Features and Characteristics of New Building Energy Standards of Japan

Masato Miyata
miyata-m92ta@mlit.go.jp

National Institute for Land and Infrastructure Management
Ministry of Land, Infrastructure, Transport, and Tourism

Outline

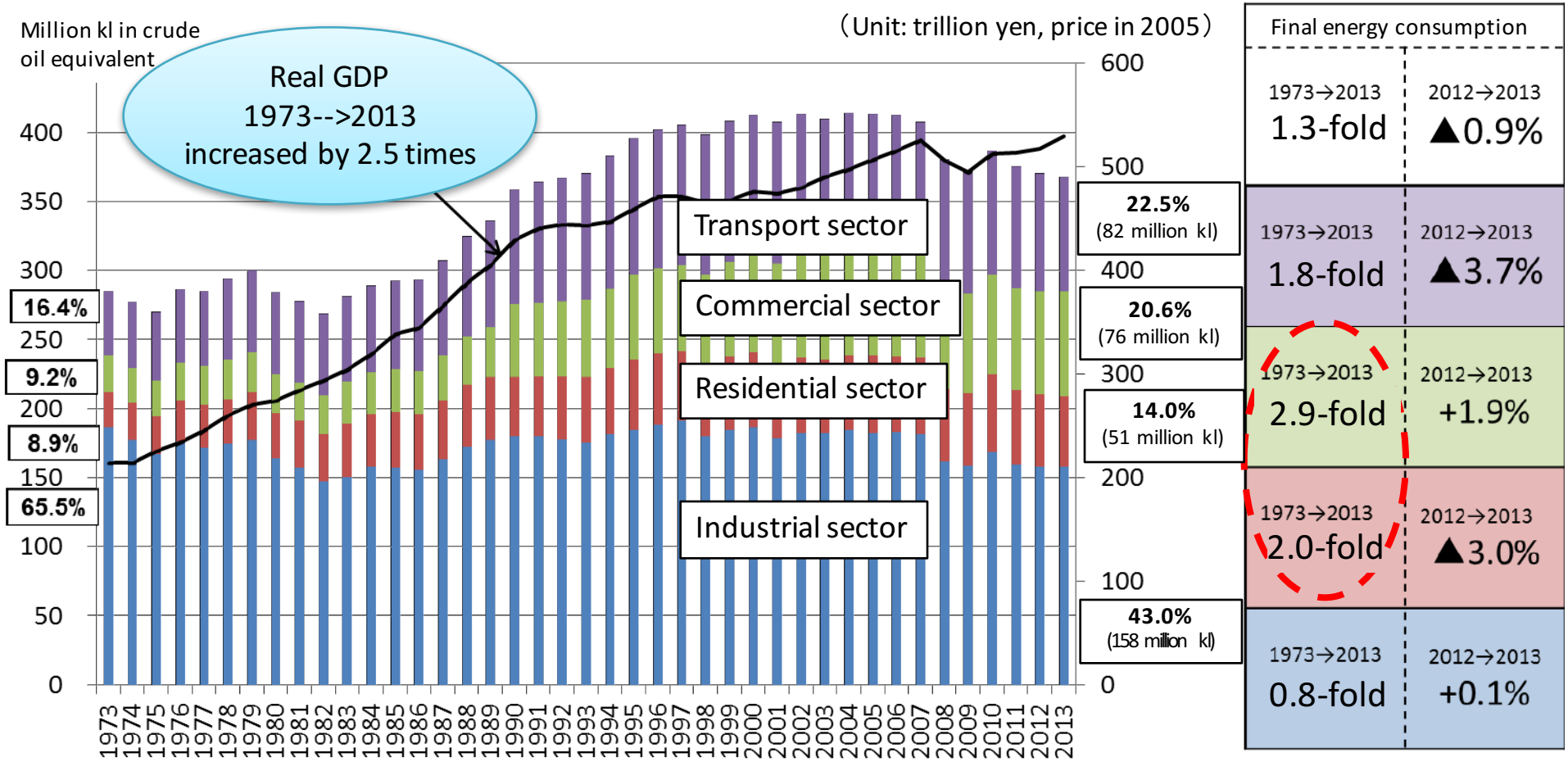
1. Brief Overview of Energy Policy in Japan

2. Evaluation Method (Commercial Buildings)

1. Brief Overview of Energy Policy in Japan

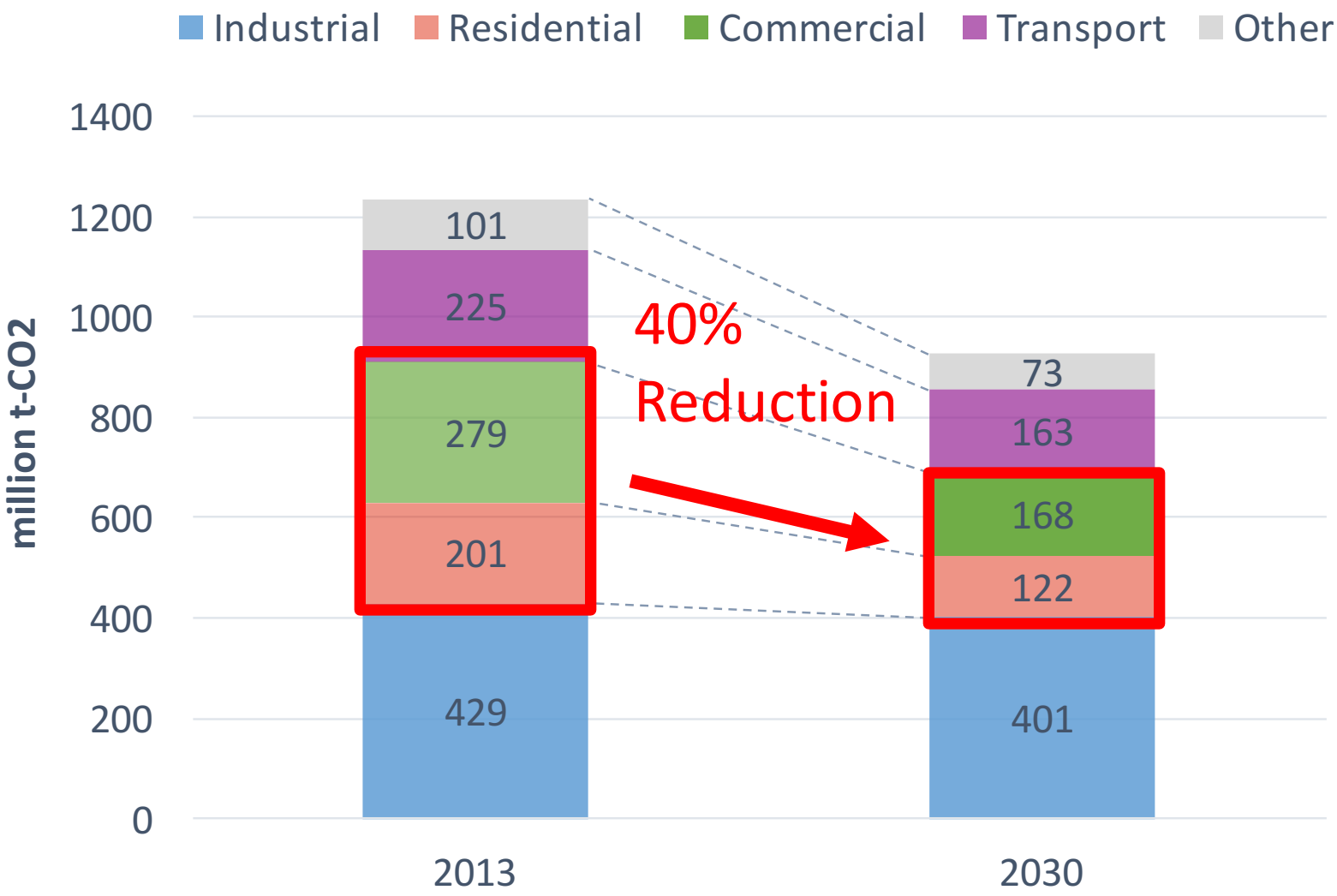
Status of energy consumption

To stabilize the energy demand and supply in Japan, it is essential to take measures to reduce energy consumption in the civilian sector.



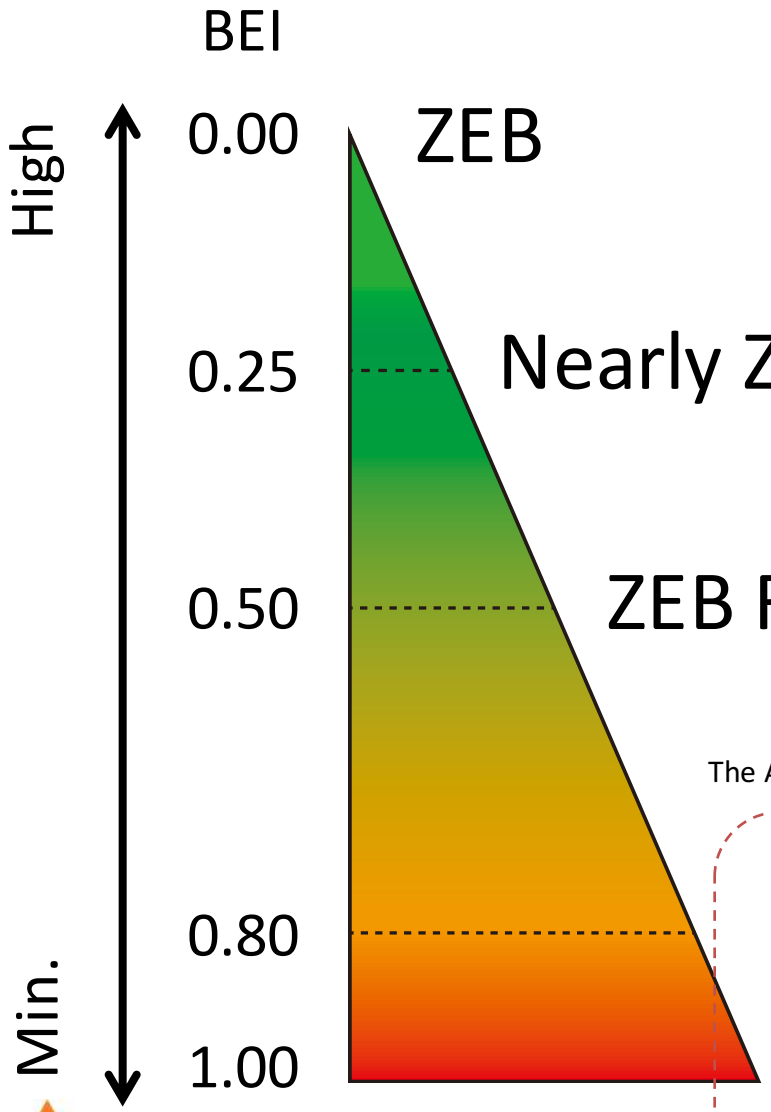
[Sources] *Comprehensive Energy Statistics, Annual Report on National Accounts, EDMC Handbook of Japan's & World Energy & Economic Statistics*

Our Goal (Civilian Sector)



[Sources] Ministry of Economy, Trade and Industry: Long-term energy supply and demand outlook July, 2015

Targets



BEI = Designed primary consumption / Reference primary consumption (2013)

- Realize ZEBs in newly constructed public buildings by 2020
- Realize ZEBs in average newly constructed public and private buildings by 2030

[source] Japan's Strategic Energy Plan (April 2014)

