One Less Nuclear Power Plant, Phase 2

Seoul Sustainable Energy Action Plan

Climate & Environment Headquarters
Seoul Metropolitan Government

Seoul

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Energy self-reliance made by citizens, Seoul is changing.

Won-soon Park
Mayor of Seoul

It has been about 800 days since I made an official announcement of the launch of Seoul's flagship energy policy titled "One Less Nuclear Power Plant", which I had believed would bring the future I pictured for our future generations.

Seoul worked tirelessly. So many people, individually and in their many affiliations, supported and joined our endeavor to take responsibility to reduce Seoul's energy consumption and improve the city's general energy culture.

Over 20,000 young students voluntarily presented ideas on what they can do at school to save energy. They dedicated their summer and winter vacations to campaign for energy-saving on campuses. Religious organizations like Buddhist temples, Christian churches and Catholic churches also joined us to make Seoul healthier for our children through their voluntary energy-saving activities.

World-renowned energy scholars provided invaluable input and strong support both online and offline for the success of the "One Less Nuclear Power Plant." Talent donation from people from all walks of life followed. As part of the program, the Seoul Metropolitan Government allowed its staff for the first time in its history to wear shorts in office during the hot summer days. 1.65 million members of the Eco-Mileage Program voluntarily changed their energy consumption behaviors and culture.

With one mind, we saved energy in our daily lives and our collective efforts prevented Seoul from another blackout during both hotter summer and colder winter days than ever. Together, we turned an impossible dream into reality. Step by step, Seoul has changed.

People generally think that it is not easy for a megacity like Seoul to achieve such a shift. In fact, a lot of cities worldwide frequently ask me to share the key to Seoul's such success. My answer to the question is always the same: "Citizens are the main driver of Seoul's energy policies."

Now we are launching the Phase 2 the "One Less Nuclear Power Plant." As proven in Phase 1, I have no doubt that Seoul can accomplish the goals of the new energy policy as long as we believe in ourselves and join hands with our citizens.

There is a Korean adverb "Shinmyungnage," which we use to express a real fun and a sheer joy. I think I can go as far as to say that we all worked "Shinmyungnage" during the 26 month-long journey in transitioning toward sustainable energy and making history.

I am now rolling up my sleeves once again to make another history with our citizens. In our journey to make that history, we will fulfill our vision of energy self-reliance and energy-sharing.

Seoul will improve necessary institutions to promote sustainable energy and photovoltaic power systems will be further introduced throughout the city. Seoul Special City will transform itself into Green Special City. Our children will grow into responsible adults who care about Seoul, the world, and the future of the planet.

Please listen to our story, give us your support and join us on our happy journey to make a transition toward a truly sustainable city. Please remember that Seoul will always behind you.

Thank you very much.

"I fully support for the history of hope made by One Less Nuclear Power Plant, and its new start."

In-Ryung Shin
Co-chair of the Citizens' Commission for
One Less Nuclear Power Plant

I am very overwhelmed by the successful completion of the Phase 1 of the One Less Nuclear Power Plant and the launch of the Phase 2.

I am very amazed and proud Seoul achieved its goal of reducing 2 million TOE of energy, the capacity of one nuclear power plant in less than just two years and is now setting yet another ambitious goal of becoming an energy self-reliant city.

What's most notable, among others, is that the plan for the Phase 2 was developed with the "Citizens' Commission for One Less Nuclear Power Plant" at the center. Critics say that a lot of so-called commissions exist only in name, but our commission sets itself apart from them as it takes the lead in soul-searching and discussions necessary for policy setting. The Citizens' Commission has steadily made substantial progress, and I believe that all members of the commission find it very rewarding to be a part of it.

The direction for the Phase 2 was set through more than 20 meetings over 6 months. Public opinions were collected through town hall meetings, the 2013 Seoul International Energy Conference and other events. As such, the Citizens' Commission is in the vanguard of promoting civic engagement in the policy setting of the One Less Nuclear Power Plant.

Core values of the Phase 2 are "Energy self-reliance, sharing and participation". I firmly believe that if these values are fulfilled, citizens of Seoul could restore conscience as they have long enjoyed the electricity generated at the expense of people in the Southeast and the Southwest regions, where nuclear power plants and power transmission towers are concentrated.

The country's oldest nuclear power plant, Kori Unit 1, has well passed its design life, sparking concerns among the public. Korean people still grieving from the April Sewol Ferry tragedy claim for the immediate shut down of the plant for fear the old nuclear reactor could lead to a disastrous accident. Continued operation of the 30 plus- year old Kori Unit 1 can never be justified, when we all have just witnessed the disastrous consequences of the Sewol Ferry sinking. I think that the success of the Phase 1 make another strong case against the operation of the Kori Unit 1. In this sense, the One Less Nuclear Power Plant is not just an environmental policy but also a security policy in the face of a risk of dangerous nuclear crisis.

I have a strong conviction that the achievements of the Phase 2 will point to a new direction of autonomous administration that departs from increasing inhumanity and anti-life sentiment.

In conclusion, I would like to extend my sincere gratitude to all the experts, civic activists, staff of the Seoul Metropolitan Government and other relevant public organizations for their tireless work toward the One Less Nuclear Power Plant.

Thank you very much.

I will always support all of you.

01

One Less Nuclear Power Plant, Phase 1

SEOUL

One Less Nuclear Power Plant, Phase 1

To cope with the energy crisis and climate change across the world, the Seoul Metropolitan Government (SMG) launched the "One Less Nuclear Power Plant, Phase 1" initiative in April 2012 and fulfilled its goal in June 2014, six months ahead of schedule.

1. Outline of "One Less Nuclear Power Plant": Seoul's Regional Energy Policy

1) Policy Background

Imminent energy crisis including the national blackout on September 15, 2011

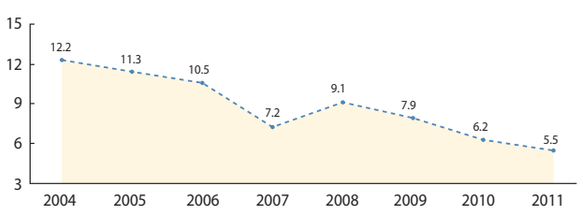
In 2011, the electricity self-reliance rate of Seoul was a mere 2.8%, whereas its energy consumption accounted for 10.9% of the nation's total energy consumption. The city's energy consumption was on the rise, marking a 12% increase between 2006 (41,824GWh) and 2011 (46,903GWh).

Seoul's reserve margin dropped from 12.2% in 2004 to 5.5% in 2011. On September 15, 2011, a large-scale blackout occurred in many parts of the country including Seoul. Since then, Korea has never been free of worries of power outage. Seoul felt a strong urge to raise its energy self-reliance rate.

To secure the ability to cope with such situation, Seoul needed to reduce its electricity consumption and increase its production of renewable energy, which became the top priority in its energy policies.

Energy Guardian Angels Corps

[Changes in Reserve Margins for Seoul]



※ Reserve Margin : [(supply capacity - peak demand) / peak demand] × 100%

Need for Expanding Renewable Energy Production to Cope with Climate Change

In 2011, Seoul produced 250,000 TOE of new and renewable energy or a mere 1.5% of its total energy consumption; which was much lower than the national average of 2.7% and the rates of Japan (4.7%) and USA (8.1%).

Most notably, 95% of the renewable energy came from waste and biogas, with only 2% produced from photovoltaic panels and solar thermal energy systems. Seoul badly needed to increase the proportion of new and renewable energy in its energy portfolio by taking full advantage of remaining spaces to prove its strong commitment to combating global warming.

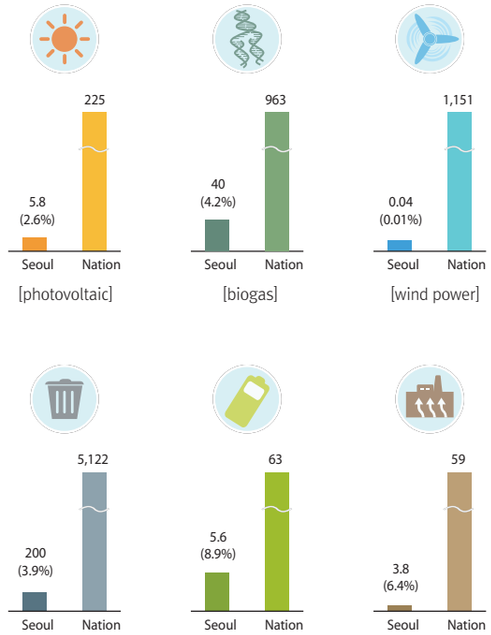
Practical Alternatives Required in the Wake of the Fukushima Nuclear Disaster

The Fukushima nuclear accident in March 2011 triggered stronger opposition to nuclear power plants due to worries of radiation damage across the world, with Germany vowing to shut down all of its nuclear power plants and a number of other countries abandoning their nuclear power plants.

In 2011, Korea produced 31% of its electricity (154,500GWh out of 496,900GWh) from nuclear power plants while pursuing ambitious expansion of its nuclear power capacities, which led to mounting public concern over the nuclear safety and radioactive waste disposal from a mid-and long-term perspective. SMG was faced with the challenge of finding practical alternatives.

Enhanced Necessity of Managing Energy Demand amid Rising Oil Prices

As Korea's dependence on oil imports reached 96% in 2012, fluctuations in oil prices required energy demand management. To maintain economic and social stability, stable energy demand management emerged as a compelling issue for SMG.



College Students' Performance for GHG Emission Reduction

2) Overview and Progress of One Less Nuclear Power Plant, Phase 1

Announcement of the "Comprehensive Plan for One Less Nuclear Power Plant"

On April 26, 2012, SMG announced the Comprehensive Plan for One Less Nuclear Power Plant, a practical yet future generation-oriented regional energy policy taking into account the characteristics of the city's localities and energy supply and demand.

The comprehensive energy plan was aimed at breaking the city's pattern of increasing energy consumption and reducing its energy consumption by 2 million TOE – equivalent to the amount of electricity produced by an average nuclear power plant in Korea – by the end of 2014 through the introduction of new energy efficiency and conservation measures and production of new and renewable energy.

Specifically, the plan encompassed six areas: expansion of new and renewable energy production; building retrofit program (BRP); establishment of environmentally-friendly, high-efficient transportation system; job creation in the energy industry; shift to a low-energy, urban spatial structure, and; creation of a civic culture promoting energy conservation. The 6 areas were composed of 23 policy tasks and 71 programs.

The total amount of budget required for implementing the plan for three years by 2014 was estimated to be KRW 2.78 trillion. By types of financing source, KRW 414 billion would come from SMG budget, KRW 184.6 billion from the national budget and KRW 2.19 trillion from the private sector. 89% of the total budget will be injected into the production of new and renewable energy and 6% will go into BRP.

Once completed, the plan is expected to yield import-substitution effects of around 1,560 barrels of crude oil or approximately KRW 2.8 trillion(USD 2.8 billion) each year starting 2014. The annual substitution of crude oil also translates into reduction of 7.33 million tons of greenhouse gas or creation of forest over an area of 7,330 square kilometers, thereby helping ease global warming.

Policy Establishment and Implementation through Citizen Engagement

Diverse civic groups have participated in the establishment and implementation procedures of the One Less Nuclear Power Plant initiative. From January to April 2012, SMG held 16 meetings with the Hope Policy Council and representatives of various civic groups to finalize a draft of the comprehensive plan. On February 21, 2012, it held a Public Opinion Listening Workshop with citizens to listen to their views regarding the directions of the plan. Finally, SMG held a Grand Town Hall Meeting on April 16, 2012 to reflect citizens' evaluation of the details of the plan on the final version.

Grand Town Hall Meeting

Implementation Council for One Less Nuclear Power Plant

Citizen engagement is also crucial for the successful implementation of the One Less Nuclear Power Plant initiative. SMG formed the "Citizens' Council for One Less Nuclear Power Plant" and "Implementation Council for One Less Nuclear Power Plant" in April 2012 with representatives from a wide range of fields such as environment, energy, business, religion, and education in an effort to promote joint governance between the public and private sectors in the energy sector.

The Implementation Council consisted of four subcommittees in the professional areas of energy production, energy conservation, energy efficiency, and communication with citizens. For the past two years, it had held 13 general meetings and 28 subcommittee meetings to implement the initiative successfully and achieve its goal ahead of schedule.

For effective implementation of One Less Nuclear Power Plant initiative, SMG reshuffled its administrative organization. One Less Nuclear Power Plant Task Force, consisting of One Less Nuclear Power Plant Team and Energy Citizen Cooperation Team, was newly launched. One Less Nuclear Power Plant Team was in charge of supervising overall project and Energy Citizen Cooperation Team served as a communication channel with citizens.

In July 2012, SMG amended the "Seoul Metropolitan Government Energy Ordinance" to secure the institutional foundation for the establishment of the Citizens' Council for One Less Nuclear Power Plant and the promotion of the initiative. It also commissioned the Seoul Institute - the affiliated research center for Seoul policy development - for the establishment of a system for measuring and evaluating the results of the initiative. In an effort to boost citizen engagement, SMG has provided incentives to citizens, civic groups, and businesses for their contributions to the initiative, signed 60 MoUs with various businesses and civic groups, and launched more than 100 public contests related to the initiative.

MoU with Civic Groups and Businesses

2. Accomplishment : Achievement of 2 Million TOE

1) Achievement of 2 Million TOE Goal in the first half of 2014

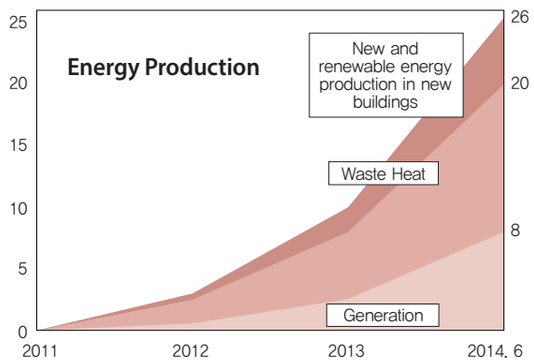
SMG surpassed its 2 million TOE goal for the One Less Nuclear Power Plant initiative by the end of 2014, recording 2.04 million TOE in the first half of 2014 based on citizen engagement and policy consensus.

(Unit: 10K TOE, as of June 2014)

	Total	Energy Production	Efficient Energy Use	Energy Conservation
Goal	200	41	111	48
Achievement	204	26	87	91

Social Fiction Event on One Less Nuclear Power Plant, Phase 2

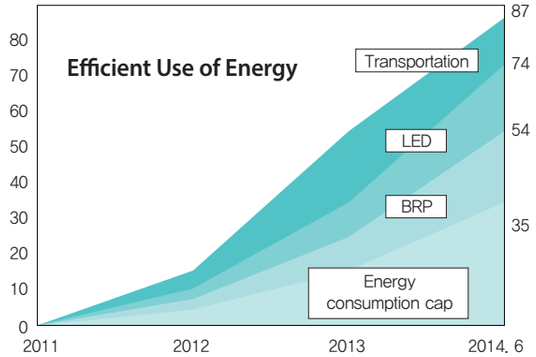
Through energy production, SMG posted 259,533 TOE – 57,403 TOE by securing decentralized energy sources such as PV panels, 119,218 TOE through the recovery of heat from incineration and wastewater treatment, and 82,912 TOE from new and renewable energy production in new buildings.



(Unit : TOE)

Energy Production	259,533
Power Generation (PV panel, hydrogen fuel cell, etc.)	57,403
Waste Heat Recovery (wastewater, incineration), Geothermal, Regenerative Power	119,218
Environmental Impact Assessment	82,912

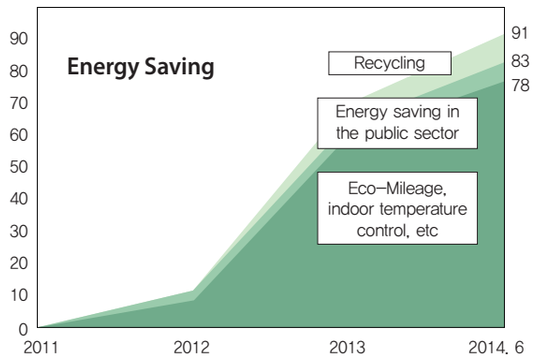
Through efficient use of energy, SMG recorded total reduction of 869,024 TOE: 352,098 TOE through the energy consumption cap for new buildings; 192,304 TOE through BRP; 201,252 TOE through LED replacement, and; 123,370 TOE through eco-friendly transportation.



(Unit : TOE)

Efficient Use of Energy	869,024
Energy consumption cap	352,098
BRP	192,304
LED	201,252
Transportation	123,370

SMG realized total reduction of 910,285 TOE thanks to citizens' active participation in energy conservation efforts: 777,376 TOE through the Eco-Mileage program, indoor temperature control, etc.; 55,302 TOE through energy saving in the public sector, and; 77,607 TOE through recycling.



(Unit : TOE)

Energy Saving	910,285
Eco-Mileage Indoor Temperature Control	777,376
Energy Saving in Public Sector	55,302
Recycling	77,607

2) Major Accomplishments of Phase 1

The accomplishments of One Less Nuclear Power Plant, Phase 1 – made through the production of new and renewable energy and conservation of energy – were confirmed by reduction of the city's energy consumption. Since 2012 when SMG launched the One Less Nuclear Power Plant initiative, the city has shown changes in its consumption of electricity, gas, and petroleum and registered reductions.

When the national electricity consumption registered a 4.9% increase in 2014 compared to 2011, electricity consumption in Seoul dropped by 4% to 45,019 GWh over the same period or a 3.3% decline year-on-year. Given the fact that Daegu and some other big cities in Korea with the same socioeconomic structure as that of Seoul recorded increases in electricity consumption, the city's reduction of electricity consumption was quite impressive. One Less Nuclear Power Plan initiative seems to play a key role in reducing SMG's electricity consumption.

[Electricity Consumption of Nation and Major Cities]

(Unit: GWh)

	2011	2012	2013	2014	Rate (2011→2014)
Nation	455,070	466,593	474,849	477,592	4.9
Seoul	46,903	47,234	46,555	45,019	-4.0
Daegu	14,822	14,955	15,080	14,859	0.2
Gwangju	8,047	8,131	8,274	8,197	1.9
Daejeon	9,060	9,160	9,225	9,103	0.5

Electricity consumption by household in Seoul dropped by 290kWh in 2014 from 2011, showing a greater decline than other cities. The higher energy conservation was attributable to citizen participation in saving energy.

