial Capital has been carried out.

Figure 2. Aerial view of the Gyeongsangbuk-do New Provincial Capital



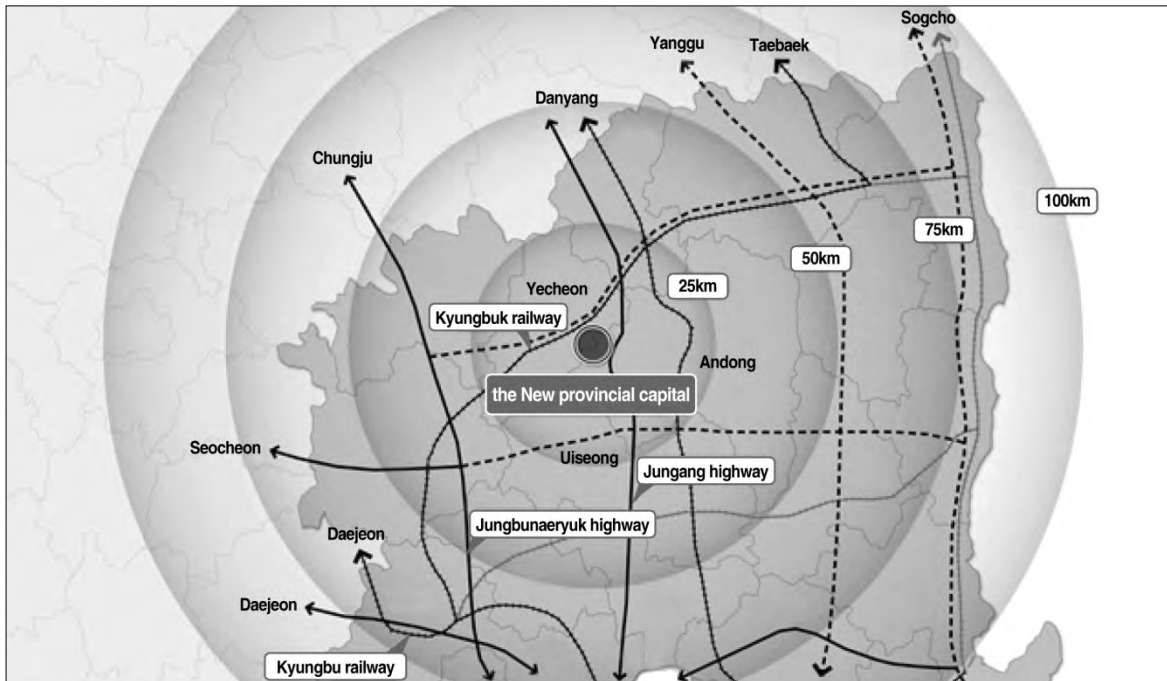
III. BASIC CONCEPT OF THE GYEONGSANGBUK-DO NEW PROVINCIAL CAPITAL

1. Concepts and Objectives

The purpose of the New City of Gyeongsangbuk-do Provincial Office project is to construct a fine city inhabited by population of 100,000 people in the entire area of 10.96 situated in Pungcheon-

myeon, Andong (6.34 km²) and Homyeong-myeon, Yecheon(4.62 km²) for 20 years from 2008 to 2027.

Figure 3. Aerial view of the Gyeongsangbuk-do New Provincial Capital



Its construction project is aimed at developing the New City into a hub city for new growth of Gyeongsangbuk-do, including self-sufficiency and strategic functions for the development of Gyeongsangbuk-do in addition to the basic function as the seat of a provincial office. To formulate the practical strategies for achievement of development objectives, the development concept was materialized into three themes, which include a cultural city with living history and tradition, an ecological garden city leading low-carbon green growth and a sophisticated administration and knowledge-based industrial city that drives the new growth of Gyeongsangbuk-do (see Figure 4).

The direction of the Gyeongsangbuk-do New Provincial Capital aims to construct a sustainable growth city equipped with the best existing technologies that can be designated as a World Heritage Site after one thousand years from now, while maintaining the most "Korean" style that is harmonious with nature, history, culture and ecology. In addition, it promotes a environmental energy city that uses renewable energy and contributes to the low-cost and high-income with clean environment as well as a human-centered city that facilitates land use driven by coexistence of past, present and future and construction of low-density and low-rise oriented architectures.

Figure 4. Development concept of the Gyeongsangbuk-do New Provincial Capital



2. Introduced Functions and Facilities

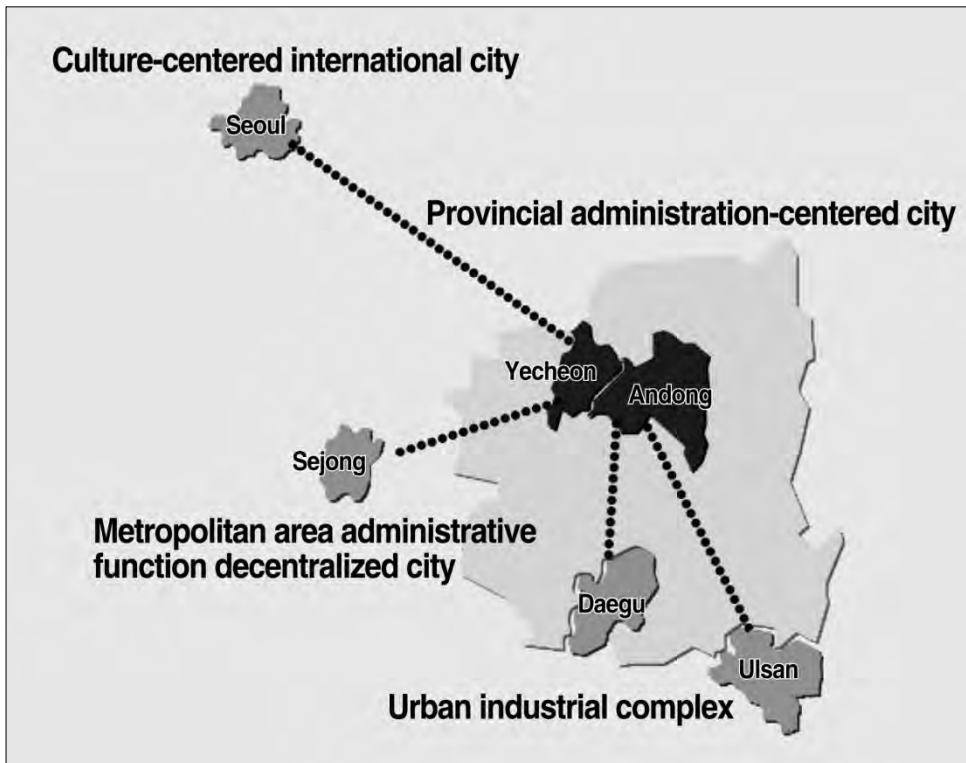
The purpose of the New City of Gyeongsangbuk-do Provincial Office project is to construct a fine The basic functions to achieve the goal of Gyeongsangbuk-do provincial office removal include performing the key functions of the city due to the removal of provincial government, a provincial assembly and relevant agencies and fostering a hub city for new growth of Gyeongsangbuk-do, including strategic and self-sufficiency functions for the development of Gyeongsangbuk-do.

As the most basic function to achieve the goal of the provincial office removal, first comes local administration. politics-centered function. The new growth center for local administration and politics can be formed by directing wide-area administration of Gyeongsangbuk-do and leading local politics as the center of local administration and politics and providing administrative services for residents and supports for each city and county in Gyeongsangbuk-do, subsequently helping to facilitate support and connection with each district of Gyeongsangbuk-do.

Second, knowledge industry and business promotion functions are required. To drive the new growth of Gyeongsangbuk-do, a functional linkage with 5 industrial belts is considered to be an essential element. For the 5 industrial belts, the new seat of a provincial office needs to support the growth of each industrial belt actively by providing excellent human resources and administrative services for R&D development and promote the linkage development of industries in Gyeongsangbuk-do by formulating plans for exchange of convention, finance and business required by each industrial belt.

Third come education and culture creation functions. a new driving power to lead Gyeongsangbuk-do is required, and space and opportunities to attract talented people with great potential should be provided. In addition, it is necessary to lay foundations for reorganizing the

Figure 5. Wide-area location features of the Gyeongsangbuk-do New Provincial Capital



assets for Gyeongsangbuk-do and foster human resources to carry on and develop the history and cultural resources.

Based on these functions, the following facilities need to be introduced. First, it is required to install provincial office building in accordance with the removal of provincial government office, a provincial assembly and relevant agencies in terms of local administration and politics.

In addition, it is necessary to construct support center for strengthening R&D capabilities, attract academic, industrial and research cluster linked to Gyeongsangbuk-do industrial belts and strategic industries or public research centers, invite IT. BT. CT. MT. energy related enterprises and create business and convention centers to support the activities of the abovementioned enterprises and centers in terms of knowledge industry and business.

From the equational and cultural aspects, the formation of cultural clusters through establishment of provincial schools (middle and high schools), attraction of branch or main academies of professional education institutions and construction of provincial public facilities (museums, art galleries and indoor gym) can be considered.

Table 1. Introduction facilities by function

Functions	Introduction facilities
Local administration and politics	<ul style="list-style-type: none"> ◦ Removal of a provincial office, a provincial assembly and relevant agencies, etc.
Knowledge industry and business	<ul style="list-style-type: none"> ◦ Construction of R&D and support centers ◦ Introduction of functions for the linkage of Gyeongbuk industrial belts and strategic industries (academic, industrial and research clusters and public research centers, etc.) ◦ Attraction of IT, BT, CT, MT and energy related enterprises ◦ Construction of business support faculties such as business center and convention centers, etc.
Education and culture	<ul style="list-style-type: none"> ◦ Establishment of provincial schools(middle and high schools, etc.) ◦ Attraction of universities and professional education institutions, etc. ◦ Construction of provincial public facilities (museums, art galleries and exhibition halls, etc.) ◦ Introduction of city entertainment (resort, theme parks and sports faculties, etc.) functions

3. Step-by-Step Construction Strategies

The project period of the Gyeongsangbuk-do New Provincial Capital is divided into three phases to secure the efficiency considering project effects and business characteristics, and an administration-centered complex self-sufficiency city with population of 100,000 people is to be constructed through step-by-step development.

The budget of the Gyeongsangbuk-do New Provincial Capital is estimated to be 2.5 trillion won and it is conducted by step-by-step progression. In step 1, administrative institutions are moved to new seat of a provincial office until 2014. Step 2 is urban growth period from 2015 to 2020. Step 3 is urban expansion period from 2012 to 2027. The major institutions to be moved in the step 1 include Gyeongsangbuk-do provincial office, metropolitan police agencies and a provincial assembly, etc.

In detail, step 1(quickening project) project is implemented through construction of administrative town in which a provincial office, a provincial assembly, a provincial office of education and Gyeongbuk provincial police agency are situated in 4.76 km² building area with size of population of 25,000 people from 2010 to 2014. In step 2(growth period) project, residential/commercial facilities, general hospitals and complex transit centers are constructed in 3.31 km² building site with size of population of 43,000 people from 2015 to 2020. The step 3 (expansion period) project includes installation of urban self-sufficiency facilities such as residential sites, industrial/R&D, specialized colleges and theme parks in 2.9 km² building site with size of population of 32,000 people.

Figure 6. Promotion stages of the Gyeongsangbuk-do New Provincial Capital construction



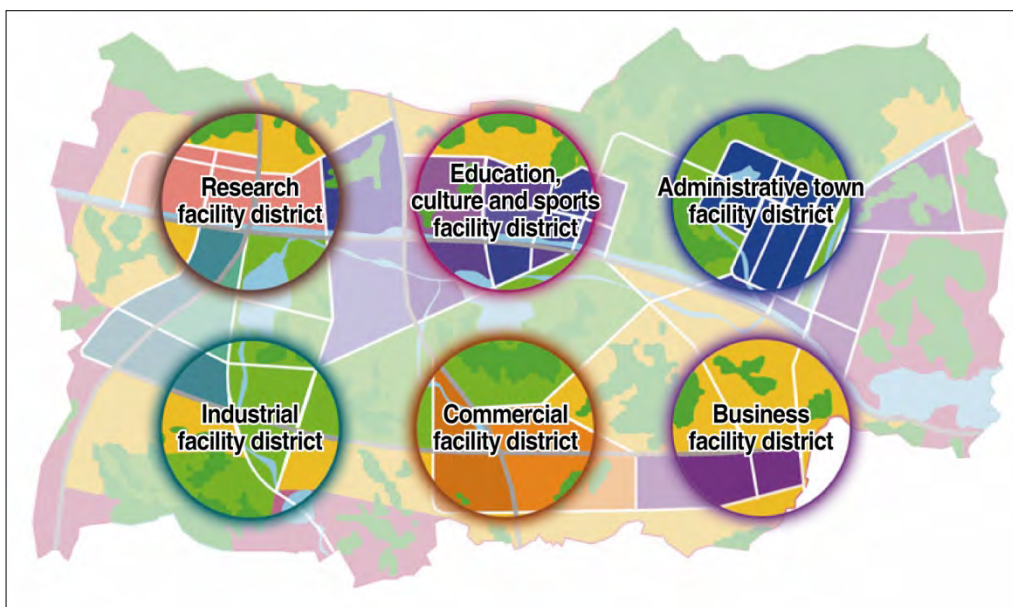
4. Sectional Plans for the Gyeongsangbuk-do New Provincial Capital

a. Spatial Planning

The new city, the seat of Gyeongsangbuk-do provincial office is situated at the place 21.5 km away from the Andong City Hall and 10.2 km away from Yecheon Ward Office, and it is located in a site, usually behind a mountain with a river in front, with Mt. Gummoo in the northeastern part, Mt. Gail in northwestern part and Nakdong River in the south. In addition, since the National Road No. 28 and No.35 lines pass through this site adjacent to the Central Expressway and Central Inland Expressway, the geographical conditions of the New City of Gyeongsangbuk-do Provincial Office are expected to contribute to the development of northern areas in Gyeongsangbuk-do.

Taking this into account, the entire Gyeongsangbuk-do New Provincial Capital is composed of 6 based districts in consideration of terrain, topography, linkage system with surrounding districts and maintenance plans of wide-area infrastructure, thereby promoting balanced development

Figure 7. Concept of characterization by district



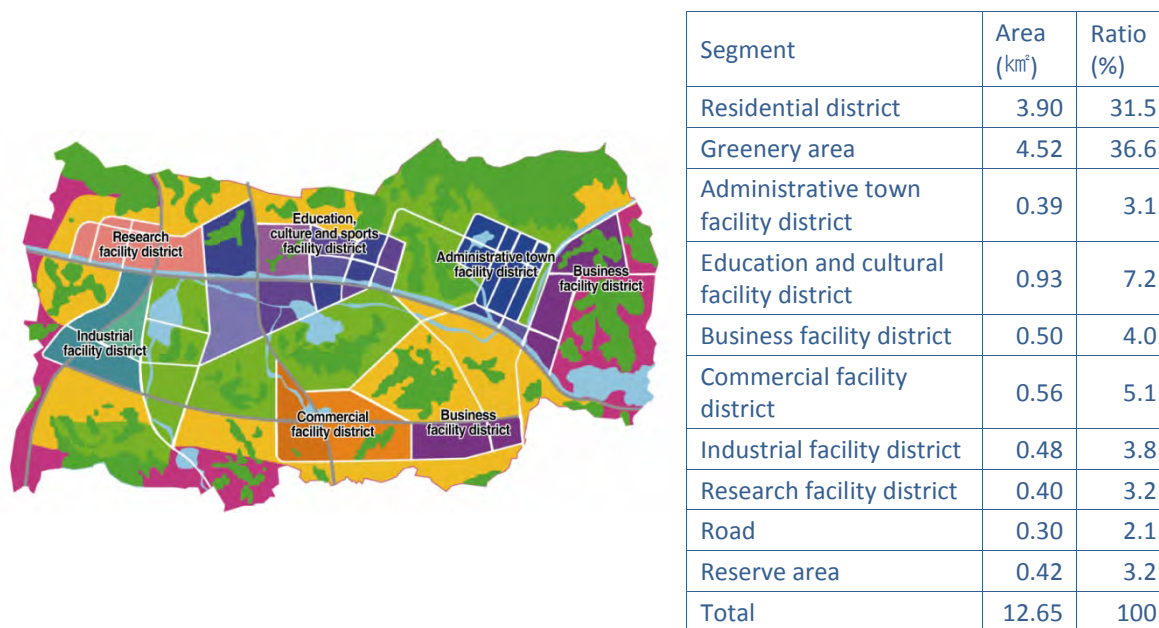
through characterization by district and construction of networks. In addition, to alleviate the traffic demand, residential areas are distributed by district.

b. Land Use Planning

The Gyeongsangbuk-do New Provincial Capital project aims to construct a city to accommodate population of 100,000 people. For this, housing supply for 2,377 detached houses and 37,623 apartment houses is needed. For educational facilities, establishment of 6 kindergartens, 7 elementary school, 4 middle schools, 3 high schools and 1 university are planned. In addition, two theme parks, logistic facilities, medical facilities, complex community facility, cultural and sports facilities, youth facilities and other facilities will be built.

In addition, the height of structures is configured to be less than 4 floors to blend in with surrounding environment, pursuing low-density and low-rise land use. In consideration of medium and low-density urban environment and future urban development, residential site ratio is planned less than 30%, and park greenery ratio is set 36.6% and reserve area ratio 3.2%. For ensuring self-sufficiency, relevant agency ratio and industrial site ratio is set 3.1% and 3.8% respectively. Such area and ratio were planned to realize the settlement life for settlers not to feel inconvenience to live in the new town for provincial office relocation.

Figure 8. Land use planning for the Gyeongsangbuk-do New Provincial Capital



c. Green Network Planning

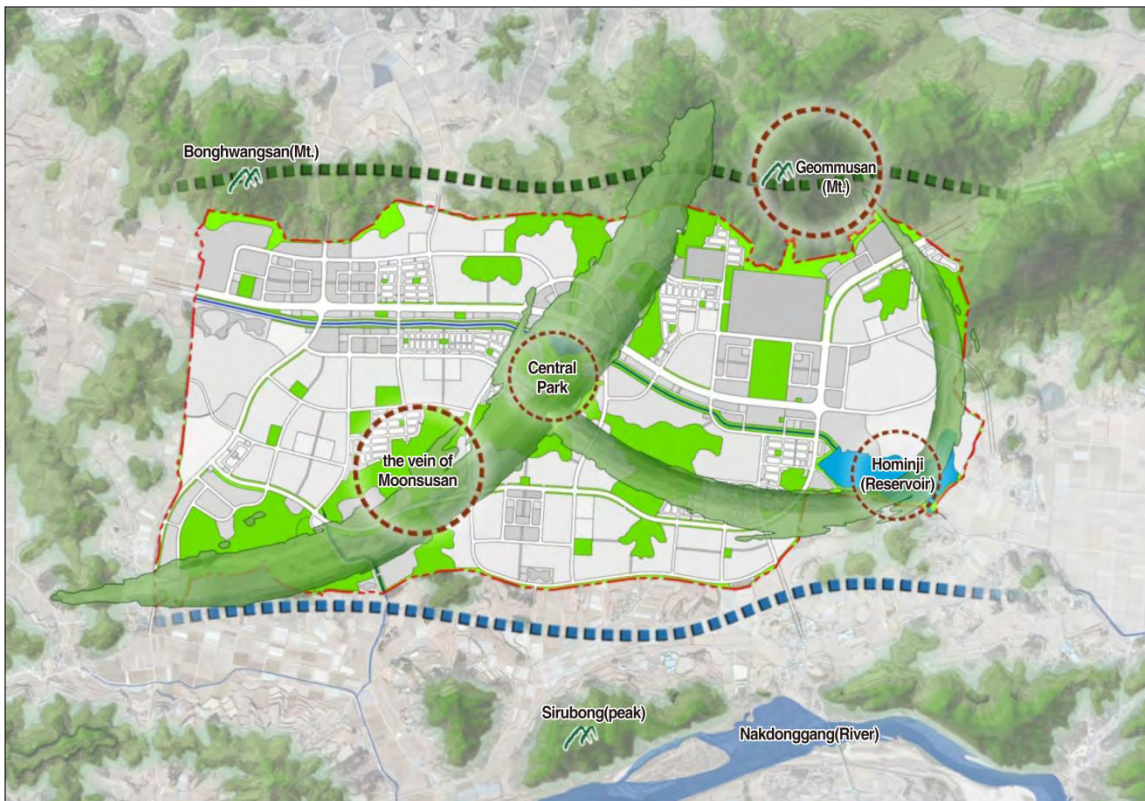
Gyeongsangbuk-do possesses wonderful natural elements. Green Network Project was planned in compliance with basic direction not to cause network disconnection due to development and to

make the best use of the natural elements. Constructing Green Network of the new town for provincial office relocation first preserves Munsu-jimak under this basic direction.

To construct a green network, Munsu-jimak needs to be preserved first. The green network is to be built through utilization of good convergence zone and preservation of greenery areas, Central Park and original terrain with 120m above the sea level such as Mt. Gummoo and Mt. Bongwhang, along with Munsu-jimaek that stretches from the northeastern part to the west. Second, it is required to create a river greenery corridor. In a related move, the green network connected to water system is constructed, and connection of aquatic environment created in waterways, greener areas and waterside parks is taken into account. Third, a park network is to be constructed. The network that connects district-level linked greens, green islands and buffer greens with neighborhood park and waterfront parks needs to be constructed.

Taking this into account, the green network of the Gyeongsangbuk-do New Provincial Capital forms a green corridor that connects 6 districts, centering on the Munsu-jimak and visualizes a plan for greenery area and preservation of greens considering local characteristics and natural terrain. In this connection, it is required to consider the construction of networks with watersheds within the district, preserved greens and reservoirs, etc., and the waterfront space for eco-friendly natural ecological rivers and landscape improvement needs to be mapped out.

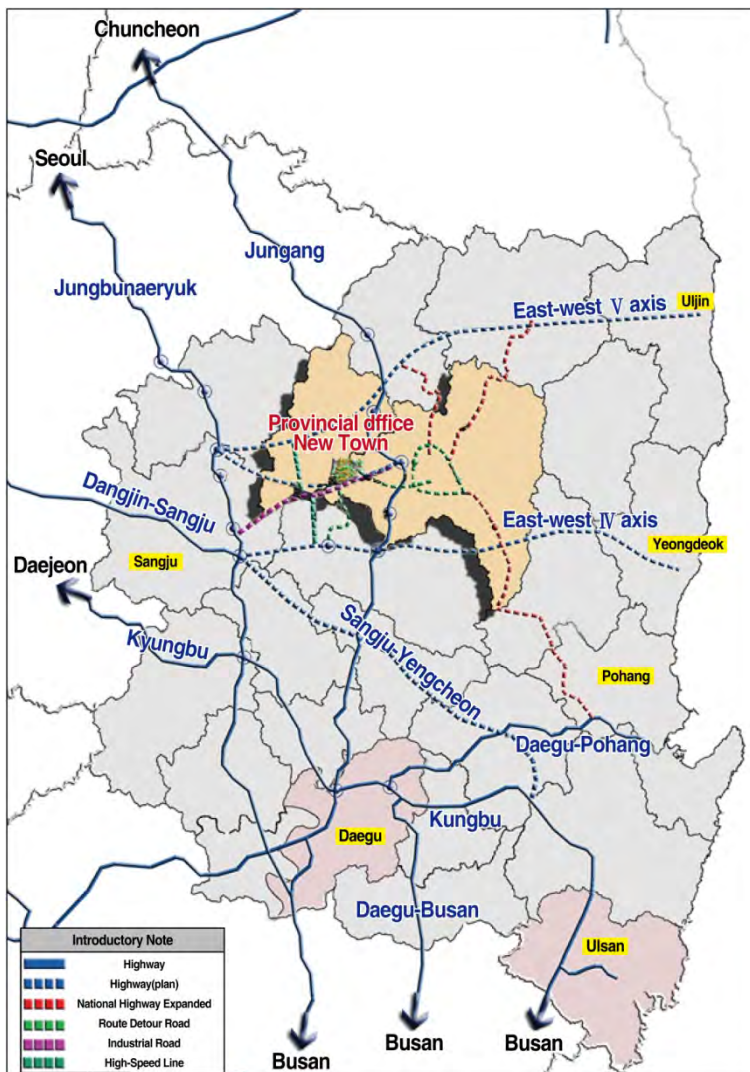
Figure 9. Concept of Green Network for the Gyeongsangbuk-do New Provincial Capital



d. Wide-area Road Network Planning

To build a network associated with wide-area transportation networks, 69 km of roads 7 lines are being planned. Of these roads, Route 34 ~ New City Sector connecting Andong ~ Provincial Office and Yecheon Capital ~ New City Sector connecting Yecheon ~ Provincial Office are being designed in detail to build a convenient transport link between Andong, New City, and Yecheon. The transport plan in the district includes forming a trunk skeleton considering the natural terrain like Munsu-jimak, building a street network to facilitate linkages with surrounding areas, connecting Mungyeong from Andong in the east-west direction, and planning principal roads connecting Yecheon and Uiseong around Local Roads 927 and 914 in the south-north direction. The width of main arterial roads are planned in 50m for a symbolizing horizontal axis in the east-west direction, in 25~30m for Local Road 927 in the south-north direction, and in 30m for circular roads in the district.

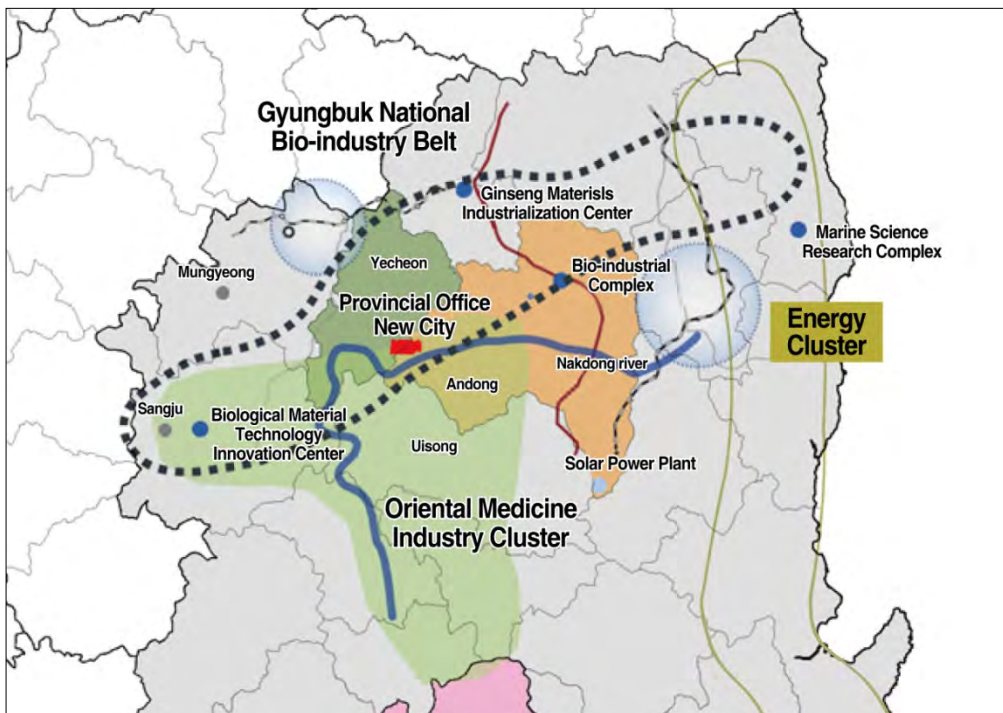
Figure 10. Wide-area Road Network Plan



e. *Development Plans Associated with Surroundings*

For the plan associated with surroundings, first complementary functions with those of surrounding cities are to be introduced. The new city for a removal of the provincial office will be nurtured as an integrated administrative city based on central administration, industry knowledge, education, and research; Andong as a tourist city based on Confucianism and traditional culture, and Yecheon-gun as a garden city for agricultural and bio-ecological experiences. Second, land is to be allocated for efficient use considering the organic relationship, and the plan for land use needs to focus on complementing health care, culture, education, environment, etc. in consideration of support for insufficient facilities. Third, a transportation system needs to be constructed in conjunction with surroundings. Fourth, a network between industries is to be built, which facilitates win-win development. The new city where the provincial office moves is planned to nurture industry knowledge such as IT, BT. Andong needs to focus on nurturing Confucian and cultural content industries as well as tourism industries, and Yecheon-gun is suggested to foster industries related to herbal medicines, herbals, food, and eco-friendly agriculture.

