[4th ZEB Insight]

Incentive Schemes and Examples to Improve Building Energy Efficiency in Korea

2020. 8. 27.

Background: Establishing Local Government's Green Building Policy Direction through Green Building Construction Act

Response to the National Goals

Reduction of GHGs Emission in Building Sector by **32.7% in 2030 compared to BAU**

Global Concern about Climate Crisis

National Enforcement of Mandatory Zero-Energy Building **in Jan 2020**

Need to improve building energy performance

Green Building Construction Act

Green Buildings

A building that minimizes the impact on other buildings and the environment, at the same time providing a pleasant and healthy living environment for people

Creation of Green Buildings

Activities of constructing green buildings, maintaining the performance of green buildings or converting existing buildings into green ones

Basic Plan for Green Buildings → Green Building Construction Plan

Development of Seoul's policies

- 2016~2020
- Improving Green Building Design Criteria and establishing the system
- 10.1 million TCO2

First Phase (Introduction)

- 2021~2025
- Establishing sophisticated systems to ensure proper implementation
- **Feasible projects with an action plan reflecting on-site conditions**

Second Phase (Implementation)

- 2026~2030

Third Phase (Completion)

Background: History of Green Building Polices

Realizing a Green City through Green Buildings

Current Status: **Buildings eligible for Incentives**

(Design criteria and approval process are regulated by local governments)

Design standards for green buildings in Seoul (not legally mandatory, but applied to the review and permission process)

For Seoul, different committees and review procedures are applied according to the floor area and height.

- Buildings with a total floor area of more than 100,000 square meters or 21 stories or more: Seoul City Planning Committee, Seoul City Building Committee
- Buildings with more than 50 floors or a height of 200 meters or more: Seoul Metropolitan Government permission
- Buildings with a total floor area of not less than 3,000m2 or with a total floor area of not less than 20 households: District Building Committee

Relevant Institution	Floor area		Criteria
Green Building Certification	Larger than 100,000㎡		Best (Green First Class)
	Larger than 10,000㎡		Excellent (Green Second Class)
	Larger than 3,000㎡		Normal (Green Fourth Class)
Building Energy Efficiency Rating	Residential	More than 1,000 units	Average Exclusive Area > 60㎡: Higher than 1⁺Class Average Exclusive Area < 60㎡: Higher than 1st Class
		More than 30 units	Average Exclusive Area > 60㎡: Higher than 1st Class Average Exclusive Area < 60㎡: Higher than 2nd Class
	Non-Residential	Larger than 100,000㎡	Higher than 1⁺Class
		Larger than 10,000㎡	Higher than 1st Class
		Larger than 3,000㎡	Higher than 2nd Class
Renewable Energy (as of 2020)	Residential	More than 1,000 units	7%
		More than 300 units	6.5%
		More than 30 units	6%
	Non-Residential	Larger than 100,000㎡	11% (20% with Environmental Impact Evaluation conducted)
		Larger than 10,000㎡	10%

Conditions eligible for Incentives according to Green Building Design Criteria in Seoul

- Buildings certified Excellent (Green Second Class) by Green Building Certificaion and buildings rated second or higher by Energy Efficiency Rating, when receiving both green building certification and building energy efficiency rating
- Buildings certified as zero-energy buildings

Note: The Green Building Certification consists of four grades such as Best, Excellent, Good and Normal (Green 1 to 4, respectively), applied in two stages of preliminary certification and main certification, and the Energy Efficiency Rating has ten grades from 1+++ to 7.

Classification			Alleviation of Building Standard	Acquisition Tax	Property Tax*
Certification of Zero Energy Building	ZEB 1 (Energy Self Sufficiency Rate, higher than 100%)		15%	20%	15%
	ZEB 2 (Energy Self Sufficiency Rate, 80~100%)		14%	20%	15%
	ZEB 3 (Energy Self Sufficiency Rate, 60~80%)		13%	20%	15%
	ZEB 4 (Energy Self Sufficiency Rate, 40~60%)		12%	20%	15%
	ZEB 5 (Energy Self Sufficiency Rate, 20~40%)		11%	20%	15%
	Others (Building Energy Efficiency Rate 1^{++}, Energy Self Sufficiency Rate less than 20%)		10%	15%	15%
Building Energy Efficiency Rating & Certification of Green Building	Class 1^{+}	Best (Green 1^{st} Class)	(12→)9	15%	10%
		Excellent (Green 2^{nd} Class)	(8→)6	15%	7%
	Class 1	Best (Green 1^{st} Class)	(8→)6	15%	7%
		Excellent (Green 2^{nd} Class)	(4→)3	10%	3%
	Class 2	Best (Green 1^{st} Class)		10%	
		Excellent (Green 1^{st} Class)		5%	

