# 13. Seoul, Korea

Miree Byun, Chang Yi, Mook Han Kim, Jun Sik Bae and Inhee Kim

## 13.1 INTRODUCTION

The Republic of Korea, as the 5th largest economy in APEC, and the 11th largest economy in the world, has undergone a significant transformation from a manufacturing to a services based economy. Seoul, as the capital of Korea, and the area with the highest population and concentration of economic activities in the nation, has been leading this change. Functionally, Seoul is a part of a greater metropolitan area that includes the City of Incheon and Gyeonggi Province. The metropolitan area is one of the largest and densest urban agglomerations in the world (Photo 13.1).

This chapter describes the current state of the economic, social, physical development and governance environments of Seoul, and the sustainable development initiatives involving various types of partnerships undertaken to create a more liveable and prosperous city. After a period of rapid development in the 1960s and 1970s, serious environmental and urban development problems began to emerge in the city and metropolitan region. These necessitated strong actions by the government, often in partnership with business and the community, to address issues like water and air pollution, traffic and housing.

**Photo 13.1 Central Seoul**

Credit: The Seoul Institute.

In recent years, the economy has been changing rapidly, with an enormous shedding of manufacturing jobs and firms; and a vigorous response was required to create new jobs and affordable housing for people. Many old industrial areas, freeways and parts of the old economy have already undergone a transformation. Some of the transformation has been difficult, but out of it is emerging a new regional economy in Seoul.

Lessons have been gained from the painful adjustment to these changes, but the innovations that have taken place are turning Seoul into a more exciting, greener and smarter city. The final section of this chapter presents three case studies of the way Seoul has used a range of partnership initiatives to contribute to its sustainable development. Some of these initiatives have the potential to be replicated and adapted elsewhere in the APEC region. Other cities could learn much from Seoul about making cities sustainable.

## 13.2 POPULATION GROWTH AND ECONOMIC DEVELOPMENT

### 13.2.1 Population Trends

According to the 2010 Population and Housing Census, there are an estimated 9.63 million people living in Seoul.[644] The Seoul Metropolitan Area (which includes Seoul) had a population of 24.5 million in 2011, or 48.9 percent of Korea's population, in 2011. Seoul has seen a gradual decline in its population since 1990, when it had 10.6 million inhabitants. In the same period, population had continued to rise in the Seoul Metropolitan Area and Korea as a whole.

According to Statistics Korea, the population of Seoul is projected to increase slightly from 2013 until it reaches a peak in 2026 (Table 13.1). The population of Seoul Metropolitan Area is expected to reach a peak of 26.7 million in 2031, while Korea as a whole will reach a peak of 52.16 million in 2030.

**Table 13.1 Estimated Population of Seoul and the Seoul Metropolitan Area, 2011–2014**

| | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| **Seoul** | 10,026,451 | 10,025,756 | 10,135,026 | 10,214,422 | 10,202,243 | 10,101,828 | 9,924,373 |
| **Seoul Metro Area** | 24,564,036 | 25,227,848 | 25,957,255 | 26,464,910 | 26,691,182 | 26,620,275 | 26,258,981 |

Source: Korean Statistical Information Service (KOSIS).

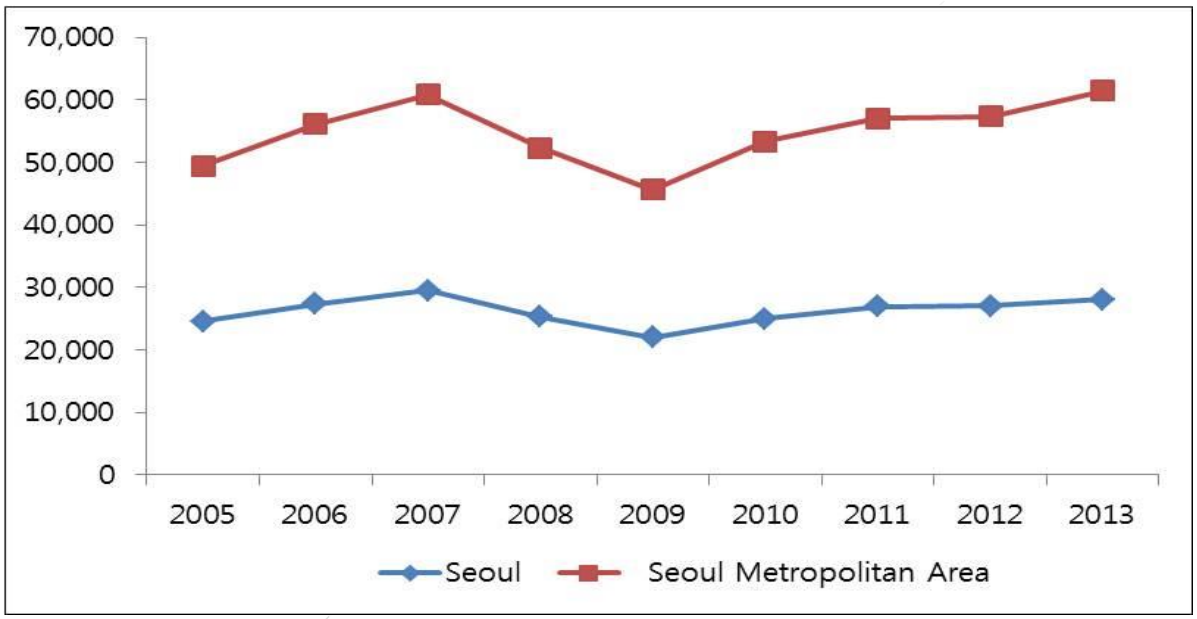
### 13.2.2 Key Economic Facts

Seoul is one of the largest manufacturing cities in the world, but its economy is changing rapidly as wages and salaries, China's manufacturing strength and capital-labour costs rise with the move toward technology-based manufacturing. These changes have had a significant impact on Seoul's economy. This section describes the changing dynamics of the metropolitan region's economy and the city's response to it.

Seoul is the single largest economic region in Korea, although its share of national GDP has declined from a stable 24 percent in 2005–2008 to 22.2 percent in 2013. On the other hand, the metropolitan area during the same period maintained its share, with 48.9 percent in 2005 and almost half of Korea's GDP in 2013.

The gross regional domestic product (GRDP) growth rates of Seoul and the capital region show that the region has outpaced the city itself (Figure 13.1). Between 2005 and 2013, Seoul's GRDP grew an annual 1.6 percent, while the capital region's GRDP increased by an annual 2.8 percent. The average for Korea was 2.2 percent.

**Figure 13.1 GRDP of Seoul and the Seoul Metropolitan Area, million USD, 2005–2013**




Note: calculated in 2010 constant price.
Source: Korean Statistical Information Service (KOSIS).

Seoul is Korea's key business and employment centre. In 2013, Seoul was host to 21.4 percent of Korea's business establishments (785,094) and accounted for 23.9 percent of employment in Korea (4,585,090 employees). The metropolitan area had 47.2 percent of total establishments (1,736,300) and 50.8 percent of total employment (9,739,962 employees). Seoul's unemployment rate has been one of the highest since 2005. The rate was 4 percent in 2013, which is higher than the national average of 3.1 percent.

Despite a declining residential population in Seoul, the number of establishments and employed people has risen since 2005. Between 2005 and 2013, the residential population declined by 0.2 percent, from 10,167,344 persons to 10,143,645, while that of the metropolitan area grew by 7.6 percent and that of Korea as a whole by 4.8 percent. During the same period, the number of business establishments in Seoul increased by 5.9 percent and employment by 19.3 percent. Growth has been slower in Seoul than for the metropolitan area and fore Korea. The number of business

establishments in the metropolitan area rose by 16.4 percent, higher than the average for Korea of 14.7 percent, and the number of employed people grew by 27.5 percent, higher than the average for Korea of 26.6 percent (Table 13.2).

**Table 13.2 Key Economic Facts – Seoul and Seoul Metropolitan Area**

| | Residential Population | | Establishments | | Employed Persons | |
|---|---|---|---|---|---|---|
| | 2005 | 2013 | 2005 | 2013 | 2005 | 2013 |
| **Seoul** | 10,167,344 (20.8%) | 10,143,645 (19.8%) | 741,229 (23.1%) | 785,094 (21.4%) | 3,843,010 (25.4%) | 4,585,090 (23.9%) |
| **Metro Area** | 23,465,054 (48.1%) | 25,258,057 (49.4%) | 1,492,099 (46.6%) | 1,736,300 (47.2%) | 7,637,127 (50.4%) | 9,739,962 (50.8%) |
| **Korea** | 48,782,274 (100.0%) | 51,141,463 (100.0%) | 3,204,809 (100.0%) | 3,676,876 (100.0%) | 15,147,471 (100.0%) | 19,173,474 (100.0%) |

Source: Korean Statistical Information Service (KOSIS).

**Table 13.3 Number/Share of Establishments and Annual Growth Rate by Industry, Seoul, 2010 and 2013**

| Industries | 2010 | | 2013 | | Annual Growth Rate |
|---|---|---|---|---|---|
| | No. | Share % | No. | Share % | |
| **Total** | 729,731 | 100.0 | 785,094 | 100.0 | 2.5 |
| **Information and communications** | 13,690 | 1.9 | 19,240 | 2.5 | 12.0 |
| **Professional, scientific and technical activities** | 26,414 | 3.6 | 33,624 | 4.3 | 8.4 |
| **Business facilities management and business support services** | 10,033 | 1.4 | 12,495 | 1.6 | 7.6 |
| **Sewerage, waste management, materials recovery and remediation activities** | 379 | 0.1 | 448 | 0.1 | 5.7 |
| **Electricity, gas, steam and water supply** | 106 | 0.0 | 122 | 0.0 | 4.8 |
| **Health and social work activities** | 22,042 | 3.0 | 24,984 | 3.2 | 4.3 |
| **Construction** | 19,077 | 2.6 | 21,027 | 2.7 | 3.3 |
| **Manufacturing** | 53,950 | 7.4 | 58,551 | 7.5 | 2.8 |
| **Wholesale and retail trade** | 209,989 | 28.8 | 226,629 | 28.9 | 2.6 |
| **Education** | 30,044 | 4.1 | 32,240 | 4.1 | 2.4 |
| **Accommodation and food service activities** | 115,415 | 15.8 | 123,634 | 15.7 | 2.3 |
| **Financial and insurance activities** | 9,581 | 1.3 | 10,165 | 1.3 | 2.0 |
| **Membership organizations, repair and other personal services** | 68,226 | 9.3 | 71,509 | 9.1 | 1.6 |
| **Transportation** | 92,893 | 12.7 | 93,368 | 11.9 | 0.2 |
| **Mining and quarrying** | 22 | 0.0 | 22 | 0.0 | 0.0 |

| | | | | | |
|---|---|---|---|---|---|
| **Public administration and defence; compulsory social security** | 1,281 | 0.2 | 1,267 | 0.2 | -0.4 |
| **Real estate activities and renting/leasing** | 35,100 | 4.8 | 34,629 | 4.4 | -0.4 |
| **Arts, sports and recreation-related services** | 21,467 | 2.9 | 21,122 | 2.7 | -0.5 |
| **Agriculture, forestry and fishing** | 22 | 0.0 | 18 | 0.0 | -6.5 |

Source: Korean Statistical Information Service (KOSIS).

### 13.2.3 Key Industry Growth Sectors

Although wholesale and retail trade (28.9%), accommodation and food service activities (15.7%) and transportation (11.9%) had the largest shares by industry, the growth rates of those industries were around or lower than the average growth rate of all industries in Seoul.

Between 2010 and 2013, information and communication showed the highest annual growth rate of 12 percent. During the same period, Seoul recorded a growth rate of 2.5 percent for all industries. The share of the information and communication industry also expanded from 1.9 percent in 2010 to 2.5 percent in 2013. Professional, scientific and technical activities grew by 8.4 percent, followed by business facilities management and business support services at 7.6 percent. These fast-growing industries are the growth sectors for the city.