Figure 11. Development Plan Associated with Surroundings



IV. PROSPECTS AND CHALLENGES

The project of the Gyeongsangbuk-do New Provincial Capital has smoothly proceeded, and the compensation for land is to be completed by the end of this year. Additionally, the development and implementation plans for creation of the Gyeongsangbuk-do New Provincial Capital were established and approved in April 2011, and a ground-breaking ceremony for the construction of

a new city was performed in May 2011. Since then, the new city construction project has actively been promoted.

The provincial office and assembly as well as 77 relevant agencies such as Gyeongsangbuk-do Office of Education, Police Agency of Gyeongsangbuk-do, Gyuneopook National Agricultural Cooperative Division, Agricultural Research Institute, ect. will be encouraged to expand the sufficiency base for the New Provincial Capital in the early stage.

In addition, to the land for industrial use located in the new city, influential companies will be attracted, and to the campus town, top-ranked universities in Korea will be invited as a result of concerted efforts. It is expected that the development costs of the New City of Gyeongsangbuk-do will be relatively low compared to those of other cities, which facilitates attraction of many companies and universities.

If the Gyeongsangbuk-do provincial office is moved to Andong and Yecheon, Andong located in the north of Gyeongsangbuk-do is added to the development axis previously concentrated on the southern region including Daegu, Gumi, Pohang, etc, and thereby Daegu and Gyeongsang Province develops around this new rectangular axis.

In particular, a road transport circumstance improves to enable provincial residents to reach within 1 hour from all the region in the province to the capital of the provincial office with the development of a 5-6 axis high way in the east-west direction, which leads to expectation that Andong and Yecheon will be reborn as a new transport hub connecting Seoul and the southern region.

To promote early settlement of the Gyeongsangbuk-do New Provincial Capital as a hub city with population of 100,000 people in the northern zone of Gyeongsangbuk-do, the following challenges need to be resolved:

First, a leading project should be attracted to promote activation of the city in the initial stage. To ensure tangible results and maximize the effects, it is necessary to induce the new city to serve as a capitalist by allowing the city to attract base-typed leading projects. It is desirable to formulate high - tech industrial functions, or education, research & development functions, which meet the characteristics and functions as a new city. In this regard, a state-of-the-art knowledge-based industrial park, a university and research park, a health medical complex, etc. can be considered. For the leading projects, it is suggested to adopt the public-private development approach in the form of a special purpose company (SPC) to efficiently implement the project or proceed the project in a pure private investment approach, but even in this case, it is important to review taking measures for guarantying a widespread autonomy in executing the plan.

Second, it is necessary to attract related organizations actively. To seek the early development of the new city for a removal of the provincial office, it is essential to actively attract related organizations prior to the development by the private sector, which requires concentrated efforts. In a related move, it is required to take various support measures (taxes, charges, housing issues, education, infrastructure, etc.) for moving institutions and employees working for the relevant institutions.

Third, the acquisition strategy for securing the urban identity should be established. For the preparation of a new city space environment integrated design, it is required to introduce a special system of making the design collectively and dimensionally by integrating the systems separated by facility according the phase of business. In addition, it is necessary to establish a strategy of developing the new city as a luxury city by integrating plans on a spacious plan on street lights, outdoor billboards, landscaping, etc. and a plan on public facilities such as roads, street furniture, squares, bridges, sidewalks, signs, and others, which are planned after the development plan. Furthermore, it is necessary to induce a plan for the development of an urban brand to actively cope with securing a comparative advantage over rival cities, and a strategy to raise the image for the development of an international city brand. In particular, an urban brand needs to develop for image positioning of the northern district of Gyeongsangbuk-do as a city worth living and luxury city, and deduction of the items and applications to make the best use of the urban brand should precede development.

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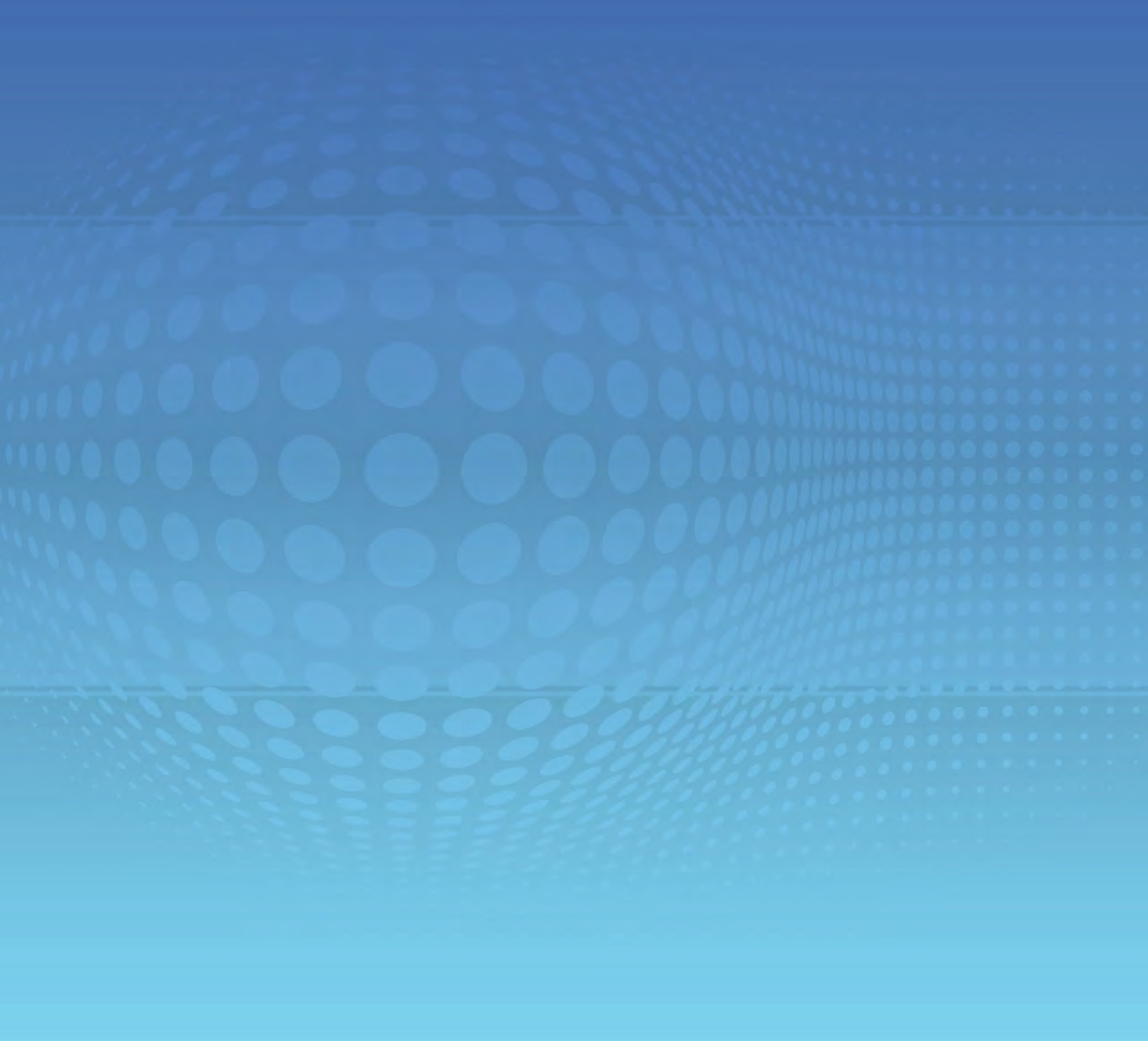
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PART 3.
LOCAL RESPONSES TO CLIMATE CHANGE
AND BALANCED DEVELOPMENT



Greenhouse Gas (GHG) Emissions and Transportation in Southern California: Challenges and Responses

I. INTRODUCTION

Two new laws were passed to address the reduction of Greenhouse Gas (GHG) emissions in California. The first bill (Assembly Bill (AB) 32: Global Warming Solutions Act) was signed by the Governor of California, Arnold Schwarzenegger, in September 2006. AB 32 is intended to reduce GHG emissions to 1990 levels by the year 2020. Executive Order (S-3-05) signed in 2005, requires the reduction of GHG emissions to 80% below 1990 levels by the year 2050. The 2009 Public Policy Institute of California (PPIC) survey revealed that most residents (66%) support the 2006 California law (AB 32) with a split opinion about whether the state government should take action to reduce emissions immediately (48%) or wait until the economy and state budget situation improve (46%) (Baldassare et. al. 2009).

The California Air Resources Board (CARB) estimated that 2004 GHG emissions from automobiles and light trucks totaled 135 million metric tons. Automobiles and light trucks accounted for almost 30 percent of the total GHG emissions in California. Given the significant contribution of the transportation sector in producing GHG emissions, Senate Bill (SB) 375 was passed by the state legislature and signed by Governor Schwarzenegger in September 2008. It became effective on January 1, 2009. It provides a means for achieving AB 32 goals from cars and light trucks. This law shows a significant effort from the State of California to implement the global warming goals of AB 32.

SB 375 requires Metropolitan Planning Organizations (MPOs) in California to develop a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan (RTP) to reduce GHG emissions. SB 375 requires that MPOs develop a SCS to reduce GHG emissions from cars and light trucks through the integration of planning processes for transportation, land use, and housing. SB 375 provides local governments with regulatory relief and other incentives to encourage new development patterns and transportation alternatives.

A SCS includes the general location of diverse land uses, residential densities and building intensities as a land use element in the RTP. The SCS, however, is limited in its applicability, because planned land uses in local general plans do not have to conform to the SCS. The land use plan element and its relevant strategies in the SCS should encourage smart growth and sustainable development such as transit oriented development (TOD); mixed use development, provision of housing opportunities near job centers, job opportunities in housing-rich communities, the focusing of growth along transit corridors and nodes to utilize available capacity. As a result, transit use or walking becomes more popular, and the planned reductions of

GHG emissions will be achieved by the target date. There have been efforts to assess SB 375 implementation (Barbour and Deakin, 2012; Eaken and Horner, 2012; Rose, 2011).

This paper assesses SCAG's planning efforts to implement SB 375. The paper assesses how SB 375 changes the existing way of developing SCAG's regional plan to achieve the regional GHG emissions target. SB 375 put CARB in charge of developing the GHG emission target, but it was not equipped with the necessary models and tools as well as standard parameters. How did SCAG work with the technically deficient CARB to develop regional GHG emission reduction targets? SB 375 also promotes the integration of land use, housing, transportation, and environment to achieve the GHG emission target. What was SCAG's approach? The SB 375 target setting process used a scenario planning approach and required SCAG's active involvement in the analysis and modeling process. How did SCAG develop scenarios and select a preferred scenario with a recommended GHG emissions target? What would be a new planning emphasis of the RTP/SCS? SB 375 requires enhanced models and tools to accurately measure the impact of land use strategies on transportation, and vice versa. The paper also presents the current progress of developing urban models (e.g., local sustainability planning tool (LSPT), production, exchange, and consumption allocation system (PECAS) model), and shows the models' sensitivity test and its results. The paper concludes with the discussion of potential issues and challenges for effective SB 375 implementation.

II. SB 375 AND NEW REGIONAL PLANNING PROCESS

1. Planning and Decision Making

With the introduction of SB 375, local, regional, and state planning and decision making are more closely linked with each other. The horizontal and vertical linkage of planning agencies is emphasized.

The Regional Targets Advisory Committee (RTAC) of CARB acknowledged the importance of vertical collaboration between the MPOs and CARB for successful target setting under SB 375. RTAC further suggested enhancing the horizontal and vertical linkages by encouraging CARB/MPOs to work with Caltrans and the California Transportation Commission to update modeling and RTP guidance. There was a close interaction between CARB and MPOs during the research, analysis and modeling process of the land use/transportation sectors and emissions. MPOs formed and frequently held meetings of a technical working group, which included CARB staff, to coordinate the development of various land use and transportation policy scenarios for CARB's target-setting process. These scenarios were developed to test the effectiveness of implementing various transportation and land use policies. The MPOs discussed technical issues including: land use and transportation strategies that could be tested in the MPO scenarios, different approaches to interregional travel, travel cost assumptions, and future revenue assumptions.

SCAG provided the initial results of its own scenario analyses and target-setting approaches to CARB and the public in time for the final RTAC meeting on May 25, 2010 (CARB, 2010). The frequent exchange of technical information and modeling results with CARB, MPOs, and other stakeholders helped SCAG to develop a standardized approach on how to do analysis and modeling, and to draft regional GHG emission reduction targets.

CARB used a “bottom up” and regional approach toward developing the statewide GHG emission reductions target in a collaborative framework. SCAG along with other MPOs and CARB developed parameters for preparing sensitivity analyses and multiple scenarios to test the effectiveness of various approaches. The CARB’s bottom up approach emphasizes the importance of input from regional and local officials and stakeholders. SCAG has been working closely with local jurisdictions and stakeholders to find a technically sound approach and politically acceptable solution for target setting and SCS development. The statewide GHG emission reduction target was simply derived through aggregation of regional emission targets. This process might guarantee a politically acceptable emissions target, but is also subject to criticism due to its flexibility and the possibly unfair spatial distribution of the regional emission targets.

2. Integration of Land Use, Housing, Transportation, and Environment

Traditional regional planning efforts focus on improving regional mobility and other related performance measures. As part of the federal transportation funding requirements, the RTP must also conform to the regional emission requirements. The Clean Air Act (CAA) was amended in 1990. It intends to reduce smog and air pollution by establishing air quality standards and planning requirements for various air pollutants. The amended CAA requires federally supported highway and transit project activities to meet federal air quality requirements. Under the U.S. Department of Transportation (DOT) Metropolitan Planning Regulations and U.S. Environmental Protection Agency’s (EPA) Transportation Conformity Rule requirements, the MPO’s RTP needs to pass a regional emission analysis test. The analysis should demonstrate a conformity finding.

In addition to the federal efforts to improve both the regional mobility and air quality associated with the emissions of light and medium vehicles, California has focused on two major regional planning efforts: the Regional Housing Needs Assessment and the Regional Blueprint. The Regional Housing Needs Assessment (RHNA) is intended to improve housing affordability for residents through the RHNA process and the resulting local housing element updates for several decades. The RHNA process establishes minimum housing development capacity that cities and counties are to make available via their land use powers to accommodate growth within a short-term planning period. RHNA numbers are assigned to four income categories as guideposts for each community to develop a mix of housing types for all economic segments of the population.

The Regional Blueprint planning program was introduced to help MPOs develop alternative growth scenarios in the early 2000s. The program was intended to utilize previously unallocated federal funding, as well as to improve the comprehensive level of transportation/land use planning. The Regional Blueprint Planning Program is a voluntary, discretionary grant program that provides seed funding to MPOs to conduct regional blueprint planning. The program contributes to the vision of improved quality of life within California by addressing future growth on a twenty-year horizon through the integration of transportation, housing, land use, environmental resources, other infrastructure, and services (Sollenberger and Klein, 2007). The regional blueprints are not required to be part of the RTP. Their impact on transportation funding decisions has, thus far, been limited.

Federal programs and requirements (i.e., RTP and conformity analysis), two state programs (i.e., RHNA and Blueprint), and local general plans were loosely interlinked before SB 375. For example, local general plan should be adjusted to incorporate the new RHNA figure, while it does not require to be changed due to Blueprint planning. Local general plans might be voluntarily updated to include the smart growth concept, resulting in the reduction of GHG emissions. There would be no incentives or regulation to introduce the smart growth concept into the plan. Local general plans, through the local input process, directly influence transportation modeling, in particular, trip generation, and furthermore transportation investments. Land use decisions were locally driven and there was a lack of strong coordination with the regionally driven transportation decisions.

SB 375 strengthened the relationship among the RTP, conformity analysis, RHNA, Blueprint, and local general plans with SCS. SB 375 still maintains the existing relationship between RHNA and local general plans and the importance of local general plans relative to Blueprint planning and SCS. Local general plans do not need to be consistent with the newly introduced SCS. SCS emphasizes the interaction of land use and transit investments. SCS acknowledges the importance of transit stations as a result of transit investments, and designates the qualified surrounding areas of transit stations as high quality transit areas (HQTA) (i.e., transit priority projects areas), and promotes TOD in those areas. SCAG used the socioeconomic forecast to link land use, housing, transportation, and environment. The geographical scale of those socioeconomic forecasts varies due to the different federal and state requirements. For example, transportation planning relies on transportation analysis zone (TAZ), while housing planning (i.e., RHNA) targets the jurisdictional level. The best way of maintaining consistency between these two planning elements was to use the jurisdictional level forecast from RHNA process, while incorporating the smart growth concept focusing on the HQTA of the local jurisdiction. Since the jurisdictional level growth forecast relied on a bottom up and local input approach, the resulting growth forecast was generally well-accepted by local jurisdictions in the SCAG Region, with a different degree of acceptance of the small area growth distribution incorporating the smart growth concept.

SB 375 is arguably the most monumental regional planning law to integrate land use, transportation, and housing for GHG emissions reductions in California. SB 375 might not produce a revolutionary impact, but rather an incremental change (Fulton, California Planning & Development Report, 11/18/2008). The major reason is that SB 375 is not linked with local planning. According to SB 375, SCS can be developed considering local general plans as part of the RTP, but local general plans do not need to be influenced by SCS. The best case scenario is that the HQTAs designated in the SCS with land use densities and building intensities different from the existing planned land use in the local general plan would be reflected in the upcoming update process of the existing local general plan.

III. GHG EMISSION REDUCTION TARGET SETTING

There are three ways of reducing emissions from cars and light trucks: greater fuel efficiency, reducing the carbon content of fuels, and the changes in growth patterns that reduce overall driving (Fulton, 2008). SB 375 required CARB to develop a GHG emissions reduction target for cars and light trucks for California's MPOs by September 30, 2010. According to a scoping plan adopted by CARB, the recommended regional transportation-related GHG target (measure No. T-3) is to reduce GHG emissions statewide by 5 million metric tons of carbon dioxide equivalent (MMTCO₂E) in 2020 (California Air Resources Board, 2008). The potential benefits of this measure that can be realized by 2020 were estimated after accounting for the benefits of overall fuel efficiency improvements from improved emission standards and low carbon fuels and from changes in fuel composition in the plan. A regional GHG reduction target for each of the State's 18 MPOs was used as the benchmark for development of the SCS. SB 375 required the CARB to set regional targets for the purpose of reducing GHG emissions from passenger vehicles for 2020 and 2035. Through a few major milestones, CARB officially released the approved regional GHG reduction targets in February 2011.

The SB 375 target setting process requires three major steps: (1) pre-preparation, (2) preparation, and (3) adoption. The pre-preparation step focuses on developing the target setting process and factors (including methods and tools). Its key elements include RTAC appointment and recommendations. The RTAC was appointed by CARB on January 23, 2009. The 21 RTAC members included representatives of metropolitan planning organizations, local transportation agencies, air districts, the League of California Cities, the California State Association of Counties, and other organizations involved with planning, the environment, environmental justice and affordable housing. RTAC provided recommendations on the target setting process, methods and tools, and implementation to CARB on September 30, 2009. Recommendations included factors to be considered and methodologies to be used in CARB's target setting process.

The preparation step focused on the research, analysis and modeling efforts of the 18 MPOs to quantify the impacts of alternative land use and transportation scenarios on GHG emissions between October 1, 2009 and June 30, 2010. After the 9 month joint effort of CARB and the

MPOs, CARB released the draft regional GHG reduction targets for further review and adopted the regional targets.

The adoption step focused on the adoption of the regional emission target between July 1, 2010 and September 30, 2010. As mandated by SB 375, CARB released a proposed target range for 2020/2035 of all three groups of MPO regions on September 23, 2010 and adopted a proposed target range. Based on the information provided by MPOs, CARB adopted a 2020 target range of a 7-8% per capita reduction in GHG emissions from 2005 levels and a 2035 target range of a 13-16% per capita reduction in GHG emissions from 2005 levels for the four largest MPOs in California.

SCAG developed five scenarios to test a range of potential GHG reduction strategies for the RTP/SCS in May 2010 (See Table 1). The scenarios create a set of bookends from the most achievable business as usual case to the most aggressive policy intervention. Each scenario is comprised of seven distinct land use and transportation components: land use, network, TDM, TSM, non-motorized, transit, and pricing. The different policy interventions in terms of land use and transportation strategies are applied to determine what is ambitious and achievable. Five different scenarios show a range of CO₂ reductions of -6% to -10% for year 2020 and of -3% to -12% for year 2035. SCAG staff assessed the reasonableness of the planning scenarios. Scenario 2 and 3 are ambitious and achievable, and the range of CO₂ reductions would be -7% to -8% for year 2020, and -5% to -6% for year 2035. Scenario 4 and 5 are ambitious and unachievable. The range of CO₂ reductions would be -9% to -10% for year 2020, and -10% to -12% for year 2035. In September 2011, the SCAG RC adopted and recommended to CARB the following targets for GHG reductions: -6% in 2020 and -8% in 2035. The target for year 2020 was achievable, while the target for year 2035 was ambitious. SCAG showed a willingness to renegotiate for the higher numbers if certain conditions are met, including restoration of the region's transportation and redevelopment budgets and more planning funds (Barbour & Deakin, 2012; CARB, 2011). CARB responded to SCAG's achievable GHG target with a higher GHG target of -8% for year 2020 and -13% for year 2035. SCAG agreed to the CARB's higher GHG target, while CARB announced a grant of \$500,000 for smart growth demonstration projects in the region (Barbour & Deakin, 2012; CARB, 2011). SCAG eventually adopted the new RTP/SCS which successfully achieves and exceeds the region's GHG emission reduction targets set by ARB by achieving a 9 percent reduction by 2020 and a 16 percent reduction by 2035 compared to the 2005 level on a per capita basis. These ambitious plan targets were made possible due to more aggressive travel demand oriented strategies and more accurate measurement of the land use impact on GHG through a newly developed parcel based sustainability model (Hu, 2011).

In summary, regional MPOs and CARB collaboratively worked together to implement the standard modeling practice (e.g., data and assumptions for transportation demand modeling) in preparation for a regional target setting. MPOs enhanced sharing of technical information and

Table 1. Range of GHG Targets: Scenario Planning Results, SCAG Proposed Target, CARB Adopted Target, and SCAG Plan Target

	2020	2035	Note
	% Change of Daily CO ₂ (per capita from 2005)	% Change of Daily CO ₂ (per capita from 2005)	
SCAG Scenario 1 Target %	-6%	-3%	Achievable
SCAG Scenario 2 Target %	-7%	-5%	Ambitious & Achievable
SCAG Scenario 3 Target %	-8%	-6%	Ambitious & Achievable
SCAG Scenario 4 Target %	-9%	-10%	Ambitious
SCAG Scenario 5 Target %	-10%	-12%	Ambitious
SCAG Proposed Target %	-6%	-8%	
CARB Adopted Target %	-8%	-13%	
SCAG Plan Target %	-9%	-16%	

Note: Scenario 1: projected trend land use and growth, no improvements in transportation infrastructure, consideration of State decrease in transit funding, and no additional policies beyond current RTP commitments; Scenario 2: “Blueprint 1” land use, reflecting locally supported Blueprint Planning land use policy incorporating concepts developed through the region’s Compass Blueprint efforts, and gradual improvements in transportation infrastructure and policy (e.g. Los Angeles County Measure R projects and new TDM, TSM, and non-motorized assumptions); Scenario 3: “Blueprint 1” land use, reflecting locally supported Blueprint Planning land use policy incorporating concepts developed through the region’s Compass Blueprint efforts, and incrementally more aggressive improvements in transportation infrastructure and policy relative to Scenario 2; Scenario 4: “Blueprint 1” land use, reflecting locally supported Blueprint Planning land use policy incorporating concepts developed through the region’s Compass Blueprint efforts, and the most aggressive improvements in transportation infrastructure and policy as set forth in Scenario 4, with the addition of a 2 cent VMT fee in 2035; Scenario 5: “Blueprint 2” land use, reflecting optimization of land uses beyond what has been vetted or supported by local jurisdictions, and the most aggressive improvements in transportation infrastructure and policy as set forth in Scenario 4, with the addition of a 2 cent VMT fee in 2035.

Source: Heminger et al (2010); Barbour & Deakin (2012); SCAG (2012)

planning concepts among themselves to standardize their modeling data and planning framework. This kind of a close collaboration among regional and state agencies was made available due to the introduction of SB 375. SCAG’s emissions target process was controversial relative to other MPOs because CARB adopted a higher regional emissions target. With additional planning fund arrangements as requested by SCAG, SCAG accepted the higher regional emissions target (Barbour and Deakin, 2012).

IV. A NEW PLANNING EMPHASIS OF THE RTP/SCS

The SCS outlines a plan for integrating the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. The key strategy of the RTP/SCS is to reduce the demand for driving, as envisioned by CARB (CARB, 2008b). Local input and extensive collaboration among local and regional stakeholders have been instrumental in determining the land use

scenario of the RTP/SCS. By using local input, the most current land use assumptions are implicitly incorporated into the regional transportation plan as mandated by federal law.

The following briefly describes major land use and transportation strategies reducing the demand for driving in the RTP/SCS. First, the SCS focuses on the general land use growth pattern for the region, because geographical relationships between land uses—including density and intensity—help determine the need for travel. Therefore, SCAG's SCS includes not only projections regarding the transportation network, but also regarding land use. Under SB 375, an SCS must identify existing and future land use patterns, consider statutory housing goals and objectives, identify areas to accommodate long-term housing needs, identify areas to accommodate 8-year housing needs, consider resource areas and farmland and set forth a future land use pattern to meet GHG emission reduction targets. The SCS focuses the majority of new housing and job growth in high-quality transit areas (HQTA) and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development (TOD). TOD is expected to increase access by transit and non-motorized transportation and to encourage transit ridership (Victoria Transport Policy Institute, 2010). A typical TOD tends to be compact, mixed-use development near transit facilities and tends to maintain high-quality walking environments. The most direct benefit of TOD is reduced driving and per capita VMT (Kittleson & Associates, 1999; Rood, 1999; Cervero et al., 2004; Tumlin, et al., 2005; Evans and Pratt, 2007; Gard, 2007; Cervero and Arrington, 2008; Haas et al, 2010; Center for Transit-Oriented Development, 2010). SCAG's SCS encourages TOD by focusing the future housing and employment growth near the stations in HQTA during the planning horizon. For example, a 61% increase in housing stock is expected within a half mile of transit stations in HQTA, while there is a 26% increase in housing stock in the SCAG region. A 54% increase in jobs is expected within a half mile of transit stations in HQTA, while there is a 22% increase in jobs in the SCAG region. Housing units and jobs within a half mile of transit stations in HQTA grow 2.5 times as fast as the overall housing and job growth in the SCAG region (CARB, 2012).

Second, public transportation is an important investment focus in the RTP/SCS. The RTP/SCS plans to spend \$246 billion of a total funding of \$524.7 billion for public transportation during the plan horizon. It accounts for 47% of the total funding. In particular, managing transportation demand is a major and renewed emphasis of the SCS. Under SB 375, an SCS must identify transportation needs and the planned transportation network and comply with federal law for developing an RTP. Active transportation and travel demand management (TDM) are two major demand oriented transportation strategies. First, active transportation, such as bicycling and walking, is a cost effective strategy to reduce road congestion, enhance public health, and improve air quality. Currently, 42.6 percent of the region's residents have easy access to 4,315 miles of bikeways, and 62.4 percent of all residents would be able to have access to an additional 4,980 miles of bikeways proposed in the RTP/SCS. The RTP/SCS plans to spend \$6.7 billion of a total expense of

\$524.7 billion on active transportation. This accounts for 1.3% of the total expense for RTP/SCS and showed a \$4.9 billion increase from the 2008 RTP. Second, TDM was well-known in the 1970s and 1980s as cost-effective alternatives to road capacity expansions. The Los Angeles area has been home to some of the more innovative and successful TDM efforts over the years. The RTP/SCS commits \$4.5 billion to fully implement TDM strategies throughout the region (a \$3.4 billion increase from the 2008 RTP) in three overall areas: reduce the number of single-occupancy vehicle trips through rideshare (carpooling and vanpooling); redistribute vehicle trips from peak demand periods to non-peak periods via telecommuting or alternative work schedules; and reduce the number of single-occupancy vehicle trips through the selection of other modes of travel such as transit, bicycling or walking.

V. NEW MODELING PRACTICE

SCAG has been developing and improving travel demand forecasting models since 1967. SCAG applies the models to provide state of the practice quantitative analysis for the Regional Transportation Plan (RTP), the Federal Transportation Improvement Program (FTIP), and Air Quality Management Plans (AQMPs).

