

The Improvement of an Incentive System for Energy Efficiency of Buildings in Seoul

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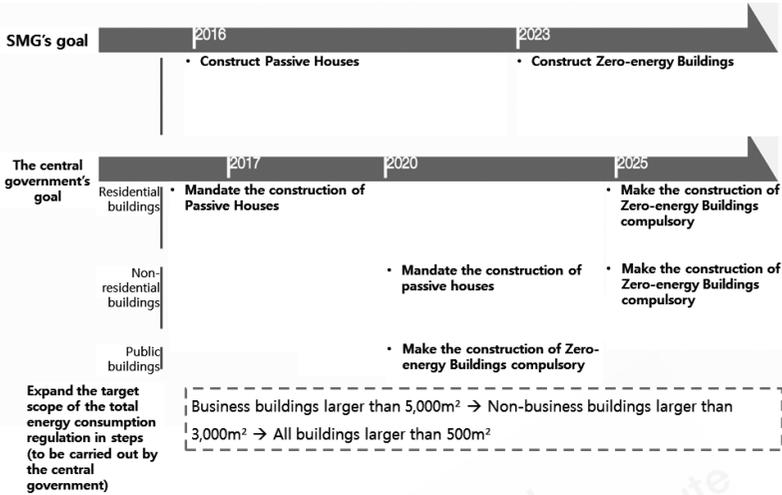
Summary

The Seoul Metropolitan Government (SMG) should provide existing buildings with appropriate incentives for efficient energy performance through the Energy Performance Diagnosis Program.

1. Introduction

At present, there are no measures to regulate the energy performance of existing and newly constructed buildings smaller than 500 square meters

The Korean government introduced its first National Energy Master Plan in 2008. The plan announced the “reinforcement of energy conservation in residential and commercial sectors through the construction and diffusion of Super Energy Conservation Buildings.” Later in 2014, the government presented the second energy plan. It mainly focused on achieving the goal of “transforming every new building into a Zero-Energy Building by 2025.” Participating in the national government’s quest for energy efficiency, the SMG introduced an enhanced version of the building code in September 2013. The new building code includes plans to make the construction of passive houses and Zero-Energy buildings compulsory by 2016 and 2023, respectively. SMG is also planning on gradually reducing building energy consumption. Its achievement is ahead of the national government’s energy conservation plan by one to two years.



[Figure 1] Plans of SMG and the Central Government to Promote and Obligate (in stages) the Construction of Zero-Energy Buildings

Although more buildings are now subject to the SMG's new building code, there is no system that regulates energy consumption of new buildings smaller than 500 square meters. In addition, the Green Building Certification Program and the Energy Efficiency Rating Program are unfavorable to small buildings compared to medium and large buildings. Furthermore, for existing buildings, there are currently no measures available to control energy performance of buildings over 3,000 square meter except for public buildings and apartment houses. The policy endorsing the improvement of building energy performance and the acquisition of the SMG's Green Building Certification are only presented as a suggestion, not a mandate. In other words, it is entirely up to building owners to decide whether to adopt energy-conserving practices.

Under such circumstances, an incentive program plays an essential role. Incentive programs targeting new buildings should be implemented in steps in accordance with the SMG's plan to promote building energy conservation. Also, more and more non-restricted buildings (buildings that are not being regulated)

need to be regulated by the energy consumption regulations. If the government offers incentives to non-restricted buildings for implementing energy-saving practices, their owners and users will adopt energy-efficient measures for themselves. The incentive will help raise the interest of Seoul citizens in the issue of energy conservation.

In this regard, this research examines how the SMG operates and manages the building energy incentive program. It introduces what improvements the government should make to the current financial and institutional incentives so that they become more effective in terms of encouraging building owners to implement energy conserving practices. Finally, this study proposes a plan as to how the SMG should foster an environment that promotes green buildings.

2. Main Findings

No incentive has been given in the form of an eased building code under the current building energy conservation program. Meanwhile, exempting acquisition tax has been offered in only four cases

The current building energy conservation incentive program comprises two parts: institutional support (building code relaxation) and financial assistance (local tax cut). According to our expert survey, there is a very high expectation that the government's relaxation of the building code would have positive effects. Yet many building owners find it more convenient and efficient to apply for other incentive programs for similar benefits, such as drafting the District Unit Plan, than resorting to the building energy conservation incentive program. Consequently, they feel reluctant to carry out environment-friendly and energy-conserving practices in their building construction.