### 13.2.4 Trade

China is the city's largest trading partner. In 2014, exports to China were valued at USD 17.85 billion; with imports valued at USD 32.563 billion. The total trade deficit with China was USD 14.713 billion. The total value of exports to other nations includes: the USA (USD 7.472 billion), Viet Nam (USD 4.587 billion), and Japan (USD 3.32 billion). After China, Japan (USD 17.039 billion) and the USA (USD 16.426 billion) rank second and third in terms of import sources. Overall, Asia was the largest market for Seoul: the destination for 60.1 percent of its exports, and the source of 52.2 percent of its imports (Table 13.4).

**Table 13.4 Exports, Imports and Growth Rates by Economy, Seoul, 2014**

| Economy / City | Exports (thousand USD) | Growth rate (%) | Imports (thousand USD) | Growth rate (%) | Trade balance (thousand USD) |
|---|---|---|---|---|---|
| **China** | 17,850,397 | -0.5 | 32,563,499 | 13.7 | -14,713,102 |
| **US** | 7,472,263 | 11.8 | 16,425,673 | 6.3 | -8,953,410 |
| **Viet Nam** | 4,587,347 | 13.5 | 3,384,722 | 26.7 | 1,202,626 |
| **Japan** | 3,320,042 | -0.2 | 17,038,768 | -3.8 | -13,718,726 |
| **Hong Kong, China** | 2,492,689 | -2.7 | 617,177 | -9.3 | 1,875,512 |
| **Russia** | 2,181,875 | -5.9 | 1,474,650 | -5.9 | 707,225 |
| **Indonesia** | 1,562,261 | -4.4 | 2,658,938 | -2.5 | -1,096,678 |
| **India** | 1,498,232 | 17.7 | 2,069,694 | -4.2 | -571,462 |
| **Slovakia** | 1,274,925 | 17.7 | 102,552 | 29.3 | 1,172,373 |
| **Thailand** | 1,070,671 | 9.3 | 2,401,002 | 8.2 | -1,330,331 |

Source: Korean Statistical Information Service (KOSIS).

### 13.2.5 City/Regional Economic Competitiveness

As indicated, Seoul is the largest economic entity in Korea. In 2013, more than half of the total establishments in information and communication were in Seoul. Including the ICT industry, Seoul has the highest number of business establishments engaged in professional, scientific and technical activities (38.3%), business facilities management and business support services (26.9%), transportation (25.1%), financial and insurance activities (24.5%), and wholesale and retail trade (23.6%). In real estate activities and renting and leasing, Seoul represents the second biggest agglomeration in Korea, but still showed an impressive share of 26.9 percent of the total number of establishments in the industry.

Seoul's industrial specializations were assessed by determining the location quotient (LQ) of each industry. LQ is an analytical statistic measuring a region's industrial specialization in relation to a larger region, typically the economy in which the region is located. If the LQ of an industry is higher than 1.0, the region has a higher concentration of that industry than the economy; if lower than 1.0, vice versa.

The LQs of the seven industries cited above are higher than 1.0, indicating that Seoul is more specialized in those industries than Korea as a whole (

Table **13.5**). Other industries also rank highly in 16 provinces, special and metropolitan cities, but none of them has an LQ over 1.0.

Although most industries exist in Seoul, not every industry in Seoul is more competitive than in other regions in Korea. For example, despite its overall economic scale, agriculture, forestry and fishing and mining and quarrying barely exist in Seoul.

**Table 13.5 Industrial Specialization and Competitiveness by Industry, Seoul, 2013**

| Industry | Location quotient (LQ) | Share | Rank |
|---|---|---|---|
| Information and communications | 2.54 | 54.1 | 1 |
| Professional, scientific and technical activities | 1.80 | 38.3 | 1 |
| Business facilities management and business support services | 1.26 | 26.9 | 1 |
| Real estate activities and renting/leasing | 1.22 | 26.1 | 2 |
| Transportation | 1.18 | 25.1 | 1 |
| Financial and insurance activities | 1.15 | 24.5 | 1 |
| Wholesale and retail trade | 1.11 | 23.6 | 1 |
| Arts, sports and recreation-related services | 0.95 | 20.3 | 2 |
| Health and social work activities | 0.93 | 19.9 | 2 |
| Education | 0.87 | 18.6 | 2 |
| Accommodation and food service activities | 0.84 | 18.0 | 2 |
| Construction | 0.84 | 17.9 | 2 |
| Membership organizations, repair and other personal services | 0.84 | 17.9 | 2 |
| Manufacturing | 0.74 | 15.8 | 2 |
| Public administration and defence; compulsory social security | 0.49 | 10.5 | 2 |
| Electricity, gas, steam and water supply | 0.34 | 7.3 | 7 |
| Sewerage, waste management, materials recovery and remediation activities | 0.30 | 6.4 | 4 |
| Mining and quarrying | 0.05 | 1.2 | 10 |
| Agriculture, forestry and fishing | 0.03 | 0.7 | 13 |

Source: Korean Statistical Information Service (KOSIS).

### 13.2.6 Innovation, Creativity and Business Entrepreneurship

Innovation and creativity are hard to measure quantitatively. Typically, however, patents and R&D investments in a region are good proxies. In Seoul, the number of applications for intellectual property, such as patents, declined from 2007 to 2010, but rebounded after 2010. Between 2010 and 2013, the number increased from 118,459 to 138,695, at an annual growth rate of 5.4 percent. The annual growth rate itself grew 7.7 percent in 2013 over the previous year (Table 13.6).

**Table 13.6 Applications for Intellectual Property, Seoul, 2007–2013**

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|
| **No. of applications** | 128,575 | 124,811 | 122,494 | 118,459 | 120,548 | 128,734 | 138,695 |
| **Index** | 108.54 | 105.36 | 103.41 | 100.00 | 101.76 | 108.67 | 117.08 |

Source: National Science & Technology Information Service

R&D investment in both the private and public sectors has grown steadily since 2010. In 2013, R&D investment in the public sector was valued at USD 3,109 million, an increase of 1.2 percent over the previous year; while the private sector invested more than twice that – USD 6.62 billion – representing an increase of 11.4 percent over 2012. In general terms, this indicates that the level of innovation and creativity in Seoul has been improving consistently since 2010.

**Table 13.7 New Business Formations, Seoul, 2013**

| Industry | No. of existing businesses (A) | No. of new businesses (B) | Percent Growth (B/A) |
|---|---|---|---|
| **Wholesale and retail trade** | 319,308 | 48,098 | 15.1 |
| **Real estate activities and renting/leasing** | 329,030 | 34,046 | 10.3 |
| **Accommodation and food service activities** | 137,879 | 26,111 | 18.9 |
| **Professional, scientific and technical activities** | 51,222 | 8,321 | 16.2 |
| **Transportation** | 103,450 | 8,165 | 7.9 |
| **Manufacturing** | 72,377 | 7,171 | 9.9 |
| **Information and communications** | 36,553 | 6,702 | 18.3 |
| **Membership organizations, repair and other personal services** | 49,507 | 6,061 | 12.2 |
| **Education** | 28,182 | 5,989 | 21.3 |
| **Construction** | 56,979 | 5,311 | 9.3 |
| **Arts, sports and recreation-related services** | 24,431 | 4,488 | 18.4 |
| **Business facilities management and business support services** | 20,584 | 3,680 | 17.9 |
| **Financial and insurance activities** | 9,995 | 2,542 | 25.4 |
| **Health and social work activities** | 18,641 | 1,666 | 8.9 |
| **Electricity, gas, steam and water supply** | 166 | 45 | 27.1 |
| **Sewerage, waste management, materials recovery and remediation activities** | 478 | 23 | 4.8 |
| **Mining and quarrying** | 47 | 6 | 12.8 |

Source: Korean Statistical Information Service (KOSIS).

Seoul is Korea's city of entrepreneurship. In 2013, 22.4 percent of total new businesses were formed in Seoul, while more than half (53.1%) started in the metropolitan area. In the same year, wholesale and retail trade (48,098 businesses), real estate activities and renting/leasing (34,046 businesses) and accommodation and food service activities (26,111 businesses) saw the largest increase in the number of new businesses. These new businesses represented 64.3 percent of total new businesses in Seoul.

In terms of share of new businesses, financial and insurance activities (25.4%) and education (21.3%) recorded the highest levels. Electricity, gas, steam and water supply had the highest of all at 27.1 percent, but had a lesser impact on the number of new businesses in the industry than those in other key industries. In addition, accommodation and food service activities (18.9%), arts, sports and recreation-related services (18.4%) and information and communications (18.3%) showed higher growth rates than other industries (Table 13.7).

### 13.2.7 Local Economic Development Competitiveness

According to a report by the Economist Intelligence Unit, *Hot Spots 2025*, Seoul ranks 15th in city competitiveness. However, Seoul's economy is not growing at the rate residents expect, with the slowdown in growth resulting from the size of the city itself.[645] Seoul is the biggest city in Korea: almost one-fifth of the people and businesses and one-fourth of the jobs are located in this city which takes up only 0.6 percent of the total land area of Korea. Seoul produces about 38 percent of Korea's total GDP. As the growth rate of the city declines, the scale of Seoul's economy and its growth rate may be undervalued.

The changing industrial structure of Seoul may also lower its regional economic growth. The rise of service industries in juxtaposition with the decline of manufacturing industries has been one of the dominant trends emerging in the Seoul region. Since the productivity of manufacturing is generally higher than that of the service industry, the overall productivity of a regional economy can go down. Seoul realizes the seriousness of this trend and has made efforts to identify and support new growth engines and upgrade old industries.

Lastly, to capture a whole picture of Seoul's regional economy, the spatial pattern at the metropolitan level should be considered. Seoul may be slowing down, but the Seoul Metropolitan Area as a whole, composed of the Seoul Metropolitan Government (SMG), Incheon City and Gyeonggi-do, is still growing strongly. Spatial division of labour, driven by the economies and diseconomies of the megacity, has been developed by municipalities in the Seoul Metropolitan Area. Seoul has become more of a 'command and control' service centre, whereas other municipalities accommodate the spatial needs for production and logistics. Thus, it is important for Seoul to imagine and pursue a win-win regional economic and industrial policy framework at the metropolitan level, which is still in the pipeline.

## 13.3 STRATEGIC INFRASTRUCTURE AND ASSETS

### 13.3.1 Infrastructure Needs

With a population of 10 million, it is of critical importance that the SMG manages key strategic infrastructure properly. The transportation network undoubtedly is a key part of the physical infrastructure and of major importance. As of 2012, the number of trips in and out of Seoul was reported as more than 60 million including 25 million trips within Seoul. As shown Table 13.8, about 66 percent of these travellers used public transportation.[646]

The number of automobiles registered in Seoul has also been increasing steadily since the 1980s. The number of cars reached 3 million in 2014.[647] The SMG has been a large consumer of electricity, increasing its use at an annual rate of 3.5 percent from 2000. In 2012, the city used 47,000 GWha of electricity.[648] In that same year, a person living in Seoul was provided 303 litres of water per day and consumed 286 litres.[649] As residents of Seoul seek a better quality of life, energy consumption, including electricity and water, is likely to increase.

**Table 13.8 Transportation Mode Share in Seoul, percent**

| Mode Share | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Public Transit** | 60.6 | 61.2 | 62.0 | 62.3 | 62.3 | 62.5 | 62.8 | 63.0 | 64.3 | 65.1 | 65.6 |
| **(Bus)** | (26.0) | (25.6) | (26.2) | (27.5) | (27.6) | (27.6) | (27.8) | (27.8) | (28.1) | (28.0) | (27.4) |
| **(Subway)** | (34.6) | (35.6) | (35.8) | (34.8) | (34.7) | (34.9) | (35.0) | (35.2) | (36.2) | (37.1) | (38.2) |
| **Automobile** | 26.9 | 26.4 | 26.4 | 26.3 | 26.3 | 26.3 | 26.0 | 25.9 | 24.1 | 23.5 | 23.1 |
| **Taxi** | 7.4 | 7.1 | 6.6 | 6.5 | 6.3 | 6.2 | 6.2 | 6.2 | 7.2 | 7.0 | 6.9 |
| **Other** | 5.1 | 5.3 | 5.0 | 4.9 | 5.1 | 5.0 | 5.0 | 4.9 | 4.4 | 4.4 | 4.4 |

Source: Seoul Statistics.