[Household Electricity Consumption in Seoul and Major Cities]

		Seoul	Daegu	Gwangju	Daejeon
Residential Electricity Consumption (GWh/yr)	2011	12,952	3,028	1,744	1,804
	2014	12,892	2,974	1,841	1,826
No. of Households (1K)	2011	3,213	821	471	483
	2014	3,441	870	517	522
Household Electricity Consumption (MWh/yr)	2011	4.03	3.69	3.70	3.73
	2014	3.74	3.42	3.56	3.50
Amount of Decline (kWh/household, yr)		290	270	140	230

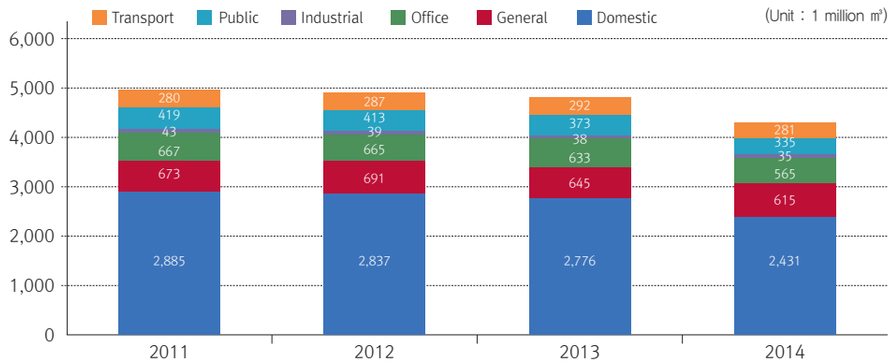
The consumption of natural gas in Seoul dropped by 13.5% or 694,000 TOE in 2014 compared to 2011. The decline was largely driven by drops in the use of gas for domestic and industrial use, which fell by 15.7% and 15.3% respectively.

[Natural Gas Consumption in Seoul by Year]

(Unit : 1,000 ㎥)

2011	2012	2013	2014	Rate (2011→2014)
4,927,023	4,931,781	4,756,918	4,262,032	-13.5% (664,991)

[Natural Gas consumption by Usage]



Energy Conservation Campaign with Citizens

In terms of petroleum usage (gasoline, diesel, kerosene, LPG), Seoul posted a 1.9% increase or 76,403 TOE in 2014 compared to 2011. While petroleum consumption for domestic, public and commercial uses dropped, uses in the aviation, construction and power generation sectors increased. In addition, such increase was largely due to a rise in diesel cars.

[Petroleum Usage (Petronet, Jan. 26, 2015)]

(Unit :1,000 barrels, %)

	2011	2012	2013	2014	Rate (2011→2014)	Note
Nation	328,361	325,971	328,309	323,316	-1.5	Uses of kerosene, LPG dropped.
Seoul	31,156	29,629	29,906	31,755	1.9	Use of diesel increased.
Daegu	11,814	11,748	11,478	11,199	-5.2	Uses of kerosene, LPG dropped.
Gwangju	7,421	7,665	8,685	8,612	16	
Daejeon	7,202	7,270	7,635	8,036	11.6	

※ Number of registered cars grew by 1.2% (35,942 cars) (2,977,599 cars in 2011⇒ 3,013,541 cars in 2014).
- Number of diesel cars grew by 25%(117,104 cars) (468,604 cars in 2011⇒ 585,708 cars in 2014).

[Petroleum Usage in Seoul (Petronet, Feb. 23, 2015)]

(Unit :1,000 barrels, %)

	2011	2012	2013	2014	Rate (2011→2014)
Gasoline	10,408	10,243	10,106	10,336	-0.7
Kerosene	968	808	664	573	-40.8
Diesel	9,251	8,507	9,713	11,701	25.6
LPG	10,529	10,071	9,423	9,145	-13.1
Total	31,156	29,629	29,906	31,755	1.9

Such significant changes in the city's energy consumption pattern were partially attributable to the expansion of renewable energy production through PV panels and fuel cell and efficient use of energy. Yet, achievements of such projects were offset by growing energy consumption. Between 2011 and June 2014 when One Less Nuclear Power Plant, Phase 1 was completed, photovoltaic power generation capacity more than tripled from 22.6MW to 70.4MW; the number of buildings implementing the building retrofit project (BRP) soared from 475 to 2,267, and LED replacement skyrocketed from 200,000 to 6.79 million lights. During the same period, memberships in the Eco-Mileage program surged from around 500,000 to 1.68 million.

3. Major Accomplishments by Sector

1) Laying the Groundwork for Solar Power-Centered Production of New and Renewable Energy

To expand its production of new and renewable energy, SMG attracted KRW 300 billion (USD 300 million) from the private sector to invest in the production of clean new and renewable energy for 300,000 households. As of June 2014, SMG has invested KRW 63.5 billion (USD 63.5 million) in 3,762 (70MW) solar power stations as well as a total of 46MW fuel cell stations.

Solar Power (Total)	Permitted Power Stations	Fuel Cell Stations	Private Investment	Utilize Unused Energy
3,762 stations 70MW	20 ⇨ 188	46MW	Solar power KRW 6.35 billion Fuel cell KRW 2.3 billion	Wastewater heat, small hydro, dry sludge, waste heat

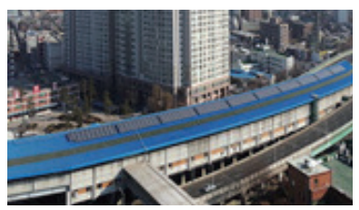
Expansion of PV Power Plants through Various Support Measures including Seoul-type FIT

SMG has installed 38 PV power plants (23MW) in the municipal facilities and generated KRW 450 million of profit every year by leasing idle public lands. PV power plants were installed with KRW 63.5 billion investment from the private sector.

SMG has also enhanced its administrative and institutional support measures to expand the small-scale PV power plants run by citizens. It has offered municipal land to four cooperatives for the installation of PV power stations. It has also shortened the period required to obtain a license for a PV power plant from 60 days to 30 days. In addition, SMG provided loans for a PV power plant with capacity of up to 150kW at a preferential annual interest rate of 1.75%. Through the Seoul-type FIT (Feed in Tariff), it supported KRW 50 (USD 5 cents) per kilowatt produced by a PV power plant. It also helped with the sales of REC (Renewable Energy Certificate) through MoUs with PV plant operators. Through either direct investments or subsidy payments, SMG has expanded the installation of PV power plants in schools to 117 locations including Gangbuk Samgaksan High School, which helped save KRW 10 million (USD 10,000) in electricity bills a year. In addition, SMG has developed and distributed small PV panels that citizens can participate in the production and installation in apartment house since 2014.

Gwangam Purification Plant (810kW)

Dobong Car Depot (700kW)



Guro Digital (100kW)

Construction of 46㎿ Fuel Cell Power Plants Generating Both Electricity and Heat

To help secure energy sources required to run the city's basic infrastructure, SMG has promoted the construction of fuel cell power plants using hydrogen as fuel as a decentralized energy system. Through an MoU with Korea Hydro & Nuclear Power Co., Ltd. in 2012, it attracted KRW 230 billion (USD 230 million) in investments from the private sector. In February 2014, SMG broke ground for the construction of a 20㎿ fuel cell power plant at the Godeok Car Depot, which was completed in October, 2014. In June 2014, it received an approval for the construction of another 20㎿ fuel cell power plant at Noeul Park in Worldcup Park. SMG set a plan to begin construction of fuel cell power plants at the Seonam Sewage Treatment Center and Sinnae and Dobong Car Depots in the second half of 2014 to supply power and heat to 225,000 and 45,000 households, respectively.

Using Heat from Incineration and Wastewater Treatment as New Energy Sources

To help reduce citizens' heating costs in winter, SMG has arranged for neighboring local governments to supply heat from their incineration and power generation to Seoul at low prices. It signed an MoU with the Euijeongbu City in March 2012, laid heat pipes, and began to be provided with 60,000 Gcal (6,000 TOE) of heat from the city's incineration facility for the Nowon District of Seoul on December 1, 2012. It signed a basic agreement with Bucheon City in February 2014 regarding the supply of 470,000 Gcal of heat from the city's incineration facility to Seoul; this was followed by the execution of an MoU between the two cities in June 2014. Meanwhile, the temperature of wastewater treatment effluent remains at 10℃ in winter, so it can be an excellent energy source for district heating. Additionally, SMG has recovered 190,000 Gcal of heat energy from the effluent of the Tancheon Sewage Treatment Center. It is installing the facilities required to recover 150,000 Gcal of wastewater heat from the Seonam Sewage Treatment Center.

As a result, a total of 15,000 households in apartment complexes receive heating service through such arrangement; the KRW 35 billion of facility investment from the private sector contributed to the revitalization of the local economies concerned. In February 2014, SMG built a 360㎾ small-scale hydro plant at Noryangjin Distributing Reservoir using the 2.4 m of altitude difference in water pipes, and it is supplying power to 500 households. Moreover, SMG had completed the pilot test in 2012, and promoted the installation of a 460㎾ micro hydro plant at the Seonam Sewage Treatment Center since May 2014 using a low head during sewage treatment process.

Fuel Cell Station in Nowon

MCFC-type Fuel Cell Station in Sangam (2.4㎿)

Development of Uncharted Niche Energy Sources

As of 2014, 4.07 million tons of domestic sewage was generated daily in Seoul. SMG has promoted a project designed to use biogas – which used to be burnt away or to raise temperatures in digestion tanks – as fuel for cogeneration plants. In March 2013, the Nanji Sewage Treatment Center began operating a 3.1㎿ biogas-based cogeneration plant for the first time in Korea. The sewage treatment center supplies 26,000㎥/day of biogas produced during its sewage treatment processes to Korea District Heating Corporation, which uses the gas to produce 20,000 ㎿h of electricity and 24,000 Gcal of heat for 8,000 households each year. The Jungnang Sewage Treatment Center produces 5.98 million cubic meters of digestion gas a year and sells it as natural gas. KRW 7.8 billion (USD 7.8 million) was invested by the private sector to complete the project. SMG has supplied eco-friendly wood pellet to 46 social welfare facilities to help with their heating needs in winter. In May 2014, SMG launched a pilot project for wind-powered street lamps. In addition, 5.5 tons/day of waste cooking oil was recycled throughout the year.

2) Pioneering Energy Efficiency through BRP and LED Projects

SMG has expanded its BRP from office buildings to residential buildings, provided low-interest BRP loans, and promoted Energy Service Company (ESCO) projects to enable building owners to improve energy efficiency sans immediate financial burdens. It has completed the replacement of lights at its numerous subway stations with LED lamps, facilitating the growth of the nascent LED industry in the country's public sector, followed by rapid industrial expansion into the private sector.

Social Welfare Facilities BRP	Building BRP	LED Installation in Subway Station	BRP Loan	LED Distribution
59	2,267	100% (430,000 lamps, 243 stations)	KRW 54.9 (1.75% of interest rate)	6.79 million

Low-Interest BRP Loans and Promotion of BRP through Public-Private Partnership

Taking the lead in the promotion of BRP, SMG has implemented BRP for 59 social welfare facilities and 116 schools. In May 2014, it installed an Energy Eco-house (a low-energy house) in Seoul Plaza – where citizens can experience BRP technologies. For 424 facilities consuming a huge amount of energy, SMG analyzed their energy consumption patterns, disclosed their positive BRP efforts to the public, and attempted to motivate them to make continuous improvements in their BRP through various measures. In addition, SMG offered KRW 54.9 billion (USD 54.9 million) in BRP loans for 19,687 locations while simplifying the BRP loan application procedures considerably. In the first half of 2013, SMG lowered the interest rate of BRP loans from 2.5% to 2% per year. It further reduced the rate to 1.75% at the end of 2013. In August 2013, it included energy service companies in the category of businesses eligible for the preferential BRP loan benefit. In April 2014, it increased the maximum loan amount from 80% to 100% of the applicable facility costs. Through MoUs with various businesses and civic organizations, SMG has increased civic cooperation and participation in BRP while reducing the city's BRP execution costs. In particular, SMG signed MoUs with construction material companies including LG Hausys and Eagon Window & Doors to offer citizens with insulation window at lower prices. Citizens have shown enthusiastic response to the arrangement which guaranteed quality assurance and follow-up service.

Energy–Saving Model Town	+	MoU for Reducing Prices of Window&Doors	+	Promotion of Specialized Regional BRP	+	Energy Efficiency Improvement for Hospitals
MoU with Daelim IS (2013. 2)		5 companies including LG (2013. 2)		G–Valley (2013. 7)		30 hospitals including Yeouido St. Marys Hospital

Creation of the LED Market in the Private Sector through Leadership in the Public Sector

In 2013, SMG launched a project to replace all 650,000 lights for its 243 subway stations and numerous subway cars with eco-friendly LED lights in two phases. The first phase, which saw a total of 430,000 lights at the stations replaced with LED lamps, was completed in May 2014. The second phase – which is underway – is aimed at replacing a total of 220,000 lights in all of its subway cars with LED lamps, so that all the lights at the stations will be replaced with LED lamps. Funding was provided entirely by Korea Finance Corporation, a public financial institution, through an MoU executed in April 2014. The project was a new model for the partnership between a local government and a public institution under the control of the central government in the area of expansion of LED lights in the public sector.

Hi Seoul Bike Festival

On top of that, SMG has had a total of 1.4 million LED lights installed in the parking lots of 400 apartment complexes through an ESCO arrangement. For instance, the ESCO project for the Doosan Apartment Complex in Seokgwan-dong, Seongbuk-gu invested KRW 140 million to replace the lights in its underground garage with LED lamps and fully recovered its investment within two years by saving KRW 10 million of monthly electricity bills. Through various ESCO projects, SMG has arranged the replacement of 5.6 million lights in saunas, fitness centers, and restaurants with LED lamps. It has also launched LED lamp markets in the city's 40 major apartment complexes for manufacturers to meet customers face to face.

3) Major Achievements in Energy Conservation through Citizen Engagement

Fostering a Voluntary Energy Saving Culture through "Eco-Mileage

SMG has implemented the Eco-Mileage system since 2009 to promote energy conservation in the household and commercial sectors, which account for 56% of the city's energy consumption. The system is a citizen engagement program wherein SMG offers citizens incentives for reducing their energy consumption in terms of electricity, natural gas, water, or district heating.

Mileage membership has steadily increased to double in 2013 to 1.4 million from the previous year. As of June 2014, 1.68 million citizens were taking part in the program as members. The members' efforts have led to the conservation of 500,000 TOE of energy – equivalent to the reduction of 680,000 tons of CO_2 emissions – as of June 2014.

Category	2012	2013	June 2014
Membership (Total)	690,000	1,400,000	1,680,000
Energy Conservation (TOE)	100,000	150,000	200,000

Energy Conservation in Transportation through Reduced Driving Demand and Improved Pedestrian Environments

To reduce the driving demand, SMG launched the car sharing service in 2013. As of June 2014, the service has secured 1,256 cars for a total of 220,000 members. In January 2014, SMG designated an exclusive public transport zone in Sinchon. It is running 18km of car-free streets in 55 zones. To promote environment-friendly driving practices, SMG has offered education on eco-friendly driving to more than 10,000 bus drivers and has distributed 2,700 eco-friendly, economical driving gadgets to them.

Operation of Energy Conservation Programs with Citizens' Active Participation

To reduce the consumption of the same amount of electricity generated by a nuclear power plant, citizen engagement is crucial. SMG has developed diverse programs to motivate citizens to take part actively in the initiative, such as Energy Clinic Service, Energy Guardian Angels Corps, Energy-Saving Model Shops, and Happy Turn-Off Hour. For the Energy Clinic Service, energy experts visit citizens' homes, perform diagnosis of their increasing energy consumption particularly due to their use of larger home appliances, and offer them customized counseling on how to reduce their energy consumption. As of 2014, 20,389 households have received the service, recording an average reduction of 6.55% in their electricity consumption year-on-year.

In July 2012, SMG launched the Energy Guardian Angels Corps for energy conservation at home and school. The corps consists of fourth ~ tenth graders who are active in implementing energy conservation as the city's future leaders in energy conservation. In 2014, 24,664 students from 557 schools joined the corps and contributed to an overall reduction of 3.6% in energy consumption in those schools throughout 2013 compared to 2012.

SMG also launched Energy-Saving Model Shops in 2013. A total of 2,004 shops including coffee shops, bakeries, hair salons, and restaurants joined the initiative in 2014 and 1,243 shops or 62% of participating shops achieved more than 5% of reduction target. They reduced their annual energy consumption by an average of 10.1% through various measures including unplugging appliances and turning off the signage lighting. In an attempt to raise awareness of the importance of energy conservation among the citizenry, SMG carried out the "Happy Turn-off Hour" wherein citizens turn off the lights for an hour between 8 and 9 pm every 22nd of each month throughout the year. So far 860,000 homes and businesses have participated in the initiative on an annual basis, saving a total of KRW 3 billion (USD 3 million) in power bills as of 2014.

Waste Recycling with Citizens' Participation

Waste recycling is considered to be extremely eco-friendly because it both reduces waste transportation costs and minimizes landfill or incineration. SMG has expanded recycling stations to boost recycling significantly. From 2012 to 2014, it has recycled 51,000 tons of textile and vinyl waste and reduced 117,000 tons of food waste.

Energy Consultants

4. Significance of the Initiative

1) Presenting Vision for Regional Energy Policies through a Successful Model

The One Less Nuclear Power Plant initiative is an evolution of various traditional energy conservation campaigns, broadening its focus from traditional energy conservation to the production of new and renewable energy, efficient use of energy like BRP, and energy saving in a wide range of energy sources like electricity, gas, and petroleum. Also noteworthy is the fact that a local government has presented a successful model of energy policies through various institutional improvements and project implementation of a unique nature despite the limitations faced by a local government in a country with a relatively short history when it comes to local autonomy. In particular, other local governments in the country have benchmarked the city's policies regarding the FIT program, preferential lease conditions for PV power plants, and implementation of small-scale solar power stations.

2) Active Citizen Engagement in Energy Issues and Positive Civic Response to the Initiative

The One Less Nuclear Power Plant initiative is the citizen-led action plan on energy issues. Among Seoul citizens, 1.68 million took part in the Eco-Mileage program as members; 20,000 students acted as Energy Guardian Angels at home and school. Citizens' active participation seems to be based on positive response to the initiative. In a survey conducted in March 2014, 71% responded that they were well aware of the initiative with 59% evaluating it positively. In other words, the One Less Nuclear Power Plant initiative is assessed to be necessary policy for SMG and highly supported by citizens at the moment.