To obtain a larger Floor Area Ratio (FAR) for a new building, most people resort to the District Unit Plan, from which they can also receive FAR incentives. They may even get the maximum FAR by proposing a plan that promises contributed

acceptance²⁰ and their participation in a public development project. However, receiving an incentive by carrying out green practices in construction is often considered bothersome due to its complicated procedures. Moreover, the size of such a financial incentive is not large enough to cover high investment costs required for building construction, equipment installation, and obtaining the green building certification. Thus a large number of land owners construe the current building energy conservation incentive program inadequate. Meanwhile, total of 35 private buildings were certified as environment-friendly structures by the Green Building Certification Program, yet only four received building energy conservation incentives, which were all paid in the form of acquisition tax exemptions.

[Table 1] Number of Buildings Certified by the Green Building Certification Program in Seoul (2014)

Category	No. of certified buildings (& its proportion in the total no. of buildings)		Mandatory Acquisition of the certificate (Yes/No)			No. of buildings that received incentive	Note
	No.	Proportion	Yes	No	Proportion		
Public	62	63.9%	Yes	53	85.5%	0	
			No	9	14.5%	0	
Private	35	36.1%	Yes	17	48.6%	1	<ul style="list-style-type: none"> · No. of cases where acquisition tax exemptions were given: 4 · No. of cases where regulations regarding to the FAR were relaxed: 0
			No	18	51.4%	3	

²⁰ Contributed acceptance refers to an act of contributing one's private land to the government for the public use, which in turn accepts the land for public development or use.

The size of local tax cut offered by the current building energy conservation incentive program is too small compared to the cost required for constructing new green building or making adjustments to the existing ones to meet the green building requirements

The incentive program currently offers local tax reduction, yet the discount is insignificant compared to the additional costs required for building construction, equipment installation, and obtaining the Green Building Certification, for which people have to incur extra expenditure for consulting services. Besides it usually takes more than 30 years to recover the investment costs. There are different types of loan support provided to building owners, including the SMG's Building Retrofit Project (BRP) as well as the Energy Service Company (ESCO) Loan Support Project and the Green Remodeling Project. However, loan recipients must fully repay the principal within a certain period of time, while bearing additional burdens such as having to pay for interests or put up their assets as collateral for the loan. As a result, building owners find these support programs less attractive as incentives.

[Table 2] Loan Support Available for Building Owners

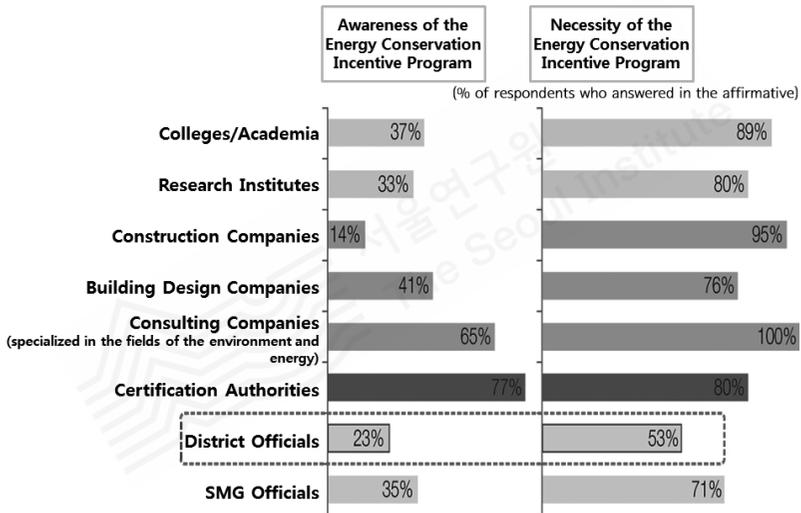
Category	Green Remodeling Project	BRP Project	ESCO Project
Main Agent	Ministry of Land, Infrastructure and Transport(MOLIT)	Seoul Metropolitan Government(SMG)	Korea Energy Management Corporation (KEMCO)
Support Type	Support for the repayment of loan interests	Grant a loan for business	Grant a loan for construction
Support Amount	3 billion Won	15 billion Won	225 billion Won