The Act on the Improvement of Energy Consumption Performance of Buildings

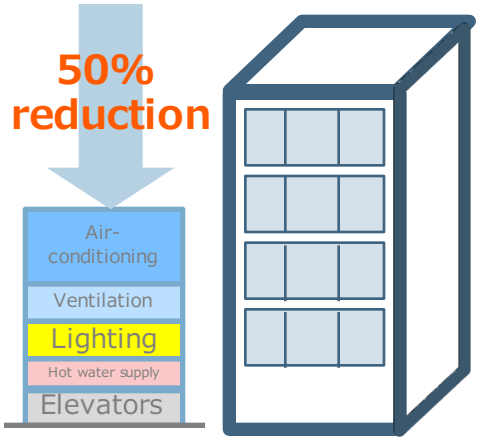
Certification Standards
(new built buildings, retrofit buildings)

Energy Efficiency Standard
(mandatory from 2017)

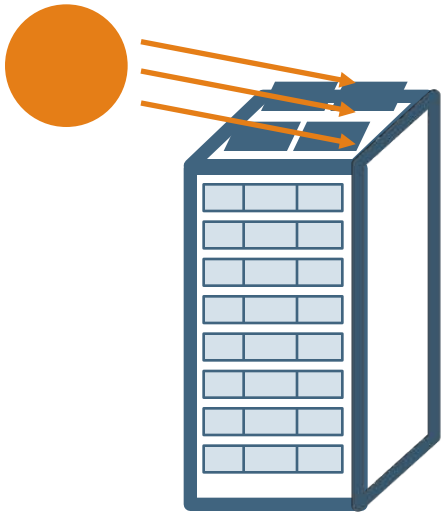
Definition and evaluation methods of ZEBs

- The goal is to achieve net zero energy consumption by creating energy (e.g., via solar power) while fulfilling the higher than 50% energy saving (ZEB Ready).
- If energy savings of at least 75% is achieved the Nearly ZEB status is granted.
- If energy savings of 100% or more is achieved, the ZEB status is granted.
- The above energy saving rate should be evaluated at the design phase.

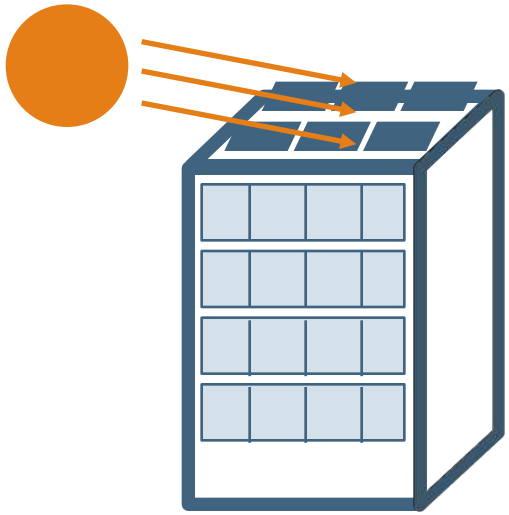
ZEB Ready
(Energy saving of **50% or more**)



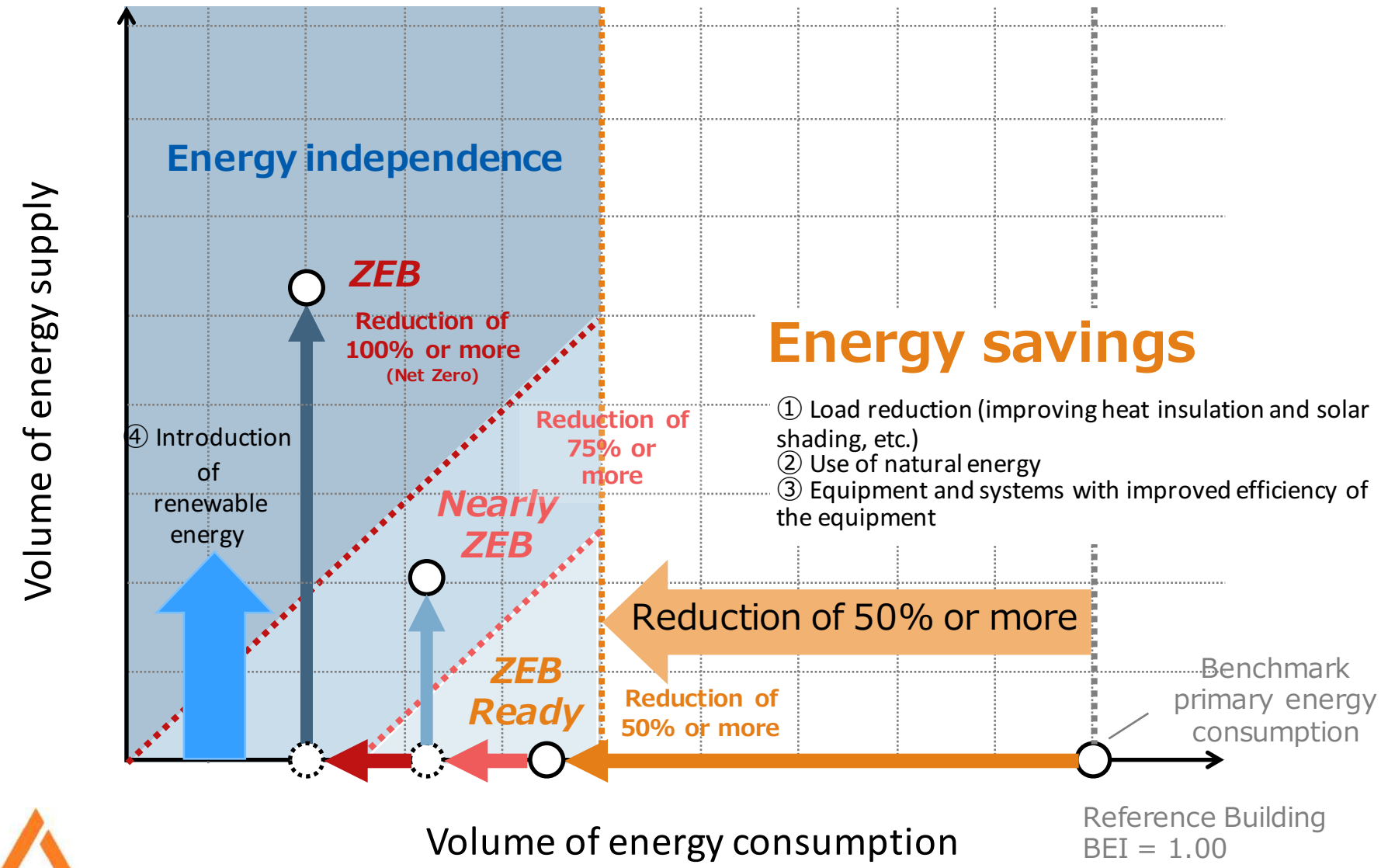
Nearly ZEB
(Net energy saving of **75% or more**)



ZEB
(Net energy saving of **100% or more**)



Definition and evaluation methods of ZEBs



History and Future of the Building Energy Standard

1979 The Energy Conservation Law was established.

1980 The Building Energy Standard was established according to the law. No obligation was taken on building owners. So the Standard was similar to recommendation.

1992 The Standard for housings was revised owing to the Gulf War.

1993 The Standard for buildings was revised as well as for housings.

1999 The levels of the Standard were enhanced because of the Kyoto Protocol.

2009 Reporting on the Standards was mandatory except small buildings and housings.

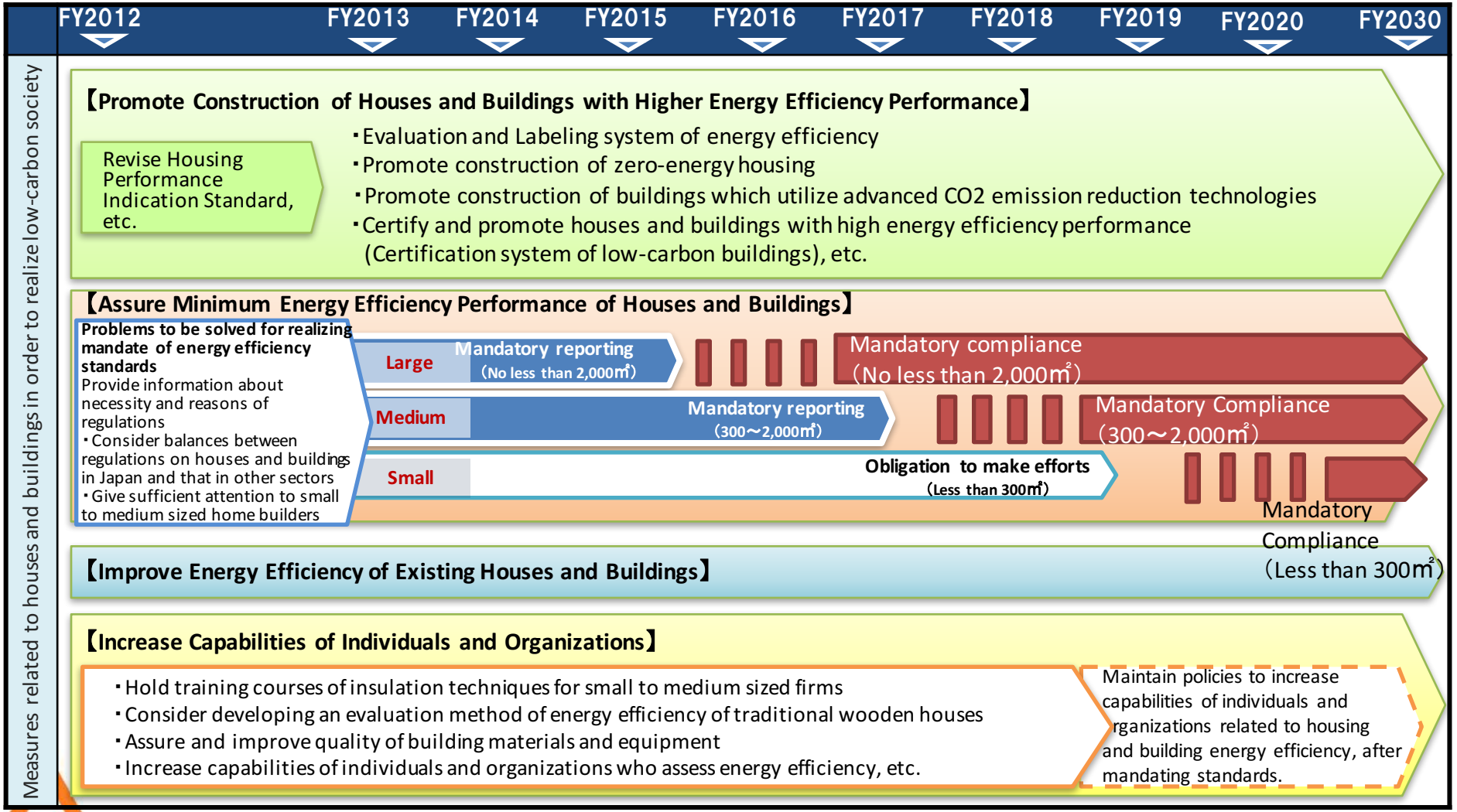
2013 The whole Standard was revised. Primary energy consumption is needed as criterion index, in addition to envelope performance.

2020 Compliance to the Standard will be mandatory for all new buildings and residences.

Masato Miyata, NILIM, Japan, miyata-m92ta@mlit.go.jp, SEforALL Workshop, February 14, 2017

Mid-term summary and progress schedule

- Compliance to the Standard will be mandatory



The Act on the Improvement of Energy Consumption Performance of Buildings

Review Process

March 24, 2015	**Cabinet decision**
June 4	**Unanimously passes in House of Representatives**
July 1	**Unanimously passes in House of Councilors, and is adopted**
July 8	**Promulgation of law**

Promulgation of Cabinet/ministerial ordinance etc.