3) Contribution to Industrial Development and Job Creation

The One Less Nuclear Power Plant initiative actually helped boost the domestic LED industry through the replacement of all the lights in the city's subway stations as well as the compulsory installation of LED lights in all new city government-related buildings and facilities. It also contributed to job creation in the areas of manufacturing and installation of PV power plants and fuel cells by attracting KRW 600 billion (USD 600 million) in investments in the areas from the private sector. A number of energy designers have formed three co-ops to continue their BRP ventures for commercial buildings following their work on the city government-initiated BRP projects.

Jonggak Underground Shopping Mall

LED Lights in Cheonggyecheon

4) Improved Image as a Global Green City

Recognition from International Organizations like the UN and WWF

The One Less Nuclear Power Plant initiative has earned recognition from international organizations including the United Nations (UN), becoming the city's representative energy initiative. In June 2013, the Eco-Mileage System won the 2013 UN Public Service Award in the category of "Fostering Participation in Public Policy Decision Making through Innovative Mechanisms" for its civic participation, expansion of culture of energy conservation, and reduction in energy consumption. The UN Public Service Award, launched in 2003, is the most prestigious international award in public administration.

In November 2013, the initiative won the "Climate Action Leadership Award" in the 2nd Government Leadership Awards held in Poland by the World Green Building Council (WGBC) for its comprehensive campaign to reduce energy consumption. Highly recognized were the city's efforts particularly the initiative to reduce energy consumption by buildings, which account for 56% of its total energy consumption, through BRP and to increase the production of new and renewable energy. In April 2014, Seoul Metropolitan Government was awarded by the World Wide Fund for Nature (WWF) and Local Governments for Sustainability (ICLEI) as the National Capital of the 2014 Earth Hour City Challenge (EHCC) for its efforts and commitment to combating climate change by reducing its CO_2 emissions and solving global energy and environmental issues.

"One Less Nuclear Power Plant" UN WGBC ' Climate Action Leadership Award'	**"Earth Hour City Challenge"** WWF 'National Capital of Climate Change Response'	**"Eco-Mileage System"** UN Public Service Award 'Fostering Participation in Public Policy Decision Making'

Increased Attention of Global Media to the Environmental Policies of Seoul

The One Less Nuclear Power Plant initiative accounted for a mere 1% of overseas media coverage of SMG's major policies in 2012 but jumped to 10% the following year. The US's CNN featured extensive reports on SMG's "weekly no-driving day scheme" and "disclosure of air quality information" during its coverage of C40 (C40 Cities Climate Leadership Group). Chinese media have also paid keen attention to the city's efforts to reduce energy consumption and protect the environment. For instance, CCTV, Xinhua News Agency, People's Daily, Science & Technology Daily, and "Economy" covered the support for green products, recycling, and energy self-reliant villages, among others. "The Nihon Keizai" and "Hokkaido Shimbun" of Japan introduced the city's limitation on the maximum cooling temperature in summer in offices and shops and the city officials' efforts to enforce the regulation. The "Tokyo Shimbun" featured articles on the city's One Less Nuclear Power Plant initiative.

C40 Siemens Award

Attracting Major International Organizations and Conferences

The One Less Nuclear Power Plant initiative is aimed at improving urban sustainability through reasonable energy consumption while contributing to the worldwide efforts to combat climate change. SMG has continued to enhance its international cooperation to align its various efforts with international endeavors. In October 2012, ICLEI (Local Governments for Sustainability) set up its East Asian headquarters in Seoul. SMG attracted the ICLEI World Congress 2015 to Seoul.

In November 2013, SMG launched the Seoul International Energy Advisory Council (SIEAC) with ten world-renowned experts in energy – such as Amory Lovins, Walt Patterson, and Allan Jones – to cope with the issue of a megacity's excessive energy consumption and get policy advice on the city's One Less Nuclear Power Plant initiative. The council appointed Walt Patterson as Chairperson and Mycle Schneider as Coordinator.

As its first undertaking, SIEAC hosted the "Seoul International Energy Conference 2013" under the theme of "Energy Transition Toward a Sustainable City: Challenges and Opportunities for Seoul" on November 13, 2013, with more than 600 participants attending including energy experts and representatives of civil society in Korea. The attendees paid keen attention to the global experts' evaluation of the city's energy policies and ways to improve them.

At the conclusion of the conference, the council presented nine recommendations for "Seoul Striving to be an Energy Service Autonomous City," highly speaking of the city's energy conservation efforts. They added that, since they were not given enough time to learn fully about a megacity like Seoul, the recommendations should be regarded as a mere stepping stone for further cooperation.

Declaration Announcement at 2013 Seoul International Energy Conference

5. Phase 1 to be Enhanced or Developed

1) Need for Presenting the Values of Seoul's Energy Vision

Phase 1 was promoted with a focus on the feasibility of programs that should lead to the reduction of the city's energy consumption by 2 million TOE within 3 years. SMG needed to present its vision for the megacity's overall energy welfare from the long-term perspective.

2) Need for Forming a Sustainable Governance Framework and Expanding Proactive Citizen Engagement

Phase 1 was led by the Implementation Council for One Less Nuclear Power Plant in both agenda setting and implementation. The city's self-governing districts or numerous civic organizations like Village Communities played a relatively passive role in forming and implementing the initiative policies. Citizen participation increased in various energy conservation efforts such as Eco-Mileage but was limited in the production of renewables or efficient use of energy, largely because the focus was placed on relatively large-scale PV power plants and fuel cell plants for energy production.

3) Lack of Institutional Framework

The REC price dropped from KRW 219,000 (USD 219) in December 2011 to KRW 128,000 (USD 128) in 2013 because the mandatory purchase quantity of solar energy remained low, hampering the profitability of PV plant operators; this discouraged them from expanding their facilities. The installation of PV power plants was not allowed on empty space within development-restricted areas or parks. In addition, the electricity connection fee for PV power plants was too high, which showed institutional limitations and regulatory barrier. The country's relatively low electricity price led to a sharp increase in the shift from other energy sources to electricity, adversely affecting the financial feasibility of BRP and commercial solar power business.

4) Need for Enhancing the Organizational Framework

The One Less Nuclear Power Plant initiative lacked a comprehensive governance structure, which caused the initiative to become less efficient in areas under the control of other headquarters of the city government, such as welfare and jobs. Moreover, an effective organization needs to be set up to promote various projects for serving public interest such as energy welfare programs and municipal new and renewable projects.

Meeting with Implementers for One Less Nuclear Power Plant

02

One Less Nuclear Power Plant, Phase 2

One Less Nuclear Power Plant, Phase 2

Based on the achievements made under the Phase 1, SMG began discussions on Phase 2 with experts and residents for the purpose of fulfilling the municipal administration's values – energy self-reliance, sharing, and citizen engagement – through institutional improvements and social structural reforms. It also conducted expert meetings, town hall meetings and extensive research on similar overseas initiatives.

1. Discussions on the Promotion of One Less Nuclear Power Plant, Phase 2

1) Setting Directions through the Implementation Council for One Less Nuclear Power Plant

The reduction of 2 million TOE as the goal for Phase 1 of the One Less Nuclear Power Plant initiative was forecast to be achieved before the end of the first quarter of 2014, six months ahead of schedule. Thus, SMG began discussions on setting up follow-ups for the Phase 2 of the initiative in January 2014.

The discussions were led by the Implementation Council for One Less Nuclear Power Plant, a public-private governance organization. The values and vision for Phase 2 were discussed at a general meeting of the council. To set up more effective implementation plans, the existing four subcommittees were restructured into the following five subcommittees: General Affairs; Energy Production; Energy Efficiency and Conservation; Energy Industry and Jobs, and; Energy Welfare and Communities.

Through 5 general meetings and 13 subcommittee meetings, the implementation tasks for Phase 2 were identified, including specific ways to accomplish them. A forum on energy policies was then held to collect the opinions of experts and citizens on the council's draft proposals for Phase 2.

General Affairs	Energy Production	Energy Efficiency and Conservation	Energy Industry and Jobs	Energy Welfare and Communities
• Plan coordination • Institutional/ regulatory reform	• New and renewable energy • Decentralized energy	• Building, transportation • Eco-Mileage	• Industry and job support • Support social enterprises	• Support low-income bracket • Donation and sharing projects

Social Fiction Event on One Less Nuclear Power Plant, Phase 2

Earth Hour Korea

2) Citizen Participation in Policy Setting

To identify tasks suitable for Phase 2 of One Less Nuclear Power Plant, SMG collected citizens' opinions online and offline including town hall meetings. In February 2014, it launched a public contest for the official title of Phase 2 of the initiative. In March, it conducted a survey on citizens' awareness of the initiative and willingness to participate in Phase 2 among 2,000 citizens. In March 2014, SMG held "a social fiction event on Phase 2 of One Less Nuclear Power Plant" under the theme of "ten million citizens' sunlight imagination fair for an energy self-reliant Seoul" at the Multipurpose Hall of City Hall. A total of 400 citizens presented diverse opinions.

3) Collection of Opinions from Experts at Home and Abroad and Various Civic Groups

The draft proposal for Phase 2 of One Less Nuclear Power Plant – prepared by the Implementation Council for One Less Nuclear Power Plant – was reviewed by experts at home and abroad including the Seoul International Energy Advisory Council and various divisions of the city government. The finalized proposal was announced on August 20, 2014 after collecting opinions of citizens for implementing diversified energy policies.

2. Background of Phase 2

1) Continuous Development of Phase 1 Undertakings

Phase 2 of One Less Nuclear Power Plant was designed to effectively enhance the results of Phase 1 the results of Phase 1 and bring the full value of energy to citizens through the institutionalization of eco-friendly energy systems and social structural changes. Phase 2 will also have to address the issue of organizational shortfall as identified in Phase 1 in terms of lack of governance and integrated control center. It should also place its focus on applying new technologies, introducing advanced policies and discovering new policy tasks.

2) Connection with the Central Government's Second Basic Energy Plan

In January 2014, the central government announced the national Second Basic Energy Plan for 2014~2035. The plan made a paradigm shift for energy policies from "Expansion of Supply" to "Management of Demand." It is aimed at reducing the total estimated energy consumption until 2035 by 13%, with the consumption of electricity cut by 15% largely through reforms in the energy pricing system and distribution of high-efficiency appliances. To achieve these goals, the government set six priority policy tasks; implementing demand management-oriented energy policies; establishing decentralized power generation system; enhancing the substantiality of energy policies; strengthening energy security; setting up a stable energy supply system; and building public consensus on energy policies.

In line with the focus shift of the national energy plan from "Expansion of Supply" to "Management of Demand," Phase 2 of One Less Nuclear Power Plant needed to align its focus with the core tasks of the 2nd national basic energy plan.

[Focus Shift between the First and the Second Basic National Energy Plans]

Shift of energy policy focus from supply expansion to demand management through increases in electricity prices	⇨	Securing the economic feasibility of the solar power business (renewables production) and BRP and LED (energy efficiency)
Improving public acceptance through decentralized power generation instead of large-scale, centralized power grids	⇨	Laying the foundation for active, decentralized power generation including community energy service and non-utility cogeneration plants
Systematic demand management based on ICT including Internet and smartphones and fostering of related industries	⇨	Creation of urban-type jobs through the priority application of advanced technologies like BEMS and ESS

3) Review of Energy Policies of the World's Leading Cities

Many cities in the developed world are already carrying out diverse sustainable energy policies to counter climate change and energy crisis. In particular, New York City announced "PLaNYC 2030" aiming at building a pleasant city to live in, among others. The plan calls for securing decentralized energy sources and expanding cogeneration for more efficient energy conservation as well as urban planning conducive to the supply of clean energy available at low and stable prices. The EU declared its 2030 Framework for Climate and Energy Policies, which calls for a 20% reduction in GHG emissions from the 1990 level by 2020 and 40% by 2030, and an increase in the proportion of renewables to 27% by 2030, compared to 1990. France carried out a government-sponsored, nationwide debate for eight months from November 2012 to July 2013 regarding a possible shift of the country's energy system from nuclear to renewable energy.

SMG kept monitoring trends in advanced cities' energy policies, and continued to propose energy policies most suitable to the city's conditions.

Environmental Cooperation with Overseas Cities

3. Vision and Strategies of Phase 2

1) Diagram of Vision for Phase 2

Vision

"Seoul, an Energy Self-Reliant City" where citizens produce energy and consume it efficiently

Values

Energy self-reliance + Energy sharing + Energy participation

Policy Goals

1. A city pursuing decentralized energy production
2. Social structure based on efficient, low energy consumption
3. Creation of good jobs through innovations
4. Promotion of energy-sharing, warm communities

Core Indicators

Achievement of 20% Self-Reliance Ratio in Electricity by 2020

- 4 million TOE in renewables production plus energy conservation
- 10 million-ton reduction in GHG emissions

Promotion Strategies

- Energy self-reliance led by 10 million citizens who transform from mere energy consumers to producers as well
- Citizens' internalization of values of renewable energy production and efficient energy use
- Creation of high-quality jobs by supporting the development of a sustainable energy industry
- Realization of a virtuous circle of energy participants' profit making and charitable contribution

Institutional-ization + Civic governance ⇨ Social structural changes and innovations

[Comparison of Phase 1 and Phase 2]

Description	Phase 1	Phase 2
Vision	■ Laying the foundation for energy self-reliance	■ **Seoul, an energy self-reliant city** ▸ Three energy values : self-reliance, sharing, and participation
Goals	■ Reduction of 2 million TOE	■ **Achievement of 20% self-reliance ratio in electricity** ▸ 4 million TOE in renewables production and energy conservation and reduction of 10 million tons of GHG emissions
Strategies	■ Production of new and renewable energy, efficient use of energy, and energy conservation	■ **Changes in social structures through institutionalization** ▸ A city based on decentralized energy production ▸ Social structure based on efficient, low energy consumption ▸ Creation of good jobs through innovations ▸ Promotion of energy-sharing, warm communities
Tasks	■ **71 projects in 3 categories**	■ **88 projects under 23 tasks in 4 categories**
Production	▸ Promotion of large-scale BTO (Build-Transfer-Operate) projects	▸ Small-scale participatory, decentralized production systems – Diversification of citizen participatory solar power generation models – Introduction of mandatory electricity production by each building – Expansion of fuel cells and cogeneration for buildings ▸ Institutional support to secure economic feasibility
Efficient use and conservation	▸ Promotion of investments through preferential BRP loans – Promotion of BRP at the level of each building ▸ Energy conservation-centered implementation campaigns – Eco-mileage, Energy Guardian Angels Corps, etc.	▸ BRP activation through institutional improvements ▸ Inducing voluntary investments through systematic arrangements – Stabilization of the energy consumption certificate system enabling building energy efficiency to be reflected on building prices ▸ Use of climate & energy map and reflection of BRP on urban planning – BRP consideration in regional development plans ▸ Citizens' internalization of energy conservation through social & cultural improvements
Industrial jobs	▸ Indirect support through R&D, financial loans, etc.	▸ Direct support through green technology startups, product commercialization, marketing, etc. – Operation of tech shops and hub centers and support for marketing ▸ Creation of community-based energy service jobs
Community welfare	▸ Concept of energy welfare undefined – Focus on directly subsidizing energy costs in winter	▸ Establishment of basic rights to energy welfare and realization of sharing – Enactment of ordinances and establishment of the Citizen Energy Welfare Fund
Promotion system	▸ Implementation Council playing advisory and monitoring roles	▸ Realization of practical energy governance ▸ Establishment of implementation systems including Energy Corporation ▸ Promotion of cooperative projects with neighboring local governments

2) Quantitative Goal-Centered (Phase 1) → Energy Value-Centered (Phase 2)

SMG has carried out discussions on the vision and values of Phase 2 of One Less Nuclear Power Plant through meetings of the Implementation Council for One Less Nuclear Power Plant, Social Fiction Grand Citizens' Meeting, and various online surveys. Through the process, it has come up with the three core values of Phase 2: energy self-reliance, energy sharing, and energy participation.

Energy Self-Reliance

- Shift to a responsible energy consumer city through reduced reliance on external power supply
- Production of safe, sustainable energy in preparation for energy crises
- Development of energy industry and creation of jobs in the process of realizing energy self-reliance

+

Energy Sharing

- Citizens sharing their energy services with the underprivileged and future generations
  - Increased fairness in energy production and consumption and mutual prosperity through energy welfare for the impoverished

+

Energy Participation

- Establishment of open energy governance for energy policy setting and implementation
- Disclosure of energy information and policies and provision of opportunities for education and training

3) Core Indicators for Phase 2: Achievement of 20% Self-reliance in Power Supply

SMG set a goal of increasing its electricity self-reliance rate from 4.2% in 2013 to 20% by 2020 – 46% from the production of new and renewable energy and cogeneration and 54% from improvements in energy efficiency and conservation of energy. As a core indicator, the energy self-reliance rate pursues energy justice through the shift from an energy consumer city to an energy producer city and mirrors the city's local energy policies designed to complement the central government's energy policies depending on mass power production and mass power transmission. The rate also represents the minimum energy requirements of the city to run its basic infrastructure on its own during power outages. It reflects the city's decentralized energy production and energy efficiency as the basic requirements for peak management and realization of a blackout-free city. Also indicative of the city's efforts in the areas of new and renewable energy, decentralized production, efficiency, and conservation,

the core indicator can be met only when renewables production has increased and consumption has decreased. Yet, it faces limitations in reflecting the city's efforts to cut down other energy sources such as fossil fuel. Thus, SMG is planning to use parallel indicators for CO_2 reduction and total energy production and reduction(by TOE), too.

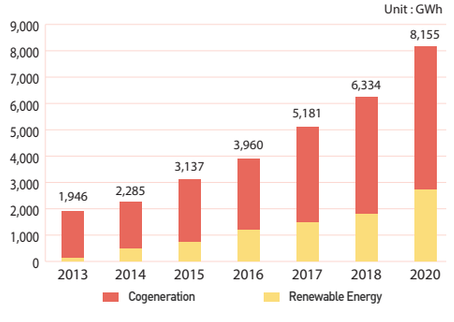
Yearly Plans to Achieve 20% Self-reliance in Electricity

The electricity consumption of Seoul in 2020 is forcast to reach 50,330GWh based on the average annual increase of 1.2% for five years from 2009 to 2013. Through Phase 2 of One Less Nuclear Power Plant, however, SMG plans to reduce the 2020 figure by 9,553GWh – 5,639GWh through energy efficiency including BRP and LED replacement and 3,914GWh through energy conservation including Eco-Mileage – to 40,777GWh.
On top of that, SMG plans to produce 8,155GWh of electricity through renewables production and expansion of thermal power plants and cogeneration: 2,711 GWh from new and renewable energy (256GWh from PV power plants and 2,365GWh from fuel cell power plants) and 5,444GWh from thermal power plants and cogeneration (1,195GWh from the integrated energy business, 803GWh from non-utility cogeneration, and 3,446GWh from thermal power plants).