Category	Green Remodeling Project		BRP Project		ESCO Project
Limits on Loan	Non-residential	<ul style="list-style-type: none"> · Max. 3 billion Won · Min. 20 million Won 	Building	<ul style="list-style-type: none"> · Max. 2 billion Won · Min. 5 million Won 	Max. 30 billion Won (max. 15 billion Won for projects invested by the same source)
	Residential	<ul style="list-style-type: none"> · Max. 50 million Won (for a detached house) · Max. 20 million Won, Min. 3 million Won (for an apartment house) 	House	<ul style="list-style-type: none"> · Max. 10 million Won · Min. 2 million Won 	
Interest Rate	2~4% depending on the degree of improvement made in energy performance		1.75% (as of 2015)		Fixed interest rate : 2.75% Floating interest rate: 1.5%
Repayment Period	5 years (equal to the length of support period)		8 years (Allow a 3-year grace period)		7 years (Allows a 3-year grace period)

Both building construction planners and public officials who carry out the building energy conservation incentive program lack the knowledge of the program

In the expert survey, nearly 90 percent of respondents had a high awareness of systems, pursuant to which the building energy conservation incentive program has been developed and implemented. By contrast, their knowledge about the incentives was limited in general. The most serious problem of all is that building construction planners and public officials in charge of administering the building energy conservation incentive program are poorly informed of the program. In order to prompt the owners of buildings that are not subject to the energy conservation regulations to voluntarily adopt energy-saving practices, a variety of serious efforts must be made. Such efforts include education, campaign, and

strongly urging them to improve the energy performance of their buildings. Yet building construction planners and public officials who lack the knowledge of the building energy conservation incentive program hinder the quest for energy conservation. Their low awareness of the program also hampers not only the management of the program itself, but also the promotion of green building construction. This raises the need to establish an organization that can be in charge of the overall management of the SMG's building energy conservation policies and the building energy conservation incentive program.



[Figure 2] Survey Results Regarding to the Awareness and Necessity of the Building Energy Conservation Incentive Program

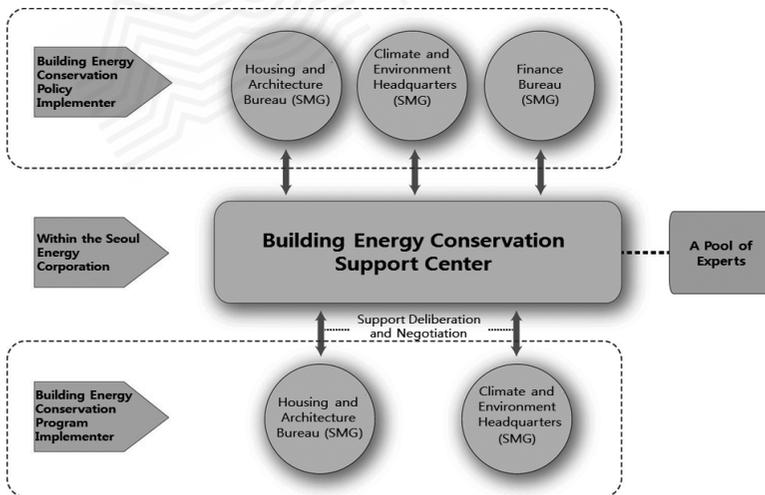
3. Conclusions and Policy Recommendations

SMG should establish a unit, in which experts from various fields exclusively deal with issues related to building energy in the Seoul Energy Corporation

The Seoul Energy Corporation that will start its operation in 2016 should have a special unit consisted of experts with knowledge in energy, building, and tax

systems. It can be titled the Building Energy Conservation Support Center. For the center to properly function, it must work in close cooperation with the SMG, in particular, the Housing and Architecture Bureau, Climate and Environment Headquarters, and Finance Bureau. In addition, it should cooperate with relevant public and private organizations dealing with energy, construction, urban reconstruction of redevelopment projects, and tax systems.

The main role of this center is to provide building owners with a wide range of consulting services on building design advice by tapping into experts from both inside and outside the unit. Furthermore it should improve the current evaluation system in the building energy conservation incentive program to ensure that it yields desired outcomes. The center ought to manage incentive disbursement. Later, a set of data would serve as the grounds for not only post evaluation and monitoring buildings that received the energy conservation incentive, but also for improving the incentive program. Lastly, the center should build a cooperation system in which it can closely communicate with 25 district governments.



