Overview of the Act on the Improvement of Energy Consumption Performance of Buildings

(Building Energy Efficiency Act)

The Building Energy Efficiency Act shall be gradually implemented beginning in April 1, 2016

■ Website of the Ministry of Land, Infrastructure, Transport and Tourism

- Overview of Building Energy Efficiency Act, Q&A etc.
- Ministerial Ordinance/Public Notice of MLIT etc.

http://www.mlit.go.jp/jutakukentiku/jutakukentiku_house_tk4_000103.html

■ Website of the Institute for Building Environment and Energy Conservation (IBEC)

- Guidebook for approval of performance improvement plans/verification labeling system of the Building Energy Efficiency Act

http://www.ibec.or.jp/

■ Website of the Building Research Institute

- Program for residential buildings

http://www.kenken.go.jp/becc/#House

- Program for non-residential buildings

http://www.kenken.go.jp/becc/#Building

■ Schedule

Incentive measures: April 1, 2016

- Announcement of Basic Policy
- Mandatory efforts of construction clients/owners etc., and business operators in selling and leasing of building
- Approval system for performance improvement plans (exception of floor-area ratio regulation)
- Labeling system

Regulatory measures: scheduled for April 2017

- Mandatory compliance/evaluation of compliance
- Notification system
- Minister-approval system for special structures/equipment
- Housing Top-Runner Program

※ Notification for repairs, remodeling, installation of equipment and regular report system based on Energy Saving Act to be abolished

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The demand for energy in Japan has become increasingly tight against supply since the Great East Japan earthquake. As consumption drops in other sectors (industry and transportation), the amount of energy consumption in the building sector has markedly increased. Therefore the Building Energy Efficiency Act was promulgated on July of 2015 in order to strengthen energy efficiency measures on building.

1 What is the Building Energy Efficiency Act?

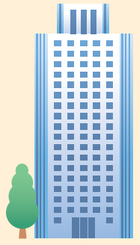
Act on the Improvement of Energy Consumption Performance of Buildings (Building Energy Efficiency Act) was newly established in July 8, 2015. This Act provides for 1) regulatory measures for mandatory compliance with energy efficiency standards for large-scale non-residential buildings, and 2) incentive measures such as a labeling system displaying compliance with energy efficiency standards and exception of floor-area ratio regulation for certified building.

● Overview of the Act on the Improvement of Energy Consumption Performance of Buildings

The incentive measures are implemented from April 1, 2016, and the regulatory measures shall be implemented within two years (scheduled for April 2017) of the promulgation of the Act.

① Regulatory Measures (Mandatory) — Scheduled for April 2017

■ Mandatory compliance with energy efficiency standards・Mandatory certification — Newly established

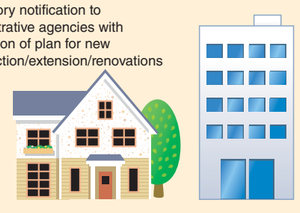


● Non-residential buildings over 2,000m² or more (planned)

Mandatory compliance/evaluation for compliance of newly-constructed building energy efficiency performance standards (energy efficiency standards)

■ Notifications ● Buildings 300m² or more (planned)

Mandatory notification to administrative agencies with jurisdiction of plan for new construction/extension/renovations



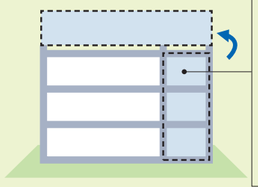
Residential　Non-residential

Instructions/orders issued when deemed necessary without compliance with standards.

■ Housing Top-Runner Program

② Incentive Measures (Voluntary) — April 1, 2016

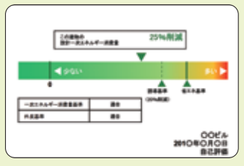
■ Performance Improvement Planning Certification System / exception of floor-area ratio regulation — Newly established



Portion that exceeds normal building floor space for equipment necessary to improve energy efficiency performance
II
Not calculated

(Certificate by administrative agencies)

■ Labeling System for Energy Efficiency — Newly established



◎Display of building energy efficiency performance based on Article 7 of Act

◎Labeling of approval of compliance with energy efficiency standards (Verification by an administrative agencies)