Implementation Schedule

Advisory measures within 1 year of promulgation of law (April 2016)

1. Announcement of basic policy
2. Mandating efforts of construction clients/owners etc., and business operators in selling and leasing of building
3. Performance Improvement Planning Approval System (Floor space ratio exceptions)
4. Display System
5. Preparations for Registered Energy Conservation Evaluation Institutions and Registered Energy Conservation Performance Appraisal Institutions (applying for registration etc.)

Regulatory measures within 2 years of promulgation of law (Planned for April 2017)

1. Instruct/advise construction clients, designers/builders, construction material manufacturers
2. Mandate/evaluate compliance, register etc. Registered Energy Conservation Evaluation Institutions
3. Notification System, instructions/orders etc. via administrative agencies with jurisdiction
4. Minister-authorization system for special structure/equipment, register etc. Registered Energy Conservation Appraisal Institutions
5. Housing Top-Runner Program

*Abolish Energy Conservation Act-based regular report system for renovations, remodeling, installations and repairs and notification system

Masato Miyata, NILIM, Japan, miyata-m92ta@mlit.go.jp, SEforALL Workshop, February 14, 2017

Mandatory Compliance with Standards by Construction Clients of Specified Buildings

- **Section 11 Mandatory Compliance with Standards**
  - When construction client attempts to undertake specified construction (*1), the specified building （Limited to non-residential） must comply with the building energy efficiency standards.
  - The stipulation in the preceding paragraph is one of relevant provisions of Building Code in Japan.

***1 Specified construction**

1. New construction on a specified building (*2)
2. Extension/renovation on a specified building (The scale of the extension/renovation for non-residential portions shall only be for the Cabinet-ordered scale or larger [planned to be 300 m^2].)
3. Extension on buildings other than specified buildings (The scale of the extension for non-residential portions shall only be for the Cabinet-ordered scale or larger [planned to be 300 m^2], and when the building in question will become a specified building after the extension construction.)

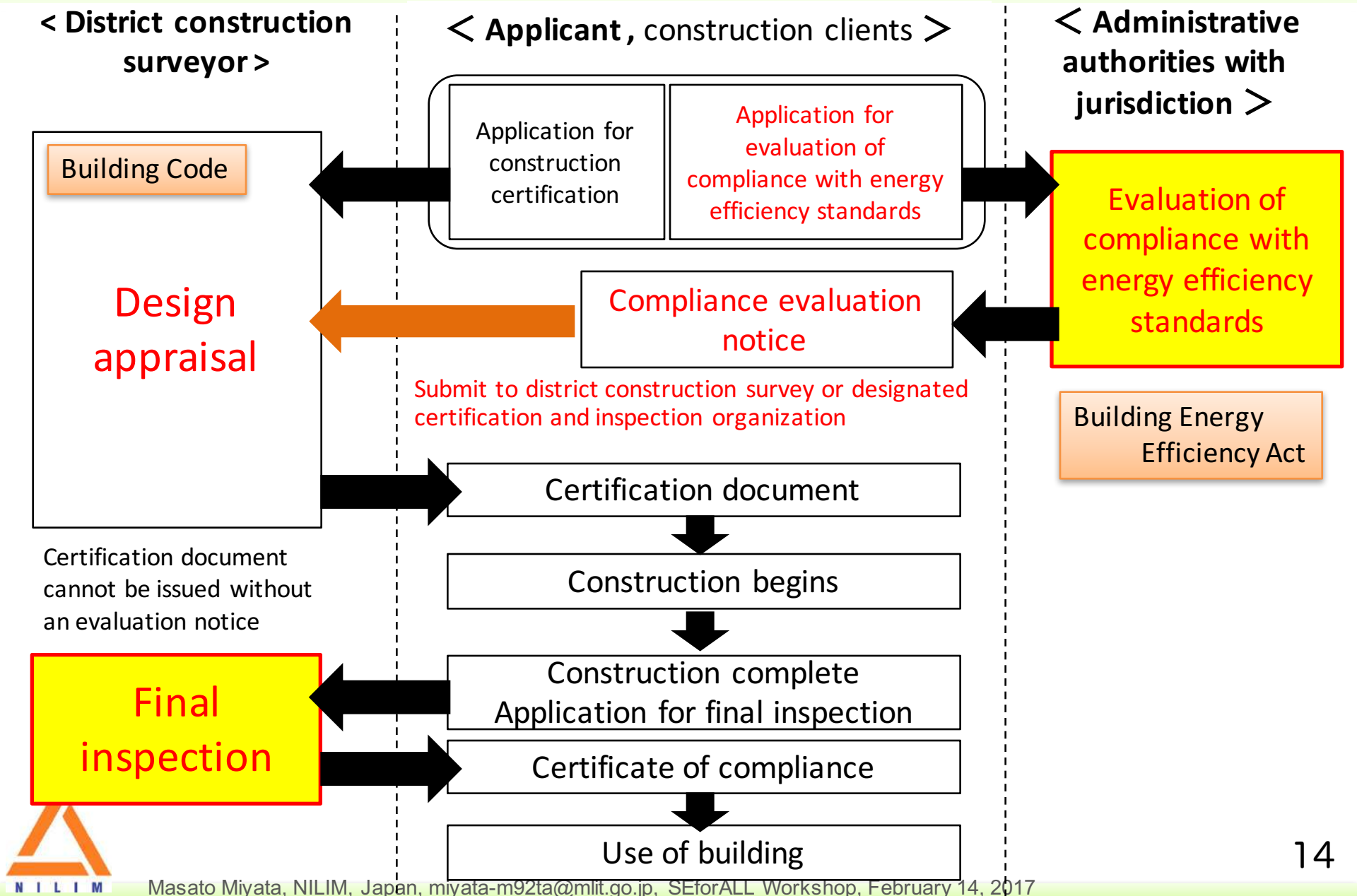
***2 Specified buildings**

This refers to buildings that are at the Cabinet-ordered scale or larger (planned to be 2,000 m^2) and are of a scale large enough to particularly require the attainment of energy consumption performance for a non-residential area.

New Building Energy Conservation Act

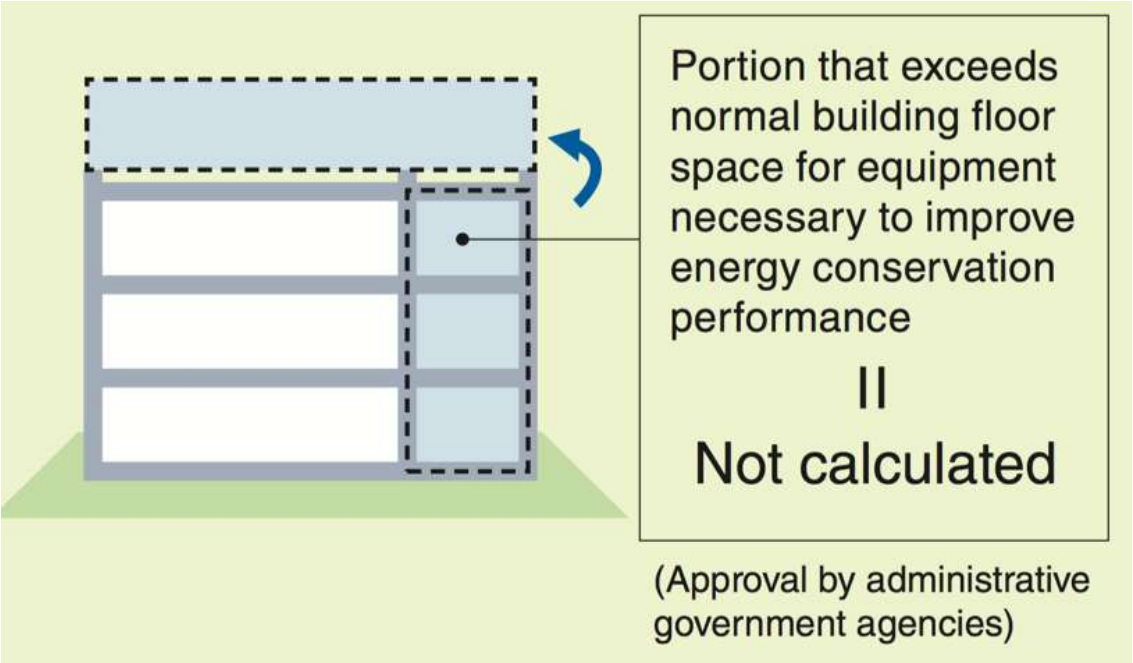
		Present status	April 2017
Large-scale buildings (2,000 m^2 or more)	Non-residential	Mandatory Notifications 【Instructions/orders etc. when markedly insufficient】	Mandatory Compliance 【Synched with building certification procedures】
	Residential		Mandatory Notifications 【Instructions/orders etc. when deemed necessary without compliance with standards】
Medium-scale buildings (From 300 m^2 to less than 2,000 m^2)	Non-residential	Mandatory Notifications 【Recommendations when markedly insufficient】	
	Residential		
Small-scale buildings (Less than 300 m^2)	Residential Construction Client (Housing Top-Runner)	Mandatory Role 【 Recommendations/orders etc. when deemed necessary 】	Mandatory Role 【 Recommendations/orders etc. when deemed necessary 】

Scheme for Evaluation of Energy Conservation Compliance and Building Certification/Inspection From April 2017



Certification Standards (Article 29)

- When carrying out new construction and renovations for energy conservation(*), certification of compliance with guidelines that exceeds the level of energy conservation standards (BEI<=0.80) may be received.
  - (*) Extensions, renovations, improvements/remodeling, installation of equipment such as A/C, repairs



Renovation that has been certified may receive special exception status, such as for floor space ratio

Labeling System (Section 7)

Section 7 Emphasize Energy Conservation Performance at or above Level of Standards

- Third party verification (BELS) label with stars.

★★★★★	**BEI<=0.60**
★★★★	**BEI<=0.70**
★★★	**BEI<=0.80**
★★	**BEI<=1.00**
★	**BEI<=1.10**

Labeling System (Article 7)

[source] https://www2.hyoukakyoukai.or.jp/bels/info/jireishokai.php

Labeling System (Article 7)

■ 都道府県別BELS事例一覧 － 東京都 － 事務所等

閲覧したい用途がある場合には、下のボタンをクリックしてください。
なお、複合建築物、複数用途建築物の場合は、床面積に占める割合が最も大きい用途について掲載しています。

事務所等 | ホテル等 | 病院等 | 百貨店等 | 学校等 | 飲食店等 | 集会所等 | 工場等 | 一戸建ての住宅 | 共同住宅等 | すべて

<3件中1～3件目を表示しています。>

★★★★★

物件名	ＫＴビル			申請者	鹿島建設株式会社　代表取締役社長　押味　至一		
設計者	鹿島建設株式会社　一級建築士事務所			施工者	鹿島建設株式会社　東京建築支店		
評価年月日	2016/09/30	竣工年月日	2016年8月1日	申請の範囲	建物	BEI	0.46
外皮適合	適合	評価手法	通常の計算法（標準入力法・主要室入力法）（平成28年基準）			特記事項	ZEB　READY
アピールポイント	本計画は、都内に立地する延床面積約12,000㎡の本社機能を持つオフィスビルである。コストやスペース有効活用の制約などから、CO2削減が進みにくい都市型中規模ビルをターゲットに、適応性の高い省エネルギー技術を積極的に導入している。また、今回採用した技術はコスト合理性や建築計画への親和性にも配慮している。						

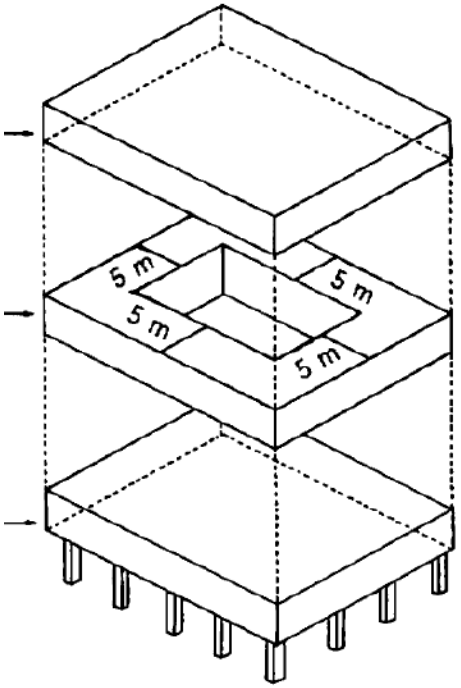
[source] https://www2.hyoukakyoukai.or.jp/bels/info/jireishokai.php

2. Evaluation Method (Commercial buildings)

Old Energy Standard for Commercial Buildings (~2013)

- The standard used two indicators for assessing the energy performance of a building.
- Reporting on the standards is mandatory except small buildings and housings.