[Figure 3] Management Structure of the Building Energy Conservation Support Center

SMG should revise the current building energy conservation incentive program, developing comprehensive consulting services for newly constructed buildings and existing ones

The Building Energy Conservation Support Center should provide comprehensive consulting services to building owners. With its pool of experts, the Building Energy Conservation Support Center can offer a wide range of consulting services and design advice to building owners as well as construction firms. As our expert survey shows, people's demand for building energy performance assessment and following consultation is quite high. To provide effective support, the center must develop a customized consulting service by weighing the condition of each building. At the same time, it should run energy performance simulations to show expected outcomes of its support in detail. In the meantime, the SMG ought to designate a consulting company for providing the best consulting service to building owners while actively encouraging them to comply with the efficient energy performance standards set by the SMG. The company would establish the standard consulting service in the market, where more and more private consulting firms are ceaselessly emerging. Thus, it would help relieve financial burdens on building owners.

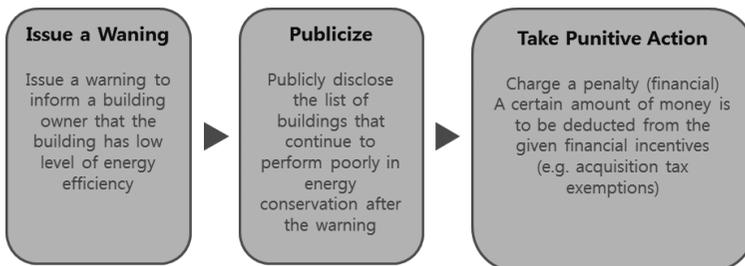
SMG should streamline the current building performance assessment standard and create new building energy performance evaluation model. SMG currently assesses the energy performance and environment-friendliness of buildings based on five different evaluation models. Without a system that comprehensively manages all the five models, many of their assessment criteria overlap. In other words, the five evaluation models are not much different from one another, rendering it inefficient to use all of them. In order to manage the energy performance of buildings in a comprehensive way, the SMG should streamline the current assessment system and establish its own building energy performance evaluation model that focuses on maintaining high energy efficiency of buildings.

SMG may develop the assessment standards and frameworks for its building

energy performance evaluation model by either creating a new assessment system or reorganizing the existing ones.

SMG ought to apply flexible assessment criteria to new small buildings and existing structures. Compared to constructing a medium or large structure, erecting a new small building entails greater financial burdens due to additional construction costs. The energy performance assessment criteria that are inappropriate to apply to a small building, such as ones related to equipment installation, nearby transportation, and the environment, should be removed, while placing greater emphasis on other criteria.

SMG should carry out the post evaluation of energy performance of buildings after giving them incentives. Depending on the evaluation result, additional incentives or penalties (punitive) should be given. The current building energy conservation incentive program examines the eligibility of a building for incentive payment based on its preliminary design and construction plan. Yet it does not monitor if the construction was carried out according to an original plan once incentives were disbursed. Besides there is no system showing whether the energy performance of a building has improved to the expected level stated in the plan. SMG should implement a system for the post evaluation of the energy performance and take punitive action against buildings that do not comply with their original energy conservation plans. Such buildings will be charged with penalties, which will be used to fund incentive disbursement and running education/promotion programs. With these measures, the SMG would be able to achieve the sustainable management of building energy performance.



[Figure 4] Working Steps of Punitive Measure

SMG should avail itself of the existing programs, such as the District Unit Plan, as a means to control the energy performance of new constructions.

Owners of newly constructed buildings have a high preference for institutional incentive (i.e. building code relaxation), such as eased FAR regulations. But such incentive does not serve the purpose of promoting energy conservative practices. It only results in increasing the size of area occupied by a building. Therefore, the SMG should offer the institutional incentive within the scope of inducing the voluntary participation of building owners in energy saving.