In May 2008, the California Transportation Commission (CTC) adopted an addendum to the RTP Guidelines that advised that the RTP should address climate change and GHG emissions. The RTP Guidelines recommend that the four largest MPOs in California create new activity-based models and micro-economic land use models. In addition, the RTP Guidelines recommend that commodity flow models be developed including truck and van tour capabilities. With the passage of California SB 375, travel demand models used by MPOs to develop RTPs must assess the effects of land use decisions, transit service, and economic incentives. SB 375 also mandates the four largest MPOs in California to actively utilize diverse and complex modeling capabilities to measure and monitor the impacts of land use on transportation and GHG emissions, and vice versa. The Strategic Growth Council (SGC) was created as a cabinet level committee to coordinate the activities of state agencies. One of those activities is to assist state and local entities in the planning of SCS and meeting AB 32 goals. The SGC awarded SCAG with one million dollars to develop data, models and other tools necessary to comply with SB 375.

SCAG has embarked on an ambitious model improvement program. SCAG has taken the long-term view towards the development of fully functional regional integrated tour/activity-based models while at the same time pursuing improvements to the existing travel demand model to ensure compliance with SB 375. Accordingly, all of SCAG's modeling tools and supporting databases are being updated and new analytical tools are being developed. This includes development of next generation land use and activity-based models. These two components will be run interactively to form SCAG's new integrated land use and transportation modeling methodology. SCAG has made good progress in enhancing the current four step transportation demand model and developing LSPT, PECAS, and ABM, etc.

1. Local Sustainability Planning Tool (LSPT)

SB 375 requires SCAG to provide the public with the information and tools necessary to provide a clear understanding of the issues and policy choices that the region has in developing the SCS. This is accomplished by conducting public workshops structured to allow discussion and dissemination of information about SB 375 and the various policy choices relevant to the development of an SCS. At these workshops, an urban simulation computer modeling tool was used to create visual representations of the SCS. SCAG has developed the parcel-based LSPT, a sketch planning tool that local jurisdictions and members of the public can utilize to analyze the impact of different land use scenarios on vehicle ownership, VMT, mode-use, and their associated effects on GHG emissions. The LSPT serves to help local jurisdictions, local elected officials and members of the public to visualize their thought processes as it relates to various land-use strategies, and also envision the effects of certain policy choices “on the ground”. The tool was developed to display instant results estimating directional and order-of-magnitude VMT and emissions reductions as a result of community design, and other land-use decisions made by stakeholders (SCAG, 2010).

According to the preliminary model results from the application of the LSPT for 2008 base year and 2020 local input scenario, the parcel-based LSPT reduced the 2008 probability of making a vehicle trip per household by 0.3% and the 2008 per household VMT by 6.7% (see Table 2). The VMT of the parcel-based LSPT is more sensitive to land use variables than that of the TAZ-based LSPT. The parcel-based model results in a lower VMT per household than the TAZ-based model. The % difference of per household VMT from the TAZ-based model would be -4.6%, while there is no change in the probability of making a vehicle trip.

Table 2. Comparison of Impacts on Per Household VT & VMT: TAZ-Based Model vs. Parcel-Based Model

	2008	2020				
	TAZ-Based	TAZ-Based	% Difference from 2008 Model Result	Parcel-Based	% Difference from 2008 Model Result	% Difference from 2020 TAZ-Based Model Result
VT*	92.7%	92.5%	-0.3%	92.5%	-0.3%	0%
VMT	51.99	50.88	-2.1%	49.15	-6.7%	-4.6%

Note: * the probability of making a vehicle trip per household.

Source: Hsi-Hwa Hu, Preliminary SCAG’s Parcel-Based LSPT Result, October 30, 2011.

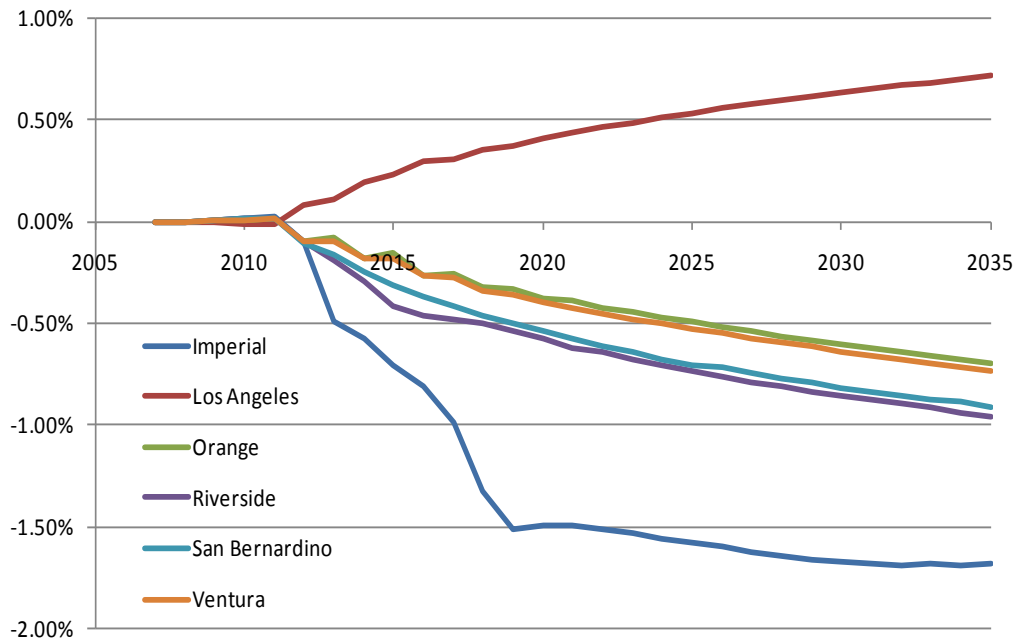
2. Production, Exchange, and Consumption Allocation System (PECAS) Model

PECAS (Hunt, 2003) is one of the most sophisticated integrated land use models (e.g., MEPLAN by Echenique et al, 1990, and UrbanSim by Waddell, 2002) that includes land use policy and market variables (e.g., amount of zoned land by use and intensity, land prices, sewer and water availability), and often contains economic underpinnings as well (e.g., economic input-output

tables) rather than simple gravity models. As one of the most advanced models, PECAS has been introduced into planning practice in the U.S. SCAG is developing the SCAG PECAS (Production, Exchange, Consumption, Allocation System) land use model that will integrate land use and transportation models to meet the modeling requirements of AB 32/SB 375 and RTP Guidelines (California Department of Transportation, 2010).

The preliminary SCAG PECAS model has been completed. Two scenarios were applied to determine if there is any significant impact on urban form and rent. The first scenario was to increase the allowable floor area ratio (FAR) within the 0.5 mile radius of major transit stations in Los Angeles County by 2,000% to see if there is any impact on the urban sprawl pattern of the baseline model. The scenario results in an increase of 1.5% in developed areas (see Figure 1). The scenario shows a very limited impact on the overall urban form in the SCAG region. The rent impact of the expanded capacity of available developable land within the TOD area is not confined to the specific area (e.g., Los Angeles County), but is apparent across the region.

Figure 1. Impacts of TOD (with 2000% Increase of FAR within 0.5 Miles of the Major Transit Stops in Los Angeles County Only) on Household Forecasts by County in the SCAG Region Relative to the Baseline Household Forecasts.



The second scenario was to test the impact of an increased gasoline tax on vehicle miles traveled. The current gasoline tax, \$0.36 per gallon, is assumed to increase by 10% to \$0.4 per gallon in 2020. Since the increased gasoline tax directly affects auto operating costs, the travel distance of workers and goods would be negatively affected. With the introduction of the gasoline tax increase between 2007 and 2020, the model expects that the average travel distance for

commuting, goods, and shopping will increase from 32.5 miles to 32.8 miles (an increase of 0.8%), which is 1.5% lower than the percent change of the average distance of travel in the trend scenario (see Table 3).

Table 3. Impacts of Gas Tax Increase on Average Distance in 2020: SCAG Region

	Average Distance (Mile)	Business As Usual Approach		Base Year Approach	
		Difference from Trend	% Difference from Trend	Difference from 2007	% Difference from 2007
2007	32.517				
Trend	33.257			0.740	2.3%
Gas Tax	32.776	-0.481	-1.5%	0.259	0.8%

Source: Sungbin Cho, Preliminary SCAG-PECAS Model Result on Gas Tax Increase and Average Distance, October 30, 2011

The preliminary model results indicated that the SCAG PECAS model has a potential strength of assessing complex interactions of proposed changes in land use, economic, and transportation systems, by analyzing the dynamic relationship between transportation and land use. There is ongoing research on the model calibration process and other elements.

3. Activity Based Model (ABM)

The traditional trip-based approach to travel demand modeling is limited in modeling complex travel patterns involving multipurpose and multistep travel (Meyer & Miller, 2001). The current trip-based travel demand models are also not able to address a variety of policies at multiple geographical and social scales, such as pricing policies, high occupancy vehicle (HOV) and car-pooling options, telecommuting, travel demand management (TDM) measures, land use strategies, etc. The activity-based travel demand forecasting model is based on the concept that travel is a derived demand resulting from the need to participate in diverse activities. This approach projects travel demand from a thorough understanding of travel behavior, and takes trip chains into consideration.

California Transportation Commission adopted an “Addendum to the 2007 Regional Transportation Plan (RTP) Guidelines,” suggesting that the largest four MPOs in California should develop ABMs in order to improve modeling assessment on key policy options for reducing GHG emissions during the RTP process.

California SB 375 reiterated the importance of advancing the current travel demand modeling practice in order to assess the effects of land use decisions, transit service, and economic incentives on travel. To analyze these important policy issues, SCAG is in the process of developing an activity-based travel demand model for the region, known as Simulator for Activities, Greenhouse Emissions, Networks, and Travel (SimAGENT). The overview and selected

details of SimAGENT was presented at the 2012 Annual Meeting of the Transportation Research Board (Bhat et al, 2011; Goulias et al, 2011; Pendyala et al, 2011).

VI. CONCLUSION

The paper assesses how SB 375 changes the existing way of developing SCAG's regional plan to achieve the regional GHG emissions target. SB 375 introduces an effective way of addressing GHG emissions by using the existing framework of developing a RTP. The paper discusses the questions: How did SCAG work with the technically deficient CARB to develop regional GHG emission reduction targets?; What was SCAG's approach toward integrating land use, housing, transportation, and the environment to achieve the GHG emission target?; How did SCAG develop scenarios and select a preferred scenario with a recommended GHG emissions target?; What would be the new planning emphasis of the RTP/SCS?; What have been SCAG's efforts to improve the current modeling practice?; and What has SCAG done to implement SB 375?

The paper finds that SCAG successfully went through the RTP/SCS planning process meeting federal and state requirements. The planning success might be related to the direct linkage of a state required SCS to the federally mandated RTP. The bottom-up, collaborative, regional, and incremental approach might have played a role in successful GHG emission target setting and RTP/SCS planning for SB 375 implementation. With the introduction of SB 375, SCAG enhanced the vertical and horizontal linkage of regional planning agencies and other state and interested stakeholders, strengthened the linkage of different plans and programs, and expanded the modeling capabilities by enhancing the existing transportation demand model and developing the new models and tools (e.g., local sustainability planning tool (LSPT), production, exchange, and consumption allocation system (PECAS) model). The newly developed parcel-based LSPT was used for the new SCS development and proved successful for future use due to its sensitivity to land use changes, while the PECAS model was found to be a potential tool for measuring the spatial impact of diverse economic, land use, and transportation policy options.

While SCAG makes an effort to assist local jurisdictions in implementing SCS, effective SCS implementation is a challenging task due to a lack of well-designed incentives for SCS implementation. As the Southern California Leadership Council (2010) indicates, SB 375 is "an unfunded state mandate for local governments to reduce emissions from cars and light trucks in land use and transportation planning and programs". A limited amount of financial funding will limit the effectiveness of the SB 375 implementation. Although federal funding might be linked to HQTAs in SB 375, it is not sufficient to promote TOD as a major GHG emissions reductions strategy. Additional funding would be needed from the state, but financial incentives from the state for TOD would be unavailable during a period of economic recession. Financial incentives and regulatory relief should be made available for the effective implementation of TOD through the SCS, and will play a vital role in determining the success of SB 375 implementation.

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Environmental Justice in Regional Planning

I. INTRODUCTION

1. Background

Environmental Justice is rooted in the belief that all people, regardless of race, ethnicity, gender, or income, have the right to a clean and healthy environment in which to live, work, and play. The United States Environmental Protection Agency (EPA) defines Environmental Justice as “the fair treatment and meaningful involvement of all people regardless of race, color, sex, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policies.” The fair treatment means that “no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental and commercial operations and policies.” Meaningful involvement means that people should have a fair opportunity to participate in the decision making process of environment and health-related activities, that their opinions and concerns should be considered in the decision making process, and that the decision makers should facilitate the involvement of those who are potentially affected by governmental programs and projects (EPA, 2012). Under federal requirements and guidelines on Environmental Justice, all federally funded agencies must minimize disproportionate environmental and health impacts on minority and low-income populations and ensure public participation in the decision making process.

Environmental Justice originated from a movement of minority and low-income populations struggling from toxic waste dumps and waste facility siting in African-American communities, located in Warren County, North Carolina, in 1982. It triggered many Environmental Justice protests against environmental hazards in nearby communities across the nation. The Environmental Justice movement has since challenged major national establishments, including mainstream environmental groups and the U.S. Environmental Protection Agency (EPA) (Liu, 2001). Although Environmental Justice originally focused on uneven siting of hazardous industrial development, it now spans multiple and diverse areas and geographies. Environmental Justice is not only about avoiding disproportionate environmental burdens but also about providing benefits to communities such as accessibility to open space, health, food, etc. Environmental Justice covers issues and concerns from multiple areas such as industrial development, goods movement, urban sprawl, transportation equity, urban form, equal access, and displacement. Given that the context of the Environmental Justice issues is regional in scale—such as transportation, land use, housing and industrial pollution, Environmental Justice is the key to regional strategies and the regional planning process.

2. Environmental Justice Analyses

Several studies have been already conducted on disproportionate environmental hazards and health risks on minority and low-income communities. Some studies show that minority and low-income communities disproportionately bear health and environmental burdens resulting from air pollution. The studies demonstrate that the minority and low-income communities experience a high distribution of the health risk burden from air pollution (Ash et al., 2009; Elliott et al., 1999; Liu, 2001; Pastor et al., 2005; Pastor et al., 2007). Another study focuses on premature mortality induced by air pollution, especially PM₁₀, and investigates the association of race, sex, and education with it (Zanobetti and Schwartz, 2000). Other studies have found out that minority and low-income populations are disproportionately burdened with toxic waste, pesticide, runoff and other hazardous materials (Brown, 1995; Institute of Medicine, 1999; O'Rourke, 1999; Sheppard, 1999; United Church of Christ, 1987; Waller, 1999). In addition, there are several reports and guidebooks available on Environmental Justice such as A Citizen's Guide to Using Federal Environmental Laws to Secure Environmental Justice (Environmental Law Institute, 2002) and Environmental Justice Emerging Trends and Best Practices Guidebook (US DOT, 2012).

The goal of this study is to provide background information on federal and state Environmental Justice legislation and guidance and to explore the Environmental Justice policies and programs that the Southern California Association of Governments (SCAG) developed in preparation for the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (2012-2035 RTP/SCS). In addition, it examines the Environmental Justice implications of major truck movement systems, using a case study of Southern California; and introduces the Federal Highway Administration's (FHWA) Environmental Justice best practices.

II. ENVIRONMENTAL JUSTICE LEGISLATION AND GUIDANCE

Consideration of Environmental Justice in the regional planning decision making process stems from Title VI of the Civil Rights Act of 1964 (Title VI) which prohibits discrimination on the basis of race, color, or national origin. Title VI establishes the need for regional planning agencies to disclose to the public the benefits and burdens of proposed projects on minority populations. Title VI states that "No person in the United States shall, on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." In addition to Title VI, there are other nondiscrimination statutes such as Section 162 (a) of the Federal-Aid Highway Act of 1973 (23 U.S.C. 324), Section 504 of the Rehabilitation Act of 1973, and the Age Discrimination Act of 1975. Title VI and these additional nondiscrimination requirements were further expanded through the Civil Rights Restoration Act of 1987.

The National Environmental Policy Act of 1969 (NEPA) lends support to Environmental Justice by addressing socioeconomic concerns about potential environmental hazards to be considered in the decision making process. NEPA goes on to state that the responsibility of the Federal

Government is to assure that all Americans have aesthetically and culturally pleasing surroundings, which indicates that it is not acceptable for most environmental hazards to be concentrated in a few groups. In addition, there are two Presidential Executive Orders that further support Title VI. On February 11, 1994, President Clinton signed Executive Order 12898 which directs Federal agencies to develop strategies to address disproportionately high and adverse human health or environmental effects of their programs on minority and low-income populations. Executive Order 13166 directs Federal agencies to evaluate services provided and implement a system that ensures that persons with limited English proficiency are able to meaningfully access the services provided consistent with and without unduly burdening the fundamental mission of each Federal agency. It also requires Federal agencies to ensure that recipients of federal financial assistance provide meaningful access to their applicants and beneficiaries with limited English proficiency.

In April 1997, the United States Department of Transportation (DOT) issued an Order on Environmental Justice (DOT Order 5610.2) as reinforcement to Executive Order 12898 by including all policies, programs, and other activities that are undertaken, funded, or approved by the FHWA, the Federal Transit Administration (FTA), or other U.S. DOT components. In December 1998, the FHWA issued the FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (DOT Order 6640.23) which mandated the FHWA and all of its subsidiaries to implement the principles of Executive Order 12898 and U.S. DOT Order 5610.2 into all of its programs, policies, and activities. On October 7, 1999, the FHWA and the FTA issued a memorandum, "Implementing Title VI Requirements in Metropolitan and Statewide Planning" which provides clarification for field offices on how to ensure that Environmental Justice is considered during current and future planning certification reviews. On August 4, 2011, seventeen federal agencies signed the "Memorandum of Understanding on Environmental Justice and Executive Order 12898" to develop Environmental Justice strategies to protect the health of people living in communities overburdened by pollution and to provide the public with annual progress reports on their efforts.

In addition, on September 29, 2011, the Federal Transit Authority (FTA) issued two proposed Circulars on Title VI and Environmental Justice to clarify the requirements and to offer guidance. The FTA Circular 4702.1A, Title VI Requirements and Guidelines for Federal Transit Administration Recipients provides information required in the Title VI Program, proposes changing the reporting requirement from every four years to every three years, and adds a requirement for mapping and charts to analyze the impacts of the distribution of State and Federal public transportation funds. The FTA Circular 4703.1, Environmental Justice Policy Guidance for Federal Transit Administration Recipients (Docket number FTA-2011-0055) provides recommendations to Metropolitan Planning Organizations (MPOs) (and other recipients of FTA funds) on how to fully engage Environmental Justice populations in the public transportation decision-making process; how to determine whether Environmental Justice populations would be subjected to disproportionately high and

adverse human health or environmental effects as a result of a transportation plan, project, or activity; and how to avoid, minimize, or mitigate these effects.

In addition to Federal requirements, California Government Code Section 11135 states that, “no person in the State of California shall, on the basis of race, national origin, ethnic group identification, religion, age, sex, sexual orientation, color, or disability, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency that is funded directly by the state, or receives any financial assistance from the state.” Senate Bill 375 (SB 375) requires MPOs to include a Sustainable Communities Strategy (SCS) as a component of the Regional Transportation Plan (RTP). Through SB 375, the California Air Resources Board (CARB) established per capita targets for GHG reduction for cars and light trucks for the SCS. The targets for the SCAG region are 8 percent in 2020 and 13 percent in 2035, from 2005 levels. As part of the early target setting process, the ARB appointed a Regional Target Advisory Committee (RTAC) to recommend factors to be considered and methodologies to be used for setting the targets. The RTAC report was finalized in September 2009 and included a recommendation on Housing and Social Equity. The report recognized the impact policies to reduce Vehicle Miles Traveled (VMT) could have on social equity specifically calling for appropriately located affordable housing to match local wage levels. The RTAC further recommended that displacement and gentrification, as a result of changing land uses and increased housing costs, should be addressed and specifically avoided to the extent possible in the SCS.

III. SCAG’s ENVIRONMENTAL JUSTICE POLICY AND PROGRAM

The SCAG region is experiencing major challenges to its quality of life and affordability. For example, the region’s residents have a high cost burden, with 45 percent of owner-occupied households and 54 percent of renter-occupied households spending 30 percent or more of their incomes on housing. In the region, less than 55 percent of households own their homes, a 2 percentage point decline from 2007 and 11 percent below the national average for homeownership (66 percent) (SCAG, 2012). In addition, 67 percent of households in the region spend 45 percent or more of their incomes on housing and transportation, among the highest percentages in the nation (Center for Neighborhood Technology, 2012). The poverty rate in the region stands at 15 percent, about 3 percentage points higher than the national average. In addition, the region has experienced unemployment rates over 12 percent for the past three years, about 3 percentage points higher than the national average. Furthermore, only 25 percent of adults have a bachelor’s degree or higher in the SCAG region, compared to almost 40 percent in the San Francisco Bay Area.¹

¹ U.S. Census American Community Survey 2009 Data, processed by SCAG Research and Analysis staff

Additional concerns include exposure to toxic pollutants and obesity levels. Exposure to air pollutants is an Environmental Justice issue due to the disproportionate share of minority and low-income populations living in close proximity to heavily traveled corridors, particularly near port and logistics activity. High concentrations of air pollution can lead to an increased risk of various respiratory diseases, including asthma and lung cancer, as well as contributing to premature death. In addition, populations living in areas without access to parks, safe walking environments, and fresh food have a greater prevalence of obesity and associated ailments such as diabetes. Although the SCAG region's level of obesity (24 percent) is lower than the national average of 33.8 percent, there are still disparities among racial groups, based on data from the Centers for Disease Control and Prevention (CDC). For example, the prevalence of obesity among non-Hispanic White women is 33 percent, whereas the obesity rates among non-Hispanic Black women and Mexican American women are 49.6 percent and 45.1 percent, respectively.² This raises policy questions about the opportunities for physical activity, access to healthy foods, and safety.

As a federally funded government agency, SCAG is required to conduct an Environmental Justice analysis for its RTP in compliance with federal and state requirements and guidelines on Environmental Justice. SCAG's Environmental Justice program includes two main elements: public outreach and technical analysis. It is SCAG's role to ensure that low-income and minority populations have ample opportunity to participate in the decision-making process and that they receive an equitable distributional share of benefits and burdens. On April 4, 2012, SCAG adopted the 2012-2035 RTP/SCS; and in preparation for the 2012-2035 RTP/SCS, SCAG conducted Environmental Justice analyses to assess the impacts of the 2012–2035 RTP/SCS on minority and low-income populations and to provide a set of measures for the potential mitigation of any adverse impacts.

1. SCAG's Environmental Justice Outreach

A key component of SCAG's Environmental Justice program for the 2012-2035 RTP/SCS was public outreach. Public input from stakeholders helped SCAG prioritize and address needs in the SCAG region. SCAG held two Environmental Justice workshops and convened focus groups on the Environmental Justice analysis to ensure that all members of the public have an opportunity to participate meaningfully in the planning process. In addition to the special Environmental Justice workshops, SCAG held a workshop for Resource Agencies during the development of the 2012-2035 RTP/SCS, where Environmental Justice was a primary focus. Furthermore, Environmental Justice stakeholders have been involved throughout the planning process. As a result of these workshops, SCAG determined that new analysis areas were necessary to capture the concerns

² Centers for Disease Control and Prevention: National Diabetes Surveillance System. <http://apps.nccd.cdc.gov/DDTSTRS/default.aspx>, and Centers for Disease Control and Prevention: Prevalence of Overweight, Obesity, and Extreme Obesity among Adults: United States, Trends 1960–1962 through 2007–2008. June 2010.

raised from stakeholders, including impacts from rail transportation, gentrification and displacement, pollution exposure along heavily traveled corridors, and impacts from revenue generating mechanisms.

2. Performance Measures and Technical Approach

In the development of Environmental Justice for the 2012-2035 RTP/SCS, SCAG identified the following eleven performance measures to analyze existing social and environmental equity in the region and to address the impacts of the 2012–2035 RTP/SCS on various Environmental Justice population groups:

- i. RTP/SCS Revenue Sources In Terms of Tax Burdens
- ii. Share of Transportation System Usage
- iii. RTP/SCS Investments
- iv. Impacts of Proposed VMT Fees
- v. Distribution of Travel Time Savings and Travel Distance Reductions
- vi. Jobs-Housing Imbalance or Jobs-Housing Mismatch
- vii. Accessibility to Employment and Services
- viii. Accessibility to Parks
- ix. Gentrification and Displacement
- x. Environmental Impact Analyses (Air, Health, Noise)
- xi. Rail-related Impacts

The primary focus of the Environmental Justice analysis for the 2012–2035 RTP/SCS is to compare the performance of the preferred plan scenario (Plan) to the baseline scenario (Baseline) for the year 2035. For the purposes of this analysis, the Plan represents the selected strategy to guide the region’s transportation planning over the next decades. Baseline is defined as the set of all projects and investments currently underway or for which funds are already committed. Baseline represents “business as usual” and assumes current land use trends and the completion of projects currently under construction or with available funding for construction over the next few years. Tools and data for the analysis are based on SCAG’s regional travel demand model.

Identifying low-income and minority populations is necessary both for conducting effective public participation and for assessing the distribution of benefits and burdens of transportation plans and projects. For this purpose, SCAG focused on minority and low-income populations. Executive Order 12898 and the DOT and FHWA Orders on Environmental Justice define “minority” as persons belonging to any of the following groups, as well as “other” categories that are based on the self-identification of individuals in the U.S. Census: Black, Hispanic, Asian, and American Indian and Alaskan Native.³ SCAG based its analysis on the latest census data for ethnic/racial groups in the SCAG region at the census tract level and by transportation analysis zone (TAZ).

³ Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

The poverty classification is a federally established income guideline used to define persons who are economically disadvantaged as outlined by the U.S. Department of Health & Human Services guidelines.⁴ The poverty level for the SCAG Region is chosen on the basis of regional average household size for the census year. For example, for a regional mean of 2.98 persons—rounded to 3—per household, the threshold would consist of the sum of the value for the first person plus two additional people. The household counts in each income range are then used to determine the number and percentage of households in each census tract below the poverty level. In 2010, a family of three earning less than \$17,374 was classified as living in poverty.⁵ In addition, SCAG conducted income equity analyses by breaking down total regional income figures into five income quintiles. A quintile, by definition, is a category into which 20 percent of the ranked households fall. SCAG defines regional income quintiles based on the most recent census data on household income. Using statistics provided by the US Census Bureau, the Bureau of Labor Statistics (BLS), Bureau of Transportation Statistics (BTS), and the National Household Travel Survey (NHTS), staff produced various distributions by income quintile, which were further allocated by ethnic groups within each income quintile.

The Plan results in overall air quality improvements for Southern California and improves Environmental Justice in the region by providing equitable benefits for various population groups according to income and ethnicity. The summary of performance measures and the detailed methodologies of technical approach are available in SCAG's 2012–2035 RTP/SCS Environmental Justice Appendix available at <http://rtpscs.scag.ca.gov/Pages/2012-2035-RTP-SCS.aspx>.

3. Environmental Justice Mitigation Toolbox

SCAG has developed a toolbox of potential mitigation measures (the Toolbox) to address potential impacts to Environmental Justice communities. The Toolbox presents optional mitigation recommendations that may be effective in addressing project-specific Environmental Justice impacts after a comprehensive review of impacts and consultation with all stakeholders. These measures were identified through a review of the literature, the Program Environmental Impact Report (PEIR), and recent planning activities. The Toolbox includes potential mitigation measures for noise impacts, air quality impacts along freeways and heavily traveled corridors, rail-related impacts, and road pricing mechanisms. The summary of the mitigation toolbox is available in SCAG's 2012–2035 RTP/SCS Environmental Justice Appendix available at <http://rtpscs.scag.ca.gov/Pages/2012-2035-RTP-SCS.aspx>.