A strong commitment to education is one of the key factors for economic success in Korea. With 37 universities, the SMG has become the centre of major educational institutions. The Seoul Metropolitan Office of Education administers 235 college-preparatory high schools, 80 vocational schools, 377 middle schools and 33 special education schools.[650]

Seoul is a highly-connected city with an expansive information and communications infrastructure. Internet penetration rate is 80 percent, meaning that more than two-thirds of residents have access to broadband Internet. Nationwide, nearly 60 percent of Koreans own smartphones. Korea has one of the highest Internet and communication technology access rates among OECD nations.[651] As one of Asia's megacities, Seoul needs to contain and maintain essential physical infrastructure to support its economic activities.

### 13.3.2 Assessment of Physical Infrastructure

Of the various types of infrastructure, the transportation network is the most important as it supports economic activity in the city. Seoul has an extensive roadway network of 8,173km with two inner-city highways along the Han River. In addition, a system of inner and outer ring roads exists within the city.[652] Despite this, Seoul suffers from severe traffic congestion. In 2010, the average travel speed on the main roads in Seoul was 20km/h. The Korea Transport Institute estimates that the cost imposed on residents in the form of time wasted on the road is USD 9.5 billion per year. Improving travel speed is a significant challenge for the SMG.[653]

While Seoul is highly motorized, the SMG has continued to invest in its subway system since opening the first subway line in 1974. Seoul now operates nine rail lines totalling 327km with 306 stations. Bus networks complete the public transportation network. With 7,500 buses, the SMG provides a three-tiered bus service of express, long-distance and community buses. As part of the 2004 'bus reform', the SMG integrated the bus and subway systems, allowing free transfers between the two systems, with a transit card granting convenience to users of both systems. More importantly, dedicated bus lanes at the centre of major arterials are in place. These lanes effectively guarantee a free flow of bus traffic. As a result of the bus reform, bus speed, capacity and regularity of the system have substantially improved.[654] Seoul is a transit-oriented city and invests approximately USD 300 million annually into subsidizing the public transport system.

Another key to sustaining economic activity is the provision of energy through a stable network. A single public provider of electricity, the Korea Electric Power Corporation, generates 70 percent of the city's electricity from thermal power plants and the remaining 30 percent from nuclear power stations. About half of this power is consumed for commercial and industrial uses while households take up 14 percent. After the Fukushima nuclear disaster in Japan, serious concerns were raised about the safety of nuclear power plants, but it has been difficult to find alternative sources of energy. The SMG continues its effort to upgrade the electricity network. While providing electricity to Seoul is still a one-way process, the Korea Electric Power Corporation plans to set up a smart grid to take advantage of advanced information technologies in the city.[655]

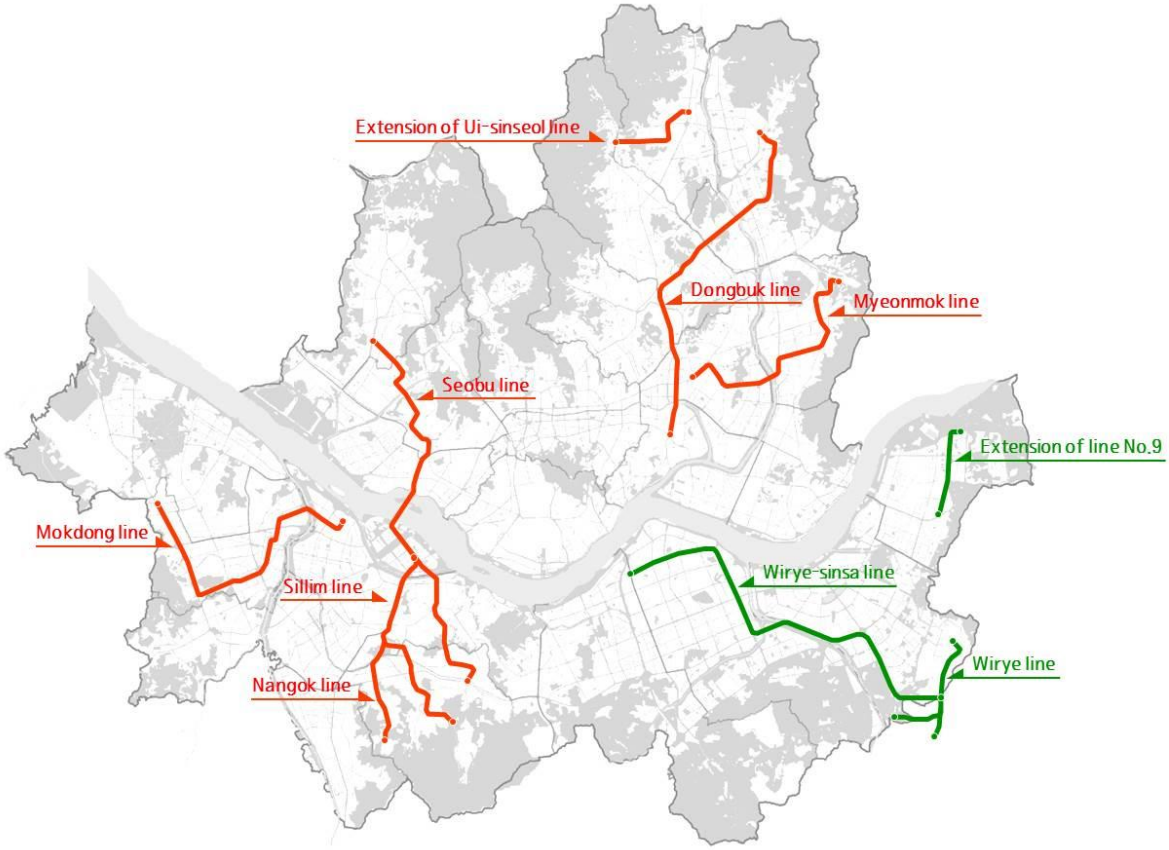
The SMG established a centralized municipal water system covering major parts of the city. All Seoul households have access to safe tap water 24 hours a day. To ensure this access, the SMG manages six water purification plants. Supply comes from 109 reservoirs and is carried through 13,720km of water pipes connecting 2 million taps in Seoul.[656] At USD 5.29 per cubic metre, the cost of producing water is high compared to other cities such as Beijing (USD 1.64), Bangkok (USD 4.72) and Manila (USD 3.70). To address this issue, at least in part, the SMG charges more per unit of water to entities with higher consumption than to those which consume less.[657]

### 13.3.3 Plans for Reinvestment in Public Infrastructure

Reinvestment is required in various forms of public infrastructure in Seoul, but the urban railway system is in the greatest need of an upgrade. Since a specific reinvestment plan has been developed, this chapter focuses on the components of the railway network. As shown in Figure 13.2, 11 new light rail lines, totalling 100km, were proposed around Seoul in 2008. This plan was based on a concession agreement to attract funds from the private sector. The Ui-sinseol line began construction in 2014. The SMG has been

revising initial plans for other proposed lines to estimate better travel demand and is in the process of negotiating with private developers.

**Figure 13.2 Proposed Light Rail Lines in Seoul**




Source: Authors.

Another major SMG investment plan is a proposed 30km rail line extending from east to west on the south side of the Han River. While Subway Line 2 services the same corridor and carries 2 million passengers each day, the level of congestion has been notoriously high, at 200 percent of capacity. Moreover, the roadway parallel to the second line, the Nambu Sunhwan Road is severely congested during peak hours. The proposed rail line, called the Nambu Express Line, is expected to reduce travel time to one-third of the current level. Figure 13.3shows the proposed route.

**Figure 13.3 Nambu Express Line (Proposed)**

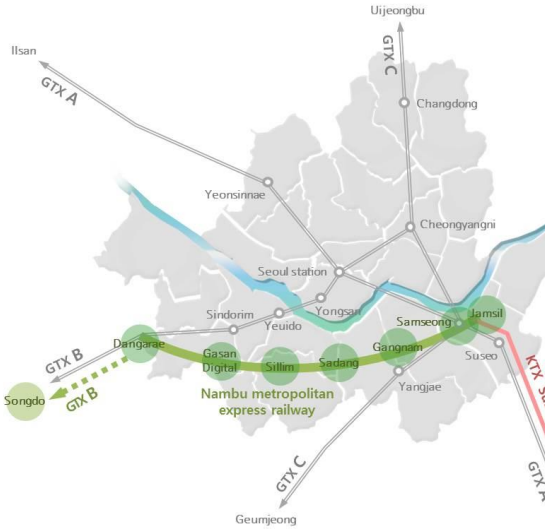
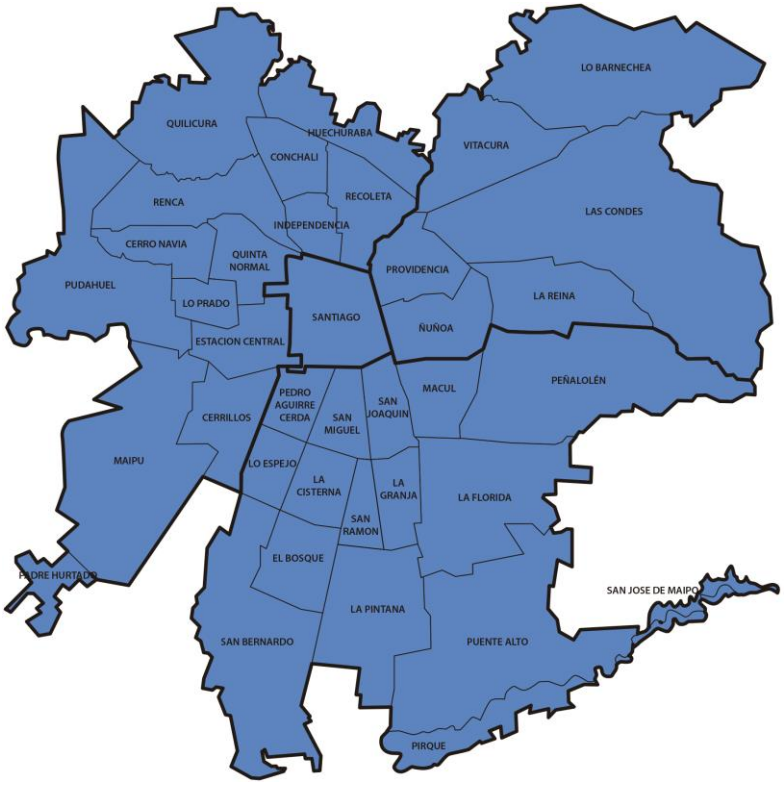



**Figure 13.4 Shin Bundang Extension Line (Proposed)**


Source: Authors.

The SMG also plans to extend regional rail services into the city. At present, there is only one subway line to access the CBD from the northwest of Seoul, which is inadequate for the increasing travel demand. Transportation planners have long suggested the need to plan for new transit service. The extension of the Shin Bundang Line by 20km could better serve citizens living in the northwest who commute to the CBD (Figure 13.4).

**Figure 13.5 KTX Extension Line (Proposed)**




Source: Authors.

Another plan is to extend service to the city for the Korea Train Express (KTX), a high-speed rail system connecting the whole nation. KTX is planning to set up a new 32km line that passes through the east side of the city from south to north (Figure 13.5). With the population in the east of Seoul at about 5 million, the current level of access to the KTX is inadequate. With this plan, local access to transit within Seoul will improve, as well as nationwide access to Seoul.

### 13.3.4 Operation and Maintenance of Infrastructure

While it is important to expand infrastructure, it is also critical that it is well maintained. Accidents in public infrastructure facilities can be catastrophic. For nuclear power plants, in addition to frequent and constant monitoring to prevent malfunctions, regular inspections are scheduled to follow the nuclear fuel reloading cycle, which is 13–16 months. Thermal power plants are examined every 2–4 years depending on the condition of the facilities. To minimize energy shortage, the Korea Electric Power Corporation puts emphasis on maintenance of its power plants.