* Effective until 2023, including buildings or houses within five years from the date of certification pursuant to Article 47-2 of the 「Restriction of Special Local Taxation Act」

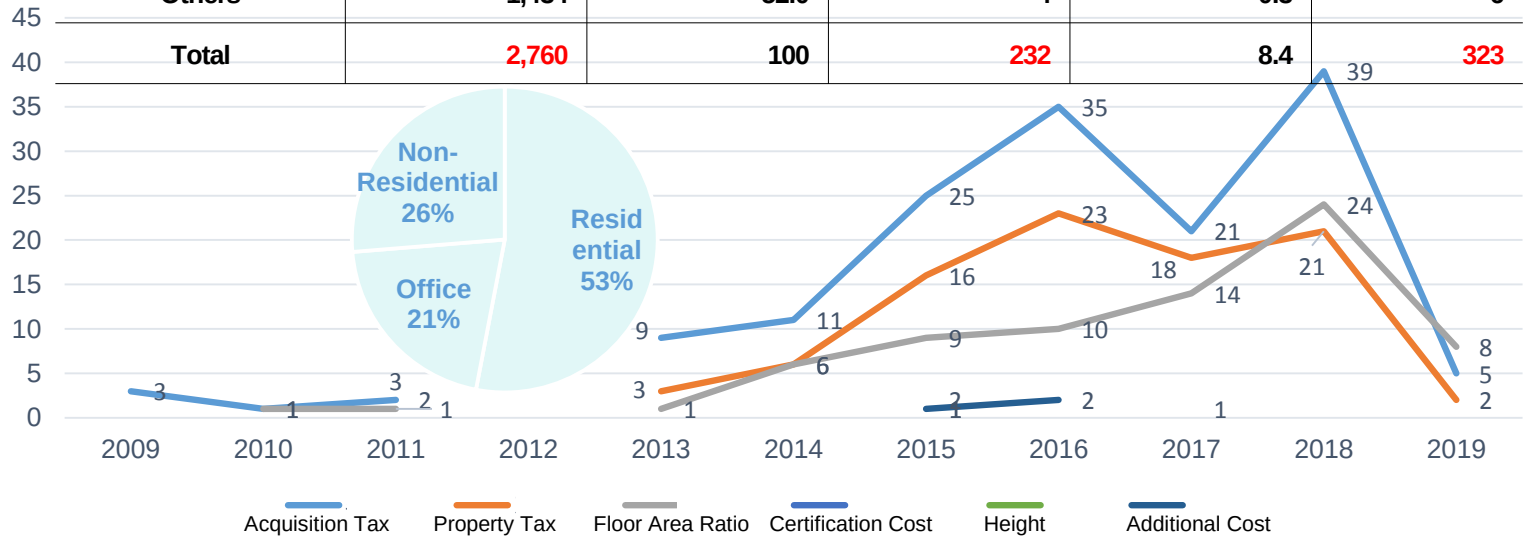
Note: ( ) refers to the incentives for mitigating building standards applied before 2017 when zero-energy building certification began.

Ref. : Announcement of Revision of Green Building Design Criteria in Seoul Metropolitan Government 2019.124(Seoul Metropolitan Government No. 2019-42), Enforcement of Article 47-2 of the Restriction of Special Local Taxation Act(Act No. 16057)

- Between 2009 ~ May 2019, 2,760 private sector buildings were certified as green buildings, 3.3% of total floor area of buildings newly built
- The number of certifications granted incentives was 232 (main/preliminary certification, 197 buildings), 8.4% of the total certifications
- 323 Incentives were granted for 232 green building certification.
- Among them, residential buildings are 123 (53.0%)

323 incentives were granted to 197 buildings for the last 10 years
By type, the majority was acquisition taxes (148 cases, 46%)