⁴ Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

⁵ Weighted average threshold. U.S. Census Bureau. Poverty Thresholds, available at <http://www.census.gov/hhes/www/poverty/data/threshld/index.html>

IV. CASE STUDY: Environmental Justice Analysis of Minority and Low-Income Populations Adjacent to Major Truck Movement System in Southern California

1. Background

Southern California is the largest international trade gateway in the United States. The region also generates enormous local and domestic goods movement activity. Given the projected growth in international trade and domestic goods movement in the future, a significant growth in truck volumes of the region is anticipated in the future. According to SCAG's emission impact study, the emission intensity estimates of ROG, CO, CO₂, NO, SO₂, and PM_{2.5} within areas in proximity to major truck corridors for the year 2008 was higher than areas along freeways. Areas in proximity to major truck corridors showed over 30 percent of PM_{2.5} emission intensity and 20 percent of CO₂ emission intensity more than areas in proximity to freeways. Since truck movement is a major contributor to air pollution and health risk in the region, it is a regional priority not only to mitigate the environmental impacts of the truck movement system, but also to ensure that there is equity in distribution of environmental benefits and burdens from federally funded truck movement programs and projects pursuant to Title VI of the Civil Rights Act. The objective of this case study is to assess potential disproportionately high and adverse environmental effects and health risks on minority and low-income populations (here called "Environmental Justice population groups") from the truck movement system.

2. Research Approach

The approach for the spatial distribution analysis of Environmental Justice population groups consists of three steps. First, the Environmental Justice population groups were identified according to Executive Order 12898 and the Orders on Environmental Justice by DOT and FHWA. Second, an appropriate criteria for buffer distance from major truck corridors was determined, based on guidance and recommendations from various organizations. Third, using the selected distance criteria, the spatial analysis of Environmental Justice population groups was conducted by using an area-weighted interpolation method. Also, this paper conducted a comparative analysis of emission intensity between areas in proximity to major truck corridors and freeways in the SCAG Region to understand the environmental impacts from freight truck operations on the Environmental Justice population groups living in proximity to major truck corridors.

a. Identifying Environmental Justice Population Groups

To assess the issue of the potential disproportionate distribution of environmental impacts on Environmental Justice population groups from the truck movement system, it is first necessary to identify minority and low-income populations. Executive Order 12898 and the Orders on Environmental Justice by DOT and FHWA define "minority" as a person who is Black, Hispanic or Latino, Asian American, American Indian and Alaskan Native, and Native Hawaiian and Other Pacific Islander. SCAG analyzed the ethnic/racial group at the census tract level and by TAZ, based on the 2000 Census, the 2005–09 American Community Survey (2005-09 ACS) and the population

growth estimates and projections for 2008 and 2035 processed by SCAG Research and Analysis staff. Social demographic indicators were selected based on the Environmental Justice Strategic Enforcement Assessment Tool (EJSEAT), a tool for the EPA Office of Enforcement and Compliance Assurance (OECA) to identify areas with potentially disproportionately high and adverse environmental and public health burdens. ‘Low-income’ population was defined as a person whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines. The poverty threshold for the SCAG Region is based on regional average household size for the census year. In addition, SCAG analyzed income quintiles and the ethnic distribution within each income quintile by processing the 2005-09 ACS data.

b. Determining Distance Criteria for Freight Transportation System

To assess the distribution of the Environmental Justice population groups along major truck corridors, it is necessary to consider appropriate distance criteria for the environmental impacts extent. In order to determine suitable distance criteria, SCAG referred to guidance and recommendations from various organizations, such as the California Air Resources Board (CARB) and Southern California Air Quality Management District (SCAQMD). CARB recommends avoiding siting new sensitive land uses within 500 feet (150 meters) between a freeway and high-traffic roads in its Air Quality and Land Use Handbook (the Handbook). The Handbook also recommends avoiding sensitive land uses within 1,000 feet (300 meters) of busy distribution centers and major service and maintenance rail yards⁶. SCAQMD’s Health Risk Assessment Guidance establishes a minimum buffer of 1,000 feet between truck traffic and sensitive receptor locations to reduce exposure from idling⁷. In addition, a California Office of Environmental Health Hazard Assessment (OEHHA)’s study found that places within 500 feet of main city streets, highways, and freeways generally have higher traffic pollutant levels⁸. Based on the guidance and recommendations, SCAG used 500 foot and 1,000 foot buffers to test if there is a statistical difference between two buffers in assessing the spatial distribution of the Environmental Justice population groups. The test showed there is no significant difference in terms of the Environmental Justice population group distribution between the two buffers. In this regards, SCAG used 500 foot buffer only to assess the spatial distribution of the Environmental Justice population groups for this research.

c. Spatial Analysis of Distribution of Environmental Justice Population Groups

To analyze the spatial distribution of Environmental Justice population groups, a residential area-weighted interpolation method was used. The residential area-weighted interpolation method assumes that the population is distributed equally within residential areas of a TAZ, and it

⁶ California Air Resources Board. Air Quality and Land Use Handbook: A Community Health Perspective. April 2005.

⁷ Southern California Air Quality Management District. CEQA Air Quality Analysis Guidance Handbook. <http://www.aqmd.gov/ceqa/oldhdbk.html>. Accessed July 2012.

⁸ California Office of Environmental Health Hazard Assessment. Air Pollution from Nearby Traffic and Children’s Health: Information for Schools. http://www.oehha.ca.gov/public_info/facts/pdf/Factsheet_schools.pdf. Accessed July 2012.

calculates population based on the area ratio of the residential areas of a TAZ interested with 500 foot buffer to the entire residential areas of a TAZ. For example, if a TAZ has 1,000 non-Hispanic Asian population and 25% of total residential area of the TAZ is intersected with 500 feet buffer from major truck corridors, then it is estimated that 250 out of the TAZ's total non-Hispanic Asian population reside within 500 feet from major truck corridors. To evaluate the spatial concentration of Environmental Justice population groups along major truck, the percentage of each socioeconomic indicator within 500 foot buffer were estimated and then compared with the regional average.

d. Estimation of Emission Intensity Along Major Truck Corridors

Air pollutant emission intensity analysis was conducted for communities in proximity to major truck corridors to assess environmental impacts of freight truck operations on the Environmental Justice population groups living in proximity to major truck corridors. Emission intensity analysis is based on running emission estimates from SCAG's emission impact study for air pollutants, including reactive organic gases (ROG), carbon monoxide (CO), carbon dioxide (CO₂), oxides of nitrogen (NO_x), sulfur dioxide (SO₂), particulate matter (PM_{2.5}). Emissions were estimated for the year 2008 at the TAZ level. To estimate emission intensity, TAZs located within 500 feet from major truck corridors were selected, and total emissions of each emission factor were estimated by aggregating emissions within the selected TAZs. Then, the total emissions were normalized by total acreage of the selected TAZs. To compare the emission intensity of TAZs along major truck corridors with the regional level, the same methodology was used to estimate emission intensity of TAZs along freeways in the SCAG Region. The emission data used in the research includes emissions from both passenger car and truck movement. In this vein, to better assess the impacts of freight movement separately from passenger cars, SCAG estimated the vehicle-miles traveled (VMT) for truck movement on the major truck corridors, and then, compared it with the truck VMT for the rest of freeways in the SCAG Region.

3. Analysis Results

a. Emission Intensity Distribution Along Major Truck Corridors

Table 1 summarizes the emission intensity estimates for ROG, CO, CO₂, NO_x, SO₂, PM_{2.5} within TAZs in proximity to major truck corridors for the year 2008. It compares the emission intensity of areas within 500 feet from major truck corridors with areas within 500 feet from freeways in the SCAG Region. Column (c) of Table 1 represents the percentage increase/decrease of emission intensity within areas along major truck corridors, compared with the regional level. Higher emission intensity was observed within areas along major truck corridors than the regional level in every emission factor. It was estimated that areas in proximity to major truck corridors show approximately 20 percent of CO and CO₂ emission intensity and over 30 percent of PM_{2.5} emission intensity more than the regional level. The emission data used in the research includes emissions from both passenger car and truck movement. In order to better assess the impacts of truck

movement separately from passenger cars, SCAG estimated the vehicle-miles traveled (VMT) for truck movement for the major truck corridors, and then, compared it with the rest of freeways in the SCAG Region. Table 2 summarizes the total truck VMTs for major truck corridors and for the rest of freeways in the SCAG Region in 2008. As shown in the table, it is estimated that 12.6% of total VMT for major truck corridors is truck VMT while only 7% of total VMT for the rest of freeways in the SCAG Region is truck VMT. And, it is also estimated that truck VMT for major truck corridors accounts for approximately 63% of total truck VMT of the SCAG Region while the length of major truck corridors accounts for 26% of total length of freeways in the SCAG Region. These observations suggest that there is a high concentration of truck movements on major truck corridors, compared with the rest of freeways in the SCAG Region. Therefore, given the results from Tables 1 and 2, it is implied that there could be more adverse environmental impacts on areas along freight truck corridors resulting from the significant amount of truck movements. Considering the concentration of the Environmental Justice population groups along major truck corridors, the results indicate that there could be potential disproportionate environmental impacts from truck movement on the Environmental Justice population groups living in proximity to major truck corridors.

Figure 1 depicts major truck corridors and freeway systems in the Los Angeles metropolitan area, and also the spatial distribution of carbon dioxide emission intensity by TAZ for the year 2008. As shown in the map, high concentration of emissions is observed along freeways, especially along major truck corridors.

Table 1. Emission Intensity Estimates for Areas Along Major Truck Corridors: 2008

Emission Factors	Emission Intensity (gram/day/acre)		Intensity Comparison*
	500 Feet from Major Truck Corridors	500 Feet from Freeways in SCAG Region	
Reactive Organic Gases (ROG)	4.04	4.06	23.4%
Carbon Monoxide (CO)	78.52	79.02	19.7%
Carbon Dioxide (CO₂)	9,997.03	10,058.50	20.0%
Oxides of Nitrogen (NO)	23.09	23.05	29.7%
Sulfur Dioxide (SO₂)	0.10	0.10	19.9%
Particulate Matter (PM_{2.5})	0.85	0.85	32.6%

* Percentage increase/decrease of emission intensity within areas along major truck corridors, compared to emission intensity within areas along freeways.

(Source: SCAG Emissions Impact Study)

Table 2. Comparison of Truck VMT for Major Truck Corridors and the Rest of Freeways in the SCAG Region: 2008

Emission Factors	Length (mi.)	Total VMT (thousands)	Truck VMT (thousands)	Share of Truck VMT
Major Truck Corridors	1,810 (26%)	124,940 (49%)	15,693 (63%)	12.6%
The Rest of Freeways	5,210 (74%)	131,240 (51%)	9,207 (37%)	7.0%
Freeways in SCAG Region	7,020	256,180	24,901	9.7%

(Source: SCAG model data, 2012)

Figure 1. CO₂ emission intensity by TAZ in the Los Angeles metropolitan area: 2008.



b. Distribution of Environmental Justice Population Groups along Major Truck Corridors

Table 3 presents the socioeconomic indicators within 500 feet from major truck corridors in 2008 and 2035. As shown in the table, the share of most Environmental Justice population groups living in proximity to major truck corridors is higher than regional average both in 2008 and 2035. The table also presents the share of five income quintile households and the ethnic distribution within each income quintile within TAZs in proximity to major truck corridors. It was observed that the share of lower income quintile households and minority populations is higher in TAZs in proximity to major truck corridors than the regional average. These observations imply that truck-related environmental burdens could be higher for the minority and low-income communities than the regional average. However, further analysis is needed to verify this observation.

Table 3. Distribution of Environmental Justice Population Groups in TAZs Adjacent to Major Truck Corridors: 2008 and 2035

	500 Feet From Major Truck Corridors				SCAG Region	
	2008	2035	2008	2035	2008	2035
Age 65 & Above	45,729	94,414	9.4%	15.5%	10.4%	16.7%
Age 5 & Below	45,322	53,101	9.3%	8.7%	8.7%	8.2%
Disabled	44,224	59,545	9.1%	9.8%	8.6%	9.3%
Hispanic	266,863	387,591	54.8%	63.6%	44.8%	55.4%
NH White	120,556	101,632	24.8%	16.7%	34.4%	23.5%
NH Black	35,219	38,391	7.2%	6.3%	6.9%	6.1%
NH NA	2,305	3,267	0.5%	0.5%	0.4%	0.5%
NH Asian	53,779	67,023	11.0%	11.0%	11.6%	12.3%
NH Others	8,178	11,064	1.7%	1.8%	1.9%	2.1%
Poverty 1*	22,345	29,181	15.2%	15.5%	13.8%	14.5%
Poverty 2*	14,293	18,696	9.7%	9.9%	8.7%	9.0%
Poverty 3*	13,582	17,403	9.2%	9.2%	8.3%	8.5%
Quintile 1	31,138	39,811	21.2%	21.1%	21%	20%
Hispanic	12,408	24,381	8.4%	12.9%	6.4%	10.8%
NH White	11,308	5,793	7.7%	3.1%	9.4%	4.2%
NH Black	3,801	3,842	2.6%	2.0%	2.4%	1.8%
NH NA	176	254	0.1%	0.1%	0.1%	0.1%
NH Asian	2,726	4,407	1.9%	2.3%	1.7%	2.4%
NH Others	718	1,133	0.5%	0.6%	0.5%	0.7%
Quintile 2	32,441	41,003	22.0%	21.8%	20%	20%
Hispanic	17,114	26,633	11.6%	14.1%	8.5%	11.5%
NH White	9,051	6,500	6.1%	3.5%	7.3%	4.3%
NH Black	2,699	2,904	1.8%	1.5%	1.6%	1.3%
NH NA	153	242	0.1%	0.1%	0.1%	0.1%
NH Asian	2,583	3,531	1.8%	1.9%	1.7%	1.9%
NH Others	842	1,192	0.6%	0.6%	0.6%	0.8%
Quintile 3	31,624	39,988	21.5%	21.2%	20%	20%
Hispanic	15,007	24,001	10.2%	12.7%	7.4%	10.4%
NH White	10,271	7,779	7.0%	4.1%	8.4%	5.1%
NH Black	2,429	2,629	1.6%	1.4%	1.4%	1.2%
NH NA	148	215	0.1%	0.1%	0.1%	0.1%
NH Asian	2,990	4,221	2.0%	2.2%	1.9%	2.3%
NH Others	780	1,144	0.5%	0.6%	0.6%	0.7%
Quintile 4	29,104	37,586	19.8%	19.9%	20%	20%
Hispanic	11,710	19,827	8.0%	10.5%	5.8%	8.8%
NH White	10,980	8,802	7.5%	4.7%	9.9%	6.4%
NH Black	2,056	2,467	1.4%	1.3%	1.3%	1.2%
NH NA	159	267	0.1%	0.1%	0.1%	0.1%
NH Asian	3,486	5,137	2.4%	2.7%	2.3%	2.9%
NH Others	714	1,087	0.5%	0.6%	0.5%	0.6%
Quintile 5	22,896	30,021	15.6%	15.9%	20%	20%
Hispanic	6,822	13,450	4.6%	7.1%	3.9%	7.1%
NH White	10,559	8,532	7.2%	4.5%	12.1%	7.9%
NH Black	1,622	2,037	1.1%	1.1%	1.0%	1.0%
NH NA	107	212	0.1%	0.1%	0.1%	0.1%
NH Asian	3,257	4,871	2.2%	2.6%	2.5%	3.4%
NH Others	529	920	0.4%	0.5%	0.4%	0.6%

* Poverty 1 = # of household below poverty; Poverty 2 = # of household between poverty and 1.5xP; Poverty 3 = # of household between 1.5xP and 2.0xP

(Source: 2000 Census and 2005-09 ACS, processed and projected by SCAG Research and Analysis staff)

4. Conclusions

In this case study, SCAG conducted Environmental Justice analysis of minority and low-income populations adjacent to the truck movement system in Southern California. In order to assess the concentration of the minority and low-income populations in areas adjacent to major truck movement systems, it estimated the emission intensity and presented the spatial distribution of minority and low-income populations, by comparing them with the regional level. The results of this study indicate that communities adjacent to major truck corridors are expected to experience more adverse environmental burdens than at the regional level. Higher emission intensity for each emission factor (ROG, CO, CO₂, NO, SO₂, PM_{2.5}) was observed within areas along major truck movement systems than areas along freeways system in the SCAG region. The results also indicate a higher concentration of the Environmental Justice population groups within areas adjacent to major truck corridors than the regional average, implying potential disproportionately high and adverse human health or environmental effects on the Environmental Justice population groups from the truck movement system. However, further analysis is needed to verify these observations.

In order to minimize the potential environmental effects on the Environmental Justice communities from the truck movement system, SCAG has presented optional mitigation recommendations in the Toolbox. It recommends that local air districts, local jurisdictions and project sponsors voluntarily implement measures adopted by ARB designed to attain federal air quality standards for PM_{2.5} and 8-hour ozone, such as pursuing near-term advanced technology demonstration and deployment like zero-emissions heavy-duty trucks and cleaner in-use heavy-duty trucks. The summary of the Environmental Justice Mitigation Toolbox is available in SCAG's 2012–2035 RTP/SCS Environmental Justice Appendix available at <http://rtpscsc.scag.ca.gov/Pages/2012-2035-RTP-SCS.aspx>.

V. ENVIRONMENTAL JUSTICE BEST PRACTICES

The FHWA, in cooperation with the FTA, prepared a document, *Environmental Justice Emerging Trends and Best Practices Guidebook*, to assist federal transportation agencies, state Departments of Transportation, MPOs, transit agencies, and the public in understanding the importance and opportunities of Environmental Justice in the decision making process. The document focuses on four topics (transit and affordability, public involvement, livability, and road pricing mechanisms). For each topic, it discusses Environmental Justice principles, issues, trends and challenges, and also provides examples of best practices. The document is available at http://www.fhwa.dot.gov/environment/environmental_justice/resources/guidebook/guidebook00.cfm.

VI. CONCLUSIONS

This study provided the background information on Environmental Justice and explored SCAG's environmental policy and programs. First, it explained the concept and principles of Environmental Justice and explored the legislation and guidance on Environmental Justice such as Title VI, Executive Orders and other federal and state statutes and guidance. The study also explored the Environmental Justice policy and program that SCAG developed in preparation for the 2012-2035 RTP/SCS. In addition, it examined the Environmental Justice implications of major truck movement systems, using a case study of Southern California, and SCAG's mitigation recommendations in order to minimize the potential Environmental Justice issues from the truck movement system.

In conclusion, the integration of Environmental Justice is one of the key components in the regional planning process. The provisions of Title VI, Executive Orders, and other statutes and guidance on Environmental Justice have affected many components of MPO's regional planning process. It is the MPO's role to ensure that diverse stakeholders are involved throughout the planning process; and therefore, it is critical to develop a wide variety of tools and processes to facilitate the interaction between the agency and stakeholders during the decision making process. As explained earlier, Environmental Justice expanded its scope from the equitable distribution of environmental hazards to other issues such as industrial development, goods movement, urban sprawl, transportation equity, urban form, equal access, and displacement. In this regard, MPOs are to develop technical methodologies in order to address and examine multiple and diverse issues and concerns on Environmental Justice.

SCAG, as MPO for Southern California, successfully developed its Environmental Justice policy and program in preparation for the 2012-2035 RTP/SCS in order to ensure that minority and low-income populations have an equitable opportunity to participate in the decision making process and that they receive an equitable distribution/share of benefits and burdens from programs and projects included in the 2012-2035 RTP/SCS. However, given the anticipated growth and dynamic nature of the SCAG region, there are many policy areas that may present future challenges and are of interest for further research, including, but not limited to:

- Defining minority populations given that the Hispanic population is projected to obtain a population majority in the SCAG region;
- Monitoring and analyzing population trends related to gentrification and displacement;
- Evaluating the implications of the general job wages/worker earnings mismatch and the jobs-housing imbalance at the regional, county, and community levels;
- Better understanding of the linkages and interactions between emissions, air quality, and health outcomes, and their overall relationship with the region's socioeconomic cohorts related to income, education, race/ ethnicity, among many other characteristics;

- Understanding the residential choices, surrounding communities, and the built environment for Native Americans, and population identified as Non-Hispanic Other; and
- Better understanding the future environmental justice impacts of rail related freight traffic in the region.

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Climate Change Responding Plan of Daegu Metropolitan City

I. INTRODUCTION

Abnormal climate changes (i.e. decreasing glacier, flood, drought and rising sea level) frequently happening across the world threaten the Earth, which is handed over to the descendant Korea is not an exception of Global Warming happening globally. The average temperature of Korea has been increased by 1.5°C for the last 100 years, which is twice of the average increase of the rest of the world. The sea level of Jeju region has been increased by 22 cm, which is triple of the world average. Like this, climate changing of Korea is faster than the rest of the world (Gwangwoo Cho, 2000).

The United Nations Framework Convention on Climate Change to prevent Global Warming was adopted by the Rio Summit in 1992 and in effect from 1994. In 1997, the Kyoto Protocol was enacted by the nations which agreed about the proposition of "Weather Protection" and Korea has actively participated in the international climate protection activities by approving the protocol in 2002.

As effects of and damage caused by climate change start being revealed in the local level, it is necessary to take an action by a regional or a local government, together with global effort. Currently, knowledge and effort of a local government, which implements policy to respond the convention on climate change, are very low. The central government has also neglected roles of a local government as its partner to prepare climate change. Only 'Support to local governments in preparing climate change' is included in the measures of the central government as an educational and public promotional task related to the United Nations Framework Convention on Climate Change among projects to prepare infrastructure for implementation of the convention. However, there are no instructions about roles and tasks of local governments to prepare climate change.

At this point, it is necessary to identify status of climate change responding plans implemented by local governments in accordance with the national climate change policy and review the direction which local governments follow, recognizing changes in environment of climate change policy. This study identifies status of climate change policy and action plans of Daegu metropolitan city and tries to find efficient promotion methods for detailed implementation plans presented by the action plans. It is expected that this study contributes on early settlement of the national climate change promotion policy, together with a role of basic data in establishing local action plans of sustainable climate change policy.

II. CLIMATE CHANGE POLICY OF DAEGU METROPOLITAN CITY

1. Status of National Climate Change Policy

Although Korea is not a country that compulsorily reduces emission of greenhouse gas, it is ranked 9th in emission of carbon dioxide, which is the main greenhouse gas, and first in the rate of increase of carbon dioxide emission among OECD countries. Therefore, it is assumed that international demand to ask Korea to participate in international efforts on reduction of greenhouse gas will be stronger in a compulsory form after completion of the first commitment period of the Kyoto Protocol.

To prepare such demand, the central government has established the comprehensive plans to respond the United Nations Framework Convention on Climate Change three times from 1999 to now. The third comprehensive plan was initiated from 2005. The amount of carbon dioxide emission by Korea is ranked 9th in the world (International Energy Agency, IEA, 2003) and it is steadily increasing due to continual economic growth and industrial structure consuming excessive energy.

By the type of greenhouse gases, percentage of carbon dioxide in the total amount of greenhouse gas emission increased from 83.6% in 1990s to 90.2% in 2004. Methane was decreased due to decline of agricultural lands and promotion of waste reduction plan since 1990s, with 3.9% of the average annual decrease. The amount of emitted greenhouse gases is significantly increasing from energy and industrial process. On the other hand, it is shown that the amount of emission from the agriculture and waste processing sector keeps decreasing.

Unless current industrial structure is not changed and innovative efforts to reduce greenhouse gases emission is not exercised, the trend of increase in emission of greenhouse gases will maintain its current pace by 2020. The 'climate change countermeasures planning team' under the Prime Minister's Office proposes the vision of 'Participation in global climate change prevention efforts and realization of a low carbon society through green growth (Low Carbon, Green Growth)' in the "comprehensive basic plan to respond climate change" (September, 08). The promotion goals following the vision are 'growing the climate change industry as a new growth engine', 'improving quality of people's life and environment' and 'leading international efforts to deal with climate change'. On the other hand, medium and long term strategy including negotiation methods to protect domestic industries is also prepared in detail.

For climate change responding policy, Article 9 of the Framework Act on Low Carbon, Green Growth, enacted 13, January, 2010, prescribes that items related to national climate change responding policy, energy policy and sustainable policy shall be included. A basic action plan to climate change is prepared and implemented every 5 year for the next 20 years in accordance with basic principles to deal with climate change (Article 40 of the Act). Based on the national

strategy, the central government established a comprehensive plan to deal with climate change, together with a detailed implementation plan and comprehensive adjustment plan for each department.

2. Daegu's Climate Change Responding Policy

According to the fourth comprehensive plan to deal with climate change, it is decided as the top priority task by the government. In addition, as it is very likely that Korea takes a burden of compulsory reduction of greenhouse gases in 2003 as a result of adaptation of the Bali Road Map (December, 2007), participation and action of local residents as a final consumer of greenhouse gases are essential.

Daegu also recognizes that a role of local government in dealing with climate change are very important and make efforts to prepare climate change in order to minimize impact in the future and use it as an opportunity of sustainable local development by actively responding to climate change.

Meanwhile, Daegu has performed projects to disseminate and expand new renewable energy including solar energy generation, small hydro power generation, steam supply and power generation, solar energy houses, solar energy boilers, geothermal heat cooling and heating system and improved energy efficiency in transportation sector by expanding environment friendly transportation system including bicycles and railroads. In addition, it uses environment friendly vehicles such as CNG buses and garbage trucks, electric cars and hybrid cars, which use clean fuel, to improve quality of air and reduce greenhouse gas emission.

Daegu first made landfill gases resource in a local government level and registered it as Clean Development Mechanism (CDM) at UN and create approximately KRW 4-5 billion of added value every year. In addition, it reuses waste heat from a waste incinerating facility and supplies it to near local heating corporations, which accounts for KRW 500 million every year.

Daegu also planted 10,420 thousand trees and 4 million trees during the first Green Daegu Decoration Project (1996-2006) and the second Green Daegu Decoration Project (2007-2011), respectively. This green projects showed high carbon dioxide absorption rate with 2,252,746 ton annually.

According to enactment of the Framework Act on Low Carbon, Green Growth and establishment and implantation of the central government's comprehensive plan to deal with climate change, Daegu also prepared a basic plan to deal with climate change and annual action plan in 2010. With this, Daegu is actively promoting projects to reduce greenhouse gases and pollution by growing new renewable energy industry, which is the next generation growth engine. Daegu grows the energy service industry by creating green industrial complexes and environment eco-

towns and keeps promoting a green forest project and a dissemination of clean fuel project to improve the atmosphere.

III. DAEGU'S ACTION PLAN ACCORDING TO CHANGE IN NATIONAL CLIMATE CHANGE POLICY

1. Climate Change Responding Plan of Local Government

The Daegu metropolitan city prepared the climate change responding plan to specify the comprehensive national climate change responding plan, which was established in 2008, in the local level and prepare implementation of the Framework Act on Low Carbon, Green Growth. The major projects implemented by the plan are followings. First, according to the instruction of national greenhouse gases inventory preparation, Daegu investigated direct or indirect emission amount of 8 different greenhouse gases from all greenhouse gas generation sources in the energy, industry process, agriculture and forestry, land use and waste sector. Second, it expected projected amount of greenhouse gases emission up to 2020 using the latest scientific technology, based on the long term development plan of Daegu.

The amount of greenhouse gas reduction by 2020 and reduction scenarios to achieve the target were decided based on analysis results of greenhouse gases reduction potential of core businesses in each major sector including building, transportation, industry, absorption, green life and new renewable energy with deep analysis of various plans related to greenhouse gases reduction being promoted by Daegu.

According to the reduction scenarios, approximately 80 major greenhouse gases reduction and adjustment project plans to be promoted in 5 sectors including energy, agriculture, animal farming and land use, waste materials, green life and CDM(Clean development Mechanism) and adjustment to climate change has been prepared.

2. Status and Forecast of Greenhouse Gases Emission

a. Maintaining 16 million tons of greenhouse gases emission annually after 2000

Reviewing greenhouse gases emission amount of each sector (Scope1) in 2005, which is the base year in setting the target of greenhouse gases reduction, the energy sector has highest contribution on the emission amount (9,924 thousand tons of CO₂/year) and the waster materials sector, the industry process sector and the agriculture, animal farming and land use sector are following.