The management of water works is an area where operation and maintenance are more important than expansion. Currently, the SMG uses its geographic information system (GIS) database for all water pipes in Seoul. The database records location, physical structure, year of installation and history of repairs. This information is key to carrying out repairs to prevent leakage from water mains. As an effort to ensure water quality, the SMG analyzes its water in close adherence to the standards established by the WHO.

Since 2011, the SMG has invested USD 58 million to replace deteriorating water pipes in 450,000 households. There are 22,000 buildings in Seoul that still provide water from rooftop water tanks, which have the potential to reduce water quality. In recognition of potential problems and since the buildings are relatively small structures, such as five-storey buildings, the SMG is replacing these water tanks with pipes. An additional, secondary benefit will be an improved cityscape.[658]

In the transport sector, a lot has been achieved to increase the mobility and accessibility of citizens in Seoul. As the first subway line was opened in 1974, many railway cars are now wearing out and need repair or replacement. Currently, the SMG operates 4,500 round-trips with a total of 3,715 railroad cars. While the transport share of the subway was 38.2 percent in 2012, approximately 20 percent of the railroad cars are operating beyond their life expectancy of 20 years. Some equipment in the control centre is also older than its lifespan. Thus, the SMG is investing heavily in improving facilities and equipment including railroad cars and tracks and the control system. In 2013 alone, the SMG spent USD 290 million (about 20 percent of the total subway system budget) on subway system upgrades. The efforts to keep the subway system safe and convenient are ongoing.

Similar efforts are being made to improve the roadway infrastructure. The major issue in operating and maintaining the roadway network is managing the citywide expressways. As noted, there are 8,173km of roads in Seoul, with 177km designed as freeways for the exclusive use of automobiles. The SMG spent USD 80 million in 2013 maintaining the safety of these freeways; work included maintenance of safety facilities, repairs to road signs, and pavement works. In a city such as Seoul where most roads are congested during peak hours, the expressway has the same issue. The average travel speed of all highways is estimated at 36km/h during the morning rush hour. Considering the speed limit is 70–80km/h, the expressway does not realize its potential as an urban highway.[659]

So far the infrastructure of Seoul has kept pace with growing economic activity and energy demands. Now things are different. Concerning transportation, the SMG needs to increase travel speed on urban highways since there is almost no opportunity to expand roadway capacity in the city. The efforts to promote public transit use should also continue even though infrastructure reforms for public transportation were completed in 2004.

Problems regarding energy and resources are also serious. According to Population Action International, the available amount of water per capita in 2025 will be between 1,199 and 1,327 cubic metres which places Korea in the category of ‘water-scarce’ economies.[660] Together with soaring demand for resources, another growing concern in Korea is potential electricity shortfalls. In 2012, blackout warnings were issued several times in August as well as during the winter. Considering the recent lacklustre national growth rate, the economy may be crippled further if the electricity supply remains uneven.[661]

Further strain is expected on the electrical grid. To promote further sustainability in the transport sector, Seoul has invested heavily in expanding the use of electric vehicles that produce no carbon dioxide emissions. This is one area that the SMG has been successful in planning for the future. Although the current transport share of electric cars is less than

1 percent, an additional 50,000 electric vehicles will be on the roads by 2018. The SMG plans to replace gasoline cars with electric vehicles in certain sectors such as taxis and buses and has allocated USD 200 million toward this in 2015.

To cope with the increasing energy demand, the SMG is replacing the current one-way electricity grid with a smart grid. Utilizing matching funding from the national government, USD 22 million was invested in 2015. Such investment will continue; with substantial assistance from the national government, a fully operational smart grid will be realized shortly. It has, however, been an uphill battle to increase the use of renewable energy in Seoul; its topography and geographical features make installation of production facilities for renewable energy difficult.

## 13.4 SOCIAL SYSTEMS AND SUSTAINABILITY

### 13.4.1 Labour Market and Human Resource Development

The discussion below looks at trends in population, the educational profile of residents in Seoul and the employment structure. Of note is the ageing population, which is becoming an important issue for the Seoul labour market.

#### Population trends

In Seoul, the young (age 14 and under) made up just 13.8 percent of the city's population in 2010, down from 31.3 percent in 1980.[662] Meanwhile, those aged 65 and over accounted for 2.5 percent of the city's population in 1980, but by 2010, they made up 9.3 percent of the city's population. Similar patterns are being seen in the Seoul Metropolitan Area and the nation as a whole.

The working-age population (those aged 15–64) in Seoul increased from 5.6 million in 1980 to 7.7 million in 2010, or 76.7 percent of the city's population.[663] Similar trends and percentages were seen in the Seoul Metropolitan Area and Korea as a whole.

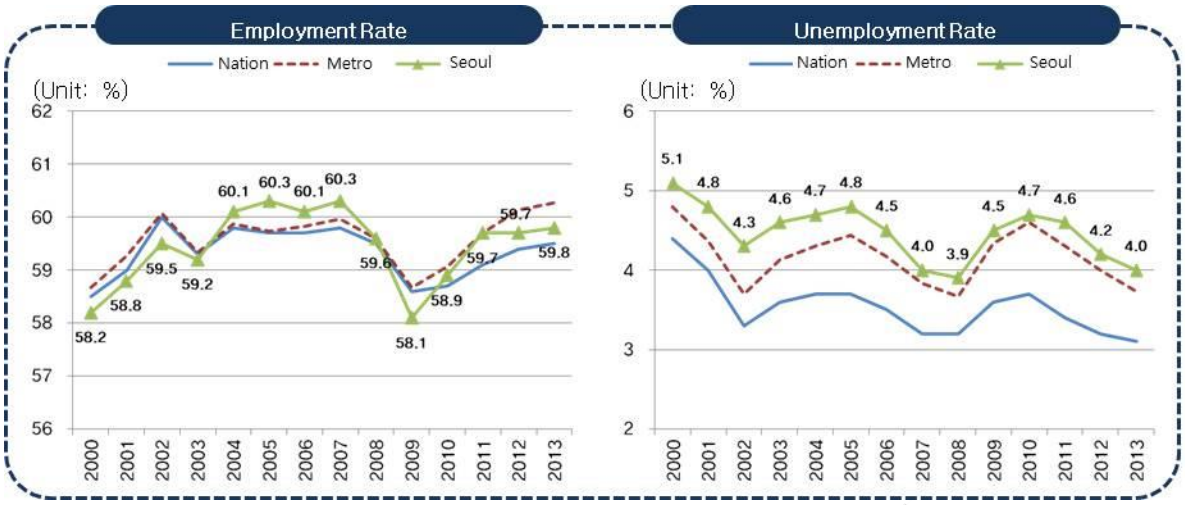
#### Educational Levels

Residents in Seoul tend to be better educated than those in other areas. [664] In 2010, those who had completed a four-year college programme accounted for 34 percent of the city's population. The corresponding figure for Seoul Metropolitan Area was 28 percent.

#### Employment Structure

The employment rate of Seoul in 2013 was about 60 percent. That is 0.3 percent point higher than the national average, but unemployment is 4 percent, which is one percentage point higher than the whole nation (Figure 13.6).

**Figure 13.6 Employment and Unemployment Rates, Korea**



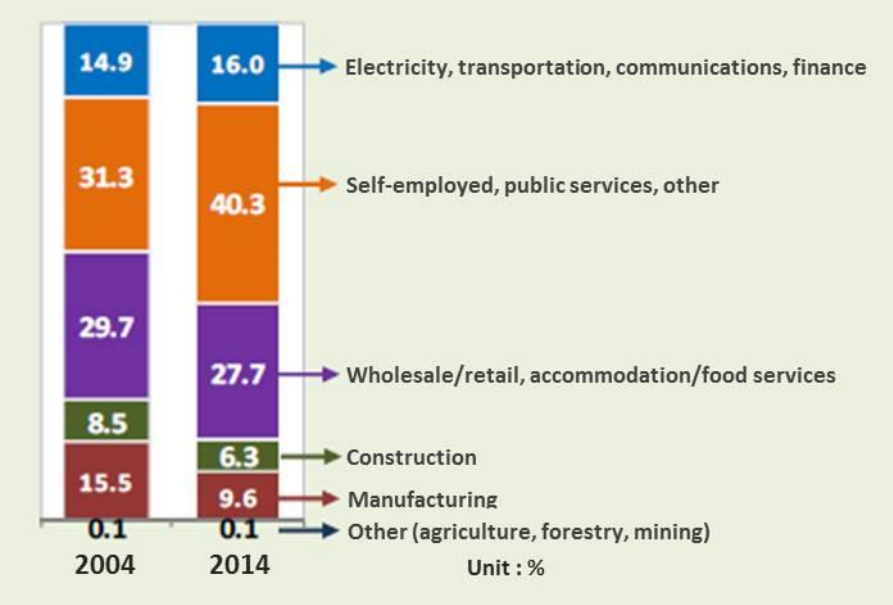

Source: Korean Statistical Information Service (KOSIS).

As of 2014, employed persons and job seekers together totalled 5.4 million, accounting for 63 percent of the 8.5 million people aged 15 or older in the city. From this population willing to engage in economic activity, some 5.15 million people – the highest number since 1989 – were employed. The number of workers has soared, particularly in the last decade, by 315,000 (from 4.831 million in 2004 to 5.146 million in 2014), largely owing to a significant rise in the number of workers aged 55 or older.

However, the city's workforce is increasingly ageing. The percentage of older workers (65 or older) has steadily climbed, surpassing the number of young workers aged 15 to 29 in 2012. By 2014, 22 percent of all workers were 55 or older, which is noticeably higher than the younger workforce aged 15 to 29, which accounts for 17 percent.

The composition of workers by industry is as follows (as of 2014): self-employed, public services and others (40.3%); wholesale/retail, accommodation and food services (27.7%); and electrical, transportation, communications and finance (16.0%) (Figure 13.7). The last decade has seen a major increase in the number of self-employed, and those working in public services and other industries – by 560,000 people – and in electrical, transportation, communications and finance – by more than 100,000. In the meantime, the number of workers in wholesale or retail trade, accommodation and food services, and the construction industry dropped by 9,000 each. The manufacturing industry saw a reduction of some 260,000 people. These statistics show a shift in the industrial structure, from traditional manufacturing and unskilled industries to the professional services, high technology and financial sectors. This has been the trend in the city's labour market and industries for a prolonged period and Seoul has responded to the change by, for example, providing various learning opportunities to its people in a proactive manner and has accomplished much.

**Figure 13.7 Percentage of Workers by Industry, Seoul**




Source: Korean Statistical Information Service (KOSIS).

In recent years, however, the industrial structure has shown a rather different change. The number of people who are self-employed, or working in public services and other industries as well as the electrical, transportation, communications and finance sectors, continued to grow until 2014 when it began to decline, while growth was seen in manufacturing, wholesale/retail, accommodation, and food services. There is no knowing whether this will become a trend in the future, but it is certainly time to pay more attention to how the urban industrial structure might be affected by the demographic changes caused by the retirement of baby boomers.

### 13.4.2 Addressing Unemployment Issues

Seoul recognizes that unemployment, especially youth unemployment, is a serious problem. As of 2014, approximately 240,000 people were jobless and actively searching for jobs, up by 14.8 percent (30,000) year on year, the highest growth rate since 2000. Compared to 2013, the number of unemployed grew in all age groups; 54.8 percent were between 15 and 29 years of age. Youth unemployment has become a major issue. In 2014, the rate of unemployment for youth reached 10.3 percent.

Since the financial crisis in 2008, Seoul has borne the brunt of the effects of the global economic slowdown on Korea. To minimize the pain felt by residents, the city has given priority to unemployment countermeasures above all other economic policies and has addressed the issue in the context of all other policies. These unemployment countermeasures look at various aspects of the issue and strive to create jobs through public projects, local community programmes and various assistance programmes (e.g. financial assistance by a centre for young start-ups in Seoul).