1. For the performance of the building envelope
   - Perimeter Annual thermal Load (PAL)
2. For the performance of the building equipment
   - Coefficient of Energy Consumption (CEC)
     - CEC/AC : CEC for Air-conditioning
     - CEC/V : CEC for Ventilation
     - CEC/L : CEC for Lighting
     - CEC/HW : CEC for Hot water supply
     - CEC/EV : CEC for Elevators



Perimeter Zone

Revised Energy Efficiency Standard for Commercial Buildings (2013-)

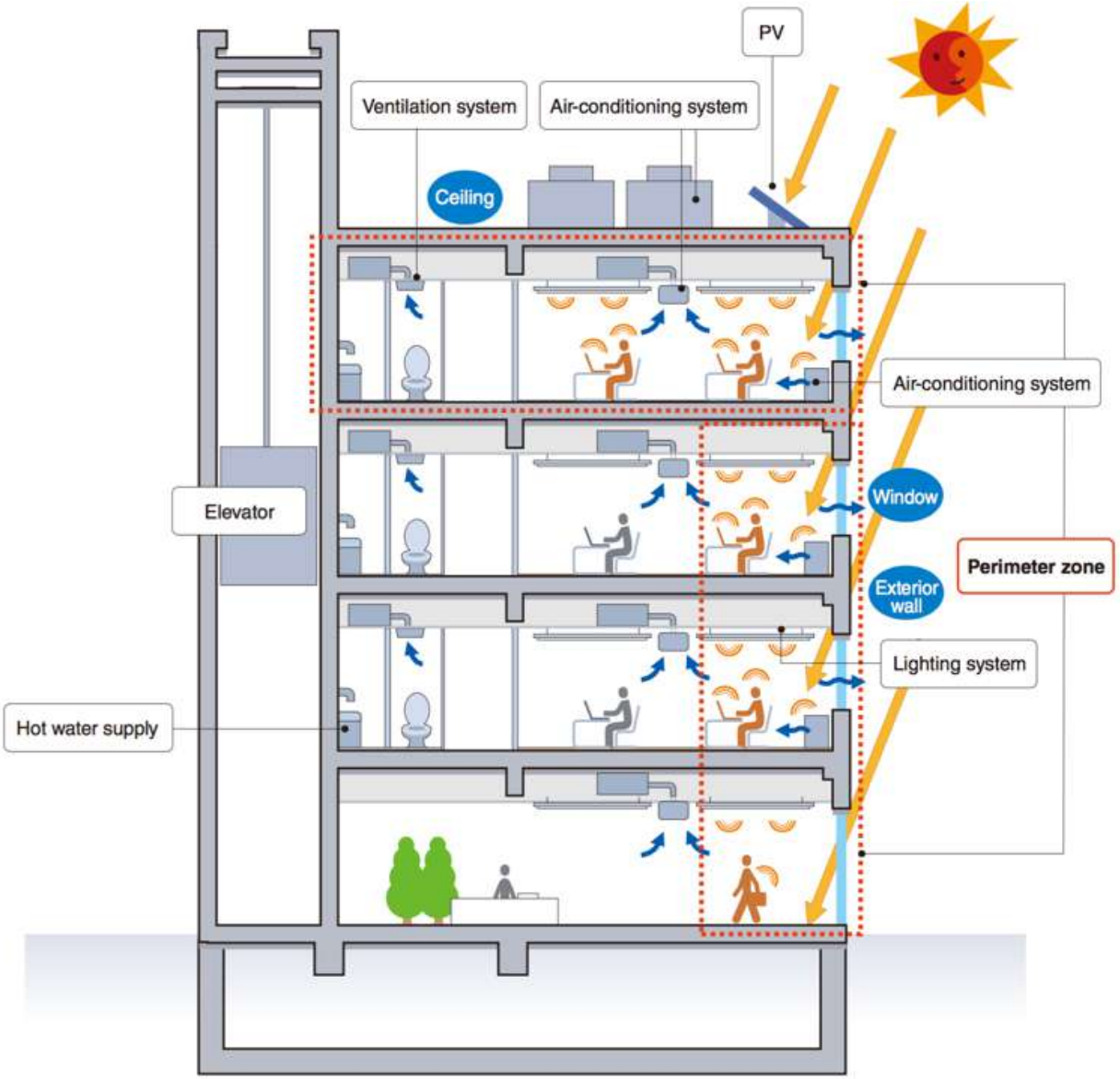
Old Standard

- There are 5 criterion indices for each equipment and it is not an index for whole building performance.
- Calculation method have not been updated for about 30 years and some newly technique cannot be evaluated.
- The values for the PAL and CEC depend on the building type

New Standard

- ❖ New index: PAL* and Primary energy consumption of 5 equipment (AC, V, L, HW and EV).
- ❖ New calculation method is developed, which can estimate the energy consumption more accurately.
- ❖ Criterion value is defined according to types of room.

Index : Primary Energy Consumption



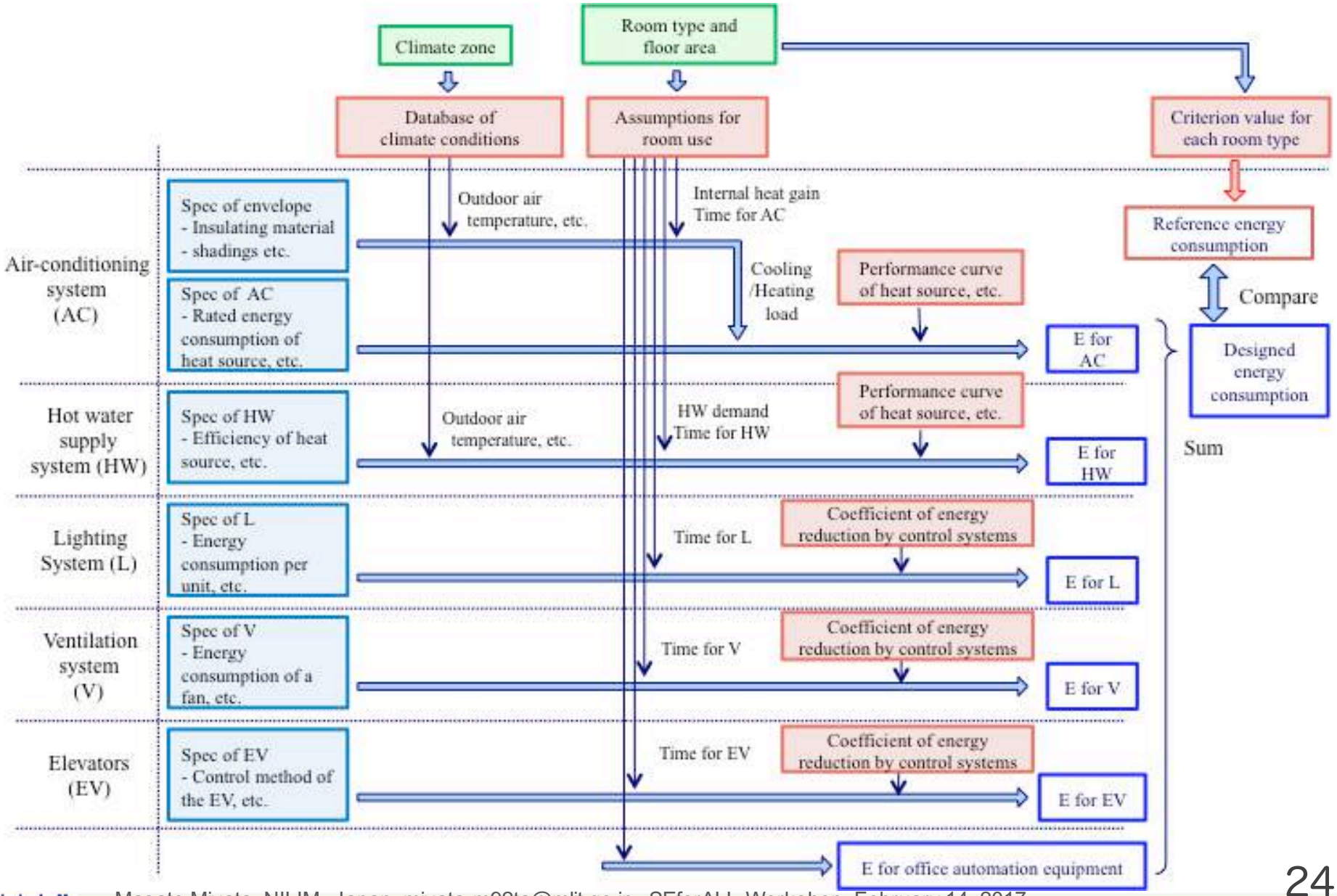
Primary energy consumption amount
= air-conditioning system
+ ventilation system
+ lighting system
+ hot water supply
+ elevator primary
+ other (Plug load)
- PV and cogeneration system

Calculation methodologies

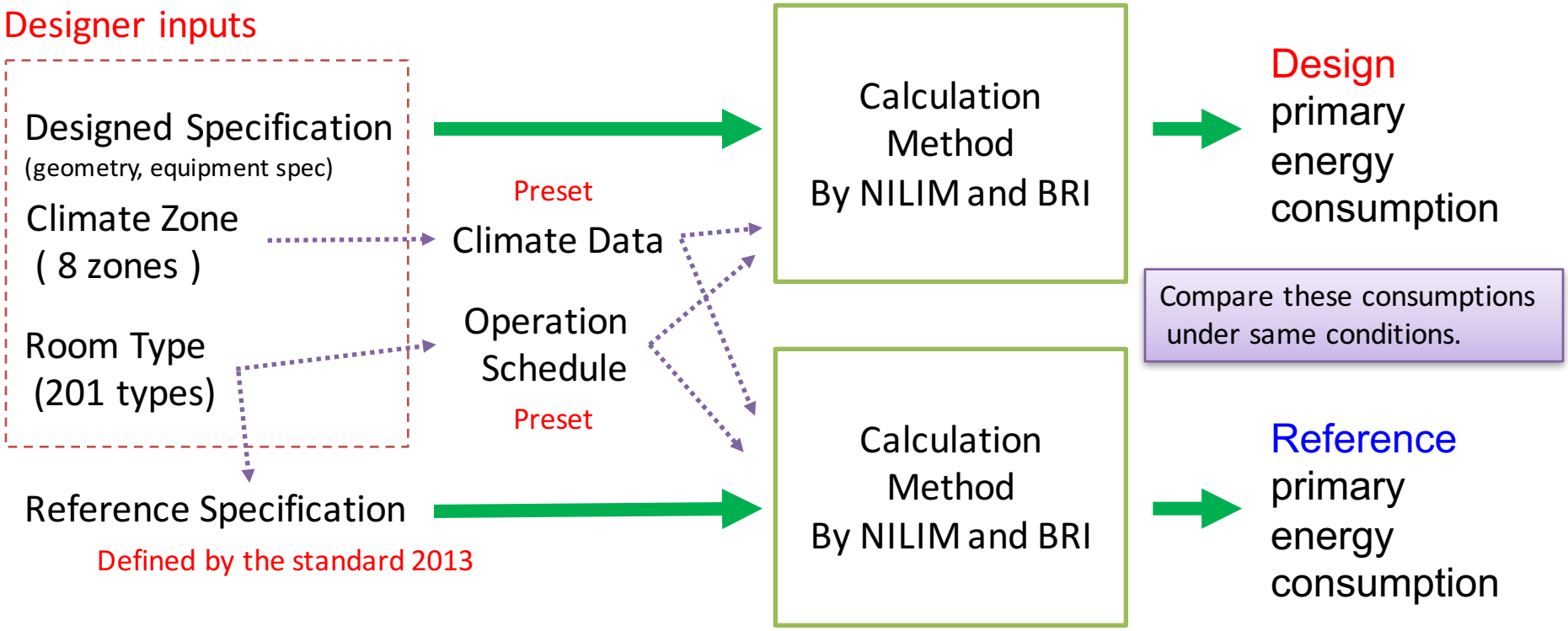
- NILIM and BRI have developed new methodologies for evaluating the primary energy consumption.