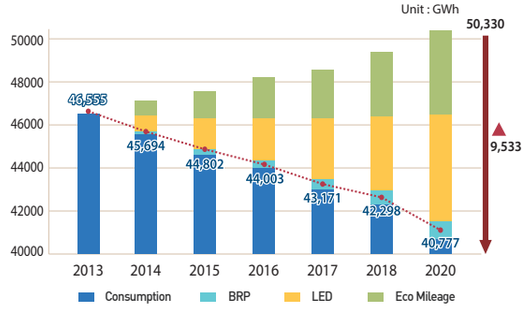
2013		2014	2015	2016	2017	2018	2020
4.2%	→	5.0	7.0	9.0	12.0	15.0	20%

Demand Forecast (GWh)	47,076	47,603	48,137	48,676	49,221	50,330
Electricity Production (GWh)	2,285	3,137	3,960	5,181	6,344	8,155
Electricity Reduction (GWh)	1,382	2,791	4,134	5,505	6,923	9,553

[Electricity Production Forecast]



[Electricity Demand and Reduction Forecast]

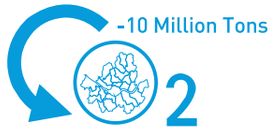


GHG Reductions through Phase 2 of One Less Nuclear Power Plant

■ Status of CO_2 Emissions in Seoul as of 2011

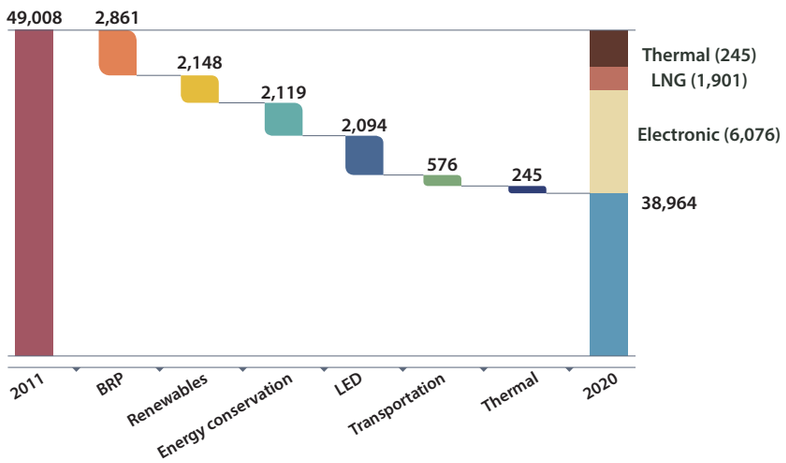
In 2011, Seoul emitted 49 million tons of CO_2eq or 9.8% of the nation's total emissions, a low proportion compared to the city's proportion in population and GNP. Such low proportion is attributable to the fact that the city's major industries are distribution and service industries, which consume less energy than manufacturing, for instance. Nonetheless, the problem is that the energy consumption of buildings and means of transportation accounts for 90.9% of the city's total GHG emissions, and their indirect emissions have more than doubled compared to 1990 largely because their energy sources have changed from coal and petroleum to electricity and thermal energy.

2011	Comparison with 1990
49 million tons of CO_2eq	▶ A 8.9% increase (1990 : 45 million tons of CO_2eq)
– Direct emissions: 26 million tons of CO_2eq – Indirect emissions: 23 million tons of CO_2eq	▶ Continued decrease (△32.4%) ▶ Continued increase (+260%)



■ Goal: "10 Million Tons" in GHG Emissions (20.5% decrease compared to 2011)

SMG has announced that it would reduce its GHG emissions (49 million CO_2eq in 2011) by 10 million tons by 2020 — a 20.5% reduction compared to the emission in 2011 — through reductions of 2.86 million tons from BRP, 2.15 million tons from renewable, 2.12 million tons from energy conservation, 2.09 million tons from LED replacement, 576,000 tons from transportation, and 245,000 tons from thermal production.



2011
49 million tons of CO_2eq
⇓
2020
38.96 million tons of CO_2eq

4) Major Policy Indicators of Phase 2

Task	Indicator	Unit	Total	2014	2015	2016	2017	2018	2020
General	Energy self-reliance rate	%	-	5.0	7.0	9.0	12.0	15.0	20.0
	Renewables production	%	-	2.0	2.5	3.0	3.5	4.0	5.0
	Energy production·reduction(total)	10kTOE	-	20	90	160	230	300	400
	CO_2 reduction(total)	10k ton	-	15	100	300	470	660	1,000
Energy Production	PV power plant	㎿	105	24	21	20	20	20	40
	Hydrogen fuel cell power plant	㎿	195	41	34	40	40	40	100
	Building cogeneration system(total)	㎿	61 (150)	1 (90)	10 (100)	10 (110)	20 (130)	20 (150)	54 (204)
Efficient Use and Conservation	Building·residential BRP	Number	60,000	10,000	12,500	12,500	12,500	12,500	13,000
	LED distribution (public, private)	10k	2,830	500	575	575	580	600	1,158
	Car sharing (total)	Number	3,000	1,500	1,800	2,000	2,500	3,000	3,500
	Eco-Mileage membership(total)	10k	280	200	220	240	260	280	300
Industrial Jobs	Establishment of co-op·social enterprise	Number	70	10	12	14	16	18	20
	Green energy techshop support	Number	210	-	30	50	60	70	90
	Establishment of Green Cluster	Number	6	1	1	1	1	2	-
Commnity Welfare	Enactment of Energy Welfare Ordinance	-	-	-	-	Enacted	-	-	-
	Citizen participation in Energy Welfare Fund	10k	10	-	-	2	3	5	5
	Foster energy social workers	Number	180	10	20	50	50	50	50
	Establishment of energy self-reliant village	Number	200	15	20	35	60	70	70

5) Tasks and Individual Projects of Phase 2

■ **Presentation of the City's Four Energy Goals and Implementation Governance**

■ **23 Tasks and 88 Individual Projects - Concentration on the Promotion of 10 Core Projects**

Four Goals in Energy Policies

Expansion of decentralized production	Low energy city	Creation of good energy jobs and workplaces	Welfare realization through sharing
5 tasks & 19 projects	9 tasks & 34 projects	4 tasks & 17 projects	5 tasks & 18 projects
1. "Solar City Seoul"project 2. Opening of era of decentralized energy production by individual buildings 3. Expansion of non-utility energy households to 60,000, saving 20% in heating costs 4. Utilization of niche energy throughout the city 5. Active support for energy self-reliance through institutional reforms	1. Declaration of zero supply of external energy for new buildings 2. A healthy, pleasant city through efficient use of energy 3. Enhanced responsibility for the public sector's energy efficiency 4. Seoul, City of LED Lighting 5. Restructuring of the city into low-energy urban space 6. Expansion of green cars 7. A city with energy-saving transportation environment 8. Establishment of a culture of energy-saving civic life 9. Creation of the world's best recycling city	1. Creation of green energy jobs with citizens 2. Tailored life cycle support for green energy companies 3. Promotion of green energy industry and building of green tech infrastructure 4. Cultivation of IT-based, innovative green energy technologies	1. Establishment of Energy Welfare Fund through citizens'participation 2. Guarantee of basic rights to energy services 3. Promotion of projects aiming at reducing energy costs through energy shift or efficiency enhancement projects 4. Special measures for the energy-underprivileged 5. Energy community projects

Implementation Governance

1. Establishment of local energy governance and energy code of conduct
2. Establishment of an integrated implementation control organization through "Seoul Energy Corporation (tentative name)
3. Sharing policies with neighboring cities and promotion of joint projects including energy production at the metropolitan level

6) Ten Core Projects - A Pledge to Citizens, with Citizens

① A solar-powered city where citizens produce energy through 40,000 micro PV power plants
- ○ Sunlight Citizens' Fund worth KRW 50 billion and expansion of Seoul-type feed-in-tariff (FIT)

② Expansion of mandatory use of renewables and decentralized power from 12% to 20%
- ○ Compulsory use backed up by amendment of laws on environmental impact analysis, environmental reviews, etc.

③ Disclosure of energy consumption by buildings and introduction of tailored energy conservation models
- ○ Mandatory diagnosis on building energy consumption and introducing energy consumption certification system in 2016

④ 100% LED replacement including security lighting and street lamps
- ○ Security lighting in 2016 ⇨ Public institutions in 2017 ⇨ Street lamps in 2018

⑤ Introduction of the Driving Mileage System (1.41 million cars by 2018)
- ○ Gradual shift of focus from time-specific to distance-specific no-driving incentives

⑥ Creation of jobs in the service sector including creation of 25 Energy Hub Centers
- ○ Cultivation of 70 co-ops and social enterprises offering energy consulting and energy services

⑦ Seoul leadership in new energy industries
- ○ Creation of smart grids, BEMS, and specialized clusters and expansion of convergence

⑧ Creation of jobs for the elderly and improvement of the recycling ratio through community-based recycling practices
- ○ Operation of 7,500 recycling stations to improve the city's recycling ratio from 45% to 66% (to the level of Freiburg, Germany)

⑨ Promotion of power conversion and efficiency projects for the energy-impoverished
- ○ Enactment of Energy Welfare Ordinance, BRP for 150 welfare facilities, and LED for 120,000 needy households

⑩ Establishment of Seoul energy governance
- ○ Setting up roles of the Implementation Council for One Less Nuclear Power Plant and Green Citizen Council and establishment of community-based local governance

Solar Power Station inside the Seoul Forest

03

Promotion Plans by Program

SEOUL

Promotion Plans by Program

1. A City of Decentralized Energy Production

Goal : Expansion of small-scale decentralized power supply through increased new and renewable energy and cogeneration

Citizen participation	Decentralized power supply	Production of new and renewable energy	Local specific energy
40,000 micro PV power plants	61㎿ non-utility cogeneration	300㎿ solar power and fuel cell	1.65 million Gcal cooling heat and incineration heat

Mini PV System for Apartment

Current Status

SMG has installed a total of 250㎿ of new and renewable energy including 50㎿ of solar energy. Nonetheless, the city's energy self-reliance ratio stood at a mere 4.2%. Though significant symbolically, new and renewable energy did not contribute considerably to improving the city's energy self-reliance.

Most of the facilities for new and renewable energy during Phase 1 were large-scale, profitable empty lots have reached a saturation point.

Electricity prices were so low that the economic feasibility of the new and renewable energy facilities for cogeneration and solar power decreased, hurting the prospects for the continued expansion of the facilities in the city.

PV System by Roadside

Seongdae-gol Village Energy Cafe

PV Panels Mini Expo

Basic Directions : Institutional support for small-scale new and renewable energy facilities and expansion of decentralized power supply

SMG will enhance its support for the spread of production of new and renewable energy – which was initiated by the public sector – to private buildings and ordinary citizens. To this end, it will introduce various policies such as micro PV power plants, Solar Power Generation Citizens' Fund, and Micro Building Power Stations with the citizens' participation.

SMG will implement systems that will enable building owners to secure the economic feasibility of their decentralized power generation facilities in line with their obligation to install such facilities. To this end, it will enhance the evaluation criteria for environmental impact assessment while lowering the prices of the natural gas used for fuel cells and cogeneration.

1) Production of "Healthy and Clean Electricity" through Citizens' Solar Power Generation

Dissemination of "40,000 micro PV power plants" that save KRW 10,000 in a household power bill

SMG plans to distribute 40,000 "mini PV power plants (250W)" that can be installed in verandas with an aim to transform citizens from energy consumers to energy producers and raise their awareness on eco-friendly energy. It will implement a pilot project involving 8,000 households in 2014 and increase them to 8,000 households from 2015.

Creation of 10㎿ "Solar Power Landmarks" in Various Locations

SMG plans to install a total of 10㎿ PV power plants along the city's main streets as the city's "Solar Power Landmarks" by 2018. It will launch a pilot project at the northern end of Seongsan Grand Bridge in 2014, followed by installations at Gangbyeon Buk-ro (urban expressway), bridges across Han River, downtown areas, and Hangang parks. It will seek ways to use them as tourist attractions as the case in Freiburg, Germany.

Operation of the "Solar Power Generation Citizens' Fund" Worth KRW 100 Billion for Energy Production and Profit Making by Citizens

SMG will create the "Solar Power Generation Citizens' Fund" for citizens to make direct investments in the PV power plant business and earn profits. It plans to launch 10 funds with a total amount of KRW 50 billion (USD 50 million) by 2018, which will be invested in the creation of 10 PV power plants in the Gueui Water Purification Plant (1㎿). A citizen can invest from KRW 1 million at minimum up to KRW 100 million (between USD 1,000 and USD 100,000) for which annual average revenue of 4% is guaranteed. Profits or investments can be donated to charity programs targeting the energy-disadvantaged.

Expansion of Rooftop PV Power Plants to All Buildings in Seoul

SMG will expand its PV power plants installed in public land while increasing rooftop PV power plants in schools and office buildings throughout the city. The city plans to increase the number of rooftop PV power plants in schools from 30 in 2014 to 230 in 2018.

SMG will also continue to support the installation of rooftop PV power plants in private buildings. It will expand the limit of the city's feed-in tariff scheme from 10㎿ to 20㎿. The scheme is rewarding KRW 50 (USD 5 cent) for 1㎾h for a small-scale PV power provider of less than 50㎾. It will continue to provide them with preferential loan conditions at low interest rate and sign MoUs with large companies regarding the installation of PV power plants.

Institutional Improvements for the Continuous Expansion of PV Power Plants

SMG will promote continuous institutional improvements to expand the installation of PV power plants. It plans to propose that the central government reinstate the national FIT scheme supporting the installation of a PV power plant with capacity of 100㎾ and amend the relevant laws so that SMG can install PV power plants in urban parks with potential for large-scale PV power plants. Currently, high installation fee is incurred when PV power plants are located far from external KEPCO power lines. Thus, SMG plans to request that small-scale PV power plants be allowed to be connected to internal power lines or connection fees be reduced.

Photovoltaic System installed in School

PV Panels on Rooftop of Gangseo Agro-Fisheries Market

2) Safe City through Decentralized Electricity Production including "Mini-Building Power Plants"

Direct Electricity and Heat Production by Residential and Commercial Buildings: 90㎿ in 2014 → 150㎿ in 2018

As of 2013, 46 non-utility cogeneration plants were installed in apartments and commercial buildings with total capacity of 89㎿, but only 55% of apartments and 4% of commercial buildings operated the plants. SMG plans to expand the cogeneration capacity from 90㎿ in 2014 to 150㎿ in 2018. To this end, it requires the installation of decentralized power generation facilities for new buildings. It plans to request the central government to make improvements in the pricing of heating & cooling fuel and electricity including time-based electricity pricing. It will also ask the central government to support the city's PV power plants through the nation's Energy Use Rationalization Funds.

Replacement of Old Residential Boilers with Micro Cogeneration Boilers that also Produce Electricity

To increase the electricity self-sufficiency of houses, SMG replaced old residential boilers with micro cogeneration boilers that produce electricity, too. To this end, it will launch a pilot project in 2014 and review the results. Based on the results, it will begin to provide subsidies or loans from 2015 to distribute 10,000 stirling engine boilers to multi-family homes including apartments by 2020.

Solar-Powered Bench

Solar-Powered Bus Stop

Installation of 174㎿ Fuel Cells that are Instrumental in Electricity Self-Reliance and with Significant Private Investment Effects by 2018

SMG installs a total of 174㎿ fuel cell plants, which contribute significantly to electricity self-reliance and private investment effects by 2018. It will install a 20㎿ fuel cell at each of the city's infrastructure facilities including railway vehicle bases (Sinnae, Suseo, and Jichuk) and the Seonam Sewage Treatment Center to ensure that the facilities keep operating as emergent power supply during power outages. SMG distributes 1㎾ class micro fuel cells to houses and buildings, particularly hotels and hospitals that use electricity and heat energy around the clock.

Construction of Supply Facilities of Integrated Energy for a Stable Heat Source of Magok District

SMG is building an integrated energy supply facility to deliver heat to Magok District steadily. It will meet the expected demand for heat in the district until 2016 in collaboration with the Mokdong Cogeneration Plant and Bucheon Combined Heat and Power Plan run by GS Power and construct a 280㎿ gas-based combined heat and power plant in 2017 for stable heat supply starting 2020.

Institutional Improvements for the Expansion of Decentralized Power

SMG will also promote institutional improvements to expand the supply of power from decentralized sources. It will increase the mandatory use of renewables for new buildings of over 100,000 square meters from 10% to 20% by 2020. To ensure that the increase of the ratio is reflected at the design stage, the criteria for environmental impact assessment will be adjusted accordingly.

SMG will start regulating the prices of the natural gas used for fuel cells and cogeneration in an attempt to secure the economic feasibility of the nascent business in the city. Institutional improvements will be made to ensure that any surplus power can be sold to KEPCO.

3) Utilization of Waste Energy and Unused Energy in Neighboring Cities

Discovering All Usable Energy Sources

SMG recovers waste energy and uses it as energy source for district heating. In 2012, it developed high-efficiency hydro power generation technology that could generate power at an altitude of less than 2 meters and applied it to a 360kW hydro plant built in the Seonam Sewage Treatment Center. Based on the success of the pilot project, SMG will continue to discover energy sources for small-scale hydro plants for the purpose of installing a total of 3,160kW small-scale hydro plants by 2018.

SMG also seeks to recover heat from the exhaust gas of incinerator chimneys in order to use it as heat source for neighboring areas. It will start with 9 locations at the Mapo Resource Recovery Facility and expand to 32 locations so as to supply heat to 70,000 households in neighboring apartment complexes. In 243 subway stations in Seoul, 120,000 tons of ground water is discharged every day, and only 20,000 tons of discharged ground water is used for cleansing while 100,000 tons of ground water is discharged to the river and stream. SMG plans to use the discarded ground water from subway stations to cool and heat neighboring buildings. It will launch a pilot project at the Korea University Station in 2014 and expand to 10 stations by 2018 to service the Mokdong Ice Rink and the headquarters of Seoul Metropolitan Rapid Transit Corporation, among others.

Use of Heat Sources of Neighboring Local Governments and Private Companies → Providing Heat to 100,000 Households

SMG plans to use the heat sources discarded by neighboring local governments and private companies to service 100,000 households. To this end, it will receive 470,000 Gcal and 200,000 Gcal from the Bucheon Cogeneration Plant and Yangju Byeolnae Cogeneration Plant, respectively, from 2014. In 2015, it will begin to receive 50,000 Gcal of the heat used by the data center of KT, a private IT company, to cool its servers to service residents in neighboring apartment buildings. By 2018, it plans to supply a total of 350,000 Gcal annually through linkage with the Seoul Metropolitan District Heating Network.