Classification	Total				
	Certification		Certification which received incentives		Number of Incentives
	Number of Cases	Composition Ratio (%)	Number of Cases	Composition Ratio (%)	
Best	229	8.3	49	21.4	74
Excellent	1,097	39.8	179	16.3	243
Others	1,434	52.0	4	0.3	6
Total	2,760	100	232	8.4	323



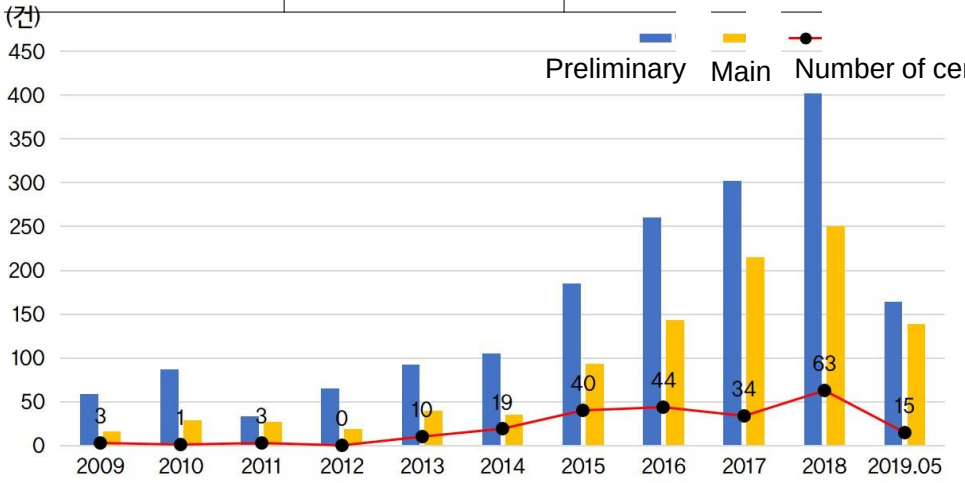
In Korea, incentives include tax reduction, relaxation of construction standards, reduction of the land donation rate by up to 15%, and increase of the loan limit from the Housing and Urban Fund by 20%

- Incentives in the U.S. include marketing support, resident benefits. Incentives are available for more than 40% of the buildings eligible for cash support
- Singapore offers cash incentives to developers, architects, and engineering companies
- UK Green Deal includes loans for additional construction costs and reimbursement within energy saving costs
- Financial Aid Incentives in Germany

	Subsidy/Cash Support	Tax Reduction	Loan Support	Relaxation of Building Standards	Reduction in Cost and Time for Certification	Technology Support /Consulting	Award Marketing
Republic of Korea	X	Acquisition tax 5-20%, Corporate tax		Floor Area Ratio 3-15%		X	
United States	California: Offers incentives to more than 40% of the target buildings	Maryland: Maximum $120 per ft2 (3,000m2, worth 40 million KRW) for residents (tenants) and landlords		Seattle: 25% relaxation in building-to-land ratio	Seattle: 45 days shortened San Diego: 7.5% reduction in certification costs		
Singapore	Provide USD100,000 (worth 100 million KRW) for architects and building facilities engineer, up to 50% of the energy facility						
United Kingdom	Financing elementary technology	Tax, VAT rate discount	Loans on additional construction costs				
Germany	20 million KRW amount of subsidy		A low-interest loan of 100,000 Euros				
India							
Japan							

Incentives are provided only to 8.4% of buildings certified as Green Buildings (through preparation & main certification) in Seoul.

Public			Private		
Preliminary Certification	Main Certification	Total	Preliminary Certification	Main Certification	Total
506	373	879	1,754	1,006	2,760



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Cause and Improvement Plan

Object	Awareness	Recognition of Necessity	Challenges
Building Owner	Low	High	Initial cost burden
Certification /Consulting Company	High	Important	Lack of benefits and awareness
Academia/ Research Institution	High	Important	Lack of benefits and awareness
Building Industry	Low	The lowest (But, strong awareness about the necessity of benefits)	Lack of promotion and education
Public Officials	Middle	Low	Work Burden

Assessment: Survey of building owners & related stakeholders (2019)

Interview results of 30 people (20 cases who received incentives and 10 cases who didn't)

Reason to receive incentives

• Benefits of increased floor area considered as the most attractive one as increased floor area can be linked to the increase of rentable area and rent cost

Difficulties related the certification process

• Lack of dedicated staff for incentive system

• Ambiguous criteria for judgment on overlapping systems and incentives

• Extension of the construction period due to the complexity of the certification process, etc.