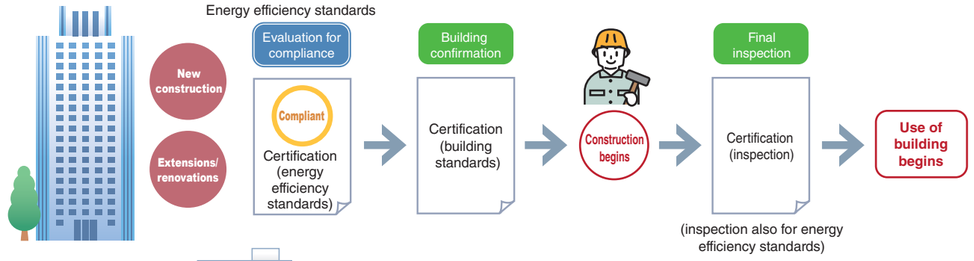
◎ **Others (Establishment of Minister-approval system etc. to evaluate new technology)**

2 What Buildings are Target of this Act?

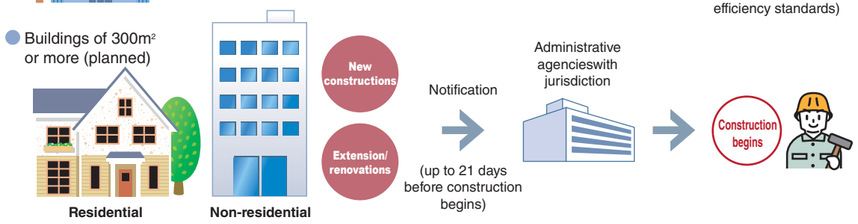
● Targets of Regulatory Measures: New construction/extensions/renovations on buildings at or over a certain size

When construction clients attempt to undertake new construction/extensions/renovations on buildings at or over a certain size, they must acquire certification of conformity with energy efficiency standards or notify the administrative agency with jurisdiction depending on the use and size, etc. of the building.
After the implementation of the regulatory measures, large-scale non-residential building that is not compliant with energy efficiency standards become ineligible for certification of Building Standards Law.

● Non-residential 2,000m² or larger (planned)



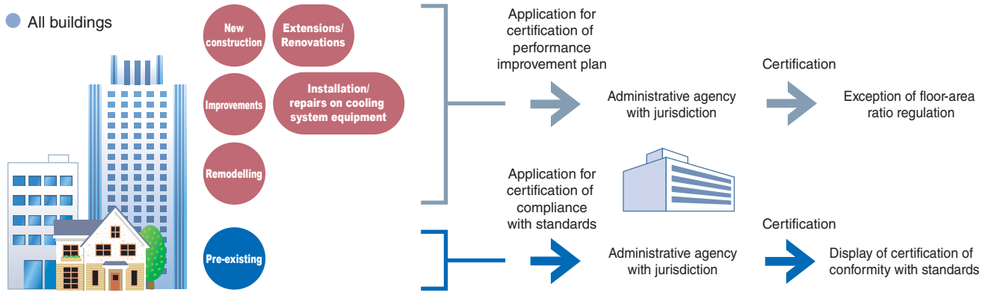
● Buildings of 300m² or more (planned)



● Targets of Incentive Measures: All buildings

Targets of incentive measures are all new construction of buildings, or extensions, renovations, improvements, remodelling, pre-installation/repairs of cooling system equipment that contribute to the improvement of energy conservation performance. When plans for such are compliant with certification standards, the plans may receive certification (certification for the performance improvement plan) from the administrative agency with jurisdiction in the construction area. By acquiring certification for the performance improvement plan, construction clients are eligible to receive benefits, such as exception of floor-area ratio regulation (the portion the exceeds the normal floor space of a building for equipment meant to improve energy efficiency performance is not calculated [upper limit of 10%]).