The SMG also develops spatial policies according to specific employment needs. Seoul has a concentration of certain industries in certain regions: jewellery in Jongno; design and publishing in Mapo; and IT in Seongsu. The city plans to build facilities in each of these regions to act as anchors for job creation. To do so, it has intensively invested to encourage ripple effects in the economy. These policies are not confined to certain regions or industries. In the areas that specialize in traditional manufacturing (e.g. sewing and textiles), education services required for the relevant industries are provided, along with financial assistance to encourage hiring.

In the high-tech R&D industrial complexes collaboratively run by academia, industry and research institutes, technology development is strongly supported as a way to sustain knowledge-based industries. In 2012, Seoul announced that 0.48 persons were hired per USD 90,909 spent on R&D investment. Recently, there have been efforts to create more jobs by inviting multinational companies to establish their regional headquarters in Seoul. The city expects that the high-tech R&D centres built with foreign capital will lead to the creation of sustainable and quality jobs.

## 13.5 ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY: POLICIES AND INITIATIVE

The SMG initiated a set of Smart City Initiatives to promote sustainable development. Under the policy direction of the initiatives, the SMG declared a Sustainable Policy Initiative along with action plans. The initiative encompasses environmental management, creative economic development, and improvement of social equity. The policy goals for each sphere are:

1. Environmental management
    - Become a world-leading city in climate protection
    - Build an energy-efficient recycling system
    - Create a pleasant and green city with resident participation
    - Build a people-oriented transportation system.

2. Creative economic development
    - Construct a creative economy
    - Generate sustainable jobs
    - Build a global economic city
    - Expand the social economy and diversify industries.

3. Improvement of social equity and cultural vitality
    - Construct a social system without polarization or discrimination
    - Create a society that includes all people
    - Build a safe and healthy city
    - Create a cultural ecosystem and expand opportunities for activities.

The following action plan has been announced and is designed to materialize the benefits from the initiative for the city's people:

- **Sustainable Energy Action Plan:** This calls for a10 million-ton reducti on in greenhouse gas emissions by reducing the quantity of energy used by an amount equal that created by one nuclear power plant between 2012 and 2014 and again by a similar amount by 2015.
- **Sustainable Transportation Action Plan.** The target is for eco-friendly transportation to have an 80 percent transport mode share.
- **Sustainable Regeneration Action Plan.** The aim is to build an entire system within the city that can regenerate for the next 100 years.

Table 13.9 shows indicators for periodic evaluation of progress on the Smart City Initiatives.

With these indicators at work, the city can carefully monitor the performance of policies for sustainability. While it is true that progress from the base year has been moderate at best, it is too early to discuss policy outcomes. To set more ambitious goals for the future, the SMG proposed a range of policy strategies. What is promising among them is the 'One Less Nuclear Plant' policy that affects various environmental management schemes. The policy attempts to increase production of renewable energy, thereby reducing fossil fuel consumption in buildings for different uses and promoting citizen participation in the process.

To advance that policy, the SMG initiated a Building Retrofit Project to reduce energy consumption in buildings with at least 2,000 square metres of total floor space. These large buildings are known to consume 22 percent of total energy used by buildings in Seoul. Financial assistance is available to building owners to install energy reduction devices. The Feed-In-Tariff system is also being introduced in Seoul to support photovoltaic systems. The SMG plans to provide a half-cent subsidy for production of 1 KWh using photovoltaic facilities. Energy consultants from the SMG also provide technical advice to businesses and households interested in renewable energy, a timely programme in the process of implementation that is designed to actively involve the city's citizenry. The eco-mileage programme, which provides financial incentives to households that reduce their consumption of electricity, water and gas, saved 100,000 tonnes of emissions between 2011 and 2013. As of 2013, 700,000 people have participated.

The 'One Less Nuclear Plant' policy is not without shortcomings. For example, the city failed to install photovoltaic systems in any schools, including universities. Private investment has also been insufficient to expand the base for solar energy use. However, with tangible improvement from environmental policies, residents are optimistic that environmental progress can be monitored, and they can adapt to new challenges.

## Table 13.9 Evaluation Indicators of Seoul's Sustainable Development

| Sector | Indicator | Base Year (2010) | Present (as of 2013) | Target (2020) |
|---|---|---|---|---|
| **Environment** | 1. $CO_2$ emissions | 49,751,000 tons | 48,551,000 tons (2012) | 37,220,000 tons |
| | 2. No. of areas prone to flooding | 34 | 29 | 0 |
| | 3. Total energy consumption | 15,717,000 TOE | 15,496,000 TOE | 13,787,000 TOE |
| | 4. Renewable energy rate | 0.6% | 1.4% (2012) | 5% |
| | 5. Recycling rate of municipal waste | 43.0% | 45.9% | 57.3% |
| | 6. Water reuse rate | 3.86% | 9.1% | 14.4% |
| | 7. Ultrafine particle concentration | 30㎍/㎥ (2007) | 25㎍/㎥ | 20㎍/㎥ |
| | 8. No. of citizens visiting Han River | 6.84 m (2012) | 9.44 m | 11.5 m |
| | 9. Park area per person | 16.06 ㎡ | 16.37 ㎡ | 17.5 ㎡ |
| | 10. Eco-friendly transport mode share | 70% | 71.3% (2012) | 75% |
| **Society & Culture** | 1. Economic activity participation rate by women | 51.2% | 52.6% | 60% |
| | 2. Decent income rate | 84.4% (2013) | 84.4% | 88.2% |
| | 3. Life-long education participation rate | 32.6% | 34.4% | 50% |
| | 4. No. of public rental houses (accumulated) | 164,581 | 215,530 | 357,000 |
| | 5. Senior citizen employment rate | 23.6% | 24.8% | 35% |
| | 6. No. of citizen proposals | 7,878 (2012) | 8,178 | 11,000 |
| | 7. Traffic accident fatalities | 429 | 371 | 212 |
| | 8. Healthy life expectancy | 73.18 | 74.38 | 77 |
| | 9. Satisfaction with cultural environment | 5.93 | 6.41 | 7.10 |
| | 10. No. of community cultural spaces | 11 (2011) | 135 | 375 |
| **Economy** | 1. No. of ventures | 3,706 (2008) | 6,237 | 10,000 |
| | 2. Percentage of people employed in the creative industry | 23.4% | 23.7% | 30% |
| | 3. Employment rate | 63.5% | 64.9% | 70% |
| | 4. Youth employment rate | 43.6% | 43.9% (12) | 50% |
| | 5. Foreign resident satisfaction with the living environment | 6.78 | 6.86 | 8 |
| | 6. No. of international visitors | 7.07 m | 9.85 m | 20 m |
| | 7. No. of social enterprises | 522 | 1,503 | 8,000 |
| | 8. No. of sharing groups/companies | 37(2013) | 50(2014) | 100 |
| | 9. No. of employees in manufacturing | 272,510 | 286,674 (2012) | 310,000 |

| | | | | |
|---|---|---|---|---|
| | 10. Areas for urban agriculture | 29.1 ha (2011) | 108 ha | 430 ha |

Source: Seoul Metropolitan Government, 서울시 지속가능발전 기본계획 [Seoul Master Plan for Sustainable Development] (2015).

## 13.6 URBAN GOVERNANCE

### 13.6.1 City Vision

While the processes of urbanization, and trends in trade liberalization and globalization, have contributed to the creation of wealth, the same processes have caused a whole host of problems. Chief among these are increasing socioeconomic polarization and social exclusion. Seoul has not escaped these impacts: 'Social exclusion, generational unemployment, material poverty, wealth inequalities and an ageing population are growing problems.' [665] This led the SMG to adopt the concept of Social Innovation under Mayor Park Won Sun's administration in 2012. This initiative sought to introduce social innovation ideas to the public sector.[666]

Social innovation is being promoted in two directions. The first looks to enhance the transparency of policy procedures and ensure substantive participation by residents. The second, collaboration and integration, is the focal part of social innovation. The SMG makes use of innovative technologies, cross-sector collaboration and social integration to advance social innovation; the SMG's strategy is to focus on a 'community rebuilding project' and the promotion of a 'sharing economy'.[667]

During Mayor Oh Se Hoon's administration (2006–2012), Seoul Creative Governance was Seoul's vision. The focus was on creativity in the process of innovating the public sector.[668] Under the paradigm shift from a supply-oriented administrative system to a custom- (or citizens-) oriented system, the public sector would have to change its process of decision-making, its organizational culture and relations between civil servants and residents.

### 13.6.2 Governance Reforms and Initiatives

#### *13.6.2.1 Collaborative Governance Initiatives*

The fundamental concept of Social Innovation is collaborative governance. The Seoul City Administration established an Information Disclosure Policy Division, which is in charge of information disclosure. The city administration planned to disclose 1,200 types of information in 150 areas, including administrative information, public data and minutes of meetings by the end of 2014. The Information & Communication Plaza aims at the disclosure of administrative information and the creation of new economic and social values through information sharing.[669]

In 2012, for the first time for a large-scale local government in Korea, the SMG adopted a Residents' Participation Budget System. Of the approximately USD 19,090 million in the annual city budget, residents will be able to decide how around USD 45 million should be utilized. For 2013, USD 42 million was spent on 120 projects proposed by residents.

Creative Governance, as viewed from the perspective of city residents, is to identify residents' needs and the sources of inconvenience. Creative governance, in essence, aims to achieve two goals. One is to enhance Seoul's competitive edge, and the other is to improve the residents' quality of life. Most cities have systems to hear the opinions of their people and reflect them in governance. In Seoul, this is carried out through the 'Ten Million Imagination Oasis'. Under this initiative, policy workshops were held frequently to gather the opinions of experts and residents on SMG policies, and to reflect those views in future policies. The SMG also runs a variety of other communications channels to listen to and communicate with people. It also uses text messaging to collect people's opinions more quickly.

The SMG seeks to make Seoul a sharing city to help solve a variety of urban problems through people sharing space, things and information. Based on close cooperation among people, corporations and the city government, Seoul city shares resources needed for daily life such as parking lots, automobiles, rooms, books and tools. Its advanced IT makes such sharing easier.

#### *13.6.2.2 Smart City Initiatives*

The Smart City Initiatives, mentioned earlier, also aim to tap the potential of technology to improve administration and governance. Seoul has been relatively successful in this regard, topping the UN-supported Rutgers Global E-Governance Survey since 2003.[670]

However, other economies are catching up. Recognizing this, the city has launched Smart Seoul 2015, a three-phase plan that begins by building a smart infrastructure based on existing ICT projects (2011–2012). The next phase focuses on the provision of smart services (2013–2014) while the final phase moves ahead to develop smart services (2015). [671]

### 13.6.3 Public Finance

All these social and physical reforms require financial assets. In 2014, Seoul issued USD 275 million in local bonds but none in 2015. In 2013, total tax revenue in Korea was approximately USD 237 billion, of which the central government's share was 79 percent and the local government's 21 percent.[672] According to the Ministry of Strategy and Finance, national tax revenue includes income tax, corporate tax, value added tax, transportation and energy tax, education tax, liquor tax and other charges. Local taxes include local income tax, local consumption tax, acquisition tax, automobile tax, leisure tax, resident tax, tobacco consumption tax, regional resources and facilities tax, local education tax, property tax, and registration and licensing tax. Among these taxes, property tax and registration and licensing taxes are levied by autonomous *Gu*s (districts); others are city taxes in Seoul.

The SMG has two different revenue structures. One is independent revenue such as local taxes and non-tax revenues and the other is dependent revenue such as grants and subsidies from the national government. The total SMG budget increased from USD 22.895 billion in 2014 to USD 23.401 billion in 2015, with local tax revenue making up 53.4 percent of the total budget. In the general account, independent revenue such as local

tax and non-tax revenues makes up 81.6 percent of the budget while national subsidies represent only 11.2 percent.