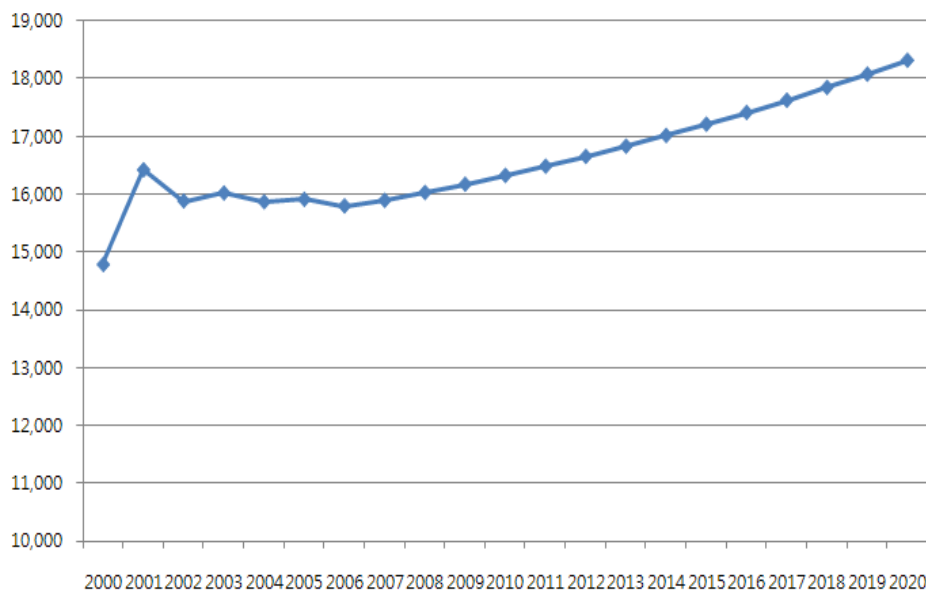
In 2005, the greenhouse gases emission per capita in Daegu was 6.30 tons of CO₂ per a person, which was steady since 2001 and less than the average amount of the nation, which was 12.35 tons of CO₂ per a person.

b. Expecting that greenhouse gases emission will Increase to 18,310,000 tons by 2020

Forecast of the future greenhouse gases emission in Daegu was made on the basis of a percentage change in the past trend. The expectation of the emission amount from each sector is divided into four categories; energy, industrial process, agriculture, forestry and other land use and waste materials.

It is expected that the total amount of greenhouse gases emission will be increased from 15,890 thousand tons of CO₂/yr in 2007 to 18,309 thousand tons of CO₂/yr in 2020. The average annual increase rate is 1.12%.

Figure 1. Forecast of Total Greenhouse Gases Emission of Daegu in the Future (2020)



Source: Daegu Metropolitan City(2010), 「Daegu's Climate Change Responding Plan and Its Annual Implementation Plan」

3. Target Amount of Greenhouse Gases Reduction

a. Reduction potential of Energy Sector is 90% of the total reduction potential

To set up the target amount of greenhouse gases reduction, Daegu prepared reduction scenarios, which were used to set up the target reduction amount, and analyzed each scenario in order to identify how much was reduction potential of greenhouse gases in each scenario.

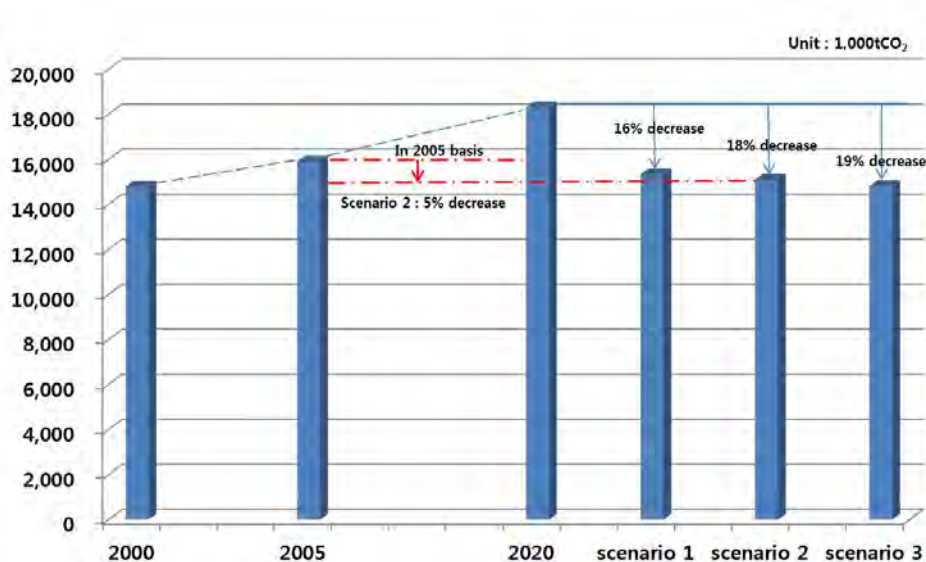
There are roughly three scenarios in Daegu. Scenario 1 is the case that Daegu and the central government follow the greenhouse gases reduction policy, which is currently implementing. Scenario 2 increases the target amount of greenhouse gases reduction in Scenario 1. Scenario 3 sets greenhouse gases reduction as the top priority goal of Daegu and strengthens the target of each policy even more.

Table 1. Reduction Potential of Greenhouse Gases for Each Sector in Daegu

Sector	Scenario 1		Scenario 2		Scenario 3	
	Reduction Potential (Thousand ton/CO2)	Percentage (%)	Reduction Potential (Thousand ton/CO2)	Percentage (%)	Reduction Potential (Thousand ton/CO2)	Percentage (%)
Energy	2,661	89.3	2,838	88.5	3,071	88.1
Agriculture, animal farming and land use	30	1.0	45	1.4	45	1.3
Waste materials	158	5.3	158	4.9	158	4.5
Green life	130	4.4	168	5.2	214	6.1
Total	2,979	100.0	3,209	100.0	3,487	100.0

Source: Daegu Metropolitan City(2010), 「Daegu's Climate Change Responding Plan and Its Annual Implementation Plan」

For a sector's contribution to the total reduction potential of greenhouse gases in each scenario, the energy sector, the agriculture, animal farming and land use sector, the waste materials sector and the green life sector accounted for 89.3%, 1.0%, 5.3% and 4.4%, respectively. The

Figure 2. Setting the Reduction Target of Greenhouse Gases of Daegu in the Future (2020)

Unit: Thousand ton of CO₂, Based on BAU, Based on 2005, Scenario 2: 5% Reduction

Source: Daegu Metropolitan City(2010), 「Daegu's Climate Change Responding Plan and Its Annual Implementation Plan」

percentages are similar in Scenario 2 and 3. In scenario 3 with highest policy strength, the percentage of green life is increased a little while the percentage of other sectors is a bit decreased.

According to the results of comparison the greenhouse gases emission of each reduction scenario in 2020 with expectation of greenhouse gases emission (BAU) in 2020, the scenario 1, 2 and 3 were 16.3%, 17.5% and 19.0% less than the expectation of greenhouse gases emission (BAU), respectively.

Based on the greenhouse gases emission of Daegu in 2005, the scenario 1, 2 and 3 showed 3.6%, 5.1% and 6.8% reduction. In the climate change responding plan of Daegu, the reduction target was set as 5%, which was the reduction target of the scenario 2. At that time, the reduction target of Daegu was 18% by 2020, compared to BAU.

4. Implementation Strategy of Climate Change Responding Plan

The climate change responding plan of Daegu, led green forest creation and green life practice, presents "Green Future City, Daegu, Leading Response to Climate Change" as the vision. It also presented specific objectives and detailed promotion strategy to realize the vision.

Specific objectives in 2020, the target year, include 5% reduction of greenhouse gases compared to 2005 (increasing 1% compared to the national target), 11% of renewable energy dissemination (increasing 9% compared to 2006), 52% of public transport share (increasing 14% compared to 2006) and planting additional 7.5 million trees as carbon dioxide adsorption source (increasing the figure every year).

To achieve the objectives, the five strategies include decrease of oil dependency and independence of energy, carbon dioxide absorption and greenization of a city, resources cycled urban system and advanced climate change adjustment.

a. Decreasing Oil Dependency and Independence of Energy

In order to improve energy efficiency and reduce green-house gases, it is necessary to disseminate energy saving culture and change industrial structure to environment friendly high-tech industrial structure. The promotion strategies of each sector are as following.

For the industrial sector, rationalization of energy structure will be promoted with support to change in energy efficiency and industrial structure. For the home and commercial sector, the strategy to introduce energy efficient devices to houses and buildings and find a method to save energy in a building is promoted. For the public sector, earlier introduction of renewable energy and change of life style to energy saving will be promoted as core elements. For the green transportation, environment friendly transportation system with introduction of environment

friendly transports such as green cars and bicycles and construction of the public transport system will be actively encouraged.

Considering the renewable energy potential of Daegu, it is necessary to expand and disseminate, focusing on solar energy and waste materials energy. Detailed promotion schedule is being adjusted, actively using Renewable Portfolio Standard (RPS) system, which is planned to implement 2012 to expand dissemination of renewable energy in Daegu, and reflecting it to the climate change policy of Daegu.

Table 2. Detailed Implementation Tasks of Strategy of Escaping from Oil Dependency and Independence of Energy

Policy Direction		Detailed Implementation Task
Energy Efficiency Sector	Industry Sector	1. Introduction of Collective Energy 2. Introduction of High Efficiency Devices 3. Support to Installation of Low NOx Burner 4. Formation of Environment Friendly Industrial Complexes
	Building Sector	5. Introduction of Passive House 6. Introduction of Green House Approval
	Public Sector	7. Replacement of LEDs in Public Sector
Green Transportation Sector		8. Activation of Bicycle Use 9. Dissemination of Hybrid Cars 10. Dissemination of Electric Cars and Charging Stations 11. Replacement of LED Traffic Lights 12. Management of Traffic Demand and Activation of Public Transport
Renewable Energy Sector		13. Dissemination of Green Home and Construction of Green Villages 14. Construction of Solar Canopy 15. Replacement of Industrial Complex Fuel 16. Dissemination of Fuel Cell to Multipurpose Building 17. Making Daegu Subway Arrangement Resource 18. Introduction of Small hydroelectric power generation 19. Dissemination of geothermal cooling and heating system to public offices 20. Compulsory installation of renewable energy in the public sector 21. Local dissemination project

b. Greenization of City for Carbon Dioxide Absorption

As global climate change becomes severe, greenization and restoration of the nature, which shows excellent carbon dioxide absorption performance receive more attraction and efforts. Daegu keeps promoting the Green Daegu Creation Project, planting 10 million trees and 4 million trees during the first Green Daegu Decoration Project (1996-2006) and the second Green Daegu Decoration Project (2007-2011), respectively.

For maximizing carbon dioxide absorption capability of urban forest, it is important to prepare the foundation to increase carbon dioxide absorption capability of forest through effective forest management and expanding carbon absorption source. Forest area of Daegu is 49,144ha, accounted for 55.4 % of the total administrative of Daegu. To use this area effectively and strength disaster prevention capability of local forest against bush fire, disaster and pest, a strategy to promoted an advanced system and disaster prevention facilities will be made.

Urban forest in the living area should be expanded as the area of urban forest per capita in Daegu (4.76 m²/person) still does not reach to the optimized area recommended by WHO (9.0 m²/person). In addition, despite that urban streams are very important space as habitat of animals and plants and as waterfront leisure space for residents, most of them in the city area are covered by concrete or destroyed as urbanization is progressing and, as a result, urban green network is largely disconnected.

On the other hand, there are some streams which still have good river environment in forest located in the outskirts of the city. To connect the streams to those in the city area, eco-friendly restoration of urban streams located in the city area is essential and strategy to promote such projects is being prepared.

Urban agriculture plays a very important role in terms of greenization of a city and creation of new types of agriculture. An urban farm, called as 'City Farm', which allows protected cultivation anywhere including warehouse in a city or underground, is going to be introduced as a 'Future agriculture model' to produce plants stably, irrespective of places or seasons.

LEDs to be used in urban agricultural facilities can increase added value of plants by automatically adjusting light, temperature, moisture and concentration of carbon dioxide and reducing a growing period.

In addition, greenhouse gases emission can be reduced by reducing travel distance and methods with preparation of strategy to supply local food.

Table 3. Detailed Implementation Tasks of Urban Greenization Strategy for Carbon Dioxide Absorption

Policy Direction	Detailed Implementation Tasks
Carbon Dioxide Absorption Creation of Green Urban Space	1. Green Daegu creation project 2. Forest management to promote carbon dioxide absorption
Creation of Green Urban Space	3. Famous green urban space 4. Change urban waterfront space to green ecological parks 5. Greenization of the 2011 marathon course 6. Changing major urban parks to carbon dioxide absorption parks
Reduction of Greenhouse Gases Agriculture/Animal Farming Dissemination of Technology	7. City farm creation project 8. Environment friendly red LED dissemination project 9. Local Food dissemination project 10. Renewable energy village creation 11. Greenhouse reduction agricultural technology dissemination 12. Greenhouse reduction animal farming technology dissemination

c. Systematization of Resource Circulation City

Mass production and consumption of goods for human activities damage the nature and make pollution worse by creating mass discharge of various waste materials. Recently, waste material management policy changes to 3R (Reduction, Reuse and Recycle) policy, which is the concept to minimize waste materials. Together, according to the national strategy of Low Carbon, Green Growth, advancement of efficient production and consumption, reuse of materials, recollection of energy and processing is promoted.

To construct a resource circulation urban system, Daegu is going to promote a urban mining project first. Urban waste materials (waste cell phones, waste PC and waste appliances) can be reused as raw materials by collecting valuable materials from them and contribute to create jobs for the low income class through a pickup and collection project.

Dumping organic waste including food waste water is completely prohibited from 2013. To process food waste more stably, Daegu is planning and promoting to construct a public resource recovery plant (capacity: 300 tons / day). Moreover, this facility is connected to CMD project, which secures carbon dioxide emission through making bio gas a source of energy.

In addition, it is planning to disseminate advanced technology to turn waste with high energy contents among flammable waste produced by workplaces and houses to oil by thermal decomposition and produce refused derived fuel. Furthermore, Daegu tries to find a method to change waste materials to an energy source with flammable gas production technology making a flammable waste to gas and heat recovery technology producing solid fuel, liquid fuel, gas fuel and waste heat. With this, it is planning to prepare to use renewable energy to energy necessary for industrial production activities.

Table 4. Detailed Implementation Tasks for Resource Circulation Urban System

Policy Direction	Detailed Implementation Tasks
Reduction of Urban Waste and Expansion of Waste Reuse	<ol style="list-style-type: none"> 1. Strengthen discharge and collection of domestic waste in separation. 2. Expand public waste reuse facilities 3. Construct and operate a DR center for reuse of waste metals 4. Create no urban waste and clean area
Turning Waste to Energy	<ol style="list-style-type: none"> 5. Install waste refused derived fuel(RDF) facilities and power generation plans 6. Install power generation plans to turn industrial waste and sludge to energy 7. Install a LFG fuel cell combined heat and power plant at Bangcheonri 8. Install facilities to make food waste public resource 9. Daegu Technoplis RDF combined heat and power generation and dissemination of fuel cells 10. Biocirculation forest energy project 11. Support to oil mist collection device installation 12. Sewage heat recover energy project 13. Environment basic facilities carbon neutralizing project

d. Advancement of Green Life Practice

Green life refers to the practice to use resource and energy environment friendly and wisely in daily life and reduces, reduce greenhouse gas emission and create green society. Daegu selected and keeps promoting the Greenlife G-4 movement and its 10 tasks to actively respond to climate change including global warming and effectively implement green life, which is the basement of "Low Carbon, Green Growth".

The G-4 movement is established on cooperation between the private and public sector to create a green growth city. Detailed contents of the movement include the Green Network movement allowing all citizens to participant in, the Green Consensus movement emphasizing citizens participation and promotion of green life practice, the Green Action movement finding and

implementing feasible green practice, and Green Incentive movement for excellent green practice.

As Daegu emitted 75.1% of total amount of carbon dioxide from non-industrial sectors, it is very important to reduce greenhouse gases through implementing green life. Considering detailed sectors, energy consumption is the highest in the domestic sector and followed by commerce, transportation and industry in order. Therefore, an energy saving plan focuses on the domestic sector.

Table 5. Detailed Implementation Tasks for Advancement of Green Life Practice

Policy Direction	Detailed Implementation Task
Development and Distribution of Green Life Practice Program	<ol style="list-style-type: none"> 1. Operate a carbon point program 2. Operate carbon parking space 3. Activate eco-drive 4. Activate participation of cars in the operating day selection system 5. Grow and expand green families 6. Activate the green workplace movement
Construction of Green Life Support Infrastructure	<ol style="list-style-type: none"> 7. Develop and monitor green life indexes 8. Construct a local greenhouse gases comprehensive management system 9. Prepare ordinances of a solar city
Promotion, Education and Governance	<ol style="list-style-type: none"> 10. Strengthen green life education and grow green citizens 11. Construct a local energy center 12. Local energy facilities turned to tourist attractions 13. Green school and campus project

e. Advancement of Climate Change Adaptation

Among strategies to dealing with climate change, the adaptation sector emphasizes much localized approach, compared to greenhouse gas reduction sector. As greenhouse gases, which have been already emitted to atmosphere, can stay in atmosphere for several decades, global warming can last for a long time even greenhouse gases emission is reduced. On the other hand, development of projects suitable for local features can minimize danger caused by climate change and can be recognized as strategy to strengthen capability of adjustment, which lead maximized opportunity of local development.

As climate change is progressing, it is necessary to research buildings, infrastructure and plants, which can maintain their performance in possible severe environment. In addition, a strategic approach to use both negative and positive effects of climate change is necessary.

It is desirable for a local government to prepare non-structural countermeasures including land use and connection to natural disaster, prevention and warning system and improving local capability, rather than countermeasures by artificial structure including dams and embankments.

Appropriate role distribution and partnership between the interested parties including the government, companies and citizens are very important to develop capability of the society to adapt to environment change. As adaptation to climate change basically has uncertainty, participation of stakeholder in evaluating weaknesses and selecting an alternative adaptation method necessary is necessary. The top priority in promoting adaptation strategy is supplying information to reduce uncertainty through research and monitoring of local climate change.

Table 6. Detailed Implementation Tasks for Strategy to Advance Climate Change Response

Policy Direction	Detailed Implementation Tasks
Constriction of Weakness Evaluation System Similar to the Developed Countries	<ol style="list-style-type: none"> 1. Construct climate, environment monitoring and management system 2. Develop climate and atmosphere environment comprehensive forecasting model 3. Prepare weakness evaluation and monitoring instruction 4. Draw climate change weakness map of Daegu
Earlier Realization of Climate Change Adaptation by Sector	<ol style="list-style-type: none"> 5. Prepare, educate and promote an adaptation manual for each sector 6. Arrange possible disaster district in an environment friendly method 7. Construct regional water supply system for Daegu and Gyeongbuk 8. Introduce a wind road to the city area 9. Healthy environmental impact assessment with analysis of possible heat wave danger factors 10. Construct disease dealing strategy and monitoring system according to climate change
Leading Governance of Climate Change Adaptation	<ol style="list-style-type: none"> 11. Configure and operate a climate change adaptation conference for Yeongnam Region 12. Construct and operate a citizen experience center for climate change adaptation 13. Establish and operate an overseas support center for climate change adaptation 14. Establish and operate a climate change adaptation forum in Daegu and Gyeongbuk Region

5. Meaning of Daegu's Climate Change Responding Policy

a. Preparation of Local Foundation for Earlier Realization of National Climate Change Policy

The climate change responding plan of Daegu metropolitan city is the official plan established in accordance with the national climate change policy. It has been prepared for mutual benefits between the central government and local governments in dealing with national climate change through policy communication.

Earlier realization of the national climate change policy can be achieved through smooth establishment and implementation of local climate change responding plan and the climate change responding plan of Daegu is perfectly matched with this purpose.

b. Developing Capability to Deal with Climate Change, which is suitable for Daegu's circumstance and Constructing Infrastructure

Climate change can be affected by several factors. As every local government has local specialty, a plan prepared by a uniform manual has low effectiveness. The climate change responding plan of Daegu secures capability for quick response to climate change, reflecting local feature and circumstance and prepares medium and long term infrastructure construction plan, considering local weakness of climate change.

c. Preparing Foundation of Technical and Financial Support for Greenhouse Gases Reduction

With calculation of greenhouse gases reduction, Daegu set the target amount to be achieved by 2020. To achieve the target amount, technical and financial support of the central government is essential. To meet the national reduction amount with the climate change responding plan, the base of human resource and physical resource support has been prepared, which is the warranty for the target of local greenhouse gases reduction.

d. Constructing Partnership through Active Communication and Cooperation with Private Organizations

For successful climate change policy, reduction of greenhouse gases through communication with private organizations and voluntary participation in green life practices are required. The joint responding conference in which the private sector, the public sector, industry, universities and institutes participate has been configured, with construction of a climate change responding governance, which is one of promotion strategies of climate change responding plan and a foundation of climate change plan has been prepared through experience education, promotion, communication and cooperation.

IV. FUTURE PERSPECTIVE AND PROBLEMS

Although the United Nations Framework Convention on Climate Change was established in 1992 implementation of the convention was not very fast because of implementation expenses and

international disagreement about fact of global warming. Recently, as scientific agreement about global warming has been made, many countries are actively involved in responding to the convention and voice to ask Korea to participate in the international cooperation has been escalated. From this point of view, there are several trends and problems that the central government and local governments should consider.

Responding to the United Nations Framework Convention on Climate Change should be strategic in long term perspective. Although reducing greenhouse gases emission is necessary to prevent global warming, it is not only applicable to Korea. In addition, greenhouse gases reduced by Korea should be approved internationally according to the convention. The Kyoto Protocol enacted from February, 2005 is currently in the implementation period (2008-2012).

Internationally agreed compulsory reduction of greenhouse gases has been applied. 39 compulsory reduction countries including 26 developed countries such as U.K, Japan and Germany should reduce greenhouse gases emission by 52% during this period, compared to 1990. Now, it is necessary to devise practical and systematic adaption countermeasures, correctly understanding climate change, together with a policy to reduce greenhouse gases.

Since the Kyoto Protocol was in effect, the developed countries, which has compulsory reduction responsibility, should reduce greenhouse gases emission by 52%, compared to 1990. Korea is likely to perform its reduction responsibility during the second commitment period, which starts from 2013. Considering characteristics of each sector of Daegu, the percentage and increase rate of greenhouse gases emitted from transportation is the highest. Therefore, concern should be placed on vehicles and transports in the first.

In addition, as the percentage of domestic, commercial and public sector are high in other fuel consumption part, education and promotion to save energy from heating of building, increase energy efficiency and change personal acknowledgement and consumption patterns, which are major causes of greenhouse gases, should be actively implemented.

To increase carbon dioxide absorption sources, Daegu is required to create sustainable green space. To do this, a greenhouse gases reduction project including developing new forest in spare space, decorating forest, preventing disaster in forest and using forest biomass should be systematically implemented.

It is also necessary to establish strategy according to energy consumption type. There are three sectors; the supply sector, the industry sector and the home industry sector. For the supply sector, distribution of clean energy and its supply system to expand city gas supply and local area heating should be introduced. For the industry sector, designation and management of an energy

management company, induction of clean energy use in a company and introduction of energy efficiency level display system are required.

For the home industry sector, several projects to encourage energy saving of houses and buildings including preparation and distribution of induction standards about house insulation, introduction of house/building energy saving mark, diagnosis and follow up management of large building energy use, diagnosis of insulation structure of existing houses, introduction of energy expense display system for appliances, promotion of energy saving devices are required.

With an active renewable energy distribution policy, Daegu has significantly high solar energy and waste energy supply. However, there is a lack of policy interest on sunlight and fuel cells. Daegu set the reduction target which planned to reduce greenhouse gases emission by 18% until 2020, compared to the emission amount of 2005, with a strategy to promote low carbon city responding climate change.

In spite of such energy policy, CO₂ emission, which is the main greenhouse gas emitted by consumption of fossil fuel is increasing by 5% every year since 2005. Therefore, a more fundamental energy saving plan are needed. For reduction of greenhouse gases emission from the energy sector, efficiency and demand management policy including reducing fossil fuel use is needed in short term, while development and distribution of renewable energy technology with low carbon dioxide emission are necessary in long term perspective. In addition, it is required prepare of foundation, institutional supplement and integrated management method for sustainable local energy, considering characteristics of Daegu.

Knowledge improvement on climate change is also needed. To improve knowledge of citizens and public officers in departments dealing with climate change, education to make them understand and inform them of how separated plans and policies are connected to climate change should be presented. It is hard to expect any achievement in reducing greenhouse gases, expanding renewable energy use, saving energy, managing transportation demand including using public transports and car-pooling and reusing materials if efforts are only made by the central government and local governments, without active involvement of local residents and companies, which are actual consumers of energy.

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Change of Governmental Policy for Nakdong River and Nakdong River Restoration Project

I. INTRODUCTION

The existing river policy started from a policy to control a river and make people use it. It changed to a policy to manage a river and protect people from damage caused by disasters. After people experienced problems and limitations of such policies, a nature-friendly river policy was introduced. However, implementing a policy concentrating on management or water use or environment caused problems in other sides. It seemed that a vicious cycle started.

The 4 Major Rivers Restoration Project started from 2009 includes various purposes such as solving water shortage issue, restoring environment and developing a local area. In addition, this project also includes flood prevention and other issues which have been neglected by previous river policies, such as activation of water front leisure space, improvement of water quality and restoration of the ecosystem. Most of existing policies are focused on river management for flood defense and water use. However, the Lee Myeong-Bak government started the 4 Major Rivers Restoration Project as a part of a river management solution that seeks integration of flood defense and water use and environment issues by adding the concept of green growth to existing policies.

The 4 Major Rivers Restoration Project attracted people's attention to water by changing river space that is hardly accessed by people to life and recreational space. The 4 Major Rivers Restoration Project can be considered as an effective way resolving water shortage and responding to climate change flexibly, such as drought and flood.

Nakdong River, which passes through Daegu and Gyeongbuk and the home in local residents' heart, is the core section and takes the biggest part of the entire 4 Major Rivers Restoration Project in terms of the scale and importance.

Therefore, for sustainable development of Daegu and Gyeongbuk with the Nakdong River Restoration Project, current status of the project should be correctly identified. As a change in the governmental policy has huge effect on a local area, it is necessary for Daegu and Gyeongbuk to review their development direction.

The purpose of this study is to help the Nakdong River Restoration Project fully implemented with its original effect by identifying what the Nakdong River Restoration Project means to sustainable development of Daegu and Gyeongbuk in changing meaning of river policies and investigating current status of the project.

In addition, this study aims to understand changes in governmental policy caused by the Nakdong River Restoration Project, prepare a base for sustainable development of Daegu and Gyeongbuk, focusing on Nakdong River and review follow-up projects to harvest fruits of green growth.

II. CONVENTIONAL RIVER POLICY AND NAKDONG RIVER

1. Change Process of Conventional River Policy

In 20th century, a river was an object to be controlled by human. People had made great efforts to maximize benefits from a river while tried to prevent disaster caused by a river. However, such efforts soon met the limitation. Flood had been getting serious in spite of endless efforts and environmental problems had been caused from a river which managed to maximize the effect of flood defense and water use.

Passing through the industrialization era after 1960s, curved rivers were changed to straight rivers and they are equipped with identical concrete revetments, focusing on prevention of flood. However, with these reasons, river environment were damaged and their water-friendly features were reduced. To solve these problems, a nature-friendly river improvement project that integrates environment with flood defense has been promoted to restore a healthy river with strong resistance to flood, clean water, beautiful scenery and active alive ecosystem since the late 1990s.

As concentration of population and economy following urbanization and industrialization accelerated and, as a result, flood damage became much more serious, it was required to find new flood control measures. With necessity of a integrated flood control solution by a river basin, a variety of flood prevention facilities were constructed and a integrated flood prevention plan to distribute flood across a whole basin was established. In addition, a flood prevention project for an entire river system has been implemented with construction of new embankments and

Table 1. History of River Management Policy

Period	Water Management Policy
Japanese Occupation	Water resource development for exploitation of agricultural products in the colonial economy
1960s	Onset of water management policy
1970s	Preparation of the water resource infrastructure base and construction of river bank
1980s	Expansion of water resource infrastructure and river bank
1990s	Introduction of environment friendly concept to water management policy
2000s	Expansion of 'nature-friendly' concept and preparation of flood control measures

reinforcement of old embankments. On the other hand, as importance of river environment is highlighted, construction of 'Featured Urban Eco-river', which preserves a river ecosystem, creates beautiful water front scenery and extends waterfront space, is initiated to accommodate life of people.

Although new water management policy has been presented according to changes in circumstance, there are still several problems remains because such policy did not catch up rapid changes in environment. The next chapter briefly describes problems caused by past water management policies.

a. Perspective of Flood Defense

To keep the national land in safe from flood, unitary flood prevention measures that focus on construction of embankments have been adopted for long time. As a result, people and property have been concentrated to and a city is developed on a low laying ground that is protected by embankment. Accordingly, possibility of huge flood damage has been increased. However, construction of embankment is not enough to control recent floods whose size and frequency have been significantly increased since 2000. As river management has been implemented since 1960s, there are many 20-30 years old levees. As a result, problems due to old levees have been emerged. For example, many people were dead or injured and property was damaged because of crack and leakage of an old levee. In addition, lost its waterfront space and have monotonous and bland river environment if a city is isolated from a river by an embankment.