Cases that didn't receive incentives

- Lack of information on incentive programs
- Unable to change the design due to late recognition on incentive programs
- Failure in persuading the owner due to the increase in construction period and cost
- Floor area mitigation ratio is not large, so limitation exists in securing enough area
- Licensing or review & approval process for incentive programs is complex and time-consuming

A survey of 30 building owners in Seongbuk-gu, Gwanak-gu, Jungnang-gu and Gwangjin-gu

Lack of promotion; but want to be cetified for incentvies

• Awareness of incentive programs is very low

• willing to receive the Green Building Certification if the floor area can be increased.

Subsidies, mitigation of parking space & building-to-land ratio, loans

• Most preferred incentives: benefits of floor area ratio and tax reduction

• Additional preference: subsidies for construction costs, mitigation of parking spaces, mitigation of building-to-land ratio, and loan support

• More benefits of floor area ratio, alleviation of regulations related to elevator, firefighting and safety

Proper pay-back period: 8 years

• As for the pay-back period of the investment costs, the majority said 5 to 9 years are appropriate.

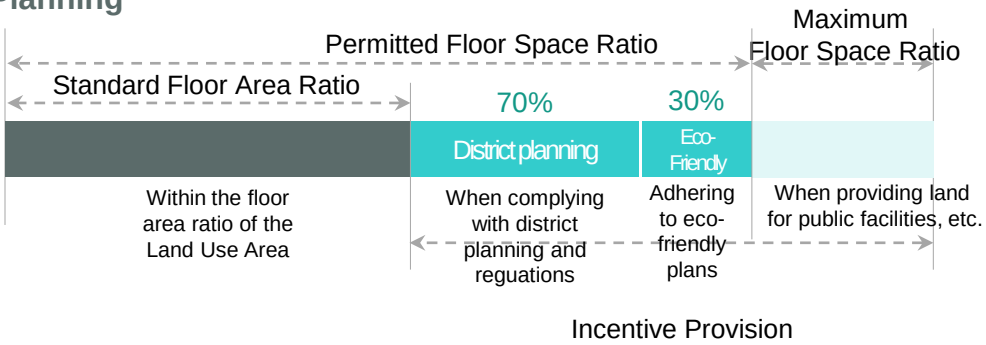
• In the case that the initial investment costs can be returned within 8 years, green building construction and renovation can be considered.

Need to refine current incentive programs from the beneficiary's perspective

Cause		Improvement Plan	
Lack of Attraction Effect	• Incentive systems change frequently, leading to less attraction effect and less case-building	**Discovering Attractive Incentives**	• Huge impact of 'construction costs' on green buildings: Need to supplement incentives about easing regulation on building height, floor area ratio and area • Introducing new incentives
Other laws provide more benefits	• Receiving incentives based on different laws, not green building construction law • Unable to receive incentives in duplicate with other laws, such as district unit planning	**Incentive Applicable Buildings**	• Setting blind spots in incentive systems, such as city-related laws, as a policy priority • Will be efficient to give incentives to buildings that are not subject to deliberation → Small buildings
Lack of information	• No accurate guidance on incentive procedures and benefits • Some people don't receive incentives even though they are qualified, and the interpretations about the incentive system vary	• Provide instructions, explanations, and empirical information • Guidelines are necessary so that potential beneficiaries can consider additional cost of certification from the beginning of the project (no grounds to persuade the building owner) • Need guidelines (manuals) regarding incentives for green buildings • Need evidence and guidelines to correct errors of different interpretations and to provide solid grounds to persuade building owners to apply for incentives Ex) Energy Conservation Guideline • Provide metrics to compare incentives with different cost benefits, depending on building value and tax types	
Certification System	• Upgrading consulting + certification cost	• Simplify the Certification System • Need to be cheaper. Receiving design fees according to building performance • Architects who want to improve the energy performance of buildings should spend more budget on designing, and switch to the structure that the designer is responsible for the whole process. Only then can the green buildings of small buildings be activated	
Institution, Dedicated Staffs	• Absence of staffs (organization, department x) who know exactly about the legal system, procedures, etc. related to incentives;	• Experts or dedicated departments related to incentives are necessary inside the Green Building Department of Seoul Metropolitan Government : a staff who can answer questions about incentives • As buildings below 500m2 are not subject to deliberation, if public officials are well aware about incentive system, small buildings will be more likely to take advantage of incentive system than large buildings (however, incentives with a 15% floor area ratio can be ineffective).	
Process/ Review	• The national government and the Seoul Metropolitan Government say they're promoting incentives for green buildings, but still cutting all incentives during deliberation process : "Case by case." • It's obligation to pay acquisition tax within 60 days of acquisition, however potential beneficiaries end up not receiving the incentives as it takes up to 80 days to obtain certification.	• Readjustment of institutions and organizations • Organization in charge of follow-up examination and management • Proposing a direction for systematic data management • Continuous complementation of management processes such as incentive withdraw or best practices encouragement based on energy performance maintenance and implementation after incentives are granted	