● All buildings



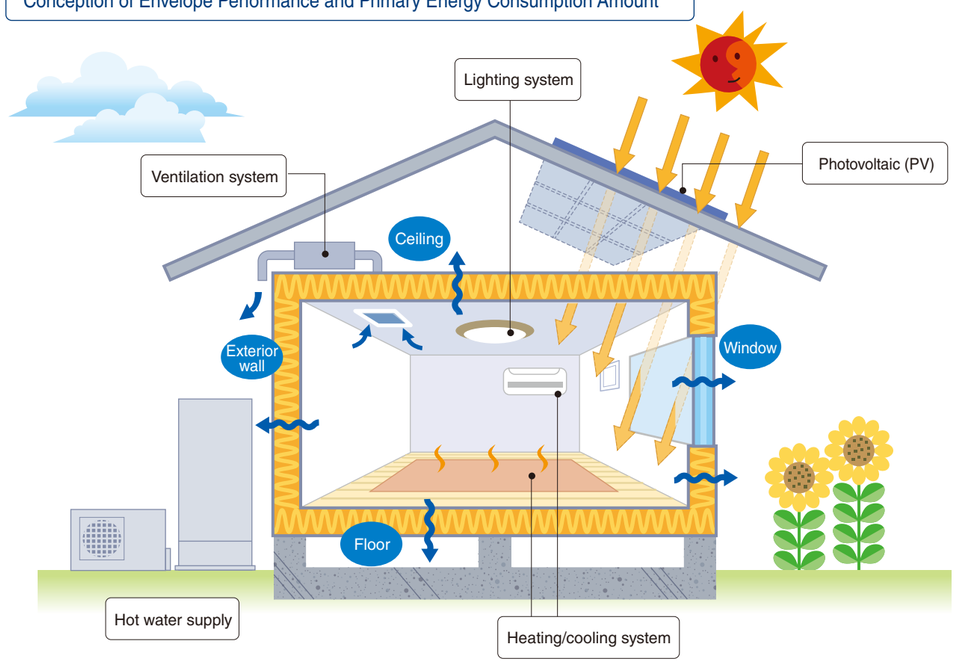
Additionally, pre-existing buildings can receive certification of conformity with energy efficiency standards from the administrative agency with jurisdiction in their area.
※ Buildings being newly constructed can receive certification after their construction is complete.
Receiving certification allows the legally-sanctioned Compliance Label (e mark) to be attached to the advertisements and contracts of the building in question.

3 What are the Standards for the Building Energy Efficiency Act?

● Overview of the Energy Efficiency Standards for Residential Buildings

The evaluation of energy efficiency performance for residential buildings uses the following two standards:
- Standards to evaluate envelope performance, such as with the windows and exterior walls of residential buildings
- Standards to evaluate the primary energy consumption amount of equipment and appliances etc.

Conception of Envelope Performance and Primary Energy Consumption Amount



● Envelope performance

◎ Average outer shell heat transmission coefficient (U_A)

$$U_A = \frac{\text{Amount of total heat loss per unit of temperature difference}}{\text{Total surface area of exterior}}$$

◎ Average solar heat gain coefficient during cooling period (η_{AC})

$$\eta_{AC} = \frac{\text{Amount of total solar heat gain per unit ofsolar radiation intensity}}{\text{Total surface area of exterior}} \times 100$$

● Primary energy consumption amount

+ heating/cooling system primary energy consumption amount
+ ventilation system primary energy consumption amount
+ lighting system primary energy consumption amount
+ hot water supply primary energy consumption amount
+ other (household appliances) primary energy consumption amount
− reduction amount of primary energy consumption through PV, etc