Since 2000, environment and climate change caused by CO2 emission have been big issue in the world. In fact, drought and flood with extreme weather become more frequent and severe. However, there is a lack of systematic responses for abnormal climate, water shortage response system brought by extreme drought and a drought prevention plan in a local government, together with a measure to handle flood exceeding designed size and destruction of structure caused by such huge flood.

As flood size is significantly increased, capability of flood prevention through construction of embankment soon reached its limit. As a result, it was strongly necessary to establish non-structural measures including improvement of flood forecast system, activation of natural disaster insurance, and emergency action plan in accordance with a flood hazard map. However, such non-structural measures also soon showed their limitation due to the lack of hydrologic information and flood damage information for preparation of such non-structural measures.

b. Perspective of Water Use

Economic level of people has been improved with national economy growth since the late 1990s. Accordingly, the demand on quality of life has been increased, which essentially requires increase of water supply. As a result, finding quality water is becoming difficult and water shortage is

getting worsened. In addition, considering Korean meteorological and geographical features, it is obvious that usable water resources are short during the dry season. Therefore, it is impossible to supply water for living and maintain water level in a river stably without development of additional water resources because the demand on such water usage is gradually increasing. The lack of water for instream flow in a river can worsen water quality. However, if water is supplied for the purpose, water shortage can be even more serious.

Furthermore, infrastructure for water supply between regions is unbalanced. The difference between water network in an urban area and a rural area is very serious and, accordingly, water supply ratio between two areas is also big. More importantly, it is very difficult to find a new water supply source (catchment) because of better knowledge of environment issues among residents, change of the ecosystem, development restriction near a catchment area and economic feasibility. In addition, there are conflicts between local governments in the upper river area and the lower river area with regard to unbalanced water supply between urban and rural area, conflict related to development of catchment and water quality issues. Together, social demands on appropriate water level of a river are gradually stronger to maintain adequate water quality and secure environment improvement water to handle a dried river passing through a city.

c. Perspective of River Environment

Entering the 21st century, 'Green' is emphasized in environment issues. Also, people ask development of waterfront space for leisure activities. However, less concern has been placed on a river environment management policy. First, there is no integrated plan to accommodate water use, flood prevention, environment, ecosystem and waterfront space. As water shortage becomes serious, there is not enough water to be used for instream flow, which is likely to make water quality worse. Moreover, most of river side areas are currently used for agricultural land. As a result, non-point pollutants including agricultural chemicals and fertilizers are coming into a river. As a variety of environment issues has been emerged, an integrated management policy is strongly required.

River space should be maintained well to use it for leisure activities. However, as mentioned above, most of river side areas are used as agricultural land, which products non-point pollutants, as well as damaging waterside scenery. Other riverside areas are used isolated walking tracks and exercise grounds because of the lack of connection to surround areas.

2. Special Features of Nakdong River's Basin

a. Geographical Features

The length of the Nakdong River's main stream is 525.15 km and it is the longest river in South Korea. The total basin area is 23,860 km², which equals to 1/4 of the total area of South Korea and 3/4 of the Yeongnam Area. The north, west, east and south basin of the river meet a basin of the

Han River, a basin of the Keum River and the Yeongsan River, the East Sea and the South Sea, respectively. The width of basin from the east to the west is approximately 150 km and from the north to the south is approximately 250 km. It has a rectangle shape. The main stream starts from Hanbaek Mountain and flows to the south. It meets several branch streams including Banbyeon Stream near Andong city and turns to the west. It joins Naesung Stream and Young River) near Hamchang and Jeomchon and flows to the south. Then, it passes through Gyeongsanbukdo, Daegu and Gyeongsangnamdo and meets South Sea at Busan.

The channel slope of the middle and the upper region of the Nakdong River is steep, which causes flood in the north of Gyeongsanbukdo every year. The channel slope of the lower region is gentle because of the alluvium layer, which makes embankment overflowed and causes flood frequently. The amount of precipitation in the Nakdong River basin is significantly differed by a season. For example, most of annual rainfall concentrated during the raining season from June to September. The amount of precipitation during the dry season from October to April accounts for only 20% of the total annual rainfall. The total amount of annual rainfall in the Nakdong River basin has the least rainfall amount, with 1,187 mm, which is 93% of the average rainfall of Korea.

b. Cultural and Economic Features

The Nakdong River basin is the origin of Silla and Gaya Dynasty's culture and the center of Confucianism culture. These cultures coming from the Nakdong area splendidly blossomed in the Korean history and they are the foundation of Korean spirit. There are many traces of Confucianism culture in the north of Gyeongbuk, mainly Andong. On the other hand, practical and sophisticated Gaya culture was formed in the middle area of the Nakdong River including Goryeong and Seongju. In addition, there are many historic sites showing beautiful Silla's Buddhism in the south of Gyeongbuk including Gyeongju, the capital of Silla Dynasty for a thousand years. Among them, Bulguksa and Seokgulam representing Silla culture are registered as UNESCO World Heritage. They still have ancient beauty and life.

Since the ancient period, the Nakdong River has led development of Daegu and Gyeongbuk. In the ancient time Daegu and Gyeongbuk is a hub of international trade in the North East Asia and goods were distributed through the Nakdong River. In 1960-70s, the Nakdong River played as a role of exporting port while Daegu and Gyeongbuk were quickly developed. Currently, industrial complexes for development of Daegu and Gyeongbuk are located near the Nakdong River and they are the core elements of the growth.

Figure 1. Location and Scenery of Nakdong River

c. Water Use and Flood Defense Features

Water demand in the Nakdong River basin has been significantly increased as the industrialization and urbanization of Daegu and Gyeongbuk progressed surrounding the river. Water abundance and usage are mainly depending on the main stream of the Nakdong River. The average annual rainfall and the amount of water resources of the main stream are 1,187mm and 28.5 billion m³, respectively. The amount of loss and discharge are 14.6 billion m³(51%) and 13.9 billion m³(49%), respectively. Among the total annual discharge, 9.5m³ is discharged by flood (68%) and 4.4m³ is discharged in normal condition (33%). Considering these figures, it is hard to say that water is abundant in the Nakdong River. Moreover, Hyeongsan River, Taehwa River and the southern coast of Korea, which are located near the Nakdong River, have received from the main stream of the Nakdong River using the river diversion method because they could not meet water demand with their own water resource due to their small areas

Major water resources include stream water, underground water and dam water. The water supply from a dam is significantly low, compared to other river basin areas. Unlike other river basin, the Nakdong River basin is special area, which supplies water from the main stream to other cities near Hyeongsan River, Taehwa River and the southern coast of Korea using the river diversion method. Moreover, big cities and industrial complexes, which have heavy demand on water, are widely distributed in the middle and lower region of the river. As excessive water supplied by the river diversion method could not return to the main stream of the Nakdong River, the river currently suffers from the lack of instream flow and severe water pollution. With these

reasons, there are many conflicts related to water between river basins and upstream residents and downstream residents.

On the other hand, too much water also causes a problem during summer as rain is concentrated during this season. In summer, serious damage occurs every year due to several typhoons and heavy rain. There is a long embankment surrounding the Nakdong River, which has been built by a flood prevention policy focusing on construction of embankments in accordance with a conventional river policy. Together, there are many pump stations to discharge stream water to the outside of embankment in the case of heavy rain. As flood size is bigger every year, the height of embankment is also increased.

The construction of embankment of the Nakdong River started from 1970s and finished in 1980s. This means that materials of the embankment are more than 30 years old. Water leakage symptoms related to the materials are detected every year. However, grouting is applied to the materials as a temporary measure whenever a symptom is found, rather than permanent problem solving. Furthermore, only such materials in the main stream prevent flood of the Nakdong River as construction of a dam or a reservoir in the upper region of the river is difficult.

Typhoon 'Rusa' and 'Maemi', which visited the Korean peninsula in 2002 and 2003, respectively, brought huge damage to the Nakdong River basin. After the events, thinking that a river management policy focusing on embankment could not properly handle a size of flood, which is gradually increasing due to climate change, is rapidly spreading across the nation. As a result, an effort to find an alternative reasonable and effective method of water use and flood control has been initiated.

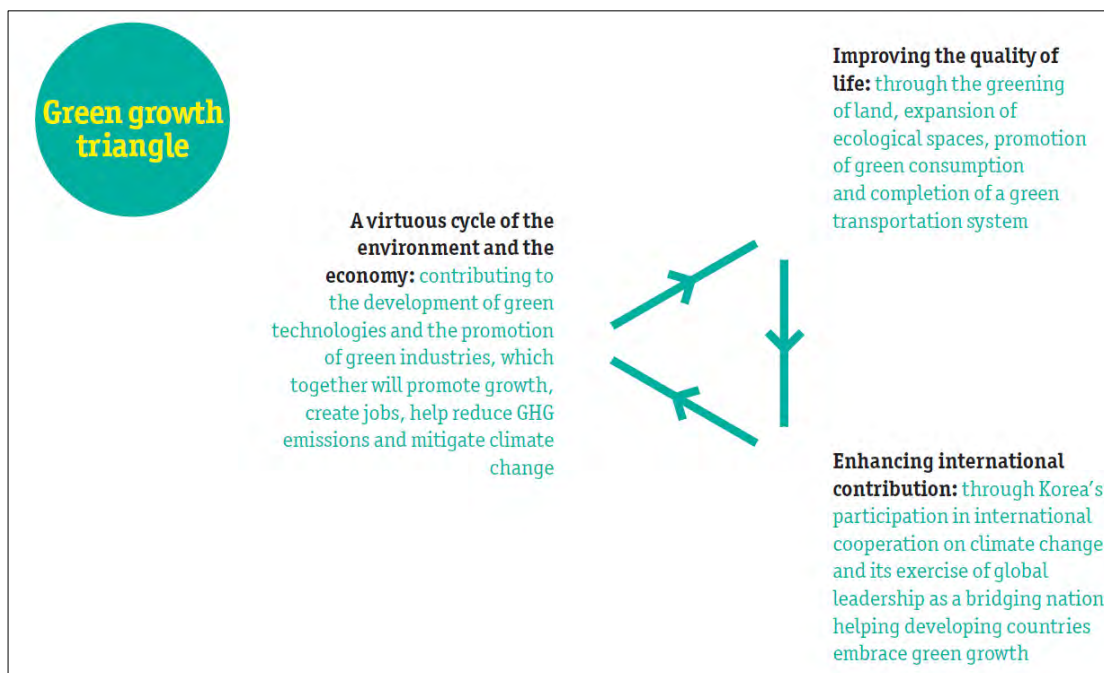
III. INTRODUCTION OF NEW RIVER POLICY AND NAKDONG RIVER RESTORATION PROJECT

1. Green Growth and River Policy

Recently, the Korean government introduced the new paradigm of 'Green Growth' integrating two opposite concepts (environment and growth) in order to make the existing paradigm of economic growth more environments friendly. The concept of 'Green Growth' is introduced to not only the economy and the industry sector, but also water resource management policy including river management.

In other words, an effort to find a method to activate local economy has started, while turning a river to a more environment friendly place. Before that, a river policy still focused on flood control and introduced the concept of 'environment friendly' little by little. After accommodate the concept of 'Green Growth', an existing river policy has been changed to a new policy including all concept of flood control, water use, ecosystem and local development and progressed to the Nakdong River Restoration Project.

Figure 2. Concept of Green Growth



Source : Website of Presidential Committee on Green Growth (<http://www.greengrowth.go.kr>)

Previous river policies focused on restoration rather than prevention. Now, with increased flood damage due to climate change, investment is made on prevention projects for more proactive flood prevention. On the other hand, various methods to secure available water resources are implemented to deal with severe drought, including channel dredge, construction of weirs and dams, and increasing number of reservoirs for agricultural use. These methods can contribute to improvement of environment through increasing instream flow.

A policy to increase flood control capability by removing sedimentary soil in a river has been adopted, out of a policy to prevent flood by constructing high embankments. Increasing the height of embankments has several problems. First, it soon confront with physical limitation. Second, it is impossible to completely prevent destruction and leakage of an embankment in the case of flood level rising. In addition, it is possible to make more serious damage when such accidents happen.

Spare flood control capability can be secured to increase safety of an embankment and reduce flood of an inner area by lowering flood level through dredge and channel clearance and prepare climate change. In addition, river side water retention sites and flood control sites are constructed to reduce burden of an embankment in dealing with flood. In addition, improving performance of the Nakdong River Estuary Barrage to discharge water quickly in the case of flood is included in a policy

Dredging sedimentary soil can allow to securing massive water resource in connection to construction of multi-functional weirs. The secured water resource can present space for water leisure facilities and waterfront facilities, as well as purpose of use. Existing water resource facilities such as agricultural reservoirs can be used to increase water quality and restore the ecosystem by improving them. Water to meet the demand can be secured with such new water resource development policy

Creation of waterfront space is also included the river policy which the government is seeking for. Generally, with a license, agricultural activities including construction of greenhouses are allowed, occupying riverside areas. However, there are many disadvantages including illegal occupation, fertilizers and agricultural chemicals flowing into a river, disturbance of floor control. The new policy of the Korean government provides several aids to help farmer to move other places and start the ecosystem restoration project, including compensation, agricultural land purchase aid and lending agricultural structure construction expense

To use a river and create new recreation space, bicycle roads and other convenience facilities are constructed. Also, the policy improves accessibility to riverside by securing a passage connecting a city and recreational space. In addition, the policy aims to create beautiful waterfront space by encouraging constructing building and facilities in harmony with waterfront.

To promote local development focusing the river, other policies are implemented, such as a branch river restoration project, activation of green growth industry and renewable energy industry, making a multi-functional weir as a landmark, selection of 12 beautiful sceneries of the Nakdong River, development of tourist attractions, host of festivals and events related to the Nakdong River and other projects to increase income of local residents.

2. Nakdong River Restoration Project

Such changes of river polices eventually lead the '4 Rivers Restoration Project'. This project upgrades a simple river management policy which focused on water use and flood prevention. It is the integrated project covering creation of environment friendly national land, as well as economy restoration and job creation. The Nakdong River Restoration Project is a part of '4 Rivers Restoration Project' and covers the Nakdong River basin.

The Korean government implements the policy, considering that a 'natural river' should be a river in the future, rather than a 'controlled river'. For this, making an 'alive' river is the first goal of the policy to allow for a river to perform its natural functions.

Figure 3. Overview of the Nakdong River Restoration Project in Deagu and Gyeongbuk region



Source : Gyeongsangbukdo

Table 2. Specification of Multi-functional Weirs in the Nakdong River

Weir	Length (m)	Height (m)	Surface Area (Million m ²)	Reservoir capacity (Million m ³)	Floodgate Size (W×H×Quantity)
Dalseong Weir	480	10.5	9.6	56.0	40×8.0×3
Gangjeong, Goryeong Weir	953	11.5	14.1	107.7	45×11.0×2
Chilgok Weir	400	14.8	13.7	93.6	40×11.3×3
Gumi Weir	374	11.0	9.1	55.4	45×11.0×2
Nakdan Weir	286	11.5	5.3	34.3	40×11.5×3
Sangju Weir	335	11.0	5.6	28.7	45×10.0×2

Figure 4. Multi-functional weirs in the Nakdong River



Source : Website of 4 Rivers Guide (<http://www.riverguide.go.kr/eng/index.do>)

The Nakdong River Restoration project is a new river channel management policy. This project is planned to diversify methods to secure water resource and use riverside space as complex space harmonizing people with the nature. The goals of the project are as follows;

a. Organic Flood Prevention Measures to Prevent Flood Damage

One of main purpose of the Nakdong River Restoration project is to protect areas from flood, to achieve this goal, the project increased efficiency by integrating several measures systematically. The main measure is lowering flood stage to prevent flood by dredging sedimentary soil from a river bed. Together with this, old embankments were strengthened to increase flood safety evaluation. In addition, the project constructed new dams to distribute flood burden across the entire basin and prevent flood from concentrating on a certain river and increased the height of agricultural reservoirs to increase flood control capacity. The project also increased the number of floodgates on the estuary barrage and constructed a training dike at a merging area to smooth discharge of flood water.

b. Securing Abundant Water Resource to Prepare Water Shortage

It is expected that water shortage is getting serious as the demand on water is increasing due to effects of climate change together with population growth and industrialization. As a result, conflict about water use between regions happens and becomes more serious. Therefore, securing water resource also takes an important part of the Nakdong River Restoration project Dredging a river bed, installing multi-functional weirs, constructing new dams and increasing the height of agricultural reservoirs helps securing available water resource by significantly increasing the amount of water storage, as well as prevention of flood.

c. Improvement of Water Quality and Restoration of Ecosystem

Improvement of water quality and restoration of ecosystem are important issues before the concept of green growth is introduced to a river management policy. Especially, local residents have strong concern on these issues as the Nakdong River experienced several serious water pollution events. The project asks systematic and intensive management of 10 sites with high pollution level by expanding and advancing basic environment facilities on them. In addition, the project strengthens river water quality standards and prepares measures to reduce non-point pollutants in order to improve quality of effluence. Also, it asks preparation of riverside ecological belts to restore the ecosystem.

d. Creation of Complex Space with Local Residents

A river played a role of recreational place for people to enjoy their leisure and cultural life. However, low accessibility caused by a flood prevention policy focusing on embankments separated a river from people. The Nakdong River Restoration project restores a role of river as a recreational place by improving accessibility to riverside and waterfront scenery. In addition, it allows more people to enjoy a river by constructing bicycle roads.

e. Local Development with River

Policies to accomplish local development through the Nakdong River Restoration project have been presented to realize green growth promoted by the government. They including branch stream restoration, agricultural and fishing village development, development of tourist attraction through reservoir and riverside development and formation of space for exchange between urban and rural area. The Nakdong River Restoration project strengthens local competitiveness by activating three major cultural elements (Silla Dynasty, Gaya Dynasty and Confucianism) blossomed near the Nakdong River.

Currently, the Nakdong River Restoration project is practically completed with completion of dredging river bed and 8 multi-functional weirs. Six weirs out of total eight weirs in the Nakdong River are located within Daegu and Gyeongbuk.

3. Achievement of Nakdong River Restoration Project

As a project to fundamentally solve problems related water use, flood prevention and river environment and make the river a symbol and pivot of cultural and economic development, the Nakdong River Restoration project attracts attention of people as a way to increase quality of people's life and lead local economic activation.

Meanwhile, it was difficult for a development project including both upper and lower region of the Nakdong River's main stream to be promoted because of lack of budget and cooperation system between government agencies. However, it is expected that such trend can be improved by the Nakdong River Restoration project. Chaotic river management including unreasonable

aggregate extraction, water pollution caused by agricultural activities in a riverside and devastated riverside can be back to a normal track

For national land development, the natural state of a river has been destroyed by constructing a road on an embankment, disturbing eco-corridor for animals and plants and installing concrete low water channel. The Nakdong River Restoration project tried to restore diversity and dynamics of a river, which are the original features of a natural river, by diversifying the height of terrace land and the width of low water and installing natural eco-friendly revetments in a low water channel.

Culture, history and tourism network surrounding the river can be formed with bicycle roads and walking tracks, which connect the main stream and the branches and urban areas and riverside. In addition, a base of integrated leisure including water sports facilities (for rafting, boating and yachting), auto-camping facilities and cultural experience space can be prepared. Furthermore, the project helped to improve the ecosystem and water quality by creating various shapes of wet lands, restoring old water ways, and managing agricultural lands, restore eco-continuum through construction of Green & Blue Way such as creating water forest and natural fish corridors and prepare a base for new type of leisure and recreational activities depending on the river

With these methods, it is expected that the river can be re-created as local cultural space and contributor to local economy activation with important tourist attraction connected to local leisure space and a variety of cultural events using theme riverside and waterfront space.

a. Solution for Water Shortage and Flood Defense

Damage caused by flood, which repeats every year, and reconstruction expense can be reduced with increased flood control capability led by strengthening embankments and expanding dams and regulating reservoirs. Together, it is also expected that a flood free river that can resist to even recent escalated flood size due to climate change can be realized. According to the analysis of unsteady model, which was conducted to review effect of channel dredging and weir construction on flood of river, the effect of dredging on reduction of flood stage was bigger than the effect of weir construction on increase of flood stage (Kyeong Soo Jeon, 2012).

Moreover, it is expected that the project can help preparing future water shortage caused by population growth and industrialization by increasing available water resources, which can be done with improvement water permeability of a river by dredging river bed, construction of new dams and weirs and redevelopment of agricultural reservoirs and supply water stably even in severe drought.

b. Healthy Water Ecosystem by Improvement of Water Quality and River Restoration.

Water quality of the Nakdong River is one of the most important issues to be solved for the residents of Daegu and Gyeongbuk because of several water pollution accidents in the past. Therefore, there are serious concerns on construction of several weirs in the main stream of the Nakdong River, which may block flow of the river and make water quality worse. Responding to the concern, the project plans to increase the number of sewage, wastewater and night soil treatment facilities and supplement chemical treatment facilities for improvement of water quality.

The project aims to achieve 'good water' with 96% and 0.089mg/L in terms of BOD and TP concentration, respectively, which is suitable for swimming and fishing, with intensive care of water quality by designating 11 mid-watersheds out of total 22 mid-watersheds as intensive management basins. In addition, the project can improve ecosystem by reducing non-point pollutant by removing agricultural land within a river region. Eco-friendly wetlands are formed in 8 sectors. Creation of eco-friendly rivers in the national river system (407km) and restoration of urban rivers are going to be performed to secure green belts in order to create healthy ecological environment.

c. Increasing Quality of Life and Leisure

Importance of leisure is increasing as life standard of people improves as a result of national economy development. The Nakdong River is suitable for enjoying leisure activities as waterfront space because there are many places with beautiful scenery and high ecological value along the river. Therefore, the project provides high quality cultural rest space by managing terrace lands and improving accessibility to waterfront as well as activating water leisure and provide opportunity to leisure activities by constructing bicycle roads connecting upstream with downstream.

d. Leading Local Economy Boom as a Green New Deal Project

For long time, the Nakdong River has successfully performed a role of the main artery. Now, the Nakdong River takes roles to activate local economy with development cultural and tourism attractions and green energy projects and recreate the national land, beyond just supplying water supply or physical distribution function, as the paradigm of growth is changed to 'Green Growth' focusing on the environment and ecosystem.

As a result, it is expected that tourist attractions are developed and local economy is activated by constructing riverside landmarks at a place beautiful scenery and abundant ecological resources along the river. In addition, emission of carbon dioxide can be reduced with new growth sources including clean IT, solar energy and small hydro power stations, which eventually contribute to prevention of the Global Warming. The project can activate economy of the Daegu and Gyeongbuk region and contribute to recover real economy by creating approximately 340 thousand jobs and 40 trillion of effect on production inducement.

e. Global Leader in Water Management.

The Nakdong River Restoration project gains attraction from the world as a project to lead development of environment, economy, culture and tourism domestically and a new green growth model to prepare climate change and water shortage globally. The Nakdong River Restoration project can improve the national reputation by transferring accumulated experience and technology to the world and supporting Korean companies advancing to the world, as well as contributing to development of the domestic water resource industry. Especially, taking a global standard model with IT and ET integrated water management technology, the base for Korea to be a leader in the water management sector can be made.

IV. FUTURE PERSPECTIVE AND PROBLEMS

Although the government presented a modified river policy through the Nakdong River Restoration project, not all problems are solved with this policy. Some people accepted the new policy of the Korean government very positively while other people concerned side effects of the project.

The most serious problem was the project period that only took three years from planning to completion. Compared to the past experience showing that planning of a river management project in 1960s took more than 10 years to investigate just hydrologic and hydraulic features, it is inevitable that such short project period makes many problems including unreasonable and incompatible planning and uneconomical efficiency. These unstable factors may cause many problems and difficulties in managing facilities of this project in the future.

Moreover, the project has many other potential technical problems related to operation of multi-functional weirs, management of quality of water staying in a weir during the dry season and increase of underground water level in the protected low land because of management water level as many promotion procedures was omitted or reduced.

In addition, dredging and constructing multi-functional weirs during the Nakdong River Restoration project made the river environment completely different. For example, Dredging changed each side of the Nakdong River completely and multi-functional weirs created completely different undercurrent of the river compared to the before the project. Therefore, data and materials accumulated and used for the previous river condition are useless for a new river management.

Therefore, it is necessary for existing river management methods such as flood warnings or total pollutant load standards to be modified or developed according to new environment. In addition, operation rules of multi-functional weirs in connection with existing dams should be optimized as soon as possible to minimize damage from flood and drought effectively.

It is obvious that the Nakdong River Restoration project is an onset of new river management policy with different point of view, compared to existing river management policies. Therefore, to successfully finish the project, it is necessary to prepare complete maintenance methods for constructed river facilities and short-term supplement measures and medium- and long-term following projects with careful consideration of the current project.

Although construction for the main stream has been completed, projects for branch streams of the Nakdong River should be implemented urgently as follow-up projects because the project affects them. The weakness of the Nakdong River Restoration project is a problem in a river function. Therefore, to make a river perform its river function correctly, increasing flood control capability of branch streams, developing new reservoirs and redeveloping existing agricultural reservoirs shall be performed together.

To do this, it is necessary to enact a special act to secure stable budget. Considering financial condition of local governments responsible for maintenance of branch streams as most of them are designated as the local river, investment should be made step by step. In other words, as it is expected that excessive financial resources should be used in a short period, projects shall be implemented step by step according to their priority, considering local features and urgency of an issue.

To manage and use results of branch streams management projects properly, it is very important to maintain river facilities. For this, a systematic support of the government is essential. Many of the branch streams are the local rivers managed by local government. Therefore, it is necessary to establish a flexible river policy reflecting local features and demands. Branches should be managed according to their priority from long-term perspective step by step.

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Relocation of Public Agencies to the Provinces and Construction of Innovation City: A Case Study of Daegu and Gyeongbuk

I. INTRODUCTION

The Korean government had promoted rapid economic growth based on economic efficiency and unbalanced national development with focus on the capital area since 1960s. As a result, Korea has achieved significant economic growth and it is currently ranked thirteenth largest economy from one of the poorest countries in the world (Seo, 2008). On the other hand, such development policy also created a serious regional polarization problem.

The main cause of unbalanced national development was the Comprehensive National Land Development Plan (1972-2001), which was implemented three times from 1972. The first Comprehensive National Land Development Plan (1972-1981) encouraged economic growth based on metropolitan areas including Seoul and Busan. The second plan (1982-1994) focused on control and management of growth of metropolitan areas, but failed in multi-centralization of the nation and decentralization of the population. The third plan emphasized regional growth to improve national land development structure that concentrated on the capital area. However, the gap between development of the capital area and other regions was getting worse (Seo, 1993). In spite of many legislations and regulations to discourage concentration to the capital area including Seoul Metropolitan Area Readjustment Planning Act (1982), the total industrial site volume control system (1994) and the overcrowding charge system (1994), concentration of industry and population to the capital region is accelerating (Seo, 2008).

The Roh Moo-Hyun Administration (launched in 2003) diagnosed that current concentration to the capital region was an important factor that weakened national competitiveness and strongly promoted the balanced national development policy to reduce 'overpopulation of the capital area' and resolve 'the unipolar national land use' (Choo, 2004). Relocation of public agencies to the provinces, as the core element representing the balanced national development policy, is to relocate public resources located in the capital area to the provinces (Kim, 2006). The construction of an innovation city is introduced to prepare ten growth poles across the nation, starting with relocation of public agencies to the provinces. The government expected that public agencies relocated to the provinces could create a new growth engine for the corresponding region by cooperating with local industry, universities, research centers and governments.

It is supposed that relocation of public agencies project and the first stage of innovation city construction are completed this year (2012). Unlike the original plan, it is expected that relocation of public agencies to innovation cities in the nation would not completed by the end of this year. However, it is necessary to review the policies related to relocation of public agencies and construction of an innovation city under the circumstance that Lee Myeong-Bak government

promotes the macroeconomic region policy based on the newly established national land policy. This paper reviews progress of projects including relocation of public agencies and construction of an innovation city, focusing on cases of Daegu and Gyeongbuk and draws future perspective and promotion tasks.