Utilizing Waste as Energy Resources

Besides the waste minimization, SMG will improve the recycling ratio of waste, including waste vinyl and fabric scraps, through citizen engagement. It will recycle 243,000 tons of waste vinyl by 2018 through the distribution of collecting bags exclusive for waste vinyl. It will also collect 168,000 tons of fabric scraps by 2018 through the mandatory separation of fabric scraps from general waste. SMG will also use the branches of street trees to make wood pellets. It will build a pellet factory with daily production capacity of 500kg to produce wood pellet fuel used by low-income households, social welfare facilities, and community centers.

Window Reinstallation for BRP

2. Energy-Efficient, Low-Energy Social Structure

Goal : A Low-Energy, Energy-Efficient City

BRP	LED Distribution	Eco-friendly Transportation	Urban Planning
Systematic energy diagnosis (2015) Disclosure of energy efficiency (2015)	Public 100% (2018) Private 25% → 65% (2018)	Increase of congestion charge Increase of EV uptake to 14,000 cars	Publication of energy maps Enhanced environmental reviews

Current Status

Buildings account for 56% of the city's total energy consumption and 87% of the city's electricity consumption. Vehicles account for 20% of GHG emissions, which required for strong measures.

Energy consumption in Korea is distorted due to relatively low prices of electricity, which discourages investments in the efficient use of energy resulting in the city's lackluster performance in the development of energy management markets including the efficient use of energy.

Consumers of energy are so widely dispersed that there are limits to the effects of the efforts of individuals or the public sector depending on support for loans to manage demand for energy.

Basic Directions : Changeover to an Energy-Efficient City Structure through Institutional Improvements

SMG will continue to expand its support for BRP loans for the energy efficiency. Given the fact that the local market is still nascent, it will improve the deliberation standards of environmental impact assessment, green building design criteria, and public building design standards.

Together with such institutional enhancement, SMG will work to lay the foundation for building energy efficiency to be reflected on building prices so that the market principle plays a critical role in its BRP initiative. To this end, SMG will reflect its principle of the most efficient use of energy by buildings on its urban planning with the aim of transforming itself into a "sustainable low-energy, compact city."

1) Improvements in Building Energy Efficiency through Institutional Arrangements and Introduction of Market Principles

Enhancement of Design and Maintenance Requirements for Energy-Saving Buildings

SMG continues to enhance the criteria for its environmental impact assessment for the purpose of significantly upgrading the energy efficiency of its large-scale development projects and large buildings. Specifically, it will require all types of buildings with a floor area of 100,000 square meters on a land area of 90,000 square meters to have Building Energy Management System (BEMS), install only LED lights by 2018, and secure the highest energy efficiency (Class 1) in design.

For private buildings, SMG will strengthen its green building design criteria to improve their energy efficiency. It will raise the bar for building energy self-reliance from 50% in 2014, 60% in 2016 to 100% in 2023. To that end, SMG will reinforce its requirements regarding the installation of new and renewable energy production facilities and high-efficiency LED lighting fixtures. Beginning 2015, it will apply new construction guidelines for the insulation feature of construction materials, for instance. In 2016, SMG, in collaboration with Nowon district, will build a Nowon Green, Zero Energy Model Town with 121 households.

For public buildings, SMG will enhance the "Criteria for Construction Technology Reviews for Public Buildings in Seoul" to improve their energy efficiency. It plans to raise the mandatory energy supply from new and renewable energy sources from 10% in 2014 to 25% by 2020 and complete LED lamp replacement by the end of 2018. Following a pilot project of BEMS, SMG will require all public buildings with floor area of more than 30,000 square meters to be equipped with BEMS starting 2016.

For existing buildings, SMG promotes improvements in energy efficiency through energy-efficient remodeling. It plans to designate as a remodeling activation zone, an area wherein more than 60% of buildings are over 15 years old and provide incentives for the area where energy-saving work is carried out or new and renewable energy facilities are installed.

Optimized BRP through Precise Diagnosis of Energy Usage

SMG will improve regulations so that big buildings consuming more than 2,000 TOE will have to go through rigorous energy diagnosis procedures. Meanwhile, SMG will develop and disseminate different energy conservation models for groups of buildings such as hospitals, schools in 2014.

SMG offers tailored energy diagnosis for houses and buildings. Current energy usage will be carefully reviewed, and energy saving measures will be recommended free of charge by different groups of experts: houses, by energy consultants; shops in small- and medium-sized buildings, by energy designers, and; welfare facilities and educational institutions, by professional energy diagnosis companies for free of charge.

SMG will carry out BRP for the city's basic urban infrastructure, too. It will focus on improving the efficiency of electrical facilities in sewage treatment facilities by replacing old motors with high-efficiency ones and converting the digestion gas generated in the sewage treatment process into heat source. And, it will introduce an efficient load management system for electricity consumption by hour for water purification center. In addition, SMG will begin operating subway cars that enable the recovery of the electricity generated during brake applications and expand to 2 stations each year.

Enhancement of Public Support Policies for BRP

SMG will further enhance the financial groundwork for its support of BRP in buildings and houses including BRP loans. It will expand the size and eligibility of loans and require building owners to go through energy diagnosis before they can apply for BRP services for purposes of securing better BRP results. The BRP coverage will be expanded from windows and insulation to energy diagnosis costs, eco-friendly boilers, installation or replacement of HVAC systems, operating systems, and monitoring expenses. SMG will reduce up to 15% of the property tax for new buildings with green building certificates or building efficiency grades, and give same benefits to existing BRP in buildings.

Information Disclosure → Promotion of Energy Efficiency through Market Economy Principles

SMG plans to have energy efficiency reflected on buildings' prices through the implementation of the energy efficiency classification system for buildings. The system will have the actual energy consumption of buildings recorded in building purchase or lease contracts so that the consumer will make wiser choices, and buildings of higher energy efficiency will consequently command higher prices/rents in the market. Following a trial project in 2014, SMG will launch the system in 2015 and begin to disclose the building energy information in the country's real estate portal run by the private sector and SMG's Integrated Multi-unit Dwellings Information Plaza starting 2016.

For buildings categorized as major energy consumers, SMG will start disclosing their energy score cards to the public to motivate them to conserve energy more aggressively. The major energy consumers are classified into five categories, university, hospital, hotel, department store and large company, and the energy score cards will include energy consumption per area, energy consumption growth rate and ranking on energy reduction performance. Beginning 2015, SMG will implement the "Excellent Energy Efficiency Building Certification System" wherein it will issue a plaque of recognition to buildings that have reduced energy consumption by more than 5% in an effort to spread energy conservation know-how and induce voluntary participation in energy efficiency improvements.

2) City of LED Lighting: Seoul Introducing 100% LED for Public Institutions

Order of Lamp Replacement	Triple wave lamps ➞ fluorescent lighgts ➞ security lights ➞ street lamps ➞ system lighting (IT+ lighting) ※ Gradual, strategic approaches depending on the levels of LED technologies and their commercialization

100% LED Replacement (2.2 Million Lamps) for the Public Sector by 2018

SMG plans to replace all the lights (2.2 million) in the city's public sector including public buildings, subway stations, and security lamps with LED lamps by 2018. In 2014, it will complete the replacement of all lights in subway stations plus 350,000 lamps in district offices and municipal hospitals, for a total of 1 million lamps. From 2015 to 2016, it will replace 500,000 lamps including those in the city's welfare facilities and affiliated offices (100%) and security lights and street lamps (50%). Between 2017 and 2018, it will replace a total of 700,000 lamps including those in its various corporations and the other 50% of its security lights and street lamps. Meanwhile, SMG will enhance the "Design Criteria for Public Facilities" to ensure the installation of LED lights in new public buildings. For old public buildings, it will set up an exclusive organization called SPC consisting of representatives of the central government (Korea Finance Corporation), SMG (Road Management Division), and private R&D institutions in 2015 in an attempt to promote the faster implementation of the replacement work.

LED Replacement in the Private Sector: 25% → 65% (30 Million Lights by 2018)

SMG plans to replace a total of 30 million lights – or 65% of those in the private sector – with LED lamps by 2018. To this end, it will enhance the LED design criteria in the "Green Building Design Guidelines" for new structures measuring more than 500 square meters. By the end of 2014, all the buildings in the city will have to replace more than 25% of their lights with LED lamps and 100% of their lights in underground garages with LED lighting fixtures. By 2020, all the lights in buildings will have to be LED lamps by revising the "Ordinance on Supporting Apartment Houses."

Through the modification of the "Seoul Special City Ordinance on Outdoor Advertisements," SMG will make it compulsory for businesses to change signboard lights into energy-efficient LED lamp, planning to replace 2,000 signboard into LED lamps every year. In addition, through the meetings of the Light Pollution Prevention Council, it will encourage the installation of high-efficiency lighting fixtures while discouraging the excessive use of lights.

It plans to launch the "On-Site LED Direct Marketplace" in apartment complexes 200 times. In cooperation with the city's Buddhist leaders, it will distribute 1 million LED lotus lanterns to 500 Buddhist temples. SMG will also open an online information plaza to provide citizens with information on LED prices and technologies. It plans to establish "LED Hub Centers" as the city's regional network for LED distribution.

SMG plans to install one or two LED hub centers in each of the city's six areas in cooperation with civil society. The centers will provide one-stop service for counseling, PR, price information, and joint purchase. It will also join forces with the Korea Franchise Association and large-scale discount stores to distribute LED lamps. On behalf of its 100 member companies, the association will sign a contract to install LED lights in their new stores. Discount stores will observe the "LED Purchase Day" regularly and display LED publicity materials in their stores.

Green Campus Leader

Eco House

SMG will also work together with corporations to develop LED technologies and expand the LED market through marketing support. To this end, it will run an LED test site in collaboration with the Korea Photonics Technology Institute and SMEs to promote the quality reliability of SME products. Most notably, SMG will perform the evaluation of effects of emotional lighting and hospital lighting with the Korea Institute of Lighting Technology and Korea Photonics Technology Institute in an effort to help improve the performance of LED smart lighting.

To spur the development of LED technologies, SMG will issue the "LED Distribution Standards for Public Institutions in Seoul," which will allow LED lights to be evaluated in terms of optical functions and require LED efficiency to be 10% higher than the national specification. In addition, it will launch the Seoul LED Lighting Fair every year to expand the LED market and open the "Comprehensive LED Information Center" in Konkuk University for the display and selling of LED lighting fixtures as well as information service and technical exchanges.

3) City of Human-Centered, Energy-Saving Transportation Environments

Energy Conservation through Reduction in Transportation Demand

An automobile used for the car-sharing service promoted by the city of Seoul is estimated to render 3.4 private cars idle in a year. In this context, one can see that supplying 3,000 car-sharing automobiles can reduce more than 10,000 private cars. SMG plans to refocus its car-sharing service on users such as apartment residents, public servants, and corporate personnel and increase the number of vehicles(car sharing automobiles) from 1,500 in 2014 (1.65 million members) to 3,000 in 2018 (2.5 million members).

Twice a year, SMG will hold Seoul's "No-driving Day" along the 2.1km stretch between Gwanghwamun and Sungnyemun. During Seoul's "Week of Citywide Use of Green Transportation" every September, it will expand the exhibition of eco-friendly vehicles and festival programs for more citizens to join the event.

In 2015, it will raise "traffic inducement charges" frozen for the past 20 years from the current KRW 700 ~ 800 to KRW 700 ~2,000 per square meter to reduce traffic congestion and energy consumption. SMG will also require parking facilities to turn more than 30% of their facilities into paid parking to reduce traffic.

In July 2015, SMG will launch the mileage-based "Driving Mileage" instead of the current weekly no-driving day scheme, compliance to which is actually hard to check. Under the new system, benefits will be based on mileage, which is quite easy to verify. In collaboration with insurance providers, among others, SMG plans to increase subscription to 1.41 million vehicles by 2018 based on citizens' voluntary participation.

Dissemination of Green Cars

Electric vehicles (EVs) emit 25% less GHG even when charging is included. SMG will continue to expand EVs to reduce energy and ultra-fine particles. It plans to increase the 195 EVs and 18 high-speed battery chargers in 2014 to 10,000 EVs and 200 chargers by 2018. It will also launch a test bed project for electric taxis in 2014 in cooperation with auto makers, taxi companies, and test institutes.

On top of that, SMG will disseminate 20,000 hybrid cars and buses by 2018. It will continue offering benefits for hybrid cars including reductions in acquisition tax and registration tax, congestion charges, and parking fees. SMG plans to increase the number of hybrid buses – which save 34.5% in fuel costs – from 20 in 2014 to 670 by 2018. To this end, SMG will encourage bus companies to purchase hybrid bus by refelcting the purchase in the evaluation and provide subsidies for CNG bus.

4) Settlement of Civic Culture that Practices Resource and Energy Conservation

Enhanced Eco-Mileage, a Platform for Citizens' Energy Conservation, Contributing to Energy Saving

SMG will continue to expand Eco-Mileage, the citizens' favorite energy conservation platform. It plans People's Assembly for Climate Change Action increase membership from 1.68 million in 2014 to 2.8 million in 2018, reducing 850,000 TOE in electricity and natural gas, among others. To this end, it will link the Eco-Mileage program to its other energy-related projects such as production of new and renewable energy, BRP, LED, and energy consulting service while trying to maximize its energy conservation effects through demand-side management including effect analysis and feedback.

Waste Recycling, Leading to Job Creation and Industrial Development

SMG will also implement diverse projects to waste recycling, turning waste into energy, which in turn will lead to job creation and industrial development. For residential areas, it will increase the number of recycling stations from 1,128 in 73 dongs (smallest administrative unit in Korea) in 2014 to 3,500 by the end of 2018. For the effective management of the stations and job creation, it will hire a total of 10,000 people as recycling station custodians or 15 ~ 30 persons per dong. SMG will train 735 citizens as recycling consultants who will offer "Tailored On-Site Waste Recycling Consulting Service" to the persons in charge of the buildings that generate large amount of waste to reduce waste as well as to create workplace.

SMG will expand urban mining, which extracts metals from waste electronics. It collects large e-waste free of charge when requests are made to its online call center. It plans to increase the subsidy for EPR (Extended Producer Responsibility) items from KRW 50 (USD 5 cents) per kilogram to KRW 100 (USD 10 cents) by 2018 to increase the recycling rates of electronics. It will continue to run a small-scale sharing marketplace in more than 300 locations closer to the residential areas including apartment parking lots and community parks each year.

People's Assembly for Climate Change Action

5) Energy Consideration in Policymaking including Climate & Energy Map and Urban Planning

Publication of Climate & Energy Map to be Used in Urban Planning and Land Utilization Plans

SMG will publish the city's Climate & Energy Map to be used as basic data for the city's major urban development plans, land utilization plans, and action plans on the climate and the environment. The map will feature the characteristics of districts and buildings in terms of climate and energy. SMG will complete the thematic map in 2015, use it in its policymaking processes, and begin to disclose it to the public in 2017.

District Energy Plans to be Reflected on Urban Planning

SMG will begin to reflect district-based energy plans on its urban development plan 2015 through the overhaul of the "Seoul Metropolitan Government Guidelines for Environmental Reviews in Urban Planning." Major changes will cover support for decentralized energy like solar energy, fuel cells, and cogeneration, including key measures for the city to raise its energy self-reliance rate while upgrading its building energy efficiency classification and enhancing its capacity to deal with climate change.

Creation of Compact City Consuming Little Transportation Energy

SMG will work out the "Seoul Master Plan 2030" aimed at creating several separate spheres in the city to minimize citizens' waste of energy for commuting and moving around. The plan will include the creation of pedestrian-friendly environments securing the minimum commuting distance for citizens, spatial structure focused on the city's train and subway network to minimize citizens' driving needs, and prevention of energy-inefficient urban sprawling. Based on pilot plans for four Northeast districts as a part of pilot project in May, 2013, SMG will set up plans for four large spheres and 25 small spheres. It will present to the public detailed development plans for the downtown area and a total of 115 small spheres starting 2016.

6) GHG Emissions Reduction through Phase 2 of One Less Nuclear Power Plant GHG Inventory and Verification

SMG will continue to make a detailed inventory of the city's GHG emissions and use it as basic data for its plan to reduce GHG emissions and shape its policy directions. It plans to select a professional GHG inventory agency that will monitor and verify the city's GHG emissions inventory in the most transparent manner.

GHG Emissions Target Management System: Early Achievement of the National GHG Emissions Reduction Target in 2014

The central government aims to reduce the country's public sector GHG emissions (annual average emission between 2007 and 2009) by 20% by 2015. SMG set a more stringent reduction target to cut emissions by 10 million tons by 2020 and by 20 million tons or 40% by 2030. It has carried out "GHG Emissions & Energy Reduction Target Management System for Public Institutions" that aims to cut energy consumption by an annual average of 5% in its 71 buildings including the new City Hall since 2011. The central government then set the goal of reducing GHG emissions from the country's waste treatment facilities by 10% by 2015. SMG reduced GHG emissions from a total of 25 sewage treatment centers and water purification centers by more than 3.3% a year through improvements in the energy efficiency of the facilities. Starting 2015, SMG will adjust its goal and strategy along with the implementation of the Emissions Trading Scheme (ETS).

Korea's ETS also allocates – on an annual basis – a certain amount of GHG emissions to organizations emitting a large quantity of GHG and permits them to trade surplus quantities. The eligibility requirement is annual average of 125,000 tons of CO_2eq for an organization or 25,000 tons of CO_2eq for a worksite during the last three years. At least 25 facilities of SMG including water supply offices and sewage treatment centers meet the criteria.

In June 2014, the Ministry of Environment posted a notice regarding the criteria for the allocation of emission rights. In August 2014, SMG submitted the application for ministerial allocation in consultation with a professional agency. Once the ministry finalizes the allocation for the period 2015~2017, SMG will work out and implement its emission reduction plans in the areas of BRP, LED, and efficient operation of various facilities.

Seoul Promise Street Parade for Climate Change Action

3. Innovation-based, Better Energy Workplaces

Goal : Seoul, Green Metropolitan City! Cultivation of Green Industries

Green Industry Clusters	Citizen Energy Business	Local Energy Service	Green Industry Support
6 green clusters	70 social enterprises & co-ops	25 energy hub centers	Support for 234 startups

Current Status

The foundation for boosting green industries in Seoul is extremely weak. Up to 99% of companies in more than 10,000 industries are SMEs, and 59.1% of them have fewer than 5 employees.

In Phase 1, investments in solar energy and renewables increased, yet most products including modules were fabricated outside of Seoul; hence the little contribution was made in the area of job creation.