National subsidies offer support for the development of social infrastructure and social welfare in the local government. In the case of Seoul, the share of dependent revenue is relatively insignificant in terms of the total city budget and Seoul (unlike many other local governments in Korea) enjoys an excellent level of fiscal independence. At present, Seoul has the most outstanding and stable financial structure of all local governments in Korea.

However, social welfare is the most significant and rapidly increasing expenditure in Seoul, consuming 34.3 percent of total spending. This trend will continue in the future due to the growing demand for social and welfare investment. The second largest spending is the support for autonomous *Gus.* Seoul provides over USD 3 billion in subsidies every year for autonomous *Gus* because of their limited ability to generate revenue. This subsidy is financially crucial for *Gu* management and also alleviates the financial imbalance between the regions. Support for the Seoul Metropolitan Office of Education is mandatory and includes subsidies for students, schools and free meals. These major expenditures take up over 60 percent of the total spending in Seoul. After these, spending on roads and transportation, and parks and the environment represents the greatest share.

In spite of the financial stability enjoyed by Seoul, the city also faces critical challenges. Increasing demand for social welfare, low birth rates, an ageing population, and income polarization are the dark side of the future financial environment in Seoul, as well as in Korea as a whole. To cope with these financial risks, the SMG continues to reform its fiscal structure through tax increases and reduction of spending as it focuses on fiscal efficiency and stability.

### 13.6.4 Development Planning

#### *13.6.4.1 Seoul's Urban Planning Structure*

With its explosive economic growth since the 1970s, demand for housing development soared in the private sector. Seoul needs to prevent sprawl and contain its housing development in an orderly fashion. The city established an institutional framework to manage new development or physical improvement of existing built-up areas. This framework is still effective. Brought into the legal system in 1981, the Urban Master Plan is comprehensive, proposing a 20-year vision and direction for development. To date, the SMG has developed and shaped the Urban Master Plan on four different occasions: in 1990, 1997, 2006 and 2014.

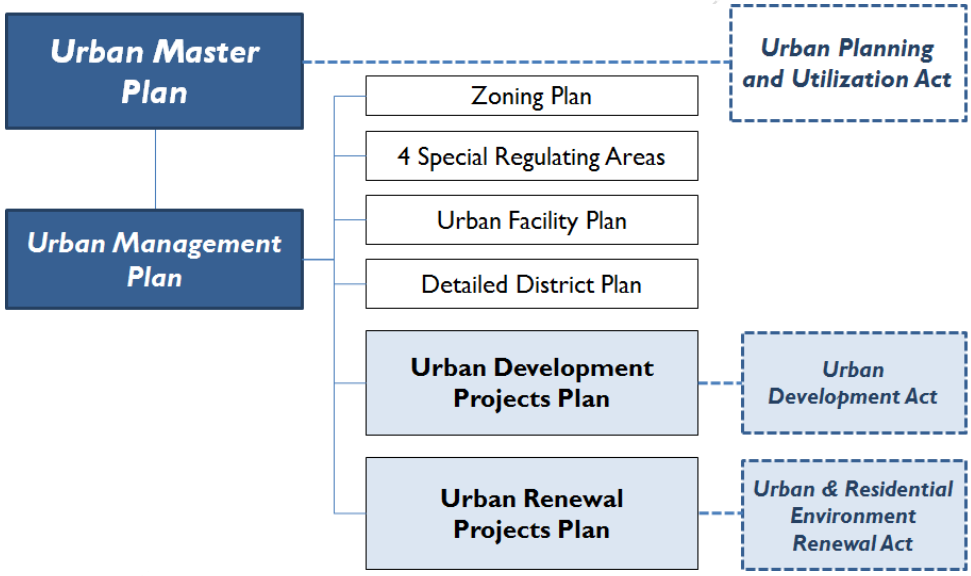
The Urban Master Plan presents directionality for the plans and sub-plans on spatial and land use. In other words, it is the top plan and serves as a guideline for carrying out lower-level plans (e.g. the Urban Management Plan, plans by sector, major independent plans) in a consistent manner. It embraces a wide range of fields – society and the economy, environment and energy, transportation, infrastructure, and culture and welfare. Due to its significance the Master Plan requires input from residents, experts, administrators, etc. which can be incorporated into the planning stage.

Along with the Urban Master Plan, the Urban Management Plan is crucial for managing new and existing development. While the Urban Master Plan acts as a citywide guideline, the Urban Management Plan provides the basis for restricting urban development at the level of individual lots. It includes the Zoning Plan, the Special Regulating Areas, the Urban Facility Plan, the Detailed District Plan; as well as the Urban Development Projects Plan and the Urban Renewal Projects Plan (Figure 13.8).

### *13.6.4.2 Status of Urban Development Programmes*

Pursuant to the Urban Planning and Utilization Act, urban planning programmes are categorized into urban development projects and urban renewal projects. The former refers to programmes implemented to develop new residential complexes or new built-up areas; its basis is in the Urban Development Projects Plan. Currently, the SMG pursues seven urban development projects.

**Figure 13.8 Plans to Guide Development in Seoul**




Source: Authors.

The second of the two programmes, the Urban Renewal Projects Plan, aims to restore and renew the deteriorating urban functions in existing built-up areas; its basis is in the Urban and Residential Environment Renewal Act. Urban renewal projects can be further categorized into housing redevelopment that targets residential areas with a high concentration of aged and deteriorating buildings; and city centre redevelopment that focuses on restoration of urban functions and target areas where promotion of commercial activities is necessary. In Seoul, 434 renewal projects have been implemented so far, and more are scheduled to be carried out in 492 target areas.

#### *13.6.4.2 Seoul's Urban Planning: Limitations and Challenges*

Since 2010, low growth has been the general trend and has affected the urban structure. Impacts include lower demand for urban development and a decline in land and housing purchasing power. Socioeconomic polarization has also become more entrenched. City centre redevelopment and housing rearrangement programmes have thus far been land owner- and demolition-oriented. These programmes were viable because the market structure guaranteed ample development profits. In the latest low-growth trend, however, such methods are no longer profitable. What is more serious is that this trend may be prolonged and even take root in society.

In the future, Seoul will be challenged to modify its urban planning system to suit this low-growth trend. For this, the city will need to: (i) pursue urban restoration, with a focus on people, not on physical improvement; (ii) revise the existing demolition-oriented development methods to meet the needs of local communities; (iii) engage the citizens and residents in the whole process, from planning to execution; and (iv) invest more resources in developing sustainable engines than pursuing short-term accomplishments. In fact, Seoul has developed comprehensive long-term urban restoration strategies and ensured consistency with the policies of the national government since 2014, working hand in hand with the local *Gu* districts and communities in building the necessary plans.

## 13.7 PARTNERSHIPS FOR SUSTAINABLE CITY DEVELOPMENT

To achieve various ambitious goals of the SMG, the city needs to establish partnerships with the private sector. Seoul has partnered with business networks (both global and local) and public institutions. Some of the public–private partnerships have binding formal structures and rules for the participating entities. Informal partnerships are not without their own merit since they can be flexible in responding to changes.

The types of partnerships are shown in Table 13.10. Seoul has 23 sister cities around the world, including San Francisco, Bogota, Beijing, Rome and Athens. However, Seoul lacks tangible developments from its international connections with cities abroad. To expand and strengthen these international partnerships, the SMG recently established a Global Urban Partnership Division at the Seoul City Hall. The division carries forward cooperative projects with various international organizations such as the Asian Network of Major Cities 21, the C40 Climate Leadership Group and the International Council for Local Environment Initiatives (ICLEI).

In the age of a 'new normal', the SMG has focused on creating decent jobs for residents through public–private partnerships and has mobilized local business networks to create jobs and attract investment into communities around Seoul. Such efforts continue within the city. In every urban regeneration project in Seoul, the SMG collaborates with communities and local industry to sustain economic activities and promote new opportunities. Project success is measured on the basis of economic development as well as physical improvement.

Three examples of best practice are described in the case studies below, each of which demonstrates Seoul's efforts to build a sustainable city: the Yonsei-ri Transit Mall Project; the Energy-Independent Villages; and the G-Valley Development. These case studies show how the urban environment and the economy can be transformed through public–private partnerships. We hope that Seoul's experience offers valuable lessons to cities in the APEC region.

**Table 13.10 Examples of Partnerships for Sustainable Development**

| | City | Economic | Governance | Infrastructure and development | Research and innovation | Labour and skills | Social and environmental | Technology |
|---|---|---|---|---|---|---|---|---|
| **Government** | | | | | | | International Council for Local Environment Initiatives (ICLEI) | |
| **City** | Asian Network of Major Cities 21 | | | Citynet | | | C40 Climate Leadership Group | |
| **Global business** | | Global business network | | | | | | |
| **Local business** | | Local business network | | | | | | |
| **Public utilities** | | | | | | | | |
| **Public institutions** | | | | Seoul Metropolitan Government (SMG) cooperating with the Korea Trade-Investment Promotion Agency (KOTRA), embassies | The Seoul Institute | Industry–university cooperation | | |
| **Community** | | Urban regeneration partnership | Dispute Resolution Committee | | | | Eco-Mileage Program | |
| **Other** | | | | | | | | |

Source: Authors.

### 13.7.1 Yonsei-ro Transit Mall Project

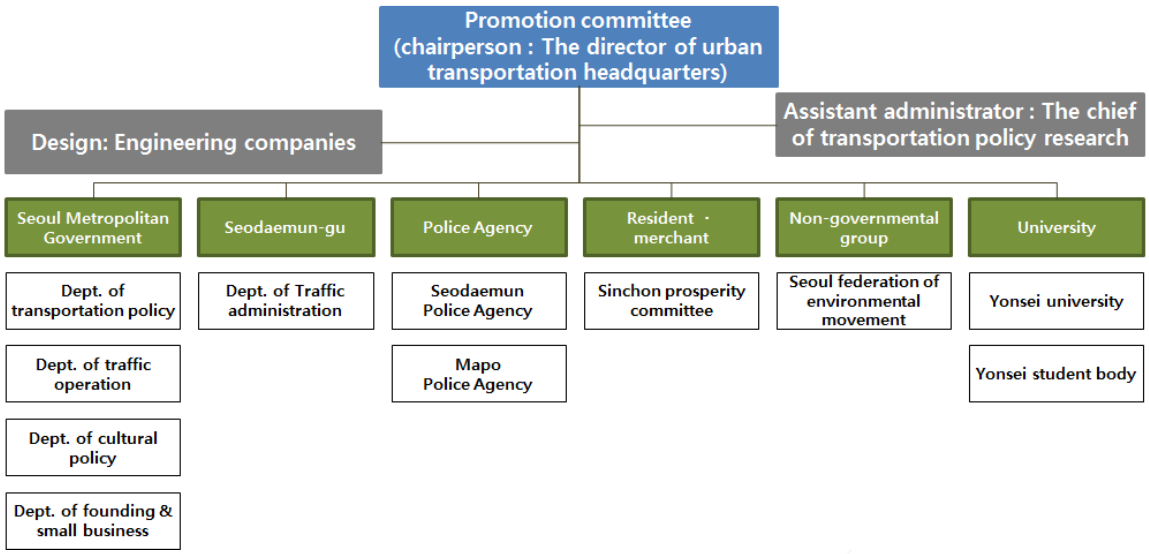
The Yonsei-ro Transit Mall Project is an example of how carbon dioxide emissions can be reduced by encouraging the use of public transport, and how local communities in the city centre can be revitalized. Seoul developed the Seoul Comprehensive Plan for Transit Malls in 2012. The idea is to not only encourage public transport but also provide a pleasant pedestrian environment for residents. Vehicles are not allowed within a transit mall, with the exception of public transport (e.g. trams, light rail, buses). Yonsei-ro was selected for the pilot project in August 2012.

**Selection of Candidate Districts**. In line with its policy of building an urban environment where people and public transport come first, Seoul began to review the introduction of the transit mall system in late 2011. The city worked with the Seoul Institute to establish the criteria for selecting candidates for the mall. Next, the city considered various elements such as land use, floating population, access to public transport, the number of public transport users, extension of target roads, road continuity, access to parking facilities, the presence of restricted access facilities, characteristics of the commercial district, and symbolic significance. Based on these assessments, the city finally selected Yonsei-ro.