II. POLICY OF PUBLIC AGENCIES RELOCATION TO THE PROVINCES

1. Public Agencies Relocation to the Provinces

The "Relocation of Public Agencies" policy aims to relocate all public agencies to the provinces for release of the capital area concentration and development of local specialty, except for institutions¹ that are necessary to be located in the capital area in nature. According to the Special Act on Balanced National Development, there are 409 public agencies in the nation and approximately 85% of them are located in the capital area. The government announced that 175 out of 345 public agencies located in the capital area were subject to relocation after deliberation of the Cabinet Meeting (Kim, 2006). The number was increased to 180 because 5 public agencies were added after the announcement including the Rural Development Administration and the Customs Border Control Training Center. However the figure was reduced to 148 in accordance with the Advanced Public Agency Project.

The destinations of the relocation can be roughly divided into the Multi-functional Administrative City (Sejong-Si) and other areas. Other areas include 3 metropolitan cities in the capital area,

Table 1. Classification of Public Agencies to be Relocated by Region

	Number of Public Agencies to be Relocated (%)	
Total	148 (100)	
To Multi-functional Administrative City	16 (10.8)	
Other Areas	Sub-Total	132 (89.2)
	To Innovation Cities	114 (77.0)
	To Individual Cities	18 (12.2)

Source: the contents were reconstructed, referring to the homepage of the Ministry of Land, Transport and Maritime Affairs(<http://innocity.mltm.go.kr>)

¹ According to Article 18 of the Special Act on Balanced National Development and Article 16 of its enforcement ordinance, the following public agencies are excluded from the relocation; ① central administrative agencies (relocation is decided by the construction plan of the multi-function administrative city) ② public agencies whose jurisdiction is the capital region ③ public agencies located in under-developed area and land fill sites in the capital region ④ public agencies that manage and promote cultural and welfare facilities for capital region residents such as performance, exhibitions, books, local culture, welfare and medical facilities ⑤ public agency that manages historic and heritage areas, cemeteries, land fill sites, inter-Korea transition sites, rail stations and airports in the capital region ⑥ public agencies that have been established for mutual assistance and promotion of rights between members ⑦ other public agencies that must be located in the capital region.

Daejeon which already has several public agencies, and other 11 metropolitan cities and the provinces except for Chungnam where the Multi-functional Administrative City (Sejong-Si) is constructed.

For smooth relocation of public agencies to the provinces, the government has prepared a support plan for public agencies to be relocated and their employees. For examples, the government helps sales of the corresponding agency's building and preparation of new office building at a new place. Together, quality housing, educational and living environment are going to be provided for their employees.

Table 2. Classification of Public Agencies to be Relocated by Region Support Plan for Public Agencies to be Relocated

Support Type	Support Item	Description
Support Public Agencies to be Relocated	Support sales of existing office building	<ul style="list-style-type: none"> ◦ provide fund from the national treasury considering financial condition in the case of loss ◦ exempt from acquisition tax and stamp duty when the Korea Land & Housing Cooperation purchases it.
	Support preparation of new office building	<ul style="list-style-type: none"> ◦ Provide insufficient fund for relocation ◦ Reduce local tax and land conversion charge including agricultural land
	Support smooth operation after relocation	<ul style="list-style-type: none"> ◦ exempt corporate tax ◦ expand independence of management and improve index of management evaluation ◦ Increase support according to status of each institution
Support Their Employees	Solve housing issue	<ul style="list-style-type: none"> ◦ give priority on purchasing a house and entering a rental house ◦ give long-term loan with low interest rate and priority on purchasing a housing site ◦ support construction of a dormitory for single persons ◦ extend the period allowing one household to have more than two houses ◦ exempt acquisition tax and stamp duty when buying a house
	Prepare excellent educational environment	<ul style="list-style-type: none"> ◦ Attract specialized vocational high schools, special purpose high school and independent public schools ◦ give priority on supporting improvement of existing school ◦ help changing and entering a school for children of employees ◦ construct a school and prepare a education supply plan earlier

	Prepare quality living environment	<ul style="list-style-type: none"> ◦ construct excellent working environment and well-being life space ◦ reduce the price for installation of infrastructure to a level of industrial complex
	Provide direct financial support	<ul style="list-style-type: none"> ◦ provide allowance of relocation to the provinces and support moving expenses ◦ allow voluntary or honorary retirement for employees who are not possible to move to the provinces ◦ provide unemployment benefits to spouse if he/she quits working due to moving ◦ provide one-stop employment service for unemployed spouses ◦ support tuition fee for employees who have university students ◦ give priority on transference of a spouse if he/she is in public sector

Source: the contents were reconstructed, referring to the homepage of the Ministry of Land, Transport and Maritime Affairs(<http://innocity.mltm.go.kr>)

The expected effects rising from the relocation of public agencies to the provinces are as followed. First, population in the capital region would be stabilized. Distribution of population in the capital region to the provinces due to moving employees of public agencies and their family may contribute to stabilization of population in the capital region. Second, local innovation capability would be improved as a local innovation system can be constructed by cooperation between a corresponding public agency and local universities, industry and research centers. The third effect would be improvement of the quality of local education. It is expected that employment opportunity of local university graduates would be increased and quality of local universities and other educational institutions would be improved. Increased local tax revenues and vitalized local economy can be the fourth effect of the relocation policy. KRIHS² (2004) calculated that 133,000 new jobs are created and approximately KRW 9,300 billion of production value and KRW 4,000 billion of added value could be induced.

The following table shows the summary of public agencies relocation progress.

Table 3. Summary of Public Agencies Relocation Progress

Year	Description of Project Promotion
2003. 6	announced the direction to relocate public agencies to the provinces for balanced national development
2004. 4	prepared the legal basis for 'Relocation of Public Agencies' in the Spatial Act on Balanced National Development

² KRIHS : Korea Research Institute For Human Settlements

2004. 8. 31	announced basic principles and promotion directions for relocation of public agencies
2005 the first half	gathered opinion through reporting to the National Assembly, conversation with unions and public hearings
2005. 5. 27	signed 'Basic Agreement' between the central government and 12 local governors
2005. 6	signed 'Basic Agreement' between the government and unions - signed an agreement between the government and the Federation of Korean Public Industry Trade Unions and the Financial Union under the Federation of Korean Trade Unions (2005.6.21) - signed an agreement between the government and the Public Union under the Korean Confederation of Trade Unions (2005.6.23)
2005. 6. 24	established and announced the 'Public Agencies Relocation Plan' after deliberation in the Cabinet Meeting
2005. 8. 5	established the 'Public Agencies Relocation Team' (Head of Team: vice-minister)
2005. 8. 31	signed 'Basic Implementation Agreement' between the central government, the cities and provinces and public agencies to be relocated
2005. 10. 13	set up 'Conference of Public Agencies Relocation Promotion' consisting of the central government, the cities and provinces and related public agencies
2007. 12. 14	approved the first relocation plan for 28 public agencies
2008. 10. 23	approved the second relocation plan for 13 public agencies
2008. 12. 30	approved the third relocation plan for 27 public agencies
2009. 6. 8	approved the fourth relocation plan for 20 public agencies
2009. 8. 4	approved the fifth relocation plan for 18 public agencies
2009. 10. 26	approved the sixth relocation plan for 11 public agencies
2010. 1. 21	approved the seventh relocation plan for 11 public agencies
2010. 5. 20	approved the eighth relocation plan for 9 public agencies

Source: the innocity homepage of the Ministry of Land, Transport and Maritime Affairs (<http://innocity.mltm.go.kr>)

2. Public Agencies Relocation to the Provinces

The government classified target public agencies into similar functional groups to maximize effects of public agencies relocation to the provinces and planned to relocate a functional group to the same area within a region (MOCT, 2005). According to this principle, the government prepared and announced a direction to select one area in each metropolitan city or province. The area in each metropolitan city or province is called as "Innovation City". This is designed to make the area as a base of specialized local development with innovation and dynamics, in cooperation with industry, universities, research institutions and administrative sector boosted by the relocation of public agencies (Kim, 2006).

There are four concepts of innovation city; the innovation base city to lead local development, the specialized unique city with local theme, and the environment friendly green city that everybody wants to live and the education and culture city with active learning and creative exchange.

Table 4. Concepts of Innovation City Development

1. Innovation Base City Creating Innovation in Cooperation with Industry, Academic, Research and Administrative Sector	2. Specialized Unique City with Local Theme.
<ul style="list-style-type: none"> ◦ Leading local development in connection with public agencies to be relocated and local strategic industry ◦ Creating a new growth engine for local development with a cluster of industry, universities, research institutions and administrative Sector 	<ul style="list-style-type: none"> ◦ Branding local and industrial features of each innovation city ◦ Building a landmark and creating unique images to appeal local identity.
3. Environment Friendly Green City that Everybody Wants to Live	4. Education and Culture City with Active Learning and Creative Exchange
<ul style="list-style-type: none"> ◦ Securing diversity and circulation of the ecosystem with maximum protection of natural geographic features ◦ Constructing sustainable urban space structure and transportation system to save energy and resources 	<ul style="list-style-type: none"> ◦ Preparing excellent educational environment with advanced educational conditions including establishing special purpose high schools ◦ Creating high quality urban culture with live local features and beautiful natural scenery ◦ Constructing u-city with cutting-edge urban management system suitable for the knowledge information era

Source: the homepage of the Ministry of Land, Transport and Maritime Affairs (<http://innocity.mltm.go.kr>)

The expected population in an innovation city is 20-50,000 people. Population inflow to an innovation city in each stage is as followed. In the first stage (2007-2012, the period for the settlement of public agencies to be relocated), it is expected that the population inflow would be 2,500-4,000 people from the direct area including employees of public agencies to be relocated and related companies and 15,000-20,000 people induced by the relocation. During the second stage (2013-2020, the period of settlement of cooperation between industry, universities and research institutions) the population will be increased by 4-8,000 people from private companies, universities and research centers moving to an innovation city and 25-50,000 people induced by such activities. In the third stage (2021-2030, the period of innovation expansion) the number of jobs and population induced by an innovation city may vary depending on the location and size of an innovation city. Development project includes an urban size to accommodate the planned number of population, an area for cluster of industry, universities and research institutions and

reserved lands. However, a city will be developed in moderate or low density with 250-300 persons per a hectare, considering environment.

Locations of innovation cities have been decided according to the evaluation made by the location decision committee in each metropolitan city or province after discussion with the central government, considering effectiveness and equity between areas. The central government constituted the location decision committee in each metropolitan city or province to ensure fairness in deciding a location (2005.9.28). The location decision committee evaluated candidate areas in each metropolitan city or province in accordance with the criteria of decision of innovation city location, decided locations (2005.12.23) and announced the final locations after discussion with the central government. In the 11 metropolitan cities and the provinces excluding the capital region and Daejeon, ten innovation cities are being constructed in the nation as Gwangju and South Jeolla Province decided to built an innovation city jointly.

III. DAEGU INNOVATION CITY: PALGONG INNOVALLEY

1. Project Overview

The Daegu Innovation City is to be constructed around Shinseo-dong, Dong-gu, Daegu. Daegu decided the name of Shinseo innovation city as 'Palgong Innovalley', which combined 'Palgong' from Palgong mountain and Innovation.³ Palgong Innovalley is constructed as 'Knowledge Creating Innovation Brain City', which accommodate 22,392 residents. The project developer is LH(Korea Land & Housing Corporation) and total KRW 1,450 billion is invested including site renovation and compensation expenditure. The project area is 4,216,496 m² accommodating total 7,699 houses and the population density is 55 persons/ha. The project started from April, 2007 and 11 public agencies including KOGAS are going to move to the innovation city by December, 2012.⁴

Figure 1. Location of Daegu Innovation City



³ Daegu Metropolitan City announced that 'Palgong Innovalley' was selected as the best name for the innovation city after 20 days contest starting from 27th October, 2006. (Financial New 7th, December, 2006)

⁴ As of September, 2012, a final base construction is in progress and moving public agencies to the innovation city is delayed because of procedural reason including budget for relocation. Moving-in is going to be completed step by step depending on completion of building construction, beginning with relocation of the Central Physical Examination Center of Military Manpower Administration by the end of 2012. It is expected that all public agencies are moved in after 2014.

2. Status of Public Agencies Relocation

Total 11 public agencies are going to be relocated to the Daegu Innovation City including three industry support agencies (e.g. KEIT), four education and academy support agencies (e.g. KOSAF) and four public support agencies (e.g. NIA)

Table 5. List of Public Agencies to be Relocated to Daegu Innovation City

Functional Group	Name of Agency	Employees to be Moved	Main Responsibilities
Industry Support (3)	KEIT ⁵	200	◦ Planning, evaluating and managing industrial technology development projects
	KODIT ⁶	740	◦ Company credit guarantee, credit investigation, management consultation, credit insurance
	KICC ⁷	133	◦ Managing, selling and renting industrial complex, supporting production activities of companies in the complex
Education & Academy Support (4)	KOSAF ⁸	222	◦ Student Oriented Scholarship (supporting tuition fee)
	KFPP ⁹	58	◦ Funding and operating private schooling promotion fund and lending facility fund to private schools
	KERIS ¹⁰	220	◦ Informatization project for schools and educational administrative institutions
	NEST ¹¹	45	◦ Education and training of public officers
Public Support (4)	NIA ¹²	337	◦ Developing policy related to informatization including electric government project
	KAB ¹³ (Including staff accommodation)	367	◦ Property evaluation, real estate consulting and national and local government compensation consignment
	KOGAS ¹⁴ (including staff accommodation and child care centers)	832	◦ Producing, supplying and importing/exporting natural gas products, constructing and operating a receiving base and supply network
	CPEC ¹⁵	48	◦ Physical examination (for class 5 and 6 people across the nation)

Source: the homepage of Palgong Innovalley (<http://pgiv.tcp.kr/pages/>), modified and supplemented.

⁵ KEIT : Korea Evaluation Institute of Industrial Technology

⁶ KODIT : Korea Credit Guarantee Fund

⁷ KICC : Korea Industrial Complex Corporation

⁸ KOSAF : Korea Student Aid Foundation

⁹ KFPP : Korea Foundation for the Promotion of Private School

¹⁰ KERIS : Korea Education and Research Information Service

¹¹ NEST : National Training Institute of Education, Science and Technology

¹² NIA : National Information Society Agency

¹³ KAB : Korea Appraisal Board

¹⁴ KOGAS : Korea Gas Corporation

¹⁵ CPEC : Central Physical Examination Center of Military Manpower Administration

3. Basic Concept

a. Development Concept

The development concept of the Daegu Innovation City is to make Daegu the center of education, academy and medical industry in the south-east region by accommodating public agencies related to education and academy and connecting them to the High-tech Medical Complex to be constructed as a national project. The development direction focuses on construction of an environment friendly city with conservation of natural environment, a futuristic innovation city connecting public agencies with the High-tech Medical Complex, a complex urban business city combining rest, leisure and culture and an integrated residential city covering a variety of social classes. As a result, five development goals have been decided; Colorful City, Eco City, U City, Edu City and Medi City.

Table 6. Specialization Method by Each Development Goal of Daegu Innovation City

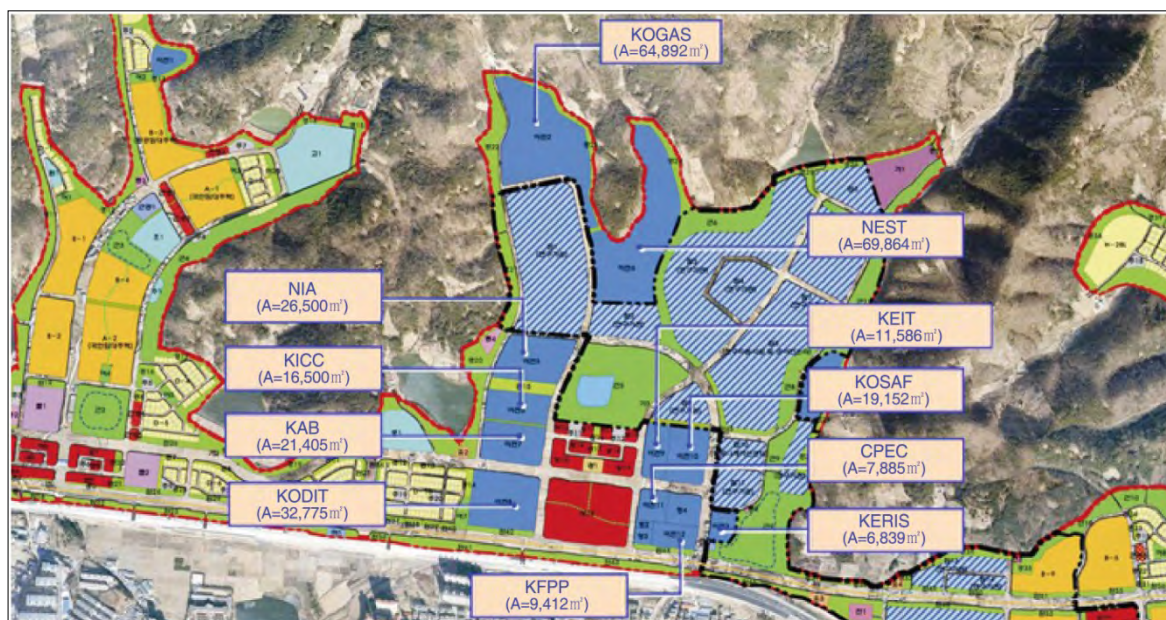
Development Goal	Specialization Method
Colorful City with Differentiated Unique Districts	Colorful city with special and unique features
Eco City with Excellent Ecosystem	Attractive city with harmony of natural and artificial Environment
Intelligent U City	Industrial Activities supporting city to provide opportunity of growth for public agencies to be relocated and local innovators
Edu City to Promoting Educational and Academic Activities	Education and academy promotion city with full of educational and academic activities
Medi City with High-tech Medical Complex	High-tech Medical Complex city as the best global high-tech medical R&D hub in Asia

Source: the homepage of Palgong Innovalley (<http://pgiv.tcp.kr/pages/>)

b. Spatial Schemes

Urban space of the innovation city consists of the innovation cluster district, the commercial and business district, the residential district, the park and recreational district and the urban support facility district. The innovation cluster district is constructed as a hub of three innovation functions; industry support, education and academy support and public support. The commercial and business district is responsible for creating an active and pleasant city center by encouraging commercial activities in connection with existing Daegu city center. The residential district provides environment friendly and pleasant residential complex. The park and recreational district provides forest, reservoir and habitats for animals and plants. Public buildings, educational/cultural/welfare facilities, roads and supply handling faculties are located in the urban support facility district to meet demands of residents for public service.

Figure 2. Location of Daegu Innovation City



IV. GYEONGBUK INNOVATION CITY: GYEONGBUK DREAM VALLEY

1. Project Overview

The Gyeongbuk Innovation City is to be constructed around Nongso-myeon and nam-myeon, Gimcheonsi, Gyeongsangbuk-do. The name of Gyeongsangbuk -do's innovation city is decided as 'Gyeongbuk Dream Valley' through a public naming contest. The project developer is LH(Korea Land & Housing Corporation) and total KRW 8 billion is invested including site renovation and compensation expenditure.

The project area is 3,815,131 m² accommodating total 10,486 houses and 26,169 population and the population density is 65 persons/ha. The project started from March, 2007 and 12 public agencies involved in road and traffic, agricultural technology innovation and electric technology are going to move to the innovation city by December, 2012.¹⁶

¹⁶ For the Gyeongbuk Innovation City, the final base construction work is also in progress, as of September 2012. Moving-in of the public agencies is much delayed because of procedural reasons including budget, compared to the original plan.

Figure 3. Location Layout of Public Agencies to be relocated to Gyeongbuk Innovation City

2. Status of Public Agencies Relocation

Total 12 public agencies are going to be relocated to the Gyeongbuk Innovation City including three road and traffic agencies (e.g. KEC, TS and KCM), three agricultural technology support agencies (e.g. NAQS, QIA and KSVS) and six public agencies from other functional groups (e.g. KEPCO E&C).

Table 7. List of Public Agencies to be Relocated to Gyeongbuk Innovation City

Functional Group	Name of Agency	Employees to be Moved	Main Responsibilities
Road and Traffic (3)	KEC ¹⁷	1,046	◦ Constructing, expanding and maintaining express ways and building and managing driver convenience facilities
	KCM ¹⁸	125	◦ Performing comprehensive construction supervision and engineering service and quality inspection and managing construction project
	TS ¹⁹	318	◦ Enhancing promotion of accident prevention and testing and researching car performance
Agriculture Support	NAQS ²⁰	150	◦ Inspecting safety of agricultural products and managing product quality

¹⁷ KEC : Korea Expressway Corporation

¹⁸ KCM : Korea Construction Management Corporation

¹⁹ TS : Korea Transportation Safety Authority

²⁰ NAQS : National Agricultural Products Quality Management Service

(3)	QIA ²¹	516	◦ Quarantining importing and exporting agricultural products and plants and researching animal health
	KSVS ²²	93	◦ Distributing plant seeds and approving patents related to new species
Energy and Others (6)	KEPCO E&C ²³	2,494	◦ Designing nuclear and other power plants
	KMA MRTS ²⁴	9	◦ Providing weather information service
	PPS ²⁵	83	◦ Distributing supplies to other public agencies
	SCO ²⁶	110	◦ Constructing post offices and selling stamps
	KRA ²⁷	24	◦ Supporting released convicts for social adjustment
	KLAC ²⁸	92	◦ Free law consultation and legal agent of civil, criminal and administrative litigation

Source: the homepage of Gyeongbuk's dream valley (<http://dreamv.gb.go.kr>). Modified and supplemented.

3. Basic Concept

a. Development Concept

The vision of the Gyeongbuk Innovation City is 'Dream Valley in the 21st Century'. The four goals to achieve the vision are set as 'the hub city of Gyeongbuk looking at the future (Core)', 'the best innovation cluster in Gyeongbuk (Change)', 'the city creating dream and the nature (Creation)' and 'the upgraded city for development (Growth)'. The urban space roughly consists of the Industry, University and Research Institution cooperation district, the innovation district and the residential district in accordance with three ideas (Change, Creation and Growth).

²¹ QIA : Animal, Plant and Fisheries Quarantine and Inspection Agency

²² KSVS : Korea Seed & Variety Service

²³ KEPCO E&C : KEPCO(Korea Electric Power Corporation) Engineering & Construction Company, INC

²⁴ KMA MRTS : Korea Meteorological Administration Meteorological Radio Transmission Station

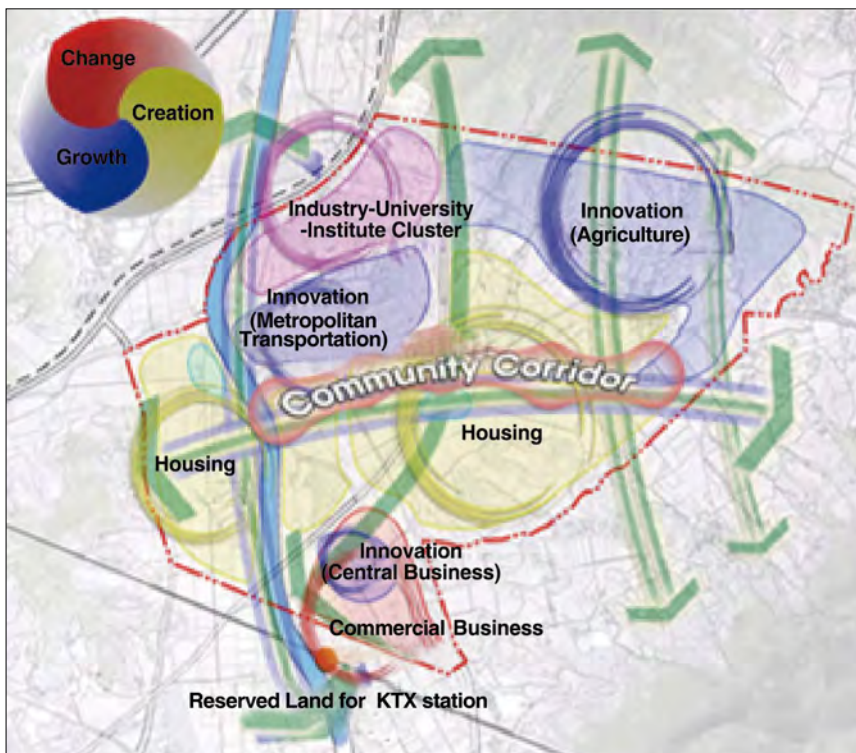
²⁵ PPS : Public Procurement Service

²⁶ SCO : Supply and Construction Office of Korea Post

²⁷ KRA : Korea Rehabilitation Agency

²⁸ KLAC : Korea Legal Aid Corporation

Figure 4. Development Concept of Gyeongbuk Innovation City



b. Spatial Schemes

The urban space of the Gyeongbuk Innovation City can be divided into 5 districts; the innovation cluster district(27.0%), the commercial and business district(4.0%), the residential district(20.6%), the park and recreational district (26.1%) and the urban support facility district (21.3%). The innovation cluster district is constructed as the center point of innovation activities including an innovation support center, education and research facilities and a venture company support centers. The commercial and business district has big physical distribution centers connecting to KTX and other life support functions. The residential district provides pleasant living environment. The park and recreational district focuses on construction of a green core in the complex and eco-friendly living area in connection to pedestrian network.

Figure 5. Location Layout of Public Agencies to be Relocated to Gyeongbuk Innovation City

V. PERSPECTIVE AND PROBLEMS

The success on the relocation of public agencies to the provinces and construction of innovation cities are depending on compliance with the schedule and formation of Industry, University and Research Institution cooperation cluster. Since Lee Myeong-Bak administration has been launched in 2008, the relocation of public agencies to the provinces are being delayed due to policy changes in advancement of public agencies. According to the original plan, relocation of public agencies is completed and the first stage of innovation city construction by the end of 2012. However, as of September, 2012, site reconstruction, land compensation and sales are not completed yet and it is expected that there is two year delay, compared to the original plan.

Construction of the innovation city in Daegu and Gyeongbuk is slower than that in other provinces. Especially, progress of Gyeongbuk Innovation City is very slow in term of purchasing a site, designing a building and starting construction, as well as forming the innovation cluster, compared to Daegu. On the other hand, Daegu Innovation City has advantages on settlement of employees of public agencies, attraction of companies and connection with innovators as it is located in the urban area of Daegu. However, functional connection to existing urban area is limited for Gyeongbuk Innovation City because Gimcheon, which is the mother city of the innovation city, is a small city. In addition, The formation of innovation cluster in Daegu Innovation City can be accelerated as the high tech medical complex and the brain research center are moved to the innovation city and it has been designated as the free economic zone and the special R&D district. On the other hand, it is expected that the Gyeongbuk Innovation City may have difficulties in forming Industry, University and Research Institution cooperation cluster

because there are no significant additional policy factors except for construction of KTX Gimcheon-Gumi station.

It is necessary that the central government and local governments make more efforts to promote balanced national development with the relocation of public agencies. The spatial policy of the next government that will be launched in 2013 should include the balanced national development policy of Rho Moo-Hyun Government and the macroeconomic region policy of Lee Myeong-Bak Government. With this, the next government should finish moving public agencies to the innovation city earlier and strengthen policy support to construct the innovation cluster. Daegu and Gyeongbuk are also required to make their best efforts to settle public agencies in the innovation city as soon as possible. It is time for a local government to actively involved in the innovation city project, considering that construction progress of the innovation city in Daegu and Gyeongbuk is delayed compared to average construction progress of other provinces and the Gyeongbuk Innovation City is especially delayed in terms of purchasing a site, designing a building and starting construction.

Problems solved by Daegu and Gyeongbuk are different in forming the Industry, University and Research Institution cooperation cluster. For the Daegu Innovation City, it is necessary to find how to connect and create synergy effect between national projects including the High-tech Medical Complex, the brain research center, the free economic zone and the special R&D district and the innovation city. On the other hand, the Gyeongbuk Innovation City needs to prepare development methods from various points of view. First, policy measures to prevent Gimcheon, the mother city, from Doughnut Phenomenon are necessary. Second, a strategy to connect to near city such as Gumi and Daegu should be prepared as there are lack of innovative institutions including universities, companies and research centers in Gimcheon. Third, to maximize use of the KTX station as the core infrastructure, a macro transportation network should be expanded surrounding the KTX station. During this process, construction of a cooperation system with Gyeongsanbukdo is the key element for success of the project.

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SUMMARIES AND PROSPECTS



This report presents research and analysis on urban and regional planning and development with a focus on the cases of the Southern California region in the United States and the Daegu-Gyeongbuk region in Korea. This report is composed of three parts: (1) metropolitan growth and local cooperation, (2) urban development and participatory planning, and (3) local responses to climate change and balanced development. Each part contains five papers. Summaries and prospects of papers on different subjects will then be presented.