A large building can maximize the floor area ratio with other methods such as urban planning.

Seoul Metropolitan Government Standards for District Unit Planning



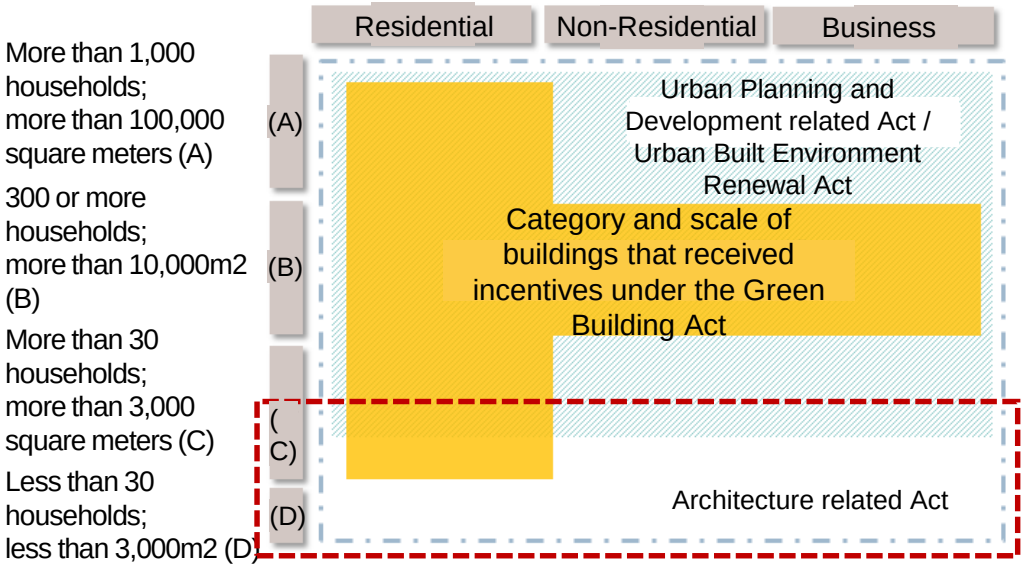
Maximum floor area ratio as incentives for green building

Upper limit floor space ratio can be applied when providing land for public facilities and designated joint development project

-> suggestion: maximum floor area ratio can be applied for green buildings considering their contrbiutions to public values

(The overall impact of the city needs to be considered when changing the limits of the upper floor area ratio)

Buildings with incentives under green building and urban planning-related laws



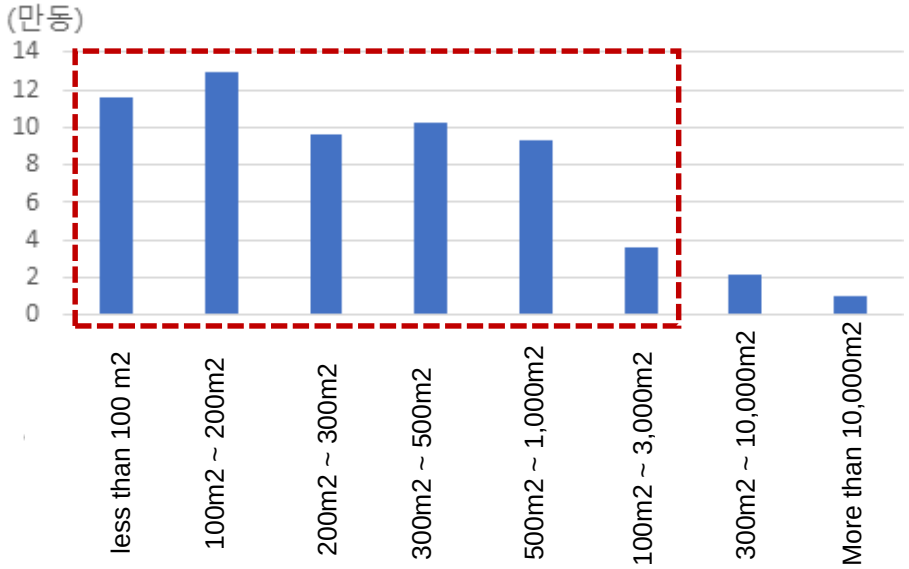
Large buildings are easy to receive incentives to reduce floor space rates under other regulations, so the application of maximum floor area ratio as incentives is not meangful.