= primary energy consumption amount

Column

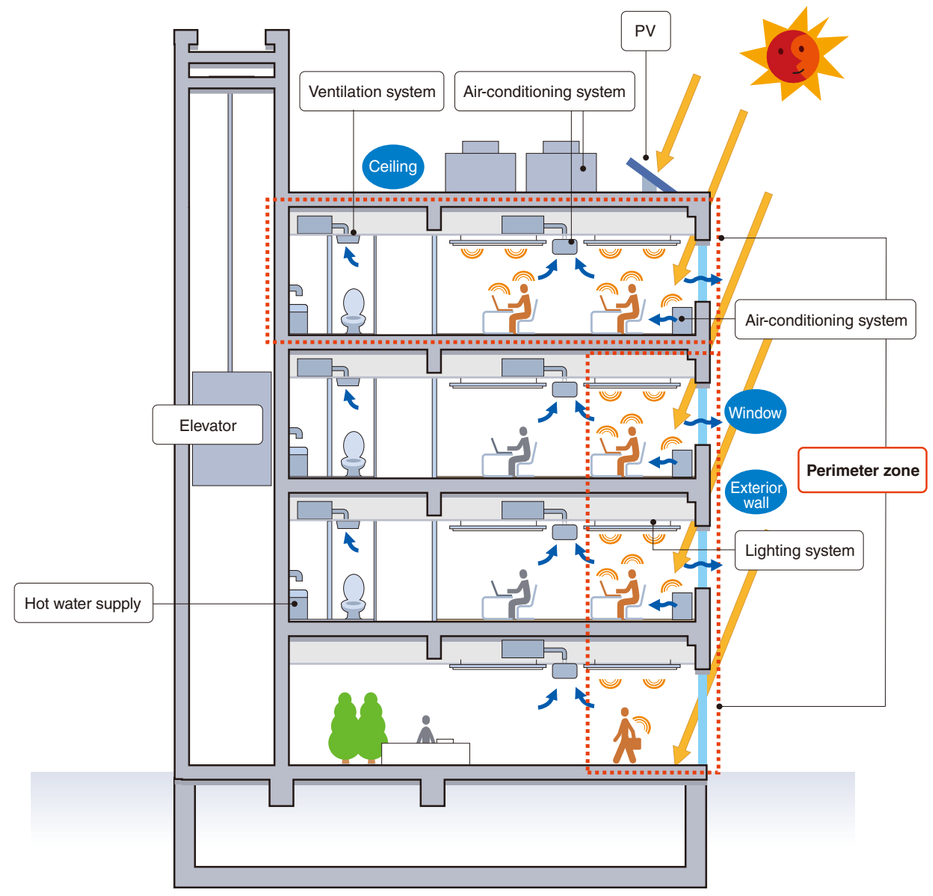
● The benefits of insulating a building

By taking measures to insulate the exterior walls and windows etc. of a building, it not only improves energy efficiency performance, but it can also improve the thermal environment inside the building, which can maintain and promote the health of the occupants, and contribute to the improvement of the working environment inside.

● Overview of the Standards for Non-residential Buildings

The evaluation of energy efficiency performance for non-residential buildings uses the following two standards:
- Standards to evaluate for envelope performance (PAL*), such as with the windows and exterior walls of non-residential buildings
- Standards to evaluate the primary energy consumption amount of equipment and OA devices etc.

Conception of Envelope Performance (PAL＊) and Primary Energy Consumption Amount



● Envelope Performance (PAL*)

◎ Annual thermal load coefficient of perimeter zone

$$PAL* = \frac{\text{annual thermal load of perimeter zone of each floor (MJ/year)}}{\text{total floor space of perimeter zone (m}^2\text{)}}$$

◎ Yearly sum of heating load and cooling load through the thermal energy given in ① through ④ below

① Temperature difference of perimeter zone with outside air
② Solar radiation from exterior walls and windows etc.
③ Heat occurring in perimeter zone
④ Heat of intake outside air based on outside air intake amount and difference of temperature/humidity perimeter zone air and intake outside air

● Primary energy consumption amount

+ air-conditioning system primary energy consumption amount
+ ventilation system primary energy consumption amount
+ lighting system primary energy consumption amount
+ hot water supply primary energy consumption amount
+ elevator primary energy consumption amount
+ other (OA apparatus) primary energy consumption amount
− reduction amount of primary energy consumption through PV and cogeneration system

= primary energy consumption amount

● What is the perimeter zone?

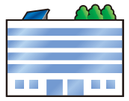
This is the inside space that is within 5 horizontal meters of the centerline of the wall of each floor in contact with the outside air, the inside space of the floor directly below the roof, and the inside space that is directly above the floor in contact with the outside air.

Point! ● **Three Standards Stipulate Different Energy Efficiency Levels**

The standards apply in the Building Energy Efficiency Act are three-fold: energy consumption performance standards (energy efficiency standards), certification standards, and residential construction client standards. There are 2 verification methods of these standards: a detailed calculation method and an abbreviated calculation method.

● Energy Efficiency Standards

Mandatory Compliance/Evaluation of Compliance with Energy Efficiency Standards | Notification | Display of Certification of Conformity with Standards



● Non-residential buildings

◎ Primary energy consumption amount $\dfrac{\text{Design value (excludes OA devices etc.)}}{\text{Standard value (excludes OA devices etc.)}} \leqq 1.0$

◎ Envelope performance　Exempt from application

● Residential buildings

◎ Primary energy consumption amount $\dfrac{\text{Design value (excludes home appliances etc.)}}{\text{Standard value (excludes home appliances etc.)}} \leqq 1.0$

◎ Envelope performance　U_A Design value ≦ Standard value
η_{AC} Design value ≦ Standard value

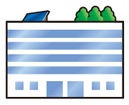
● Complexes

◎ Primary energy consumption amount

$$\frac{\text{Non-residential: Design value (excludes OA devices etc.)} + \text{Residential: Standard value (excludes OA devices etc.)}}{\text{Non-residential: Design value (excludes home appliances etc.)} \times 1.0 + \text{Residential: Standard value (excludes home appliances etc.)} \times 1.0} \leqq 1.0$$

◎ Envelope performance
Non-residential: Exempt from application
Residential: U_A Design value ≦ Standard value; η_{AC} Design value ≦ Standard value