- The methodologies are expected to be suitable for the mandatory standard.
  - Easy to understand evaluation logic (simplified and streamlined)
  - Easy to understand evaluation results
  - A fair, reliable, and transparent evaluation logic
  - Streamlined and efficient evaluation and review
    - Provision of evaluation-assistance simulation tools
  - Defined and unified evaluation rules
    - Same results regardless of who makes data entries
    - Same results regardless of who performs a review

Flow of Calculation of Primary Energy Consumption for Commercial Buildings



Reference Energy Consumption



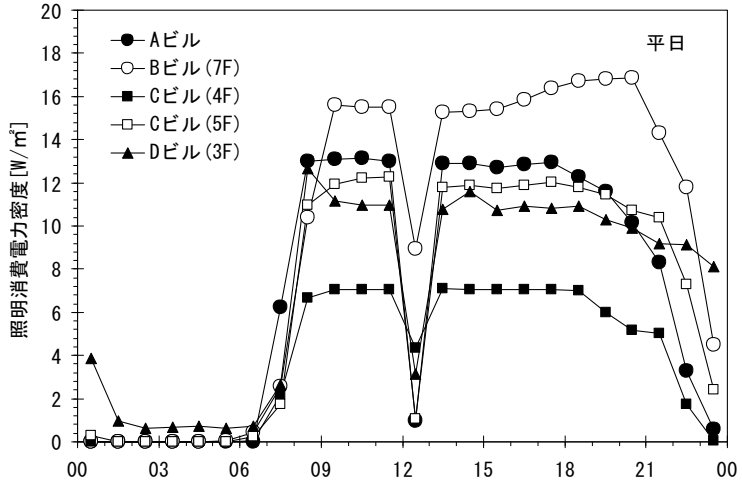
- BEI (*Building Energy Index*)
  = Design consumption / Reference consumption

Example of the room types

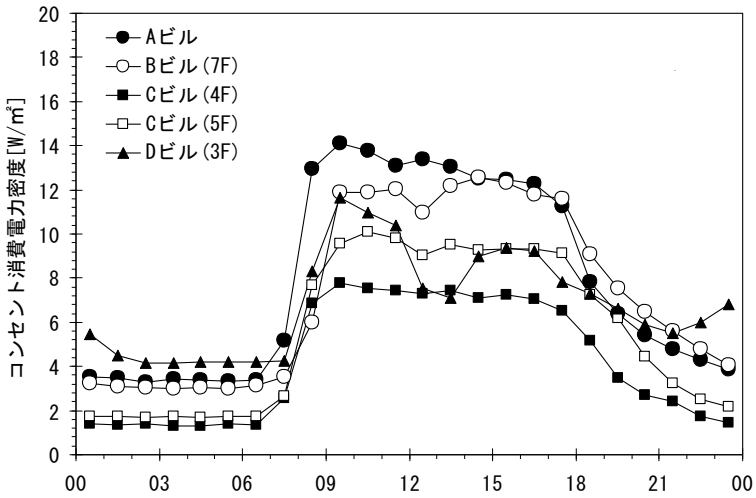
No.	Type of room (Office)
O-1	Office room
O-2	Office higher heat
O-3	Meeting room
O-4	Tearoom
O-5	Central control
O-6	Locker room
O-7	Canteen
O-8	Hall
O-9	Lobby
O-10	Toilet
O-11	Smoking room

No.	Type of room (Hotel)
H-1	Guest room
H-2	Guest room's bath room
H-3	Banquet higher heat
H-4	Banquet hall with medium heat emission
H-5	Banquet hall with low heat emission
H-6	Restaurant
H-7	Lounge
H-8	Lounge open only at night
H-9	Shop
H-10	Office room (24 hours)
H-11	Office room (closed during night)
H-12	Canteen for employees
H-13	Locker room

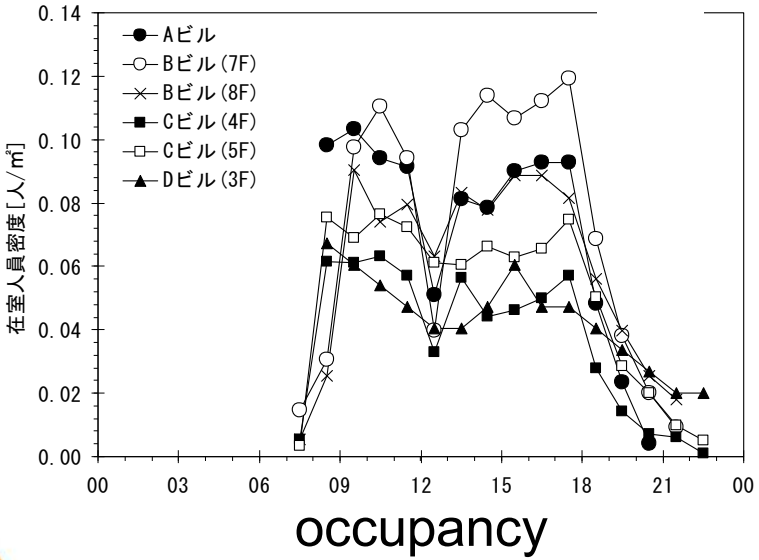
Measurement of the Internal Heat Gain in Actual Office Buildings



Internal heat gain (lighting)



Internal heat gain (OA equipment)



occupancy

Example of Assumptions for the Room Usage

Building Type	Type of room	Operation Time for AC [h/year]	Internal heat gain (lighting) [W/㎡]	Internal heat gain (metabolism) [person/㎡]	Internal heat gain (OA equipment) [W/㎡]	Fresh air intake [m^3/m^2h]	Illuminance level [lx]	…
Office	OfficeRoom	3374	12	0.1	12	5.0	750	
	ComputerRoom	3374	12	0.1	30	5.0	750	
	MeetingRoom	2410	10	0.25	2	12.0	500	
	TeaRoom	2410	10	0.25	2	12.0	300	
	Canteen	723	30	0.5	0	15.0	500	
	CentralMonitoringRoom	8760	20	0.15	30	4.0	500	
	LockerRoom	3374	15	0.3	0	4.0	300	
	Corridor	3133	15	0.03	0	2.5	200	
	Lobby	3133	15	0.03	0	2.5	500	
	Toilet	3133	15	0.03	0	2.5	300	
	SmokingRoom	3133	15	0.03	0	2.5	300	
	Kitchen	0	0	0	0	0.0	750	
	IndoorParking	0	0	0	0	0.0	150	
	MechanicalRoom	0	0	0	0	0.0	200	
	ElectricalRoom	0	0	0	0	0.0	200	
	Kitchenette	0	0	0	0	0.0	300	
	StorageRoom	0	0	0	0	0.0	300	
	CopyRoom	0	0	0	0	0.0	500	
	GarbageStorage	0	0	0	0	0.0	150	

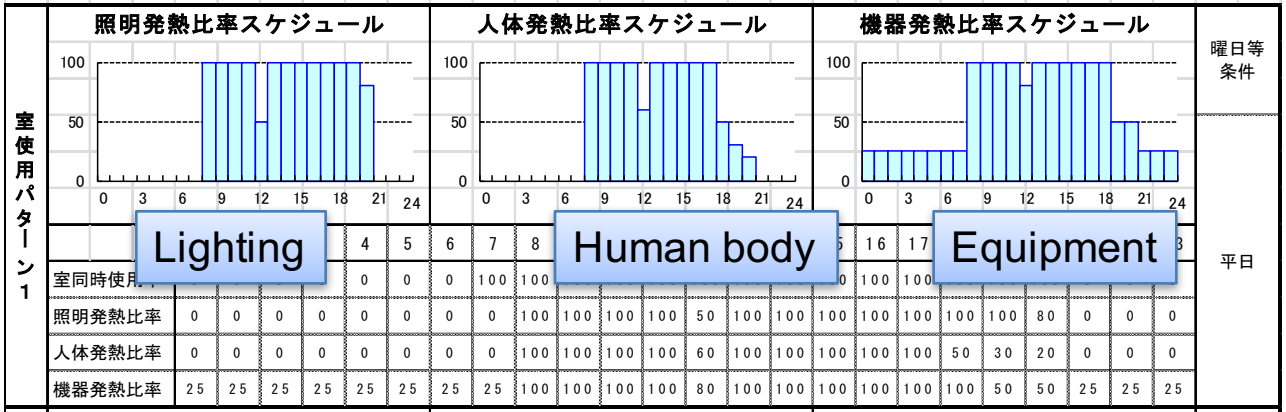
The information in this table is based on the results of a review in the MLIT Building Code Development Promotion Project (22 survey items).

Standardized room-use conditions
(Office room in office building)

Reference value for heat-generation density
Lighting: Old Standards
25 W /m² → 12 W/m²
Human body: Old Standards
0.2 persons/m² → 0.1 persons/m²
Equipment: Old Standards
10 W/m² → 12 W/m²

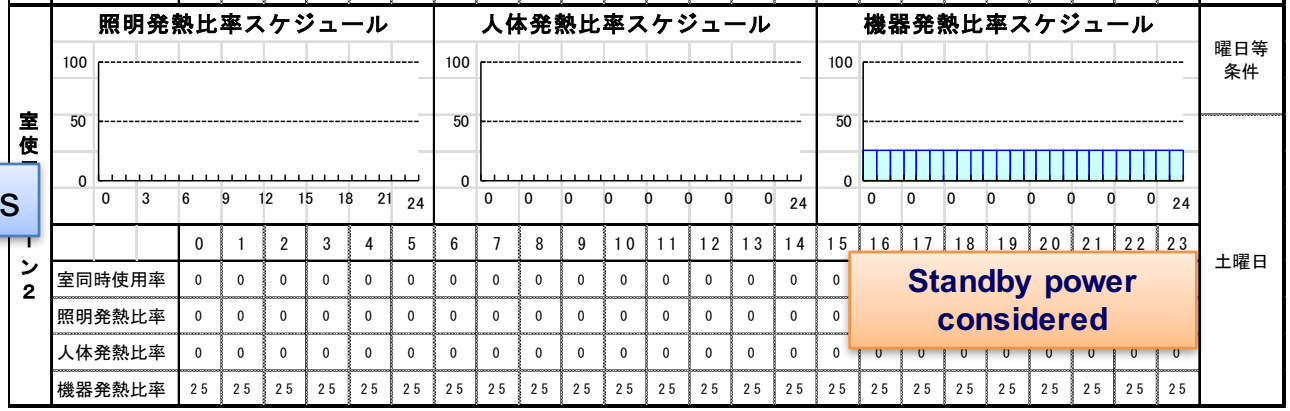
共通		空調						空調以外の換気				照明					給湯
カレンダパターン		年間空調時間	照明発熱参照値	在室者数参照値	機器発熱参照値	新鮮外気導入量		年間換気時間	基準設定換気風量	基準設定換気回数		年間照明点灯時間	基準照明消費電力	基準設定照度	基準設定保守率		年間給湯日数
A		[h/年]	[W/㎡]	[人/㎡]	[W/㎡]	[m3/㎡・h]		[h/年]	[m3/m2h]	[回]		[h/年]	[W/㎡]	[lx]			[日]
室使用パターン別年間日数		3374	12.0	0.1	12.0	5.0		0	0.0	–		3133	16.3	750	0.69		241
		空調時刻（時間）			人体発熱参照値	待機電力参照値	作業強度指数	換気時刻（時間）			基準設定全圧損失[Pa]	照明点灯時刻（時間）			基準設定器具形式	基準設定光源	基準設定湯使用量
1	241	1	7	21	(14)	[W/㎡]	[W/㎡]	[-]	1	–	–	(0)	0	1	8	21	(13)				
2	51	2	–	–	(0)	11.9	3.0	3	2	–	–	(0)	基準設定換気方式	2	–	–	(0)				L/人日
3	73	3	–	–	(0)				3	–	–	(0)	–	3	–	–	(0)	C	FHF32	3.8	