Mainly green buildings for incentives are in the caegories of the residential (A) – (C) and non-residential and business (B).

Therefore, it is necessary to expand the incentive programs to provide to small buildings (500m2 or bigger) equivalent to (D)-class in buildings less than 5,000m2 that are not eligible for incentives.

04 Improvement Plan: Incentives should focus on small-scale buildings

Status of Buildings by Scale in Seoul



- Most of the buildings in Seoul are small buildings, but there is no incentive schemes targeting for small buildings.
- In Seoul, 573,615 buildings (95%) out of about 604,700 buildings are equivalent to D-class (less than 30 households and less than 3,000 square meters).
- 444,602 buildings (74%) are smaller than 500m2 for which the review and approval process is not required.

Need to introduce effective incentives for small buildings

Number of green building certifications in Seoul according to building use and scale

Classification	Total	Residential	Business	Non-residential
A	50	32	8	10
B	127	56	30	41
C	51	34	9	8
D	**4**	**1**	**1**	**2**
Total	232	123	61	48

*If the building is multi-use, it is calculated with its primary use

- Only 4 cases out of 232 certifications with incentives are small buildings in D-class.
- Smaller buildings in D-class have their limitation in satisfying the criteria of green building certification performance.
- It is necessary to actively promote incentives for small buildings that are not subject to the review and approval process.

Supporting construction cost and providing low-interest loan

- Subsidy incentives for new buildings and new subsidies to support renovation costs for high-performance buildings
- Benchmarking of effective cases from abroad such as financial support for new green buildings by providing loan and subsidies as well as cash
- Low-interest loan such as Seoul's BRP(Building Retrofit Project) to support existing buildings and ESCO(Energy Service Company of Korean government
- Support for best practices through annual and biennial open competition between 2020 and 2024 and 2020-2029 from 2025 (large) to 2030 (all new buildings) when zero-energy buildings are mandatory

Mitigation of building-to-land ratio

- Preferred as the most attractive incentive type for small buildings
- A plan to consider short-term (five-year) support measures for small-scale buildings only, but to set strict standards and apply a fixed amount of incentive mitigation
- Legal Basis: Relaxing building-to-land ratio can be adopted up to 15% according to the 'relaxation of building standards' of the green building incentive, and currently is applied to the 'minimum location regulation zone' pursuant to Article 40-2 of the National Land Planning and Utilization Act (In the actual case where this system is applied, 80% of the building-to-land ratio is adopted, which is 33% reduced value from the 60% of reference building-to-land ratio).
- Since the factors such as the density, overall environment and future of cities are determined by the Basic Urban Plan, relaxing the building-to-land ratio in return for enhancing the eco-friendliness of a single building should be considered carefully.

Mitigation of parking standards (parking area)

- If the area for parking lots can be used for other purposes to create additional income such as rental cost, it will be a highly attractive incentive for building owners and tenants.
- Most small, non-residential buildings are difficult to secure parking lots due to their physical and environmental characteristics, so loosening parking standards can be highly attractive incentives.
- However, mitigation of the parking area only works as an incentive in case the owner wants it, depending on the area.
- Legal Basis: The Urban Planning Law allows the application of relaxed standards of parking facilities and installation, building-to-land ratio and floor area ratio despite the provision of the individual law for green city planning.
- When parking spaces lack, incentives such as supporting parking lot linkage within the district and parking fee reduction can be considered (it is more realistic to operate it as an city-scale incentive, not that of individual buildings)
- Additional effects of lowering the environmental load occur, in that this policy encourages the use of public transportation as it becomes inconvenient to use private cars

Minimum payback period of testing cases (year)