Part 1. METROPOLITAN GROWTH AND LOCAL COOPERATION

Twenty Years of Regional Planning and Collaboration in Southern California

The American planning system has evolved within a decentralized and fragmented political framework. Suburbanization has continued to cross local jurisdictional boundaries. Metropolitan areas are formed and developed. Transportation congestion and air pollution are interrelated and need to be addressed on a regional level. Current regional (metropolitan) planning in the United States is the by-product of the intergovernmental planning coordination efforts of the U.S. Congress and other governments on regional issues. Regional planning has changed significantly due to three major regional, state, and federal programs and initiatives (i.e., 1991 ISTEA, Regional Blueprint Program, and SB 375) that have been adopted over the past twenty years.

The purpose of this study is to review the regional planning and collaboration efforts of the Southern California Association of Governments (SCAG) over the last twenty years. This study discusses three major aspects of regional planning and collaboration efforts: SCAG's role and responsibility; collaborative framework; and integration of plans and programs. The findings of the study are summarized as follows: First, SCAG's regional planning process has become more collaborative and participatory by enhancing the cooperation between SCAG, the state government, other regional agencies, and local governments, and by emphasizing region-wide public participation. Second, SCAG has become more representative and accountable by increasing the number of regional council members and by actively participating in major decisions. The plan has become more realistic by being financially constrained. Third, SCAG has moved toward an integrated planning process. The efficacy of regional planning was promoted by properly linking long range plans with short range TIPs, by introducing visionary perspectives and alternative scenarios, and by integrating transportation and land use. In particular, growth forecasting and growth visioning played an important role in providing a possible solution to the regional transportation, air quality, and related regional issues. Finally, SCAG has enhanced its role in the regional planning, programming and implementation process. Federal involvement and requirements (i.e., ISTEA) have bolstered the otherwise limited or absent regional role. New state initiatives (i.e., SB 375) further enhanced the role of SCAG in developing and implementing the consensus RTP/SCS.

The SCAG Compass Blueprint Demonstration Projects program is a good example of SCAG's new role in the RTP/SCS implementation process. SCAG initiated the Compass Blueprint Demonstration Projects program to support local efforts to seek and implement creative, forward-thinking and sustainable development strategies that fit local needs and support shared regional values. The Compass Blueprint's primary focus is to provide custom planning tools and services to local governments and stakeholders. SCAG's Demonstration Projects program has partnered with more than 130 SCAG member jurisdictions on planning efforts that address local priorities and advance the regional vision of mobility, livability, prosperity and sustainability. Through these projects, SCAG provides free consultant services and sophisticated planning tools.

Economic Recession and Regional Population Projections

Population projections play a key role in determining future community needs including housing and transportation in a regional planning context. The assumptions of the existing population projections have become questionable due to the recent economic recession and the related economic uncertainty in the near future. The traditional long term perspective, which might not reflect the on-going economic trends and the frequently updated short term economic forecast, might result in a serious bias of the short term population projections.

Using the recent experience of the Southern California Association of Governments (SCAG) in developing regional population projections, the study analyzes the sources of projection errors: 1) the unstable/uncertain nature of the key economic-demographic assumptions, in particular, unemployment rate and migration in the short term framework; 2) the currency and reasonableness of population projections (and assumptions) by the US Census Bureau and the CA Department of Finance (DOF); 3) a lack of relevant statistical data in a timely manner; and 4) the significant gap in population estimates between the US Census Bureau and the CA DOF.

The study discusses two primary ways of addressing projection errors and challenges. First, the first major challenge is to develop the reasonable short term economic prospects for job growth, unemployment rate, and population growth. A range of the short term economic outlooks (e.g., job growth rate, unemployment rate) could be identified from a list of economic forecasts, a panel of experts meeting, and expert interviews. Second, there is a need to reassess the traditional top down approach and to promote the bottom up approach. The regional planning agencies might need to be selective in using and creative in interpreting the forces underlying the current economic recession and demographic changes. The regionally based bottom up demographic assumptions and projections might be the better practice because they can reflect the more realistic trend and short term outlook than the pure top down approach based on demographic assumptions and projections.

The study identifies the future challenges in a regional planning framework. First, SCAG is required to meet diverse federal and state planning and regulatory requirements (e.g., currency,

consistency) for developing reasonable regional population projections. Second, SCAG should promote public involvement and participation during the population projection process, while maintaining the accuracy of the regional population projections. Both promoting the active public involvement and maintaining the accuracy of the regional population projections are not separate but integrated planning goals in a regional planning framework.

Cooperative Planning between Local Governments

City and regional areas expand their scope and function in the process of development, which can cause conurbation. This is a phenomenon occurring within the administrative district of one local government, but it also appears over a broad area between two or more local governments. For that reason, collaborative planning between local governments is required in the plan for national territory. Currently there exists extensive town planning which is a plan established through mutual cooperation between two or more local governments. The mutual cooperation between local governments in extensive town planning comes into existence only if there are 2 or more neighboring local governments, and such united administration unit is called an 'Extensive planning area'.

Extensive town planning in the Daegu area has been established only for Daegu Metropolitan City and seven neighboring Si/Gun (Gyeongsan-si, Yeongcheon-si, Chilgok-gun, Goryeong-gun, Seongju-gun, and Cheongdo-gun). The total population of the target Si/Guns is about 3.13 million, and the gross area amounts to 4,977.4 km². The planning includes various field plans on the rank and functions between cities in the area, extensive land use, transportation, environment, green fields for leisure, and city facilities.

However, it is pointed out that the response is insufficient regarding a trend of becoming an extensive area because of planning for administrative district in the extensive planning area setup. In addition, there is a lack of concern in terms of growth management to start a communication between local governments including inappropriate allocation of infrastructure in an extensive area and recurrent investments in urban infrastructure. The planning shows its limit to be downgraded to a regulation tool for a limited development district since it focuses on regulation on the district. It is considered that such limit of extensive town planning will be settled gradually by modifying a legal basis or improving the system.

Mutual collaborative planning between Si/Gun and big cities such as extensive town planning is one of the alternatives to solve the issues including settlement of conflicting interests between local governments, strengthening capacity for local self-reliance by overcoming the strong and weak points of local governments, and efficient resource allocation between the regions. This will help to actualize the coexistent local development and local competitiveness improvement.

Promotion of Daegu Metropolitan Regional Transportation Plan

Transportation demands in metropolitan areas have consistently increased as metropolitan living areas have been enlarged due to new town development that has occurred since 1990, which has caused transportation problems in the metropolitan areas. As a result, the central government established the 'Metropolitan transportation Master Plan for the Metropolitan Area' as a 20 year official plan to efficiently solve metropolitan transportation problems. Metropolitan transportation master plan for the metropolitan area(2007~2026) aims to solve transportation problems, and to provide a vision for the future direction of metropolitan transportation for national balanced development based on the organic connection between the national and local government plans in accordance with special act on metropolitan transportation management for the metropolitan area. The Minister of Land, Transport and Maritime Affairs is the main agent for the planning; and the capital areas (Seoul Metropolitan City, Incheon Metropolitan City, and Gyeonggi-do) and the regional areas (Busan·Ulsan area, Daegu area, Gwangju area, and Daejeon area) are set for the spatial scope of the plan. The plan is developed and notified through discussion with heads of relevant local governments.

In the Daegu area, a total of 3 lines (62km extension) of the railway system including the urban railway extension of Line No. 2 and a double-track electrification project are scheduled to be constructed as part of a metropolitan public transportation network promotion project. A total of 5 lines (220km) including the Geumhogang highway were constructed as part of a metropolitan highway system promotion project. Traffic demand management, metropolitan public transportation information offering, and metropolitan traffic administration system construction are scheduled in terms of metropolitan transportation facilities operation. In 2012, five years after the beginning of the planning period, the metropolitan public transportation network construction project goes well as planned, which results from the strong support and will of the central government according to the political base of environment-friendly green growth. However, the metropolitan highway system construction project has not gone well because of lack of government supported expenditures in comparison with the metropolitan public transportation network construction. The metropolitan transportation facilities operation project has only achieved successful results on metropolitan public transportation information offering among the three plans due to its active promotion.

The smooth promotion of the metropolitan transportation project depends on securing government subsidies. This is because local tax revenue is low and the financial independence ratio of regions in the country is very low. Therefore, the need to seek a solution to raise different sources of revenue and to increase the ratio of state coffers on finances for metropolitan transportation facilities is the key in order to push forward smoothly the metropolitan transportation project in the future.

The Strategy for Regional Industry Development of Daegyeong Economic Region

The government-led regional industrial policy has been promoted to revitalize the regional economy by expanding the industrial foundation and creating more jobs since local autonomy was launched in 1990. However, the regional industry policy was also reshuffled into the metropolitan area oriented policy which can achieve economies of scale since the importance of the region, which is a new political and economic activity unit, has increased in the age of globalization. The Lee Myung-bak administration in 2008 introduced the concept of Economic Region which maximizes the connective cooperation between regions by overcoming problems in the existing uncoordinated support to the regions and industries.

12 leading industries and 20 projects were confirmed and pushed forward in 6 Economic Regions except the capital area through the leading industry policy in Daegyeong Economic Region. The policy aims at promoting future new growth engine industries of the region and creating quality jobs by fostering outstanding enterprises. In terms of each Economic Region, Daegyeong region selected green energy and the IT convergence industry; the Chungcheong region selected New IT and Red Biotechnology; the Honam region selected New Regeneration Energy and environment friendly materials and components; and the Dongnam region selected transportation machines and fusion materials and components as leading industries, respectively.

However, as the leading industry policy in Economic Region has also been pushed forward without any effort to solve the problems in the strategic industry of participatory government, it has produced problems. These problems include the absence of comprehensive control power to take charge of the regional industry policy; and the insufficiency of organic cooperation between different agencies to promote regional industry. To solve these problems, it is necessary to follow these directions. First, it is necessary to set clear medium and long term visions of the leading industry policy in Daegyeong Economic Region. Second, further consideration on regional industry policy is necessary from the overall viewpoint of the ecosystem in order for regional industry to foster self-sustainable competitiveness in the global market for the era of globalization, convergence, and knowledge industrialization. Finally, the autonomy and responsibility of each local government should be reinforced to promote the regional industry policy. To achieve this, the Daegyeong Regional Development Committee and Leading Industry Development in the Daegyeong Economic Region should be integrated to expand their power into deliberation and executive functions as well as the existing evaluation function.

Part 2. URBAN DEVELOPMENT AND PARTICIPATORY PLANNING

5th Cycle Regional Housing Needs Assessment

California housing element law requires that the California Department of Housing and Community Development (HCD) quantify regional housing needs, and the Council of Governments (COG) allocate the region's share of the statewide need to cities and counties within their region.

The regional housing needs assessment (RHNA) allocation process establishes minimum housing development capacity that cities and counties are to make available through their land use powers to accommodate growth within a short-term planning period. RHNA numbers are assigned by four income categories as guideposts for each community to develop a mix of housing types for all economic segments of the population.

This study explores how the Southern California Association of Governments (SCAG) developed its 5th cycle RHNA allocation plan, January 1, 2014-October 1, 2021, for 191 cities and 6 counties in the SCAG region. This study reviews the SCAG approach toward developing the key elements of the RHNA allocation plan: process, methodologies, and social equity policy.

This study identifies three creative and innovative approaches toward a successful RHNA outcome. First, SCAG used the BULA (Balance, Uncertainty, Latest, and Adaptive) approach toward developing the regional growth forecasts to lower the potential projection error. The regular update of the short term forecast through expert opinion was very effective, and the local input approach for local growth projections was also found to make a significant contribution to the successful RHNA allocation. Second, credits for excess vacant housing units from the existing housing stock and the absorption level of excess housing units into the healthy market vacant units were made available to reflect uncertain housing markets. The short term economic outlook played an important role in determining the absorption level of the existing excess vacant units into the normal vacant housing unit category. Third, the reasonable replacement allowance rate of the projected housing needs was made available during the RHNA projection period reflecting 10 year housing unit losses for the period of January 2001 to January 2011 from the DOF database and the SCAG demolition survey. The new replacement rate was 0.5% (0.06% on an annual basis) of the projected housing needs, rather than 0.2% of an annual replacement rate used in the 4th cycle RHNA process.

The study lists some emerging urban and housing issues for future research as they are related to the RHNA program. They include job housing imbalance and inter-regional collaboration, fair share and transportation efficiency, gentrification, and public health. The study also emphasizes the importance of measuring progress. In conclusion, preparing a Regional Housing Needs Assessment under California law requires an extensive and very fragile fair share planning process that is not well received locally, but is very important to the social and economic well-being of the State. Making fair share planning real rather than conceptual will take more than unwieldy administrative requirements in law; or threats of lawsuits and suspensions of permitting authority locally; it will take a collaborative input process between state and local governments with the acknowledgement that real incentives are needed, and that high goals deserve a commensurate commitment by the State of California to provide funding and much more flexibility in the Fair Share Process.

Regional Planning and Public Participation

Public participation is an essential component of the regional planning process. Meaningful public participation can provide Metropolitan Planning Organizations (MPOs) with critical information to better understand and address community concerns and needs more effectively and comprehensively. It can also afford stakeholders the opportunity to better understand issues and impacts associated with regional planning and to influence decisions that may affect their lives. To increase public participation and enhance collaboration between residents, state agencies, and local agencies in regional planning processes, a number of public engagement requirements have been instituted under federal and state laws. In compliance with federal and state requirements, the Southern California Association of Governments (SCAG), as MPO for the Southern California region, developed a wide variety of public participation and outreach strategies in preparation for the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (2012-2035 RTP/SCS).

This study provides the background information on federal and state requirements for public participation and SCAG's public participation plan and programs. First, it explores the federal and state legislation on public participation in the regional planning process, such as Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Title VI of the Civil Rights Act of 1964 (Title VI), and California Senate Bill 375 (SB 375). It also discusses SCAG's public participation plan and key strategies for public participation and outreach that SCAG developed in preparation for the 2012-2035 RTP/SCS. It provides various resources on public participation techniques, guidance, and best practices in the United States. This study finds that SCAG successfully developed its public participation plan and programs to ensure that the various stakeholders have a reasonable opportunity to be involved in the 2012-2035 RTP/SCS planning process. SCAG maintained extensive outreach efforts to solicit comments and feedback from stakeholders and other interested parties in the SCAG region to engage in updating the Public Participation Plan and its specific 2012-2035 RTP/SCS strategies, procedures and techniques. In addition to traditional public participation methods and techniques, SCAG utilized new techniques, including, but not limited to, video conference, teleconference, internet and social media to enhance the effectiveness of the outreach efforts.

In conclusion, the awareness and involvement of interested persons are critical to successful regional planning. The feedback from the public in the planning process helps assure that plans and projects address community needs. At the same time, the public gains a better understanding of the benefits and burdens associated with regional planning. SCAG has developed its public participation plan and programs as guidance for the continuing, comprehensive and coordinated regional planning process among stakeholders. In order to improve and enhance its outreach efforts, it is essential for SCAG to constantly evaluate the public participation strategies and approaches and to provide recommended strategies to better serve the underrepresented segments of the region.

Operation and Performance Management of Local Public Enterprises in Daegu and Gyeongbuk

Local government efficiently performs various projects to meet the demand of residents by establishing a local public enterprise reflecting administrative agency and private enterprise as a kind of agency. Agency management act as the main agents of ownership-management-supervision in the different governance structure, which means local government owns and supervises while the local public agency manages which is critical for management efficiency. Performance management through the management evaluation for local public enterprises is an important issue with regard to evaluating the efficiency of public service provision which influences the promotion of residents' welfare and has considerable influence on local finance in terms of profitability.

The importance of the management evaluation system for local public enterprises has increased as the role and scale of local public enterprises has expanded since its start for local public sector development project in 1991. Management evaluation for local public enterprises has performed a role in proposing the desirable management direction which local public enterprises should push forward through the objective measurement and evaluation on their management-wide performance. There are 306 local public enterprises which receive management evaluation conducted by the Ministry of Public Administration and Security throughout the country, and 36 out of them are located in Daegu and Gyeongbuk. Based on the results of management evaluation, the enterprises which show excellent business records are provided incentives while the enterprises which have recorded deficits for consecutive years are liquidated.

It is forecast that the effect of efficient management of local public enterprises on local finance and residents' welfare will also be expanded since the cases that public enterprises conduct large scale policy projects of central or local governments have increased. To manage local public enterprises efficiently, the management evaluation system should be supplemented and improved as a performance management tool.

A Case Review of Public Participation Urban School in Town Planning for Training Residents Leaders at Daegu

Interest in resident participation has been growing in town planning, but it is regarded as a rite of passage. For now, it is difficult to adopt public participation in town planning since most residents lack expertise and have no experience in the town planning process and design methods. Public Participation Urban School has been considered and introduced as a residents' ability strengthening program regarding town planning and design process for that reason.

Public Participation Urban School of Daegu is a short-term education program for residents concerning urban design and regeneration to help residents plan and develop projects regarding community building for themselves, and the 4th Public Participation Urban School was held in

2012. The Public Participation Urban School is composed of school operators and involved students (the number of residents were 64 out of 94 participants for the 4th program and 88% of them completed). Involved students consisted of representatives of local residents, hands-on staff involved in village improvement, and public officials. The programs of Urban School were carried out for 8 weeks, which included field investigation of the target area, exploring the cases of other regions, drawing up a plan, and lectures on theory.

The results suggested from Urban School for the past 4 years have brought positive effects from the pilot project contest from the nation and others, and the courses of Urban School paved the way to broaden residents' understanding on town planning for the city and village. It is expected that these results will be the foundation for expanding residents' positive participation in city-related policy enforcement and project progress of Daegu.

Residents' interest and participation in Public Participation Urban School have been increasing with each program. To establish residents-led community building, there must be efforts for the follow-up management of Urban School including more support from the public to the Urban School management, continuous management of participants, and re-education.

Construction of the Gyeongsangbuk-do New Provincial Capital

Do, which is regional local government, plays a pivotal role in providing regional local public service and supporting the development of each local government in its administrative district. Therefore, the location of the seat of the provincial office is critical to improve the convenience of regional administration. Discordance between the seat of an administrative agency and its jurisdiction will be an obstacle to creating the sense of unity between local residents, providing self-governing administration and administrative service, and improving the development and status of the region.

Several reforms of the local administrative system have taken place in Korea based on the high growth of the economy since the early 1980s, and in the process of such movement, Gyeongsangbuk-do was detached from Daegu-si in 1981. As a result, the seat of Gyeongsangbuk-do provincial office has been located in Daegu-si which is the other administrative district, and could not avoid suffering in a number of administrative, economic and social aspects since its jurisdiction is not consistent with its location. To solve this problem, Gyeongsangbuk-do has decided to move its provincial office to its jurisdiction in 2008 and is in the process of promoting new town construction for provincial office relocation by 2014.

The new town for Gyeongsangbuk-do provincial office relocation will be constructed in an area of 10.96 km² in Pungcheon-myeon, Andong-si and Homyeong-myeon, Yecheon-gun, aiming to make it a masterpiece city with a population of one hundred thousand for 20 years since 2008. The new town construction aims at a sustainable growing city which possesses the best technology

available with the most Korean style so that the nature, history, culture, and ecology are well blended to be designated as World Heritage after thousand years. Gyeongsangbuk-do provincial office relocation will add Andong in the northern area of Gyeongbuk to the current development axis concentrated in the southern area such as Daegu, Gumi, and Pohang, which will lead to reorganization of the development axis with 4 regions.

It is expected that the new town for Gyeongsangbuk-do provincial office relocation will become the cornerstone of promoting the regional growth and balanced development as a new base on the central axis of future regional development as well as a central space for regional local administration.

Part 3. LOCAL RESPONSES TO CLIMATE CHANGE AND BALANCED DEVELOPMENT

Greenhouse Gas (GHG) Emissions and Transportation in Southern California: Challenges and Responses

With the passage of SB 375, Metropolitan Planning Organizations (MPOs) in California are now required to develop a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan (RTP) to reduce Greenhouse Gas (GHG) emissions. SB 375 contains a new planning and implementation framework for GHG emission reduction. That framework includes SCS development, the collaborative process, the regional approach, integration of plans and programs, financial incentives and regulatory relief.

The paper assesses how SB 375 changes the existing way of developing SCAG's regional plan to achieve the regional GHG emissions target. The paper finds that SCAG successfully went through the RTP/SCS planning process meeting federal and state requirements. The planning success might be related to the direct linkage of a state required SCS to the federally mandated RTP. The bottom-up, collaborative, regional, and incremental approach has played a role in successful GHG emission target setting and RTP/SCS planning for SB 375 implementation. With the introduction of SB 375, SCAG enhanced the vertical and horizontal linkage of regional planning agencies and other state and interested stakeholders, strengthened the linkage of different plans and programs, and expanded the modeling capabilities by enhancing the existing transportation demand model and developing new models and tools (e.g., local sustainability planning tool (LSPT), production, exchange, and consumption allocation system (PECAS) model).

While SCAG makes an effort to assist local jurisdictions in implementing SCS, effective SCS implementation is a challenging task due to a lack of well-designed incentives for SCS implementation. A limited amount of financial funding will limit the effectiveness of SB 375 implementation. Although federal funding might be linked to HQTAs in SB 375, it is not sufficient to promote TOD as a major GHG emissions reductions strategy. Additional funding would be needed from the state, but financial incentives from the state for TOD would be

unavailable during a period of economic recession. Financial incentives and regulatory relief should be made available for the effective implementation of TOD through the SCS, and will play a vital role in determining the success of SB 375 implementation.

Environmental Justice in Regional Planning

Environmental Justice is about equal and fair access to a healthy environment for all people regardless of race, ethnicity, gender, or income. Metropolitan planning organizations (MPOs) in the U.S. have incorporated Environmental Justice principles into their regional transportation plans to assess the impacts of their programs and projects on minority and low-income populations in compliance with federal and state anti-discrimination law. As the MPO for the Southern California region, the Southern California Association of Governments (SCAG) developed its Environmental Justice policy and program in preparation for the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (2012-2035 RTP/SCS) to address and examine Environmental Justice issues and concerns.

This study provides the background information on Environmental Justice and explores SCAG's environmental policy and programs. First, it discusses the concept and principles of Environmental Justice and explores the federal and state legislation and guidance on Environmental Justice. The study also discusses the Environmental Justice policy and program that SCAG developed in preparation for the 2012-2035 RTP/SCS. In addition, it examines the Environmental Justice implications of major truck movement systems, using a case study of Southern California. This study finds that SCAG successfully developed its Environmental Justice policy and program to ensure that minority and low-income populations have an equitable opportunity to participate in the decision making process and that they receive an equitable distribution/share of benefits and burdens from programs and projects included in the 2012-2035 RTP/SCS. SCAG conducted extensive public outreach to prioritize and address needs in the region, identified performance measures to analyze social and environmental equity and to address the impacts of the 2012–2035 RTP/SCS on various Environmental Justice population groups, and developed a toolbox of potential mitigation measures to present optional mitigation recommendations.

In conclusion, the provisions of Title VI, Executive Order 12989, and other statutes and guidance on Environmental Justice have affected many components of the MPO's regional planning process. It is the MPO's role to ensure that diverse stakeholders are involved throughout the planning process and to develop a wide variety of tools and processes to facilitate the interaction between the agency and stakeholders during the decision making process. While SCAG successfully developed its Environmental Justice policy and program, there are many policy areas that may present future challenges and are of interest for further research, given the anticipated growth and dynamic nature of the SCAG region.

Climate Change Responding Plan of Daegu Metropolitan City

Since global warming is accelerating all over the world, there has been considerable damage due to abnormal climate change. To cope with the global warming that is occurring worldwide, UN adopted 「United Nations Framework Convention on Climate Change (UNFCCC)」 in 1992 and attracts voluntary participation at the national level including sustainable development and greenhouse gas reduction by operating the International Panel on Climate Change (IPCC).

Our government proposed the new national paradigm, 'low-carbon green growth', in 2008. In addition, the government established the comprehensive plan on climate change response, the national adaptation comprehensive plan on climate change, the green growth strategy, and the five-year plan for green growth(2009~2013) to actively cope with climate change. It also demands a strategy for reduction goal achievement from each local government, setting a national mid-term goal to reduce greenhouse gas emissions by 30% against the Business As Usual (BAU) in order to meet the policy of UN IPCC and worldwide climate changes.

Daegu Metropolitan City established a response plan on climate change at the regional level to achieve the scheduled amount of greenhouse gas reduction and the national keynote of climate change. First, the goal was subdivided into energy, agriculture/forestry and land use, waste, and green life depending on current regional characteristics, and emission quantity of each sector was expected. To achieve the scheduled amount of greenhouse gas reduction, Daegu proposed five strategies to implement according to annual performance plan as follows: reducing oil dependence and achieving energy independence, making cities green by absorbing carbon, systematizing resource circulation type cities, green life practice advancement, and climate change adaptation advancement.

To enhance the effectiveness of the Daegu city's response plan on climate change, performance assessment on the annual practice plan is required and the plan needs to be adjusted to reflect varying environmental conditions. It is also required that education and public relations actively attempt to change environmental awareness and the consumption pattern of citizens which are the primary causes of greenhouse gas emissions in Daegu area.

Change of Governmental Policy for Nakdong River and Nakdong River Restoration Project

The conventional river policy originally started as a water use policy which allows human beings to take advantage of the river by conquering the river, and has been changed to the flood control policy which aims to protect human beings from disasters by controlling the river. However, nature-friendly river policy was introduced since artificial methods appeared to be the problem and had limits. Nevertheless, a piecemeal approach to water use, flood control, and environment in terms of the river policy has continued, so that there has not been a fundamental solution.

Environmental crises such as disturbing the ecosystem and meteorological disasters caused by climate change are emerging as global issues in this situation. Accordingly, the government suggested 'low carbon and green growth' as the nation's vision toward the next 60 years. Green growth is a new paradigm combining environment and growth which are directly-opposed ideas, and at the same time a national policy to create more jobs and new growth engines by blending the existing industry with environment related technology industry.

Green growth has been applied to various fields, and the river policy was also established based on it. For this reason, the river policy which has been focused on flood control has changed into the policy managing flood control, water use, the environment, and ecosystem syntagmatically and adding the concept of regional development, which led to the Nakdong river restoration project. The Nakdong river restoration project is a policy that aims to manage ecological restoration, waterfront vitalization, and regional development as well as water use and flood control syntagmatically based on building multifunctional dammed pools, dredging channels, and creating waterfront spaces.

Appropriate maintenance measures are required since the Nakdong river restoration project has many problematic components caused by haste to complete every project in the short term even though it achieved the desired results in many ways such as water use, flood control, ecosystem, and regional development. It is also forecast that short term complementary measures and other projects in the medium to longer term through careful review from various angles will be required.

Relocation of Public Agencies to the Provinces and Construction of Innovation City

Korea has achieved remarkable economic development by pushing forward the state centered intensive economic growth strategy since the 1960s. However, this political base led to unbalanced development and polarization of the country which is biased towards the capital region. Relocation of public institutions is a typical national balanced development policy which aims to resolve overconcentration of the capital region by relocating public institutions in the capital area to other regions in accordance with 'Special Act on Balanced National Development'. Construction of innovation city is a national project to create growth poles in 10 areas throughout the country with relocation of public institutions and at the same time it is a development strategy of new town based on Decentralized Concentration method.

148 out of 345 public institutions in the capital area will be relocated, and 114 among them will be classified into the equivalent function group to be relocated to innovation cities all over the country. 11 institutions are scheduled to be moved to the innovation city in Daegu including educational and research support institutions, while 12 institutions will go to the innovation city in Gyeongbuk including road traffic support institutions. With this momentum, it is expected that Daegu and Gyeongbuk can become a foothold for knowledge production and metropolitan transportation. However, personal magnetism is not strong enough to create clusters since there

are not many affiliated organizations of public institutions to be relocated to innovation cities and relevant enterprises have difficulty in relocating accompanied by institutions. Promotion on the construction of innovation city project is behind schedule throughout the nation. The construction of innovation cities in Daegu and Gyeongbuk is also expected to be behind schedule due to the construction of the sites and relocation procedures depending on the institutions.

It is the time to require proactive efforts of central and local governments. The Innovation city in Daegu, which is easy to create clusters since it is located in a big city, has to seek ways to elevate the synergy in connection with national projects such as multi-functional high-tech medical complexes, Institute of the Brain, free economic zone, and special R&D zone. Innovation city in Gyeongbuk, on the other hand, has to strengthen innovative competence necessary to create clusters by making a connection with neighboring big cities in coordination with the efforts of the mother city to overcome the inner city decline since it is connected to Gimcheon, the small and medium-sized city. In addition, efforts to expand the connected traffic network around a wide area are required to maximize the utilization of the KTX station.

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