Growth can be expected in the area of energy service including installation and maintenance. So far, however, the installed facilities are not big enough to trigger the further development of the related service industry.

Basic Directions : Enhancement of Foundation for the Development of Seoul-Type Energy Industries and Promotion of Job Creation

SMG will expand the installation of new facilities and foster the development of maintenance service industries through continuous investments in new and renewable energy and LED industry.

SMG will support pioneering the application of new technologies suitable to mega cities like Seoul, including BEMS and smart grid. Since many new SMEs concerned lack business management competency, SMG will strengthen its corporate life cycle-based, customized support measures.

SMG will promote the introduction of industrial clusters including the new and renewable energy industry in Southwestern Seoul, urban resources industry in Northeastern Seoul, and green construction industry in Southeastern Seoul.

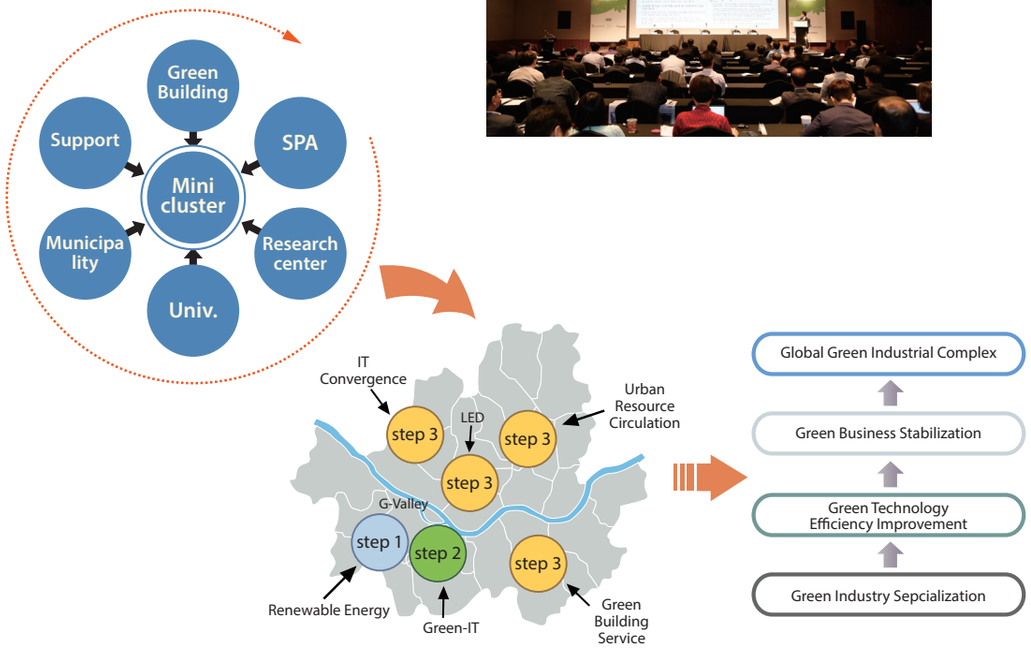
Service sector jobs are largely community-based. SMG will promote residents' participation through co-ops and ensure that job creation is linked to the promotion of energy welfare at the community level.

1) Green Metropolitan City, Cultivation of Seoul-Type Green Energy Industries

Cultivation of Regional Bases for Green Energy Industries (6 Green Clusters)

In G-Valley located in Guro-gu, Seoul registers the city's largest concentration of new energy businesses including 60 new and renewable energy companies, 117 green IT businesses, and 44 LED corporations. In particular, because of the potential for collaboration with ICT businesses there, SMG plans to cultivate G-Valley as the pilot new and renewable energy cluster.

Based on the trial experience at G-Valley, SMG will designate a total of six clusters throughout the city for business such as IT convergence, urban resources circulation, and green construction and lend special support to businesses in the clusters. SMG will form an industry-academe consortium and designate a research institute as well as exclusive management coordinators for the consulting service to businesses. Through the operation of the Green Biz Emergency Telephone Number 119, it will solve companies' grievances quickly. It will also run a green voucher system leading to various services including patents, certification, and exhibition participation.



Promotion Directions for Seoul-Type Green Industry Clusters

STEP 1 (2014~2015) Pilot Operation	STEP 2 (2015~2017) Expansion	STEP 3 (2017~2018) Outcomes
Creation of pilot cluster	Expansion of clusters	Cluster convergence
▶ G-Valley New & Renewable Energy Pilot Cluster	▶ Public contest-based selection of areas with a concentration of green businesses ▶ Consortium of district offices, colleges, research institutions, and local civic organizations	▶ Joint R&D and production of convergence products such as solar panel and LED ▶ Cultivation of self-reliant global clusters

Cultivation of 21st Century-Type Specialized Urban Energy Technologies

SMG will launch a pilot smart grid project by integrating information technologies into its existing power grid to improve energy efficiency and develop demand management markets. It will begin customized projects for several areas considering the characteristics of Seoul and relevant zones; the Sadang area will focus on CES (Community Energy Service), the Guro Digital Complex will concentrate on the energy efficiency of urban industrial complexes, Seoul Metro will work on the energy efficiency of the urban railway, and large apartment complexes will focus on smart grid. On top of this, SMG will distribute electronic smart meters that enable management of electricity consumption and demand through automation by 50% by 2016 and 100% by the end of 2020. It will also develop real-time alarm system on electricity use and conduct a pilot program for apartment houses in Seodaemun-gu.

SMG will also continue expanding the distribution of BEMS, which is estimated to save an average of 10% of the energy consumed by buildings. Since the technology is still in the infancy stage, SMG plans to apply it in stages in line with the trends of technological development.

In 2014, SMS will analyze the actual condition of existing 5 BEMS. By 2015 it will install 5 additional BEMS in its buildings and industrial facilities as a pilot project. In 2016, SMG will actively promote BEMS installation in new or renovated public buildings measuring more than 3,000㎡ or commercial buildings consuming particularly large quantities of energy. Such upgrade will be promoted by energy service companies (ESCOs), with priority given to the allocation of BRP funds. SMG will reflect BEMS on the environmental impact assessment in stages to ensure that BEMS can be introduced at the earliest stage.

Moreover, SMG will lay a foundation for adequate technology by providing one-stop support from product development, commercialization, startup to sales. It aims to develop 14 products by 2015 in collaboration with university research institutes and energy self-reliant villages (social enterprise, co-op and energy supermarket) as intermediary supporting agencies.

2) Tailored One-Stop Life Cycle Support for Green Enterprises

SMG will operate "Green Enterprise Startup Funds," which are designed to support the startup of green companies. It plans to create a total of 8 funds in the aggregate amount of KRW 126 billion – 3 funds with KRW 46 billion in the first stage and 5 funds with KRW 80 billion in the second stage – to provide funds in a long term (4 ~ 5years) to enterprises with green technologies but lack financial resources. To promising venture businesses, it will provide KRW 25 ~ 30 billion worth of SME Cultivation Fund by priority each year.

Every other year, SMG will present a policy direction for facilitating the creation of green jobs by conducting survey on green industrial jobs and publishing a white paper and use them as an input for support projects. It plans to nurture a total of 2,400 technical professionals, 240 specialists and 1,600 craft workers, by 2018.

In 2014, SMG will promote vocational education for energy managers and solar facilities technicians and open empirical courses for the Green Certificate. In 2015, it will cultivate personnel specializing in cross-industry convergence like the combination of green industry and ICT. By 2018, it will open green MBA courses in collaboration with universities. SMG will also support courses for green technicians at vocational schools.

SMG will lend full support to the efforts to develop green technologies for the purpose of creating green jobs. It is offering R&D funds until 2018 for the development of the Seven Seoul-type Green Technologies including green cars, green IT, new and renewable energy, green construction, and LED lighting. It will select new GT research topics needed by businesses and support related R&D by corporate or university research institutes. In 2015, it will launch a green energy "Seoul Green Techshop" to support commercialization of idea through DIY zones and support technology development of companies by developing over 50 products from 2016.

SMG will also launch various projects designed to promote the on/offline marketing of green products at home and abroad. Offline, it will facilitate sales of eco-products through the Green Products Fair and Danuri Shops. Online, it will join forces with online shopping malls such as G-Market to open special selling corners for excellent green products, reduce online retailers' sales commissions, and install online main banners for the products. SMG plans to launch the Green Products Expo and publish a guidebook for the top 100 green companies to introduce their products and shopping options.

3) Creation of Green Job with Citizens' Participation

Creation of Ecology for Co-ops and Social Enterprises in the Area of New Growth Energy

SMG plans to discover 70 social enterprises and co-ops in the area of new growth energy and provide them with strong initial support so that they could develop into financially stable, excellent SMEs.

SMG will offer them financial assistance up to KRW 10 billion with a pilot project cost of KRW 30 million. It will also operate education and consulting programs for the purpose of training socioeconomic leaders in the field of green energy through the "Seoul Socioeconomic Support Center" and "Co-op Consulting Center". In addition, SMG will organize 10 solar power co-ops and expand public land for the installation of their PV power plants from 10 places in 2014 to 100 places in 2018.

SMG will expand the education for energy consumption designers in charge of energy diagnosis of small and medium-sized buildings from 95 in 2014 to 745 by 2018. It will also help them be financially independent so that they can continue their career in the field by assisting them in their efforts to acquire the relevant licenses, establishing an energy designer co-op, and making them the priority in bids for public projects. For instance,

SMG will help them acquire licenses for new and renewable energy power facility technicians and building energy assessors so that they can enhance their qualifications and secure jobs in the public sector involving the installation of micro PV power plants and external air conditioner covers.

Creation of Local Jobs in the Area of Energy Services

SMG plans to set up 25 "Local Energy Hub Centers" that offer comprehensive energy services to citizens by 2017. Services provided by the centers will include the installation, monitoring, and maintenance of energy facilities, installation of LED lights and PV power plants, supply of information on various items, joint purchases, and product displays. Hub Centers will use the office of civic groups and rent public buildings, if necessary. They will collaborate with civic groups such as Green Consumer Network, Eco-Hub and Seongdae-gol Villagers with a plan to expand into service sales network and energy co-op service projects in the future.

SMG also plans to create jobs and improve building energy efficiency through the activation of "Green Interior Shops." It will ensure that excellent interior businesses are selected so that they can offer customers the most energy-efficient work using quality eco-friendly materials and deliver the most up-to-date information on BRP, for instance. For registered interior businesses, SMG will grant the "Green Interior Shop Certificate" to businesses that have completed education and achieved outstanding performance.

4. Energy-Sharing, Warm Communities

Goal : Presentation of Basic Rights to Energy Welfare and Realization of Sharing through Communities

Responsibility for Energy Welfare	Citizen Engagement	Transfer & Efficiency	Communities
Energy Welfare Ordinance – Korea's first	100,000 citizens participating in the Welfare Fund	Insulation work for 1,100 low-income households	200 energy self-reliant villages

Current Status

10.3% of the total households in Seoul are energy-poor, spending more than 10% of their income on energy. Their fuel costs are estimated to be around 4.7 times higher than those of the city's average households because they rely on relatively expensive energy (LPG and kerosene) and low-efficiency electronics.

The central government lacks the legal framework, and it continues to adhere to the centralized energy welfare delivery system without going through local governments by implementing voucher and fuel cost support on its own through the "Korea Energy Foundation."

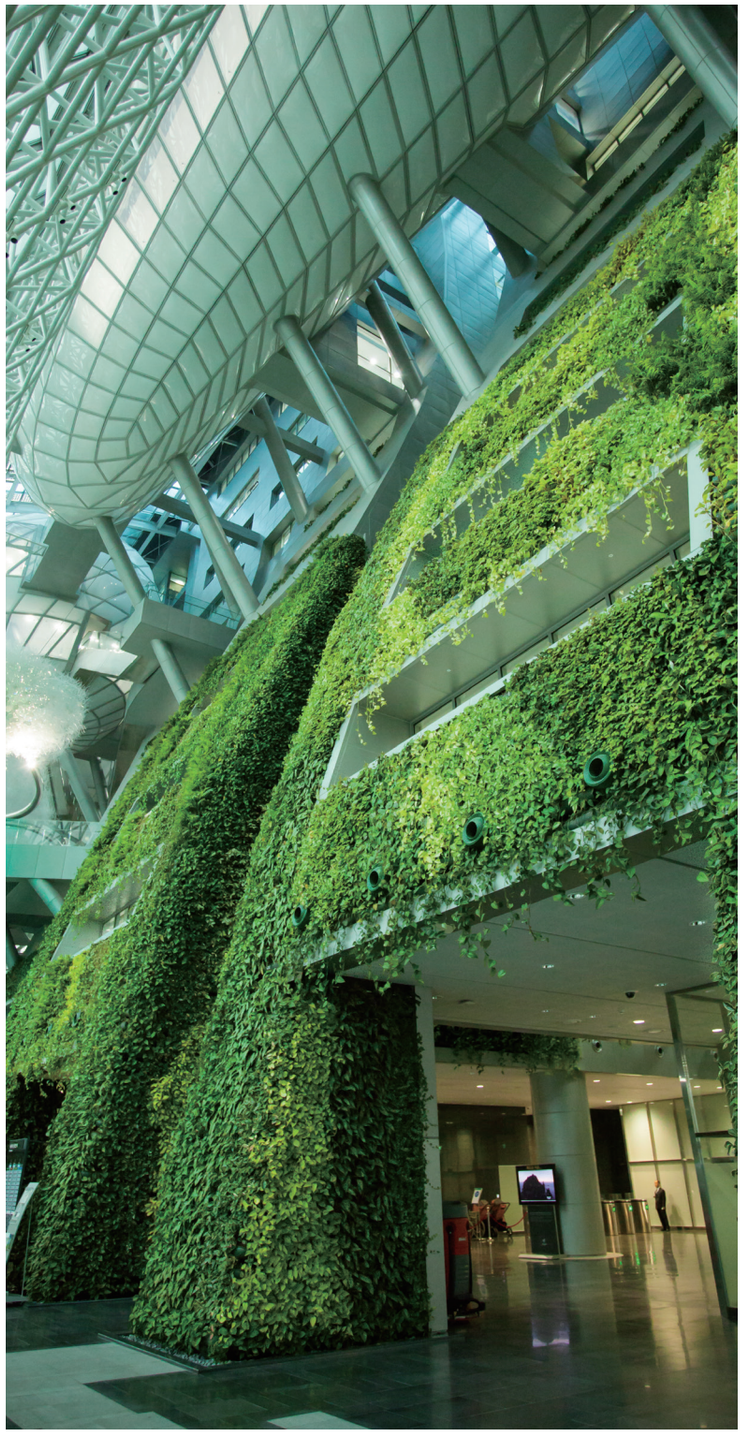
Basic Directions : Enhancement of Foundation for the Seoul-Type Energy Welfare by Institution and Community

SMG is committed to realizing its own energy welfare policies in keeping with the 20th anniversary of full implementation of local self-government in the country. It will enact the Citizens' Charter for Basic Energy Rights and Energy Welfare Ordinance to complement institutionally what is not covered by the central government's welfare policies, such as support for occupants of government-subsidized rental houses.

SMG will promote energy transition projects fundamentally including support for residential energy efficiency and solar power expansion while offering energy vouchers and direct subsidy of energy costs so that the energy-poor can survive any energy crisis.

SMG will enhance its capacity to implement its various energy welfare policies through the cultivation of energy welfare social workers and by conducting regular surveys among them and enhancing the competency of Residential Welfare Support Centers in the area of energy.

Energy welfare entails huge financial commitment. Thus, SMG will continue to pursue community-based approaches to the issue in cooperation with the private sector.



1) Securing Energy Welfare Rights through Institutional Arrangements

Enactment of the "Energy Welfare Ordinance" and Institutionalization of Support for the Energy-Vulnerable

SMG plans to lay the institutional foundation for universal energy welfare for all citizens as their basic rights. It will work out a draft for the relevant ordinance in 2015 and have such passed in 2016 when it will make an Energy Welfare Declaration. The contents of the ordinance include the responsibility of SMG for energy poverty, eligibility for support, ways to procure funds, grounds for the energy welfare platform (Fund) and encouragement of citizen engagement.

Meanwhile, in 2014, SMG will conduct the "Survey among the Energy-Poor of Seoul" regarding their housing environments, income status, and energy usage to use the data for its energy welfare policies.

"Energy Welfare Platform": A Virtuous Circle Where Energy Saving Leads to Energy Sharing

SMG will create the Energy Welfare Fund with citizens who will be deeply involved in the creation, operation, and distribution concerned. Specifically, the fund will be created through citizens' donation of profits from the production and conservation of energy in relation to the solar power business, LED, BRP, and Eco-Mileage. The fund will be used for the energy-poor.

The raising of funds as well as their management and distribution will be handled by civic groups and SMG will further develop the project with the civil society, Social Welfare Consultative Body and Co-Fund Raising Council. In 2015, SMG will lay a foundation for platform and secure financing and expand citizen participation to 100,000 by 2018.

Citizen Engagement		Management		Sustainable Fund
▶ Participants in PV power plants, LED business, and Eco-Mileage	+	▶ By 100-person Citizen Council (fund raising, management, and distribution)	→	▶ Laying the foundation for fund raising through the Energy Welfare Ordinance ▶ Cooperation with professional fund-raising organizations

Energy Support for Low-Income Households: Energy Transition + Direct Emergency Support

SMG will help the energy-poor improve their energy efficiency and reduce their energy costs. It will promote BRP for a total of 150 senior citizen centers and community welfare centers and enhance the insulation of the facilities including their windows. It will replace all the lights at 750 social welfare facilities with LED lamps using its budget.

SMG will also replace the lights of 120,000 households entitled to National Basic Living Security benefits with LED lamps free of charge by 2018 to help them reduce their electricity bills. For a total of 1,100 low-income households, SMG will continue to improve their energy efficiency until 2018. It will shift its focus from temporary services like wallpapering and replacement of floor mats to home repairs including the enhancement of insulation and window replacement. It will improve the energy efficiency of a total of 115,000 public rental housing units by 2018 (23,000 unit per year) through the replacement of balcony windows, elevators, security lights, and boilers with the most energy-efficient products.

Meanwhile, SMG will continue to guarantee the underprivileged their rights to access basic energy benefits – including emergency aid for heating costs – to help them survive the freezing cold in winter. It plans to expand the beneficiaries to single-parent households, households with handicapped members, and lowest-income households.