Weekdays



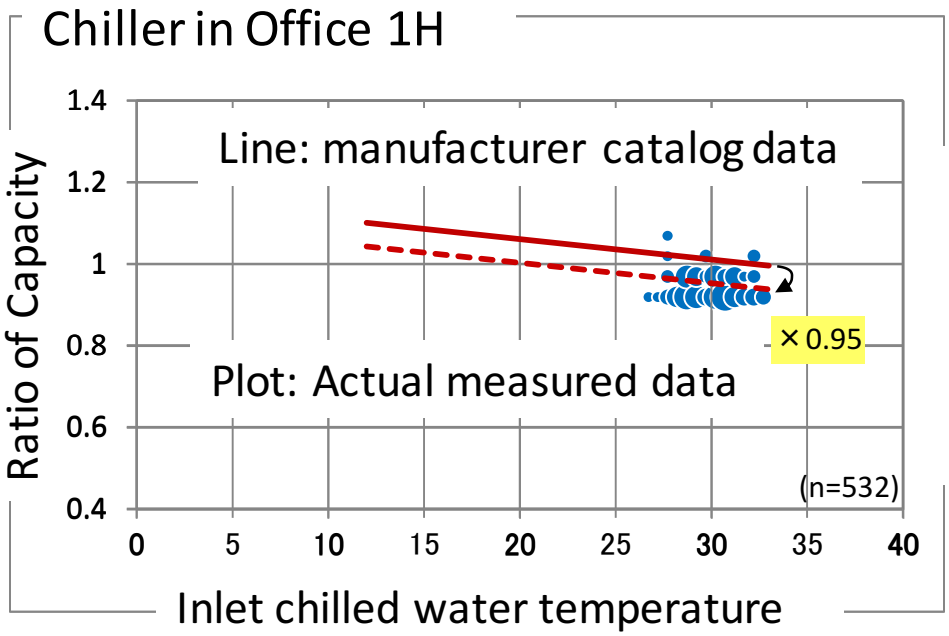
Saturdays

Sundays/Holidays

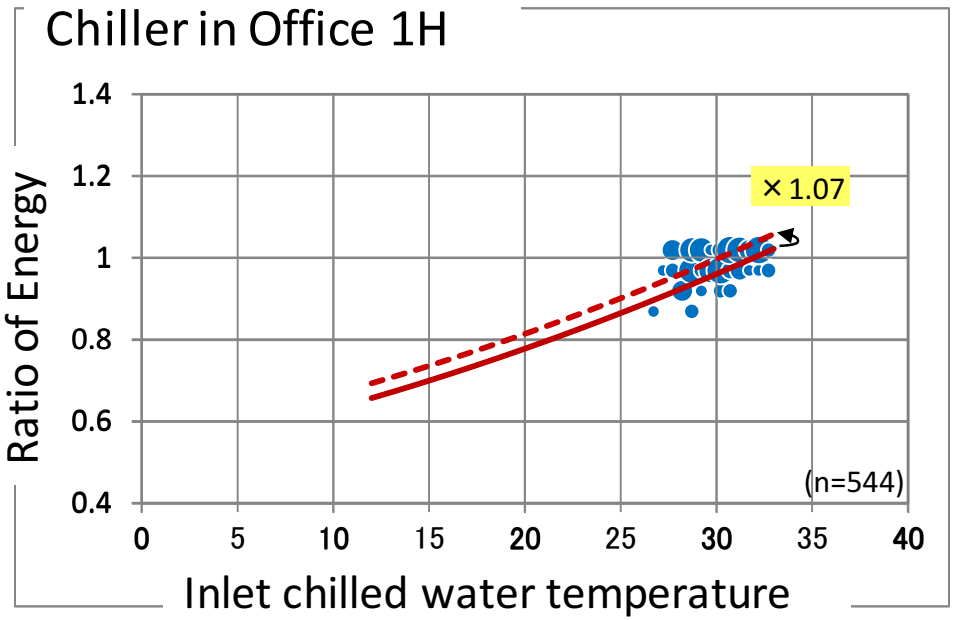


Measurement of Actual performance of Equipment

- In order to estimate the primary energy consumption accurately, NILIM and BRI measured the actual performance of the building equipment in several buildings and developed a method to estimate the actual performance based on manufacturer catalog data.

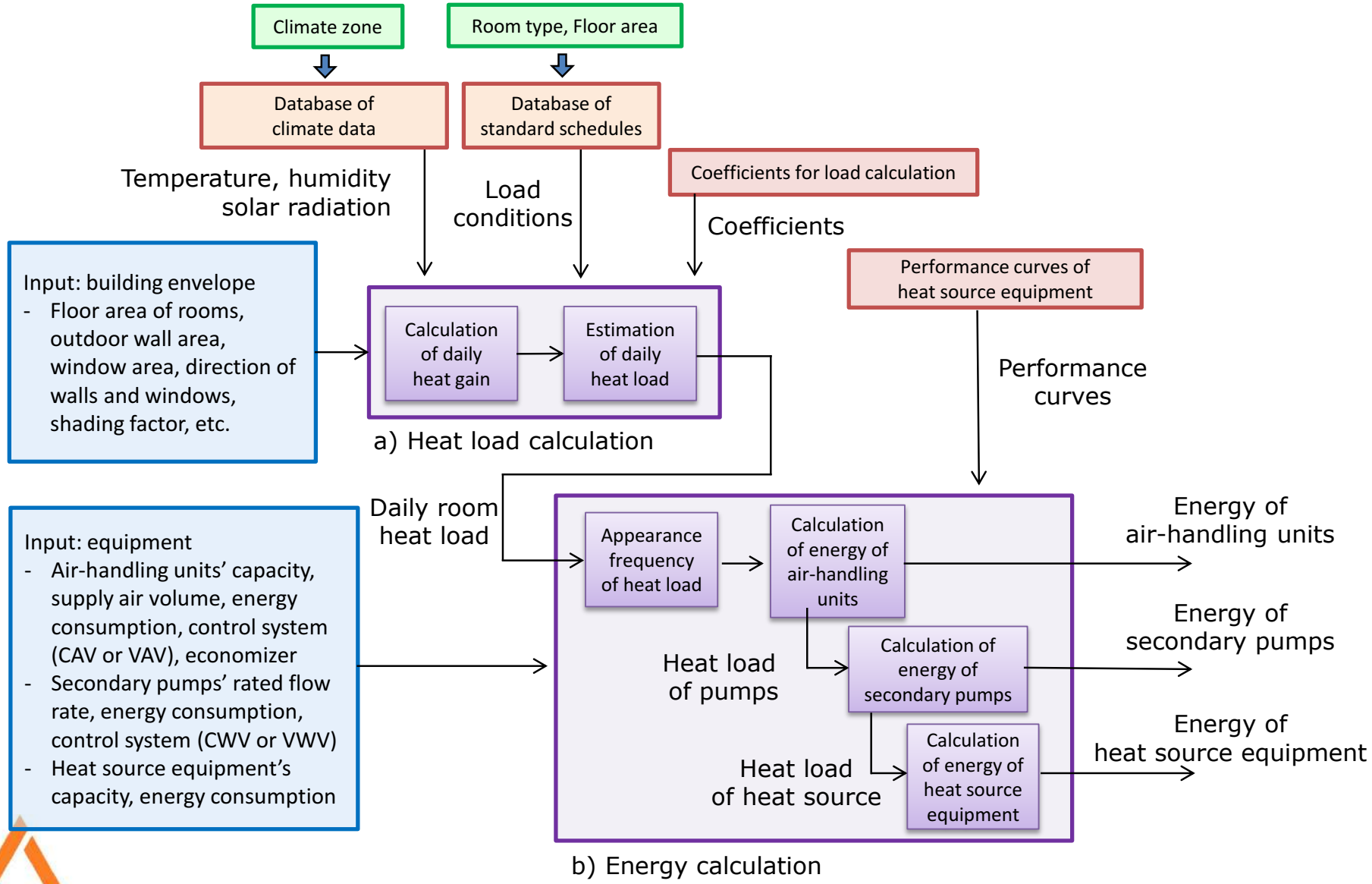


Cooling Capacity



Energy Consumption

Calculation flow (air-conditioning system)



Concept of Room Heat Load Calculation (1)

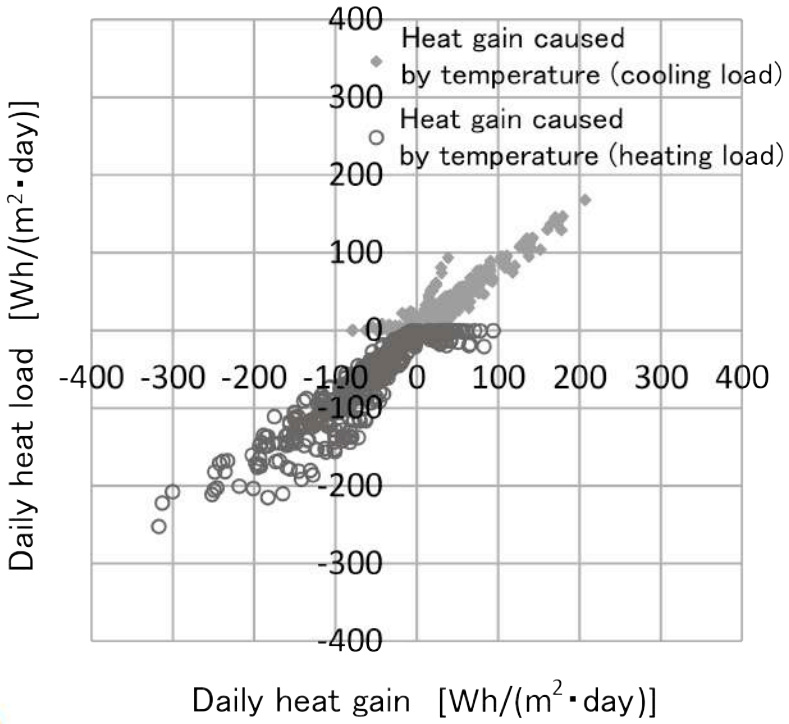
- Daily heat loads of each room $Q_{rL,j}$ are calculated using steady-state heat gain $Q_{rG,j}$.