- The pay-back period and possibility were estimated in terms of total costs and benefits when receiving existing incentives
- The most important factor is building owner's decision as the investment for green buildings is taking place when building owners recognize economic benefits of receiving incentives
- Test cases include 10 cases which received incentives according to the Green Building Certification

Category / Size	Residential	Non-residential	Business
More than 1,000 households; more than 100,000 square meters (A)	11	-	-
300 or more households; more than 10,000m2 (B)	13	10	10
More than 30 households; more than 3,000 square meters (C)	13	10	9
Less than 30 households; less than 3,000m2 (D)	12	13	11
Average pay-back period	12	11	10

Design Phase

- Certification Fee (Preliminary Certification)

Construction Phase

- Additional Construction Cost
- Additional construction costs based on floor area ratio incentives

- Subsidies on construction cost
- Additional construction costs based on the building-to-land ratio incentive

Completion Phase

- Certification Fee (Main Certification)
- Building Energy Efficiency Rating Fees
- Reduction in Acquisition tax

Operation Phase

- Tax reduction (property tax, income tax, corporate tax)
- Rental income based on floor area ratio incentive
- Benefit from energy saving

- Rental income based on the incentives for building-to-land ratio
- Rental income from mitigated area based on the relaxation of parking lot installation standards

* Consideration of building density (total floor area for building site) and rent per floor area
High preference for incentives related to building deregulation in dense areas
Need to increase access by providing spatial and regional analysis of future incentive targets
Propose incentives that work differently in favor of the city center, the sub-center, and the autonomous district.
Attraction effect of floor area ratio incentive will be significant for office buildings and complexes for rental purposes in the business district

Pilot test – attractive incentives for small buildings

Incentives	Residential (12yrs->)	Non-residential(13yrs->)	Business(11yrs->)
Support of 10% of additional construction cost	9 yrs	9 yrs	9 yrs
Mitigation of building-to-land ratio	10 yrs	-	-
Mitigation of parking standards	-	10 yrs	8 yrs

Residential Buildings

- As an incentive currently being implemented, it is analyzed as “12 years” when buildings get 1+Class after both floor area ratio relaxation and tax reduction incentives are considered
- Additional analysis is undertaken by incorporating the incentive of construction cost support and floor area ratio relaxation
- Relaxation of parking standards is excluded in consideration of parking problems.
- Incentive support of 40 million KRW which amounts to 10% of the additional construction cost will require nine years of pay-back period (three-years less than the status-quo)

Non-residential Buildings

- When incentives of floor area ratio relaxation and tax reduction are adopted, pay-back period for additional costs from green building certification will be at least 13 years
- When 10% of additional construction cost is subsidized, the payback period for additional construction cost is reduced to 9 years.
- If the area of the parking lot is mitigated, an additional 84m2 can be secured, and an additional revenue of 1.36 million KRW per month will be calculated. As a result, pay-back period for additional cost becomes at least 10 years.

Office Buildings

- As a result of the current incentive application, which includes floor area ratio relaxation and tax reduction, the pay-back period of additional expenses for green building certification is at least 11 years.
- When additional 10% of construction cost is subsidized and incentives are added to relax parking standards,
- And if 10% of additional construction cost is subsidized, the payback period becomes 9 years.
- It can be reduced to 8 years if additional area of 108m2 can be secured with additional revenue of 3.24 million KRW per month

- **As the test results, the investment can be returned less than 9 years by just applying one additional incentive among three incentive schemes**
- **‘Support of 10% of additional construction cost’ and ‘mitigation of parking lot regulation’ can be selected as additional incentive programs**

Improvement Plan: Goals and strategies to improve incentive schemes for green buildings

Promoting Small Green Buildings

- Small size buildings below the D-class
- Incentive programs suitable for small buildings

Improving Incentive schemes

- Improvement of existing incentive schemes
- Development of new incentive schemes
- Expansion of beneficiaries

Enhancing Administrative System

- Provision of information
- Data Management
- Simplifying the Certification System
- Institutions and Organizations

Revitalization of Green Buildings

- **Provide energy-related information in the building register so that it can be checked by the real estate agency.**
- **Cultivate social atmosphere to convert small buildings into green ones**
- **Utilize the Energy consumption certification system, Energy performance information system, etc.**
- **Raise awareness of the residents about the benefits of green buildings such as comfort and improved quality of life**