**Minimizing Potential for Traffic Congestion Caused by the Transit Mall**. Yonsei-ro was a congestion-prone zone. To identify the cause of the congestion, Seoul monitored licence plates and examined the characteristics of vehicles entering and exiting Yonsei-ro. To devise a solution, the city implemented a Car-Free Day in Yonsei-ro once or twice a year to analyze the effect of vehicle restrictions on detours in the vicinity. Based on this, the city identified a detour route that could alleviate the congestion, and it built an intersection in front of the underpass for Shinchon Train Station.

**Management of Conflict between Interested Parties**. Because the transit mall restricts vehicle access, pedestrians may find access to the area inconvenient while vendors may experience a reduction in revenue. Yonsei-ro also experienced conflict between the SMG and other interested parties. The city, therefore, organized a programme committee and held public hearings. Seoul also made it a priority to be in constant communication with residents, and to talk to interested parties in the region to improve the traffic system and commerce. Table 13.11 lists some of the conflicts that occurred, and how they were resolved. The list illustrates how complex it is to resolve silo issues between public agencies and stakeholders within major inner city projects in Korea. In 2013, this project was selected as a successful example of conflict management by the city and by the central government in a joint evaluation. As the next step, a comprehensive project promotion committee was organized with six different institutions working together (Figure 13.9), and three subcommittees (Transportation, Design/Construction, and Public Relations).

**Figure 13.9 Promotion Committee for the Yonsei-ro Transit Mall Project, Seoul**




Source: Seoul Solution.

**Table 13.11 Resolving Conflicts between Major Stakeholders of the Yonsei-Ro Transit Mall Project, Seoul**

| Parties involved | Conflicts | Resolution |
|---|---|---|
| **Residents and merchants** | - Reduced business due to controlled vehicle access<br>- Congested nearby road networks due to detours<br>- Demand for large public parking facilities | - 80 percent of vehicles passing through cause congestion, but only a few enter the area<br>- The positive effects of the increase in the number of pedestrians for businesses in the area were explained, based on actual examples from home and abroad<br>- Ways to attract visitors explained (e.g. cultural events)<br>- Effective transportation plans (e.g. detour, new intersection)<br>- Traffic simulation results explained<br>- Extra parking capacity after investigating parking facilities in the Shinchon area<br>- Agreement signed with Hyundai Department Store and night-time discounts offered to merchants |
| **Hyundai Department Store** | - Reduced revenues due to access control<br>- Demand for a new intersection in front of Hyundai Department Store on Yanghwa-ro | - Potential issues from building a new intersection explained<br>- Allow left turns from Sogang Bridge to Donggyo-dong Intersection to secure an extra access route |
| **Seoul Metropolitan Police Agency** | - Concerns of traffic congestion from the extra crosswalk in front of Yonsei University and a new intersection in front of Severance Hospital | - Work with Yonsei University to simplify and link the signals by removing the straight-ahead/left-turn signals for vehicles leaving Yonsei University |

| | | |
|---|---|---|
| | | - Propose a detector that prevents lines of tailgating cars entering the intersection at the red signal<br>- The merchant's association can participate in a review of traffic safety facilities to understand necessity for the programme |
| **Korea Electric Power Corporation (KEPCO)** | - The definition of the programme as prescribed by the Urban Traffic Readjustment Promotion Act<br>- Moving of 40 power distribution units to be financed by the city | - The transit mall as prescribed by the Urban Traffic Readjustment Promotion Act is related to the operation of the roads. The construction itself is controlled by the Road Act.<br>- Three legal advisors were employed to argue that the mall is not consistent with the KEPCO guidelines and the Road Act. |
| **Street vendors** | - Demand to stay in the current locations even after transit mall opens<br>- Demand for a new intersection in front of Hyundai Department Store on Yanghwa-ro | - Proposal to move to alternative locations<br>- A council formed, consisting of the Seodaemun-Gu district office, the merchant's association and street vendors to develop a protocol that specifies the locations, numbers, sales methods, etc. |

Source: Seoul Solution.

**Pedestrians First**. Passenger vehicles are not allowed in the Yonsei-ro Transit Mall. For pedestrian safety, other types of vehicles are required to travel at 30km/h or slower. Vehicles seating 16 or more, vehicles for emergency use, and bicycles are allowed. To prevent congestion, taxis are only allowed between midnight and 4 a.m. when other modes of public transport are not in operation. Any vehicles that are necessary for business must obtain approval in advance and can only travel between 10 a.m. and 11 a.m., and between 3 p.m. and 4 p.m. All other vehicles are prohibited from stopping or parking on the road. From 2 p.m. every Saturday to 10 p.m. on Sunday, all buses passing through Yonsei-ro take a detour to protect the pedestrians-only system in the transit mall.

**Hub for Life and Culture**. From the beginning, the transit mall was discussed in the context of local, long-term development strategies. Due to vehicle access control, no through-roads were formed on either end of the intersection, and the space could be utilized to hold open theatres, festivals and oher events. There is space for spontaneous performances (without the need to go through the complicated administrative process). Such liberal use of space by the public helps create a culture unique to Shinchon and provides visitors with more to see and enjoy.

**Benefits**. In the six months after the transit mall opened, traffic accidents decreased by 34 percent over the previous year. When surveyed, a majority of people said they felt much safer than when both people and vehicles used the roads. Many responded positively to questions on user convenience and improved appearance. Another survey on bus routes showed an increase in bus ridership of 11.1 percent between the first quarter of 2013 and the same period in 2014. This was due to the fact that congestion in Yonsei-ro had substantially improved, the timely bus service and the transition of the area into a transit mall. The mall also brought financial benefits. Compared with 2013, the number of visitors to the shops in Shinchon rose by 28.9 percent, the number of transactions that resulted in revenues increased by 10.6 percent and total revenues increased by 4.2 percent.

The first transit mall in Seoul has been rated a success. Plans are being reviewed to turn this area into a complete pedestrian-only zone in the future. Another candidate district is also being reviewed. The current transit mall on Yonsei-ro, however, is still in its infancy and lacks adequate amenities, trees and landscaping, and other necessary facilities. Moreover, there may be issues in the future that have not been revealed just yet. Before moving onto a second candidate, it would, therefore, be wise to review the problems of the first example and take necessary countermeasures.

### 13.7.2 Energy-Independent Villages

Seoul's energy consumption has been steadily on the rise, but the city's power self-sufficiency rate is only 2.95 percent (as of 2011). When disaster hit the Fukushima nuclear plant in March 2011, public awareness of the dangers of nuclear energy became widespread, and people began to worry more about a sustainable future for the next generation. At a public forum in 2012, a year after the Fukushima disaster, a plan for an Energy-Independent Village was first officially proposed and later became one of the projects under the One Less Nuclear Plant policy that was announced by the SMG in May 2012. It was against this background that the project was launched in the latter half of 2012.

The aim of Seoul's plan to build energy-independent villages through private–public collaboration is to encourage the public to save energy, be efficient in energy use, and produce renewable energy at the local level. This will enhance the energy independence of local communities.

**Photo 13.2 High Concentrations of Solar Power Panels Installed on Homes in Shipjaseong Village**

Source: Guangdong-Gu District Office.

**Implementation.** The Energy-Independent Village programme is based on public bidding, with final candidate communities selected from applicants that submitted plans, and provided with financial assistance. The programme does not support multiple

candidates simultaneously but focuses its assistance on communities that show significant enthusiasm for the project. Support is continuous to help improve achievements. Interim reports determine adjustments to the subsidy. Assistance may be extended for up to three years according to annual performance, with subsidies used for energy consultations, energy saving, energy efficiency, and installation of renewable energy facilities.

**Designation of Energy-Independent Villages.** As of 2014, 15 Energy-Independent Villages had been designated. Eight are detached housing communities, and seven are mostly multi-household housing. Figure 13.10 shows their locations. Six villages participated in the programme launching in 2012, with four joining in 2013, and five in 2014.

**Figure 13.10 Energy-Independent Villages in Seoul**


Source: Authors.

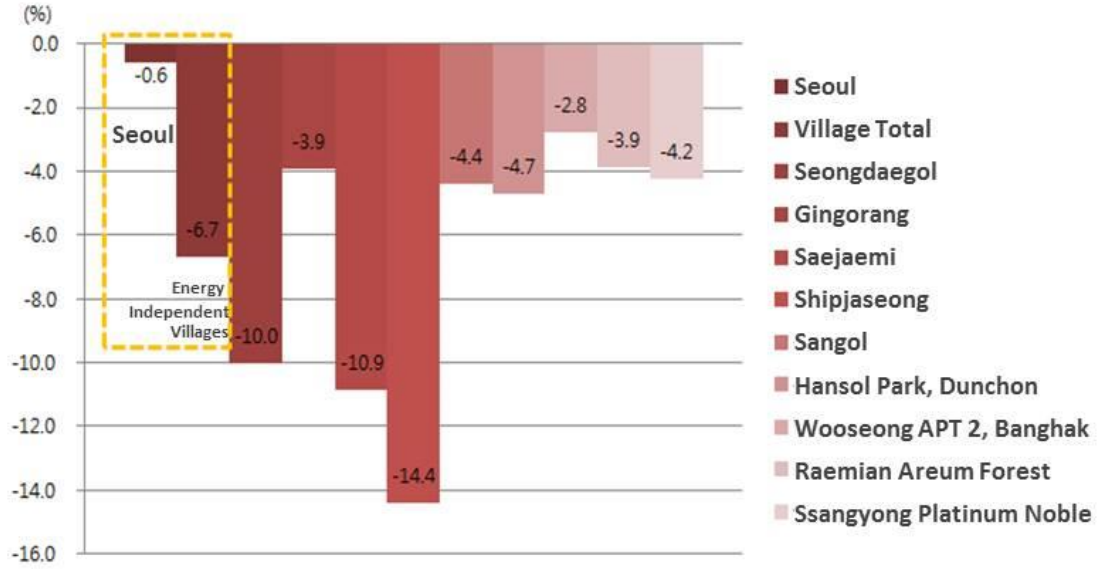
**Energy-saving and Efficiency Initiatives.** The Energy-Independent Village programme has led to the development of a number of energy-saving and efficiency initiatives by local communities. One is the Energy Saving Centre in Seongdaegol. At this Centre, the monthly energy consumption of participating households is displayed in bar graphs so participants can check their own usage and compare with others, helping them learn more about energy and motivating them to save energy. This system was shared and soon spread across the city. Some *Gu* districts such as Jongno and Seongbuk have selected this as one of their main initiatives. The energy efficiency initiatives launched by the Energy-Independent Villages include energy diagnostics, insulation, window systems and building retrofit projects. In multi-household housing, lights in public areas were replaced with LED while detached housing communities chose to conduct energy diagnostics. Some of the other participating households focused on efficiency by stopping drafts, installing LED, and replacing window systems.

**Community Production of Energy.** In urban areas, it is not easy to build energy production facilities due to the low number of home owner-residents, inadequate types of natural energy sources, insufficient energy reserves and lack of space. Nonetheless, the Energy-Independent Villages have endeavoured to provide the necessary facilities to produce energy. They have installed and expanded the use of solar power and miniature generators, and other such facilities.

In areas with a high concentration of detached housing, 3kW solar power generators have been installed. One of these areas is Shipjaseong Village, where 60 percent of the participating households opted for solar power. In areas with multi-household housing, some have installed photovoltaic power generators on rooftops and share the produced energy, but generally, the residents chose to install small generators on their balconies. From 2014, the SMG began providing all-out assistance to distribute small photovoltaic power generators in collaboration with the Energy-Independent Villages programme.

**Results.** As of 2013, total household power consumption of the city was 13,319,847 MWh, down by 81,595 MWh from 13,401.442 MWh in 2012, or about 0.6 percent of the power use in all of 2012. In 2013, power use by the Energy-Independent Villages was 15,004,063 kWh, down by 1,074,699 kWh from 16,078,762 kWh in 2012, or approximately 6.7 percent of the total consumption in 2012. As such, the villages saved at least 10 times the energy that other households did during the same period in 2013 (Figure 13.11). This is one of the most significant achievements of the programme.