● Certification Standards　Certification of Performance Improvement Plans/Exception of Floor-Area Ratio Regulation



● Non-residential

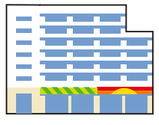
◎ Primary energy consumption amount $\dfrac{\text{Design value (excludes OA devices etc.)}}{\text{Standard value (excludes OA devices etc.)}} \leqq 0.8$

◎ Exterior　PAL* $\dfrac{\text{Design value}}{\text{Standard value}} \leqq 1.0$

● Residential

◎ Primary energy consumption amount $\dfrac{\text{Design value (excludes OA devices etc.)}}{\text{Standard value (excludes OA devices etc.)}} \leqq 0.9$

◎ Exterior　U_A Design value ≦ Standard value
η_{AC} Design value ≦ Standard value



● Complexes

◎ Primary energy consumption amount

$$\frac{\text{Non-residential: Design value (excludes OA devices etc.)} + \text{Residential: Design value (excludes home appliances etc.)}}{\text{Non-residential: Standard value (excludes OA devices etc.)} \times 0.8 + \text{Residential: Standard value (excludes home appliances etc.)} \times 0.9} \leqq 1.0$$

※ Compliance with Energy Efficiency Standards is required for both non-residential and residential buildings

◎ Exterior
Non-residential: PAL* $\dfrac{\text{Design value}}{\text{Standard value}} \leqq 1.0$
Residential: U_A Design value ≦ Standard value; η_{AC} Design value ≦ Standard value

● Residential Construction Client Standards (tentative)　Housing Top-Runner Program

Up to 2019

◎ Primary energy consumption amount $\dfrac{\text{Design value (excludes home appliances etc.)}}{\text{Standard value (excludes home appliances etc.)}} \leqq 0.9$

◎ Exterior　Exempt from application

From 2020

◎ Primary energy consumption amount $\dfrac{\text{Design value (excludes home appliances etc.)}}{\text{Standard value (excludes home appliances etc.)}} \leqq 0.85$

◎ Exterior　U_A Design value ≦ Standard value
η_{AC} Design value ≦ Standard value

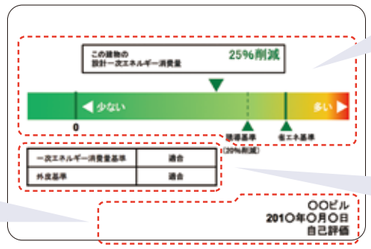
4 What is the Labeling System for Energy Efficiency?

There are two types of labeling systems: Labeling to display energy efficiency performance for buildings (Article 7), and labeling to display compliance with Energy Efficiency Standards (Article 36).

● Displaying Energy Efficiency of a Building based on Article 7 of the Act

Owners can emphasize the energy efficiency performance as being at or higher than standards during new construction of residential and non-residential buildings (office buildings etc.).

① Name of building
② Verification date
③ Distinguish between third-party-verification or self-evaluation
※ Third party verification is verification performed by an administrative agency with jurisdiction or a registered energy efficiency certification institution.
④ Name of certification institution



◎ Only with self-evaluation

⑤ Reduction rate of design primary energy consumption amount from standard primary energy consumption amount. ※1
⑥ Illustration showing relation among standard primary energy consumption amount, and design primary energy consumption amount. ※1

⑦ Compliance with primary energy consumption amount standards
⑧ Compliance with exterior standards

Non-residential/ complex buildings

◎ Example of third-party verification

※1
The primary energy consumption amounts of⑤ through⑦ are calculated using a calculation method from the standards of Ministerial ordinance etc. (excludes home appliances/OA devices etc.)

● Approval of Compliance with Energy Efficiency Standards/Labeling System based on Article 36 of the Act

Owners can emphasize the compliance of an existing residential or non-residential building to energy efficiency standards during renovations etc.

[Matters to be Displayed]
① Name of Building
② Location of Building
③ Certification Number
④ Date of Certification
⑤ Certification Administrative Agency
⑥ Applicable Standards

建築物エネルギー消費性能基準適合認定建築物

この建築物は、建築物のエネルギー消費性能の向上に関する法律第36条第２項の規定に基づき、建築物エネルギー消費性能基準に適合していると認められます。

建築物の名称	Aビル
建築物の位置	○県○市○○3-5
認定番号	23
認定年月日	2017年5月7日
認定行政庁	○市
適用基準	一次エネルギー消費量基準（新築建築物）適合

Label verifying compliance with standards (e mark)