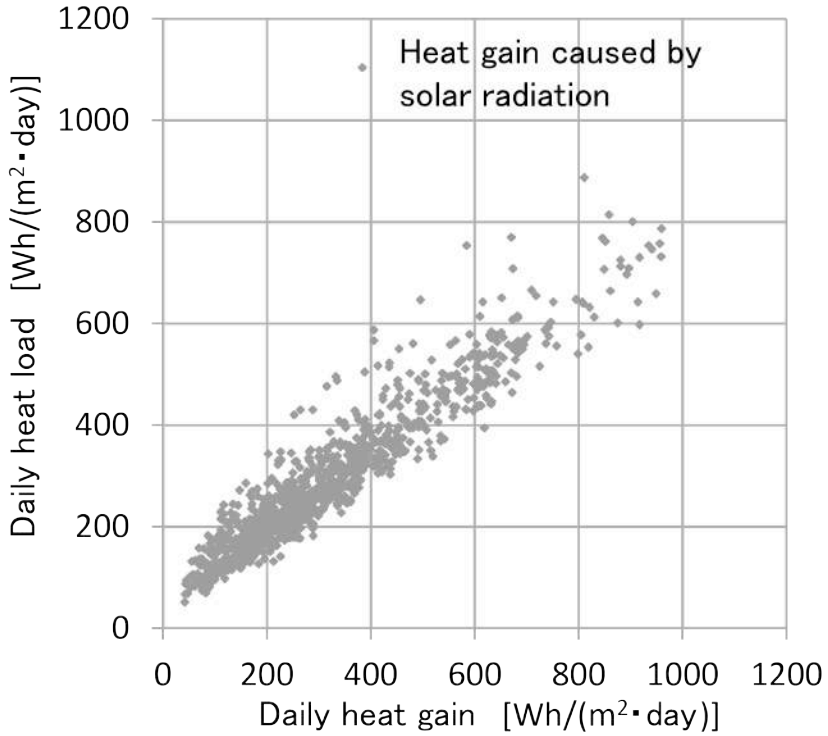
$$Q_{rL,j}(t) = a_j \, Q_{rG,j}(t) + b_j$$

- Two kinds of heat gain $Q_{rG,j}$ are taken into account:
  - Heat gain through exterior walls and windows as a result of the temperature difference
    = Overall heat transfer coefficient of walls and windows x area x indoor-outdoor temperature difference
  - Heat gain through windows as a result of solar radiation
    = Solar heat gain coefficient x area x shading coefficient x solar radiation

Concept of Room Heat Load Calculation (2)

- Coefficients a_j and b_j are coefficients for converting static heat gain to dynamic heat load.
- These coefficients are determined by using the dynamic thermal load calculation program NewHASP.
- These coefficients are dependent on the zone, room use, and season and on the use of air-conditioning the previous day.



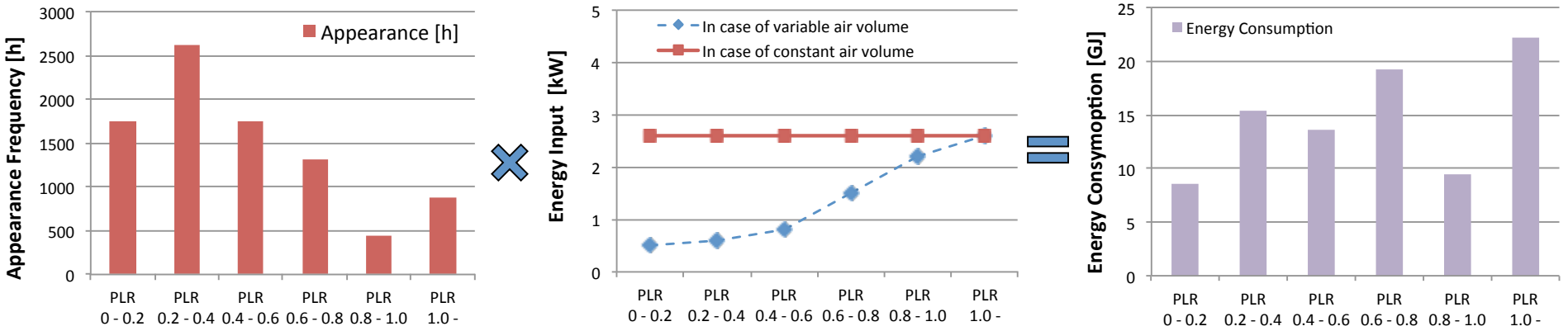


Concept of Energy Consumption Calculation

- Primary energy consumption of the air-conditioning system.

$$E_{d,AC} = E_{d,AC,AHU}(Q_{rL,j}) + E_{d,AC,PUMP}(Q_{rL,j}) + E_{d,AC,REF}(Q_{rL,j})$$

- The concept used to calculate these values are the same.
  - The appearance time of each part load ratio (PLR) band is calculated
  - The energy consumption of the equipment on each PLR band is calculated by multiplying the appearance of the load and the energy input, which differs depending on the control system introduced.



Appearance frequency of load (from load calculation results)

Energy input (from the equipment characteristics database)

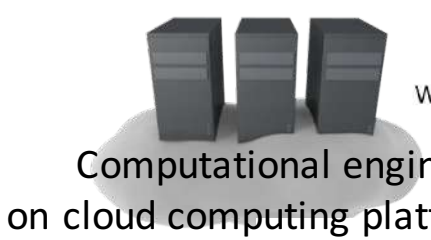
Primary energy consumption (Load appearance hours x power consumption)

Information Disclosed by NILIM and BRI

- Official Guides

- BRI's website provides technical information on the Energy Efficiency Standards: http://www.kenken.go.jp/becc/index.html
  - Links to various support tools
  - Instructions for the tools
- How to use https://www.youtube.com/watch?v=lL1cqCkbFaE

Web-based Simulation Tool for Compliance with 2013 Energy Efficiency Standard



Windows Azure

Computational engine on cloud computing platforms

Design documents

Specification Input Sheet

XML files

Calc. results

BRI Website

Download

.xls
Microsoft® Excel®

- Excel Sheet
- Manual
- Interface of the web-based simulation tool

Upload

Input the product specification of the building equipment to the Excel file.

Calculation Results

Flow for evaluation of a building's primary energy consumption in commercial buildings

Simplified Approach

- An alternative simple evaluation method: the Model Building Method.
- Shapes and room uses are considered for each model building use.
  - Primary energy consumption is calculated and evaluated by applying typical specifications for the building envelope and the equipment requiring calculation to the model building.

Building to be evaluated

Conventional calculation method

The area of each room and the specifications for the envelope and the equipment are entered.

Design value by the conventional method

Baseline value by the conventional method

Model Building Method

Web-based program for primary energy consumption calculation

Enter only the main specifications for the envelope and the equipment to be used in the model building.

Model building

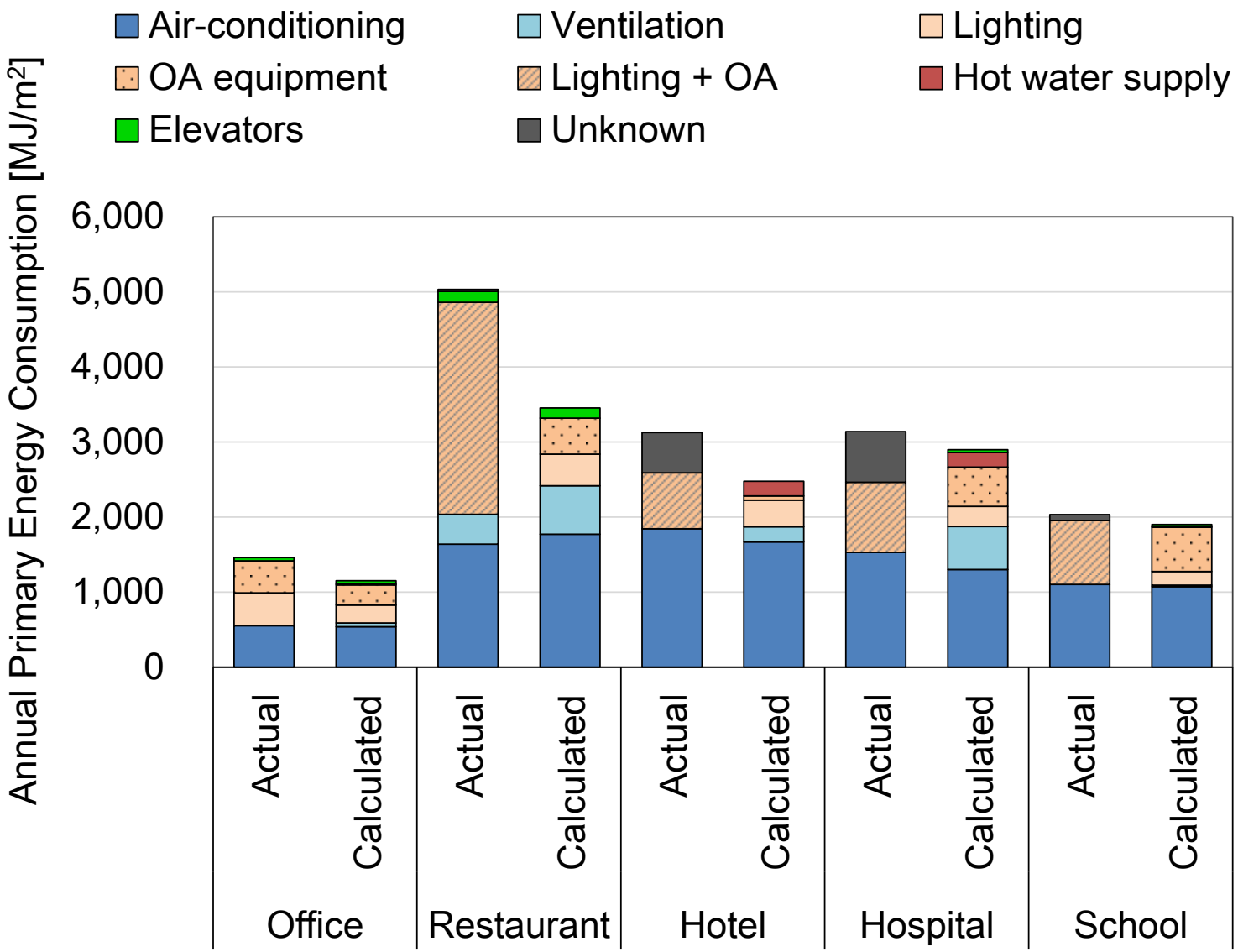
BPI_m

BEI_m

$$\frac{\text{Design value by Model Bldg Method}}{\text{Baseline value by Model Bldg Method}}$$