SMG should apply the building energy conservation incentive program to “Areas under Minimum Regulation.” The concept of the Areas under Minimum Regulation has been introduced to carry out the development by weighing regional characteristics through strategic deregulation, not restricted by strict zoning system. Related guidelines were set in January 2015. Depending on the size of public contribution they make, building owners may be incentivized with eased FAR regulations (either standard, permissible or maximum FAR according to the rules set in the district ordinance). However, they are currently not allowed to get a FAR larger than the maximum FAR by law. SMG should make the Areas under Minimum Regulation exempt from such a rule so that building owners may use favorably eased FAR regulations without being restricted by other regulations. For buildings constructed in the Areas under Minimum Regulation, the SMG should grant a FAR larger than the maximum FAR set by law if they satisfy the efficient energy performance standards suggested in this research.

SMG should increase the share of the green building incentive in the District Unit Plan. The District Unit Plan gives incentives to buildings that carry out environment-friendly practices. These green building incentives account for about 30 percent of total incentives provided by the District Unit Plan. SMG should consider increasing their share. According to the expert survey, the number of respondents who approved the idea of placing greater importance on environment-friendly incentives was 3.5 times higher than those who disapproved.

The majority answered that it would be appropriate to raise the share to 40 percent.

SMG should revise the current assessment criteria for environment-friendly building incentive payment. At present, the criteria include items such as green building construction and energy efficiency enhancement, which require much larger investment costs than others. This raises a question as to their validity as assessment items. In this regard, the SMG should revise the criteria by adding new categories that can assess building's energy efficiency, energy consumption reduction plans and other areas of the energy performance.

Greater financial incentives need to be offered to existing buildings that struggle with improving their energy performance

Existing buildings are likely to experience more difficulty in improving their energy performance than new ones. To support them, the current financial incentive program must be revised accordingly.

SMG should extend the loan repayment period and increase financial support for interest payment. Extension on loan repayment period and increased financial support for interest payment, which are the two most well-known incentives offered to existing buildings, need thorough revision. When applying for a loan support program, the applicant has to put up their assets as collateral and pay interests. With such burdens, very few regard this loan service as a helpful financial incentive. In addition, while the loan recipients are bound to pay back their loans in seven to eight years, it takes longer to make a return on investment. Estimating precisely how long it takes to recover the investment costs is difficult. To make loan support system work effectively under such circumstances, a different payback period should be set for each building by reflecting the length of time required to recover the investment costs. To come up with accurate estimates, the SMG should run energy performance simulations and consult each building owner. Furthermore, it ought to work with banks to provide cash support for a certain portion of interest or introduce the Green

Deal program. This will allow loan takers to pay parts of interests and principal with savings accrued from reduced energy costs.

The scope of the existing financial incentive needs to be expanded through increasing the local tax reduction rate and extending the property tax benefit period.

Besides the loan support, property tax discounts are the only financial incentives given to owners of existing buildings. According to the expert survey, most people preferred tax cuts. Until 2009, the SMG ordinance allowed the current tax benefit of 3-15 percent to increase up to 20 percent. This rule was not being implemented. In the interview with experts, most gave negative responses to the current 5 year tax benefit period. To increase the effectiveness of tax incentive, the SMG should raise the current tax reduction rate of 3-15 percent to 20 percent, while extending the property tax benefit period to 10 years. Furthermore, it needs to consider publicizing the current status of incentive payout.

SMG should pay incentives through the Energy Performance Diagnosis Program. For the payment of small financial incentives, the SMG should use the Energy Performance Diagnosis Program. In order to do so, the SMG should first provide every existing building owner with an opportunity to apply for the program, and then share the result with the public. At the same time, the SMG should offer an eco-mileage incentive to buildings that are rated with a higher grade than the standard level in the Green Building Certification Program and the Energy Efficiency Rating Program. This incentive would encourage building owners to participate in the Energy Performance Diagnosis Program and improve the energy performance of their buildings.

In conclusion, a revised incentive program for new and existing buildings can be categorized into two types of support: institutional and financial. For institutional support, the SMG should establish a special unit exclusively dealing with building energy performance control, improve building energy performance assessment standards and models, and closely cooperate with related institutions. For financial support, on the other hand, the SMG ought to raise funds to pay financial incentives, offer greater tax benefits and loan services, and implement a greenhouse gas

emission offsetting platform. To improve the current building energy conservation incentive program, which comprises a large part of the government's financial support, the SMG first needs to establish a separate organization that can play a central role in overall management of the program. Lastly, funds should be raised from various sources so that the SMG can lessen its financial burdens.