2) Laying the Foundation for Local Energy Communities

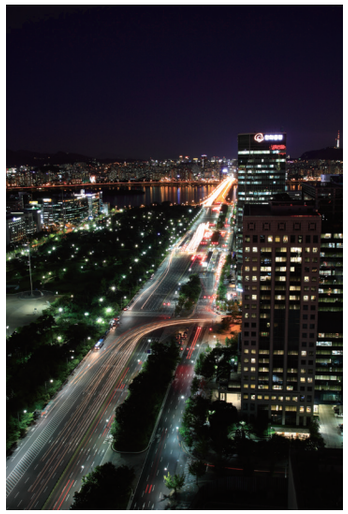
Continuous Expansion of "Energy Self-Reliant Villages" as Hub for Local Energy Governance

SMG plans to convert energy self-reliant villages that simply consume energy into communities that create profits through energy efficiency and green energy production and implement sharing in connection with energy welfare.

Specifically, SMG will increase the number of such villages from 15 in 2014 to 200 by 2018. It will carry out branding for various projects tailored to the characteristics of the villages. Special focus will be placed on the major projects of the city such as mini-PV power plants, BRP, LED, and energy consulting service. It will also encourage the villages to build a network and support one another for their mutual growth.

For instance, Sipjaseong Village will turn into a community specialized in energy production through the installation of PV power plants at all households and wind-powered street lamps and creation of a solar-powered landmark street. On the other hand, Seongdaegol Community will focus on energy jobs. It will build village enterprises such as energy supermarkets and energy cafes and create energy-related jobs including energy consultants and counselors for home energy efficiency improvements.

In addition, SMG will create a virtuous cycle of energy circulation for communities by expanding Citizen Energy Conservation Plants. Based on the results of 2 pilot projects in 2014, it plans to build 10 center in 2015 and expand them from 2016. Citizen Energy Conservation Plants are aimed at reinvesting incentives for Eco-Mileage members into community's energy projects and enhancing the value of sharing. By designating key institutes in community, SMG will foster the energy conservation plants as coordinator. It will also operate "Energy Station" for energy charging and related services for each community and establish an investment foundation for energy-related projects by redesigning Eco-Mileage and introducing Energy Conservation Point System.



Activation of Community-based Energy Conservation Campaigns

SMG will cultivate community energy activities to help citizens internalize energy conservation and implement it in their daily lives. Each year, it will train 20,000 children and adolescents as Energy Guardian Angels who implement energy conservation at home and school. It will produce 10,000 Green Leaders as missionaries for green life annually. The leaders will create a network, and they will eventually be encouraged to form a co-op among themselves.

Meanwhile, SMG will continue to expand its Energy-Saving Model Shops in collaboration with civil society for the purpose of helping shop owners conserve energy systematically. It plans to increase the number of shops from 2,000 in 2014 to 12,000 in 2018.

SMG will promote the creation of "Energy Conservation Streets" under the initiative of local organizations including merchants' associations. Following the pilot project along Sinchon Street in the Seodaemun district in 2014, it plans to expand the project to more than five locations in 2015. In 2014, through "the One Less Nuclear Power Plant Space Expansion Project" in Sinchon Street, the Sinchon Merchant Association, Seodaemun Socioeconomic Council, and Sinchon Maeul Net formed a voluntary network and implemented One Less Nuclear Power Plant policies.

Meanwhile, SMG will join forces with companies and wage the "One Company, One Street" and "Warmhearted Energy Prosumer" campaigns. It will assist co-ops and non-profit organizations with energy know-how in carrying out PR and installing energy production and energy conservation facilities along the streets in cooperation with companies. In particular, through the "Warmhearted Energy Prosumer" campaign, SMG will link companies to areas with high concentration of energy-poors so that the former will perform home insulation work for and supply energy-efficient products to the latter.

Also, SMG will promote the linkage between "Clean Apartment House" project and BRP project. Through a campaign for saving energy to cut the maintenance fee, SMG will encourage energy conservation and promote the project by proving support for BRP costs for apartment houses.

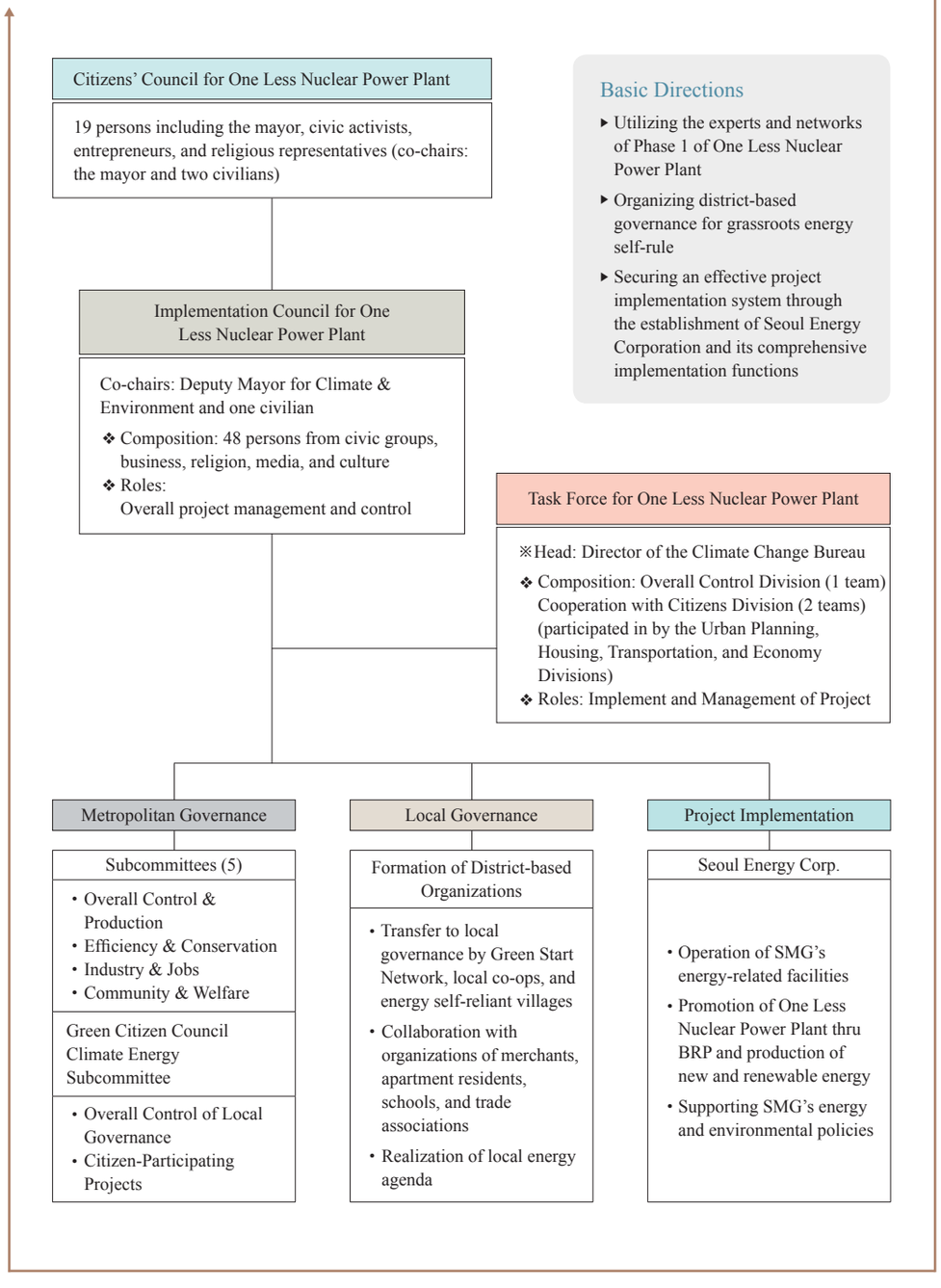
Eco-Mileage System & Energy Conservation Bonus Point System	⇨	Community Energy Conservation Plant	⇨	Investments in Energy Business and Energy Consumption	⇨	Community Enterprises
▶ Citizen Energy Conservation Plants		▶ Coordinator groups and heads of conservation plants ▶ Networking, PR, etc.		▶ Energy stations ▶ Energy supermarkets, BRP, PV power plants, etc.		Citizen Fund

04

Implementation Systems

SEOUL

Implementation Systems



1) Establishment of Energy Collaboration System through "Seoul Energy Governance"

Strategies to Establish and Run Citizen-Centered Energy Governance

SMG plans to carry out an energy culture overhaul and create jobs at the community level in three stages: development of local hubs, local agenda setting, and networking. For stage 1, SMG will discover and train local leaders for the development of energy policies. For stage 2, it will work out the energy code of conduct – taking into account the local characteristics – and identify suitable specialization projects like solar energy and LED. For stage 3, SMG will strengthen the competency of local leaders through public programs and promote networking with resident organizations and schools.

Stage 1: Development of Local Hubs	Stage 2: Local Agenda Setting	Stage 3: Networking
▸ Discovering and training local leaders for the development of energy policies	▸ Presenting the energy code of conduct considering the local characteristics ▸ Identifying suitable specialization projects like solar energy and LED	▸ Enhancing local leaders' competency through public programs ▸ Activation of networking with resident organizations, schools, etc.

In addition, SMG will promote the development of metropolitan governance and local governance at the same time and pursue systematic links between the two. For metropolitan governance, it will redefine the roles of the Implementation Council for One Less Nuclear Power Plant aiming for setting the energy governance implementation strategies and supporting local governance in policies and finance. For local governance, SMG will focus on local leaders' networking and competency development while discovering and implementing community-based local energy agenda.

Citizen Participation in One Less Nuclear Power Plant

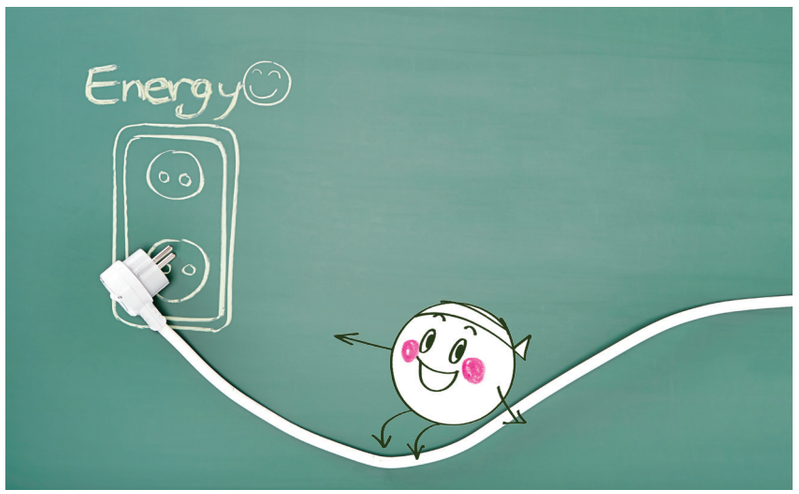
Organizing Community-based Energy Governance and Expanding Collaboration

To activate community-based energy governance, SMG will discover and support a diverse set of policy participants who will develop new policies. To this end, it will cultivate existing energy-related organizations – such as district branches of the Korea Climate & Environment Network, Energy Hub Center, Energy Co-ops, Energy Self-Reliant Villages, and Green Campus University Community – as hubs for the creation of local energy governance; they will join hands with community-based resources such as merchant associations, apartment resident councils, and green shops and form a new energy network.

SMG will promote a region-oriented governance type of public contest to seek energy alternatives focusing on competent regional groups. From 2015, 60% of the public contest project will be allocated for the regional resource linkage project, and SMG will provide compensation for project implemented under social impact funding.

With regard to local energy policy projects, SMG will shift its focus from individual projects like home energy consultants and green leaders to community-based, integrated programs promoted by competent organizations. It will organize energy consultants and green leaders into co-ops (non-profit organizations). Beginning 2015, it will refocus its energy-related programs so that energy consultants will play the key role for households and energy guardian angels for schools. Moreover, it will expand the participation of local organizations in energy projects – such as installation of PV power plants and replacement of lights with LED lamps in welfare facilities, for instance – so that they can generate revenues and develop into energy service job hubs.

SMG will work out and implement the "Energy Code of Conduct 2020," which is essential for the successful implementation of energy agenda by communities. It will support local organizations in their discovery of energy slogans and setting of energy agenda that mirror the characteristics of their communities in connection with various events initiated by civic groups or diverse cultural events hosted by self-governing districts.



One Less Nuclear Power Plant Campaign with Green Campus PR Ambassadors

From July 2014, SMG will complete local governance and energy agenda. Starting 2015, it will implement energy agenda items in collaboration with local communities and keep monitoring the results. As major programs, it will launch the Energy Conservation Street in cooperation with local shopkeepers, One Company One Street campaign in collaboration with enterprises, Zero Energy-Poor Campaign through the utilization of local energy sources, and Energy Fair including a parade.

Policy Debates for Phase 2 of One Less Nuclear Power Plant with the Attendance of Citizens and Experts from Home and Abroad

SMG plans to launch the annual "Seoul International Energy Conference" with the attendance of overseas experts in energy issues to analyze the worldwide energy trends and share honest opinions on the directions of the city's energy policies. Starting from 2013, the conference is held every November at the Seoul City Hall, inviting citizens interested in energy policies and latest technology trends, businesses, academic circle and civic groups for constructive discussion.

With full-fledged implementation of Phase 2 of One Less Nuclear Power Plant, SMG will launch a series of town hall meetings titled "Grand Panorama Citizen Meeting" to induce gradual shift to "Energy Self-Reliant City, Seoul." The grand forums will actually be held in various formats including town hall meetings, World Cafes, Public Opinion Listening Workshops, and Citizen Forums.

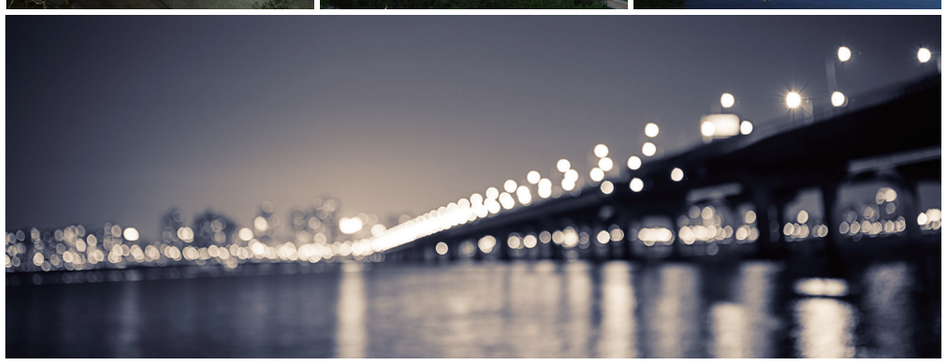
2) Establishment of Energy Administration Infrastructure and System

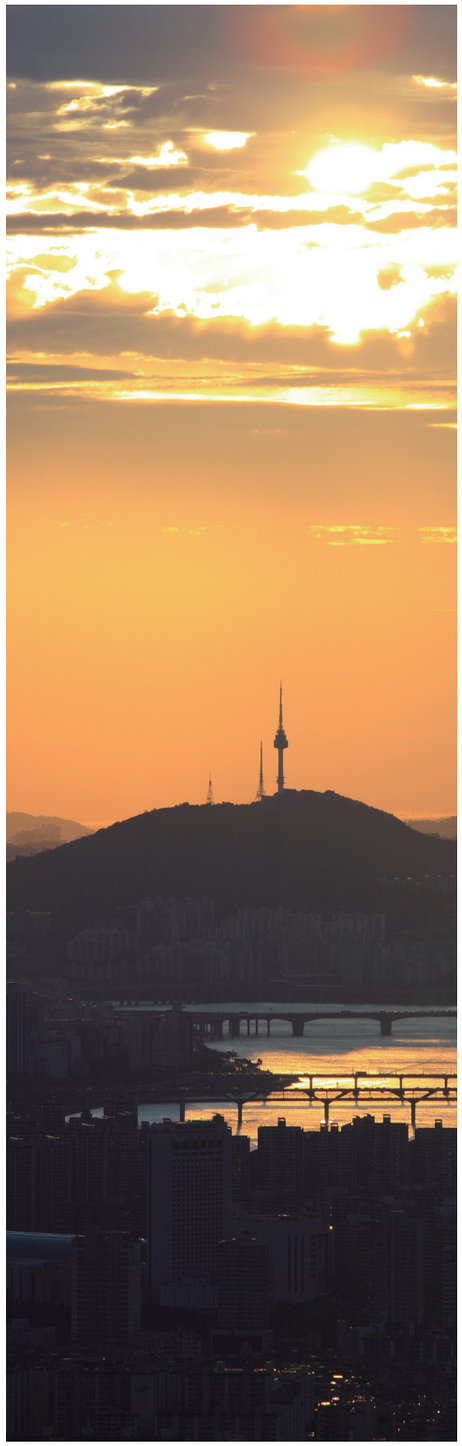
Establishment of "Seoul Energy Corp. (tentative name)" to Improve Performance

Phase 1 of One Less Nuclear Power Plant was promoted by a number of Divisions in Seoul Metropolitan Government such as Climate & Environment Headquarters, Housing Policy Office, and City Transportation Headquarters. The need for a separate exclusive organization was pointed out by many so that energy transition could be promoted regardless of changes in so many divisions. Most notably, Seoul International Energy Advisory Council(SIEAC) recommended that SMG consider the establishment of an organization in charge of efficient, effective energy services for citizens and corporation through its declaration in November 2013.

SMG has decided to set up "Seoul Energy Corp. (tentative name)," which will be responsible for the establishment and implementation of its diverse energy policies with experts specializing in energy policies and policy implementation. It plans to finish institutional preparations by the end of 2015 and launch the company in 2016.

Specifically, Seoul Energy Corporation will operate the city's energy-related facilities such as integrated energy facilities and resource recovery facilities and promote the One Less Nuclear Power Plant initiative including improvements in energy efficiency and expansion of new and renewable energy. It will also be responsible for the cultivation of energy experts and support for village energy companies while finding markets for new energy services such as LED emotional lighting and ICT energy technologies.





Implementation of the One Less Nuclear Power Plant Initiative by Office, Headquarters and Bureau and Establishment of Cooperative Mechanism

Phase 1 of One Less Nuclear Power Plant was promoted mainly by the Climate & Environment Headquarters and individual projects were carried out by other departments. Considering the need for reflecting the energy value into policies in Phase 2 beyond energy production, efficient energy use and conservation in Phase 1, the Climate & Environment Headquarters will supervise energy-related works of offices, headquarters and bureaus under SMG and each department will lead the implementation of the initiative.

Leadership for the Localization of the Country's Energy Policies

Each year, SMG will publish a white paper on Phase 2 for the systematic modeling of all the policies involved in the initiative and share the information with other local governments in the country. In 2015, It will form an inter-city energy cooperation network in an attempt to pursue shared growth between local governments and realize a shift in the leadership of the country's energy policies from the central government to local governments from the long-term perspective.