**Figure 13.11 Power Savings in 2013 and 2012, Seoul and the Energy-Independent Villages**




Source: Authors.

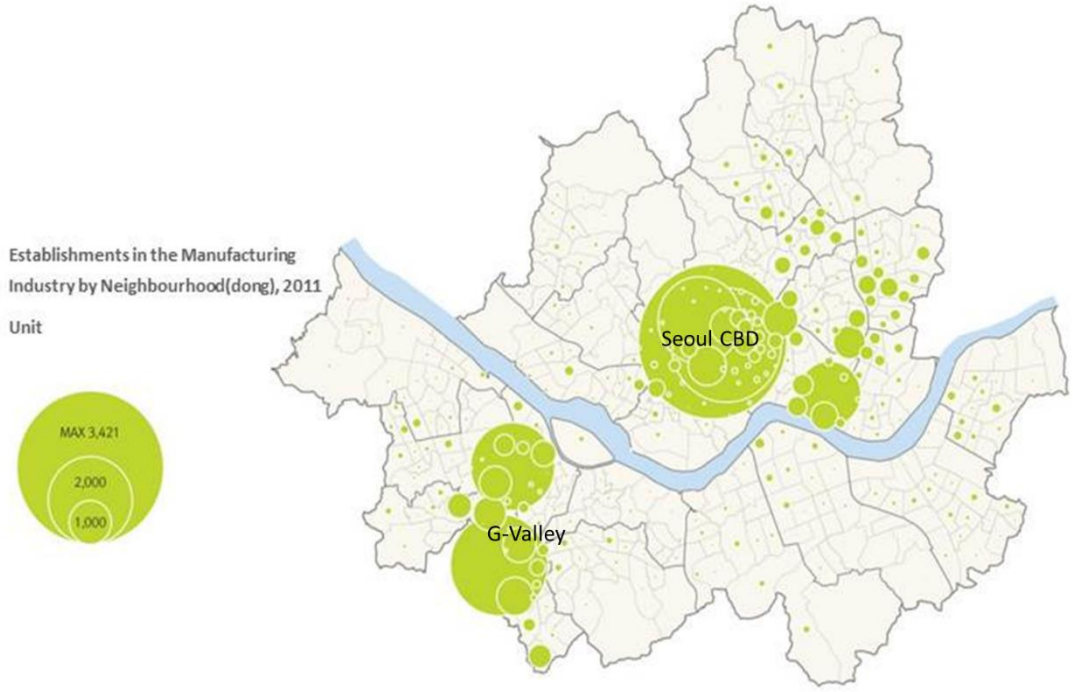
**Challenges**. When the SMG announced the 'Sustainable Energy City, Seoul' (Environment Policy, Seoul City Climate Headquarters), the second phase of the One Less Nuclear Plant programme, in August 2014, it said its plan was to increase the number of Energy-Independent Villages to 200 by 2018. However, it is important to note that voluntary participation is crucial, and the programme cannot be implemented over a short period. It is crucial to work with the residents to make the villages sustainable.

The city plans to make necessary adjustments to the programme and organize a network that involves residents, activists and administrative organizations. By doing so, the city will be able to offer training on saving energy or other learning opportunities, enhance the efficiency of energy use, and install renewable energy generators. The villages will be encouraged to continue their efforts based on the firm platform created by the city, which will increasingly advance the energy economies of local communities. Continued collaboration between residents, the city and the relevant systems will help them work together to find the best solutions to local energy issues and improve energy self-sufficiency.

### 13.7.4 G-Valley Development

Innovation can be also found in the economic development of Seoul. There is a key industrial hotspot at the southwest end of Seoul, between Guro-gu and Geumcheon-gu. It is a manufacturing centre, as seen in Figure 13.12. The hotspot embraces Seoul Digital Industrial Complex, which is one of three industrial complexes in Seoul, and one that has been dramatically transformed from one of the oldest industrial complexes in Korea (let alone in Seoul) into a unique high-tech industrial district.

**Figure 13.12 Establishments in the Manufacturing Industry by Neighbourhood (*Dong*), Seoul, 2011**




Source: Seoul Institute e-Cluster.

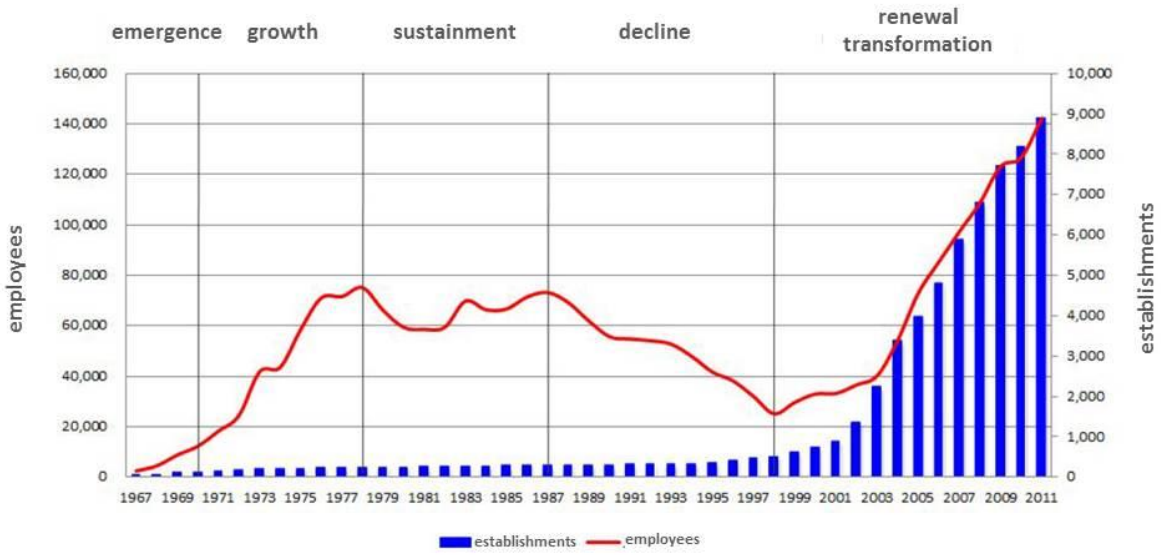
The previous name for the Seoul Digital Industrial Complex was Guro Industrial Complex (G-Valley), named after the Guro neighbourhood, the original name of the place in which it is located. The complex began with eight sewing and textile companies in the late 1960s. Until the late 1970s, textiles dominated the industrial structure of the region, with electronics becoming the leading industry in the 1980s. In the 1990s, Guro Industrial Complex, due to the availability of cheaper land and labour at other industrial complexes (both in and outside Korea), lost its competitive edge and the region suffered a steep industrial decline. The Asian financial crisis of 1997 was a real disaster for the complex, but also motivated local businesses to get together and for change.

When new IT businesses opened in the Guro area, they were given tax breaks and other forms of financial assistance. The SMG also provided educational opportunities for these new start-ups, and it facilitated connections to academia, where advanced, unrealized technologies could be sourced. In essence, the development of the Guro area was initiated by the private sector, but the role of the public sector was not insignificant in terms of financial and technical assistance.

In the early 2000s, the complex was renamed the Seoul Digital Industrial Complex and successfully transformed into an IT and high-tech centre. Figure 13.13 shows that the number of businesses increased more than tenfold, and total workers more than fivefold in the 2000s. In 2013, more than 160,000 employees worked for about 12,000 companies at the complex, in businesses ranging from manufacturing to services. Now Seoul Digital

Industrial Complex is the most densely packed and most diverse industrial complex in Korea, and a state-of-the-art technology centre.

**Figure 13.13 Trends in Establishments and Workers at the Seoul Digital Industrial Complex**




Source: Korea Industrial Complex Corporation (KICOX).

Many factors have influenced the evolution of the complex, for better or for worse. Researchers agree that the successful transformation of the complex resulted from passing through the windows of opportunity at the right time. When the IT industry became the new engine of growth in the 2000s, it required an enormous amount of new industrial space in a short period. The complex was able to convert its old factory buildings into apartment-type factories in good time, becoming a new model for high-density, compact industrial space. It was ultimately able to provide sufficient space for the fast-growing IT companies in the city. From 1997 to 2000, apartment-type factories in the complex increased from 4 to more than 100 buildings. Now the vast majority of companies at the complex are located in these apartment-type factories.

Recently, tenants at the Seoul Digital Industrial Complex have given the complex a new nickname, ‘G-Valley’, after Silicon Valley, and have since enthusiastically promoted a new governance structure of academia, industry and government. Certainly, it is a hard task now to envision the image of G-Valley in the future, but it is safe to say that the relentless evolution of the Seoul Digital Industrial Complex is well underway.

## 13.8 CONCLUSIONS

Through the last half of the twentieth century, the Korean economy went through a remarkable transformation amid a rapidly increasing population. To people outside Korea, it is known as the 'Miracle on the Han River'. Seoul was the centre of this sensational development. With housing booms and high-rise apartments, increased car ownership and growing manufacturing companies in the city, Seoul had to keep up with the demand for better infrastructure and more energy, which it was more or less successful in doing through building and managing key strategic infrastructure.

Seoul now has an extensive roadway network of 8,173km, along with inner and outer ring highways, that facilitates the movement of 3 million vehicles. The city is very much oriented toward public transit as well, with 9 rail lines and 7,500 buses in operation every day since the first subway line opened in 1974. Commitment to education has resulted in approximately 40 universities making the city their home. Electricity is provided through a stable network. To handle increasing development pressure, the SMG regulates land use through its planning authority. The Urban Master Plan and Urban Management Plan have been important planning tools and are still critical.

In the process of developing a growing city, there have been unintended consequences of drastic changes. The building of roadways accommodated the growing transportation demand but attracted more car ownership rather than encouraging the use of public transit. Thermal power plants emit greenhouse gases. Although physical improvement is visible in the city, environmental issues have become problems. Moreover, social and economic polarization has increased in the city, and this is becoming more apparent with the spread of neo-liberalism across the world, including Korea. In a nutshell, Seoul has been successful in addressing and managing urban development. At the same time, it continues to take on the challenges posed by transport, environmental and social problems.

Today, sustainability is the definite underlying principle of any urban policy or programme in Seoul. The SMG is making every effort to convert urban policy and programmes into useful tools to handle growth in a sustainable way. The One Less Nuclear Plant programme, the bus system reforms in 2004, its Smart City Initiatives, and the Seoul Creative Governance vision are all innovative urban policies to promote this sustainable development. The SMG realizes that sustainability can be achieved when old problems from the growth orientation of the past are acknowledged and tackled.

Public–private partnerships in various forms are also important parts of this sustainable development. These partnerships range from cooperation with international entities and global business networks to partnering with communities in urban regeneration projects. The case studies in this chapter provide more detailed examples of partnerships for sustainable development.

We believe there are lessons to be learned from Seoul's experience, and good practices can be adapted and applied to cities in the APEC region. The lessons are perhaps especially relevant to cities presented with new economic opportunities such as Manila, Bandung and Lima. When there are prospects for economic growth, it may be easy to overlook some aspects of sustainability, as a city government gives higher priority to economic growth and decides to take care of sustainability later. The experience in Seoul

indicates that the public sector must continue its policy efforts to focus on sustainability while handling economic growth.

Cooperation and constant communication with communities are also critical to translate sustainable development into practice. As seen in the case studies, it is important to be as inclusive as possible in identifying interested parties. Most importantly, interest groups should include members of communities. Their cooperation and understanding are critical to the success of any project.

Seoul, the capital of an 'Asian Tiger', is evolving from a growth magnet of the world into a centre of sustainable development actions. Seoul has thus far been successful in altering its course to cope with its increasing social and environmental challenges. While it is difficult to predict the outcome, it is hoped that current sustainable development efforts will benefit residents for years to come.