Meanwhile, SMG will promote quality energy production programs in the country's rural areas with favorable conditions for the production of wind power, solar energy, and small hydro power through financial assistance. It will implement a pilot project for a wind farm at the World Scout Jamboree campsite in collaboration with the government of Gangwon Province. SMG will finance the project through the Seoul-Gangwon Citizens' Shared Growth Fund, investments by the private sector, and Seoul Climate Fund.

05

Implementation Status of One Less Nuclear Power Plant, Phase 2

Implementation Status of One Less Nuclear Power Plant, Phase 2

1. Accomplishments of One Less Nuclear Power Plant, Phase 2

1) Achievement of Core Indicators for Phase 2 including Electricity Self-Reliance Rate

Through One Less Nuclear Power Plant, Phase 1, the foundation for most of the projects has been laid with experience accumulated. As of September 2015, SMG achieved its goal of producing and saving 910,000 TOE of energy and reduced 2.63 million tons of CO_2, exceeding the target for the first year. It is difficult to estimate the electricity self-reliance rate since it takes some time to compute the total amount of power used and produced in Seoul. In 2014, SMG recorded 4.7% of electricity self-reliance rate, which is close to the target of 5.0% based on the capacity of power plants.

Indicator	Goal ('14.7~'15.12)	Achievement ('14.7~'15.9)
Electricity Self-Reliance Rate	7.0% (2014 target: 5.0%)	4.7% (based on facility capacity as of the end of 2014)
Energy Production/ Efficiency/Conservation	902,000 TOE	910,000 TOE

※ Electricity Self-Reliance Rate: Achievement as of 2014 (Data on electricity used and produced in 2015 will be confirmed in March 2016)

[Energy Production and Reduction by Major Projects]

(Unit : 1,000 TOE)

Production (64,000 TOE)	Efficiency (495,000 TOE)	Conservation (351,000 TOE)
• PV panel 8.3 • Fuel cell 55.6	• Green building design standard 225 • BRP 86.4 • LED replacement 176.2 • Transportation 7.3	• Eco-Mileage 351

2) Major Accomplishments

Promotion of 'Solar-Powered City Seoul' Project

By carrying out 'Solar-Powered City Seoul' project, one of the core projects under One Less Nuclear Power Plant, Phase 2, SMG has built 30㎿ solar power plants as of September 2015. As a result, Seoul has 101㎿ solar power plants to provide about 34,000 households with electricity using solar power.

To expand PV power plants, Seoul embarked on a project to install solar power stations (1,964㎾) in 92 places by investing in the public sector. It aims to finalize project plans and allocate KRW 7.7 billion of budget of for offices and autonomous districts under SMG by March 2015 and complete projects by December, next year.

① Government-subsidy Project	② Special Grants Project	③ Citizen Participation Budget	④ Landmark Project
• 16 places including Seoul Baekje Museum • PV power plant 393㎾ • Project cost KRW 126.2 million	• 64 places including Gocheok Public Library • PV power plant 1,395㎾ • Project cost KRW 500 million	• 3 places including Gaeunsan Park • PV power plant 66㎾ • Project cost KRW 3.8 million	• 9 places including solar powered stop • PV power plant 110㎾ • Project cost KRW 1.085 million

In addition, to expand PV power stations in the private sector, SMG has reinforced relevant system by expanding FIT scheme, lowering the loan rate of public facilities and raising the limit of loan. Seoul has provided a guideline on design, construction, operation and management of PV power stations including practice guideline by sector and size after integrating information dispersed in laws and guidelines since September 2015.

Category	2014		2015
100% increase of Seoul-type FIT	KRW 50/㎾h·year	⇨	KRW 100/㎾h·year
20% reduction of loan rate for public facilities	KRW 25,000/㎾·year		KRW 20,000/㎾·year
Expand the limit of loan support for PV power plant	Within 60% of installation cost		Within 80% of installation cost
Strengthen renewable energy criteria in Environment Impact Assessment (EIA)	12%		14% ('15.9)

Seoul Energy Citizen PR Ambassadors Appointment Ceremony

SMG expanded its support for the installation of micro PV power plants to include public building with an aim to expand micro PV power plants under Phase 2. As of September 2015, it has built micro PV power plants (2,528kW) in 3,469 places by increasing contact with citizens through display and sale of PV panel at Lotte Hi-Mart and conducting a pilot project to install micro PV power plants at street vendors.

By launching the Solar Power Generation Citizens' Fund through which citizens can participate in energy production, SMG sold KRW 8.2 billion and completed the construction of solar power plants (4.24MW) at subway car depots in Jichuk and Gaehwa. In addition, it has put forward the installation of solar power plants (817kW) in 21 places through 19 citizen cooperatives. As of September 2015, solar power plants (332kW) are built in 11 places and the rest of plants (485kW) is being installed in 10 places. SMG plans to install 100 school solar power plants, which is based on cooperative, by 2018 and completed the installation in 16 places.

▸ Lay groundwork for providing school sites with good condition to citizen cooperatives

Installation completed in 2 schools before 2014	⇨	Installation underway in 2 schools in 2015	⇨	Goal by the end of 2015
Sangwon Elementary School 37kW Samgaksan High School 19kW		Doksan High School 100kW Inheon High School 96kW		Solar power plants in 25 schools

※ Total: Installation completed in 16 schools, underway in 10 schools
(installation is expected to be completed in 26 schools by the end of 2015)

Implementation of Urban-type Smart Grid Pilot Project with Efficient Use of Electricity

SMG has carried out the smart grid pilot project to establish decentralized energy production system and promote efficient energy use after selecting two energy self-reliant villages (Sipjaseong Village in Gangdong-gu, Hyundai Apt in Dongjak-Gu) and placing construction orders in September 2015. It also plans to adopt the electricity use monitoring system and the remote control of cooling system for establishing an optimized model of smart grid at the University of Seoul.

One Less Nuclear Power Plant Phase 2
Citizens' Participation in Making Seoul an Energy Self-Reliant City

Construction of Fuel Cell Power Plant and Development of Uncharted Niche Energy Sources

To expand fuel cell power plants that enable power generation and cogeneration without CO_2 emissions, SMG will select project developers from November 2015 to build a 30MW power plantat the Seonam Sewage Treatment Center. By launching a citizen fund, citizens will invest about KRW 10 billion out of the total construction cost, KRW 150 billion, for the project.

Moreover, Seoul has strived to find unused energy sources to secure energy source for district heating by recovering heat from sewage and incineration that can be utilized at sewage treatment center and resource recovery facilities. Seonam Green Energy was selected as a developer for recovering heat by 32Gcal per hour from discharge water at the Seonam Water Treatment Center and signed a concession agreement in April 2015. From September 2015, the company has been undertaking pre-construction work such as reviewing the detailed design and transplanting trees. After detailed consultation with the resident council, it will begin construction in November 2015.

Kolon Water and Energy was selected as a developer for recovering waste heat from the exhaust gas generated at the Nowon Resource Recovery Facility and signed the MoU in May 2015. It will embark upon the project in November 2015 after consultation with the resident council.

Promotion of Energy Efficiency "Lighthouse Project" and Small-and Medium Sized Model House

SMG plans to apply passive factors to building, the largest energy consumer in Seoul, and expand model houses with integrated energy production and monitoring system. To this end, Seoul has initiative Energy Efficiency Model Project by selecting four placesincluding senior citizen center and daycare center. Seoul plans to complete the by the end of 2015 and promote the project to the private sector by analyzing the effects and making a manual for the project. And, it will build 10 more model houses in 2016 for raising understanding on BRP.

Introduction of Building Management System (BEMS) using Cutting-Edge

To introduce Building Energy Management System (BEMS) for optimized energy use in building, SMG has been conducted a pilot project at Seoul Metropolitan Seobuk Hospital from April 2015. When the project is completed, SMG will expand it to three buildings in 2016 after analyzing and complementing the project and implement in 13 private hospitals in Seoul by 2020. On September 1, 2015, a new rule was implemented for mandatory introduction of BEMS when constructing a building by reinforcing deliberation criteria of EIA.

Creation of Clear-Lighted Urban Space with LED Replacement for the Public

By setting up a special purpose company (SPC) for installing low-power, high-efficiency LED lamps and carrying out the pubic lamps replacement project using private investment, SMG has replaced 93,000 lamps in 13 districts and 48 affiliated offices in Seoul. The project has been carried out under a consortium with companies including Korea Electric Power Industrial Development (KEPID). A SPC (Green LED) that takes charge of replacing 210,000 lampsin function rooms and offices of subway stations (Seoul Metro, Rapid Transit Corporation) with LED lamps, has completed the replacement work in October 2015. On top of 430,000 lamps replaced during the Phase 1, a total of 640,000 lamps except internal lamps in subway train have been replaced with LED lamps.

In order to strengthen walking safety of children and the elderly, SMG has been setting up "Solar-powered LED Road Safety Sign" at school zones since August 2015. It plans to complete the replacement project by the end of 2015 by providing a budget of KRW 2,230 million to 17 districts.

Enhancement of "Eco-Mileage" to Foster Energy Saving Culture

Through the Eco-Mileage system, a key project for energy conservation, 1.7 million members'efforts have led to the conservation of 560,000 TOE of energy as of September 2015.Along with quantitative expansion of members, SMG seeks to enhance the system by realigning 220,000 overlapping and inactive members through mandatory registration of member identification number (August 2015), and designated the amount of electricity use as a critical item among four energy conservation items.

From June 2015, SMG improved the reduction rate for incentive from 10% reduction to 5% reduction with an aim to facilitate citizen's participation in the system. As a result, the number of incentive recipients will increase by 50,000 to 120,000 from January 2016. In addition, SMG is providing a preferential interest rate of 0.2% for installment savings to the Eco-Mileage members and discounting the ticket fee of Han River cruise ship by 20% to induce citizen's participation.

Before Improvement		⇨	Improvement ('16.1)	
Reduction Rate	Incentive		Reduction Rate	Incentive
Over 10%	50,000 mileage		5% ~ 10% 〈new〉	10,000 mileage
			10% ~ 15% 〈adjusted〉	30,000 mileage
			Over 15% 〈same〉	50,000 mileage

KRW 3 Billion of Energy Welfare Fund by 2020

SMG aims to raise KRW 3 billion by 2020 to create the Energy Welfare Fund to realize energy welfare, a new value pursued in the Phase 2. As of September 2015, SMG has raised KRW 1.16 million of fund in kind (LED, etc.) and cash. It also selected 'Seoul Council on Social Welfare' as the fund operating body and signed the MoU in January 2015. In addition, the metropolitan government launched the 'Seoul Energy Welfare Citizen Fund' Council in July 2015 and formed a volunteer group consisting of university students.

[Energy WelfareFund Raising Goals by Year]

2015	⇨	2016	⇨	2017	⇨	2020
KRW 200 million		KRW 600 million		KRW 1.7 billion		KRW 3 billion

It is important to not only provide physical support but create a warm-hearted atmosphere for energy welfare, so SMG hasestablished the Energy Welfare Fund website and engaged in donation and PR activities based on citizens' participation to spread the culture of sharing.

Fund Website (www.seoulenergyfund.or.kr)

Onbitumi Street Campaign

Launching Ceremony of Citizens Council

In 2015, SMG held the 'Namsan Walkathon' to raise money for the energy welfare fund, which resulted in KRW 5 million of funding thanks to 5,000 citizens who donated KRW 1000 per person. In addition, it opened 13 energy supermarkets in energy self-reliant villages by creating jobs and the local energy ecosystem and operated the renewable energy tour course. By distributing a manual for making energy self-reliant villages, it has facilitated the culture of energy conservation throughout the local communities.

Moreover, SMG replaced lamps with LED lamps for free of charge in 400 social welfare facilities and 14,000 socially underprivileged households, spreading the warmth of energy across society.

Establishment of Institutional Framework to Facilitate Private PV Project

Contrary to the Phase 1 under which the public sector led the projects while the private sector's participation was encouraged, the Phase 2 has focused on laying an institutional groundwork for the project. In addition to the increase of FIT and the loan limits to revitalize PV power generation, SMG reinforced the deliberation criteria of the EIA to increase the rate of renewable energy use for newly constructed building from 12% to 14%, expand the rate of LED light installation from 70% to 80% and make the introduction of BEMS mandatory from July 2015.

For efficient use of energy, SMG enacted and implemented the "LED Light Standardization Plan" on July 30, 2015 to come up with LED lamps maintenance measures. The plan provides the standards for the size and capacity of key components such as module, converter and connector and expands the compatibility. SMG will complete the pilot project to provide standardized security lights to three districts by December 2015.

To strengthen the energy diagnosis system for efficient energy conservation of buildings, SMG revised and promulgated the 'Seoul Metropolitan Government Energy Ordinance on October 8, 2015 based on the result of commissioned study. The 'Energy Diagnosis Operation Regulation' is almost finalized to provide detailed rules on the scope of energy diagnosis through close consultation with Korea Energy Agency and relevant organizations.

Establishment of Plan to Launch Seoul Energy Corporation ('15.7.1)

SMG has launched and operated the 'Seoul Energy Corporation Task Force' and 'Corporation Taskforce' under Group Energy Team, SH Corporation to establish the Seoul Energy Corporation for efficient implementation of the One Less Nuclear Power Plant Initiative. In August 2015, SMG submitted the corporation establishment plan to the Ministry of the Interior and prior consultation is underway. It has commissioned a study on the formation and the work of the corporation, which will be completed in January 2016.

| Seoul Energy Corporation Establishment Plan |

- Type of Corporation : Local government-invested corporation in accordance with Article 24 of the Local Public Enterprises Act
- Scope of Project: Conduct 'Seoul-type energy policies' and implement the 'One Less Nuclear Power Plant Initiative'
- Organization, Staff, Capital Investment : To be announced based on the study result

3) Future Plan

Since 2015 when the One Less Nuclear Power Plant, Phase 2 began to gain traction, SMG faced stumbling blocks to implementing the initiative due to deterioration and changes in the social and external conditions such as the outbreak of MERS. Accordingly, it had to readjust the implementation strategies and goals of the initiative as well as highly set goals of some projects that required coordination with other agencies.

The Home Energy Clinic Service through which energy consultants visit homes or stores to diagnose the energy use and instruct energy conservation methods was difficult to conduct in the first half of the year due to the spread of MERS, which made citizens refrain themselves from contact with the outside. In addition, the subjects of the 'Wood-Pellet Distribution Project" originally targeted at low-income households had to change to public facilities due to decreased demand.

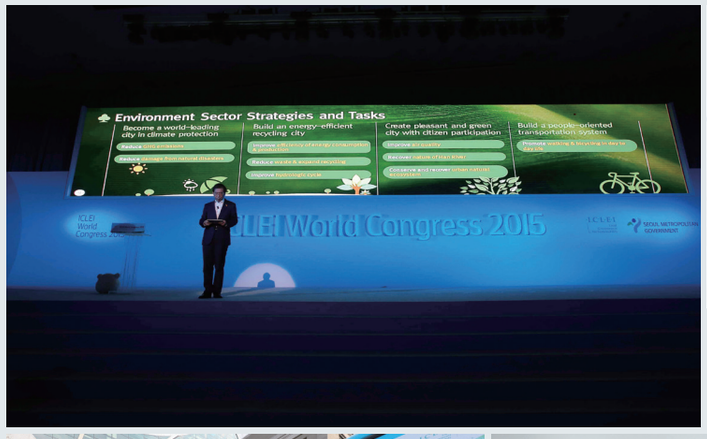
SMG has achieved its goals by 2015 despite such unfavorable conditions, but it still needs to make continuous efforts to achieve the goals of the Phase 2.

Thus, SMG will reinforce the cooperative mechanism with the Implementation Council for One Less Nuclear Power Plant and relevant organizations and come up with effective strategies by collecting opinions of experts including the Seoul International Energy Advisory, so that it can achieve all of the core objectives by 2020.

ICLEI World Congress 2015

The ICLEI World Congress 2015 took place in Seoul, Korea for five days from April 8 to 12. During the ICLEI World Congress 2015, 240 local governments (204 cities abroad) from 88 countries worldwide gathered in Seoul to contemplate on the role of city and local government to combat climate change.

During the Congress, Johannesburg, Montreal, San Rafael, Nates and Paris announced action plans to cut CO_2 emissions and 35 cities including Montreal, Paris and Vancouver expressed their intent to comply with the Compact of Mayors.



In addition, about 100 mayors adopted and reaffirmed their support for the Seoul Declaration to promote global urban sustainability. They also adopted the Seoul Action Plan which presents detailed plan and goals for implementing and expanding the Compact of Mayors to the leaders of local governments.

One of the most meaningful events was the proclamation ceremony of the Promise of Seoul for addressing climate change. At the ceremony, Seoul's commitment was presented to reduce 10 million tons of greenhouse gas emissions by 2020, a move calling on each individual to reduce 1 ton of CO_2, with action plans of citizens, businesses and the city administration for 36 tasks in 10 different areas. The ceremony ended with a street parade of mayors, citizens and NGOs with flags and Earth-shaped balloons.

With cities worldwide taking the lead in presentingCO_2 emissions reduction targets, Seoul Metropolitan Government will deliver the voices of local governments and cities at the upcoming COP 21/CMP11 to be held in Paris in December to ask for the central government to suggest more ambitious plans to cut CO_2 emissions.

ICLEI World Congress 2015
SUSTAINABLE SOLUTIONS FOR AN URBAN FUTURE
8 - 12 April 2015 • Seoul, Republic of Korea

Climate & Environment Headquarters	http://env.seoul.go.kr
One Less Nuclear Power Plant	http://energy.seoul.go.kr
Seoul Energy Dream Center	http://www.seouledc.or.kr
Seoul Environmental Dispute Resolution Commission	http://edc.seoul.go.kr
Seoul Environmental Impact Assessment	http://eims.seoul.go.kr
Seoul Air Quality Information	http://cleanair.seoul.go.kr
Eco-Mileage	http://ecomileage.seoul.go.kr
Asbestos Control Information System	http://asbestos.seoul.go.kr
Weekly-No-Driving-Day	http://no-driving.seoul.go.kr
Secondhand Market	http://fleamarket.seoul.go.kr
Resource Recovery Facilities	http://rrf.seoul.go.kr

Dongeuri the Sunlight Angel is the mascot of Seoul's environmental initiative for the future, symbolizing the face of Seoul citizens who strive to make their city the global climate & environment capital.

Environmental Policy Division
Seoul Metropolitan Government

15 Deoksugung-gil, Jung-gu, Seoul TEL. +82-2-2133-3536

http://env.seoul.go.kr