Model Building Method Input-assist Tool

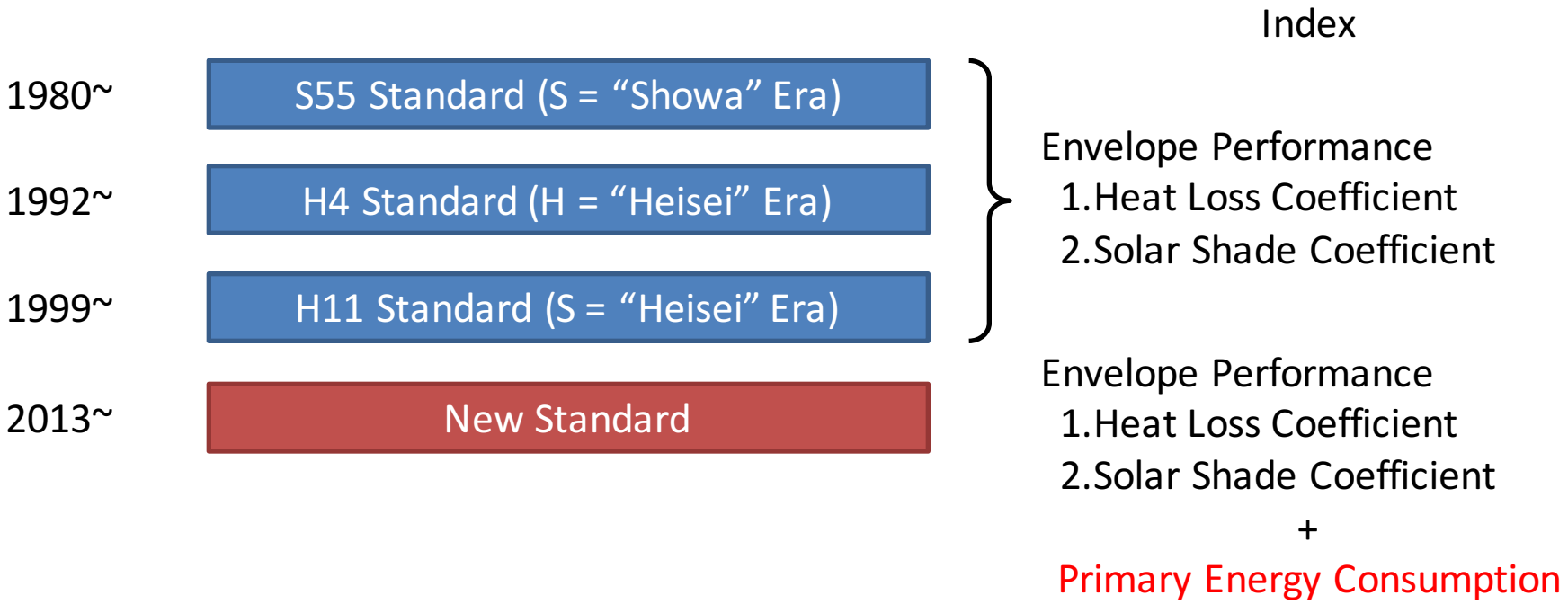
Application to actual buildings



Information Disclosed by Building Research Institute

- Building Research Institute's website provides technical information on the Energy Efficiency Standards: http://www.kenken.go.jp/becc/index.html
  - Announcement of an update of the program
  - Links to various programs
  - Input sheet (Excel sheet) and sample sheet
  - Instructions for the program (Building Research Institute document)
    - Rule book on how to create an input sheet
  - Details of baseline room-use conditions
  - Drawings of the model building, etc.
  - Information on intermediate and output files from the program

Energy Efficiency Standard for Residential House



- Revised standard consists of …
  - Envelop standard
    - Mean U value (Insulation factor)
    - Mean η value (Sun shading factor)
  - Energy Performance Standard
    - Designed annual energy consumption

Mean U Value

[W/m²K] [m²]

(A) Wall — U Value×Area×H Coeff.

(B) Ceiling — U Value×Area×H Coeff.

(C) Floor — U Value×Area×H Coeff.

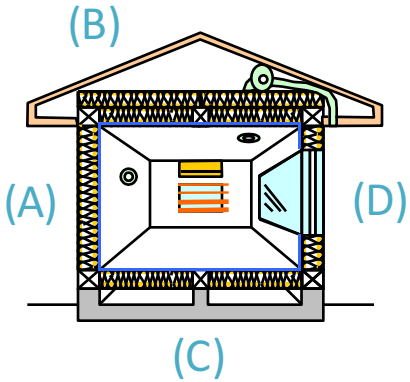
(D) Opening (Window & Door) — U Value×Area×H Coeff.

(+)

Total Heat Loss [W/K]

÷ Total Area [m²]

Mean U Value [W/m²K]

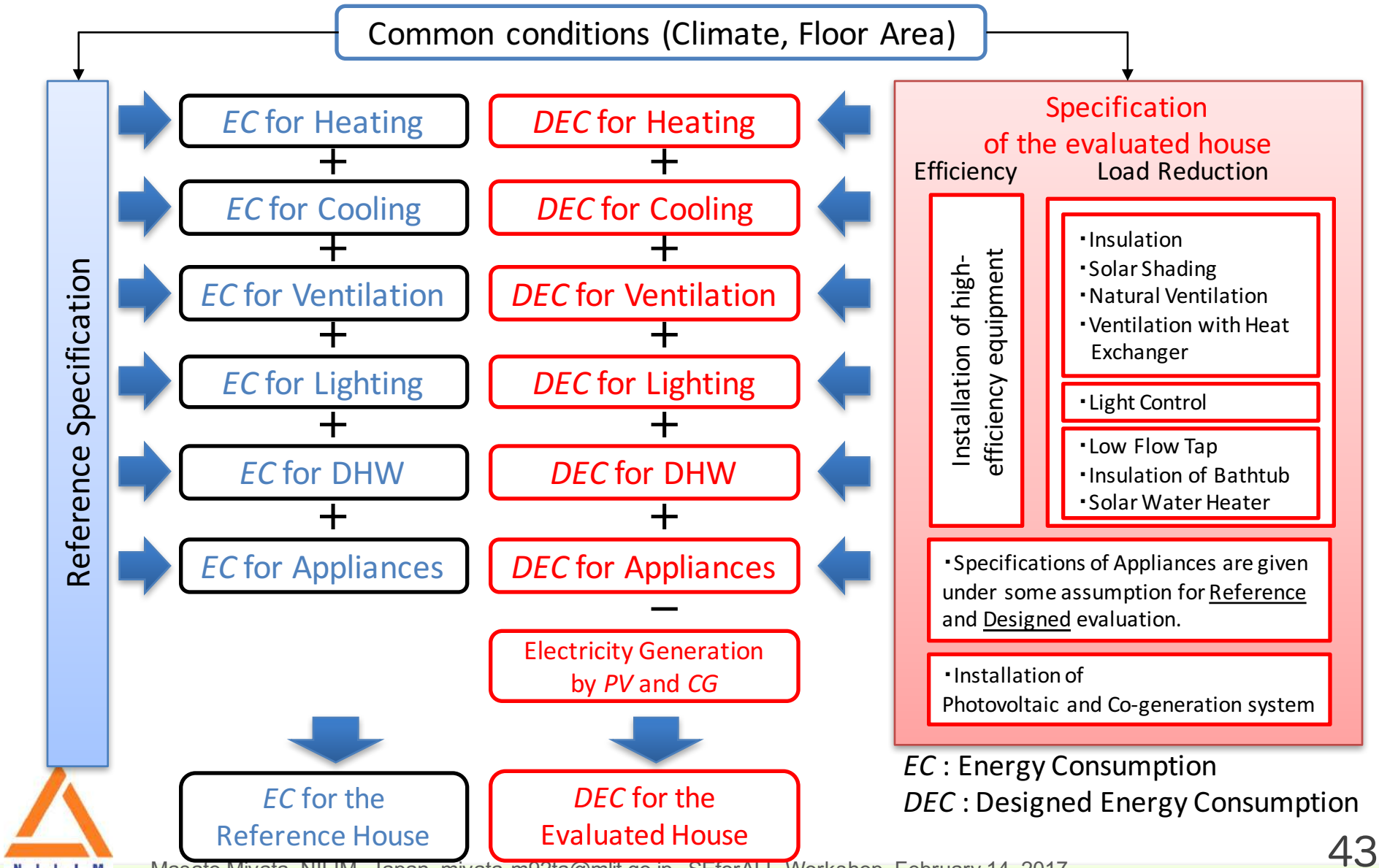


Example of H Coeff.

Outside Type	Crawl Space	Unit next door (apartment)
H Coeff.	0.7	0.05 or 0.15

Zone	1	2	3	4	5	6	7	8
Reference Value	0.46	0.46	0.56	0.75	0.87	0.87	0.87	—

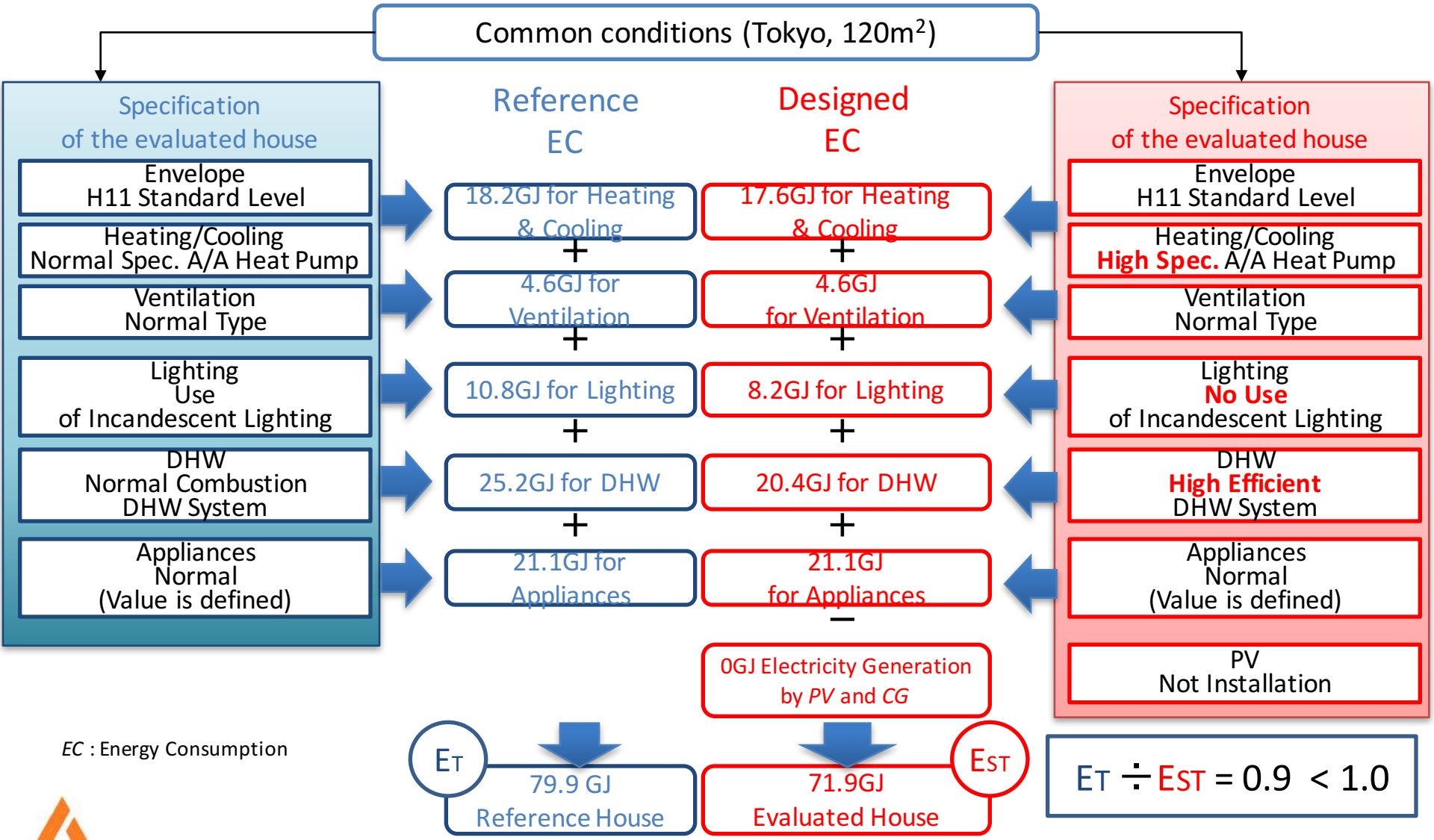
Flow of Calculation of Primary Energy Consumption for Residential House



EC : Energy Consumption

DEC : Designed Energy Consumption

Example of Evaluation (Residential House)



EC : Energy Consumption

Summary

- The building energy standard was revised in April 2013.
  - Primary energy consumption is needed as criterion index, in addition to envelope performance.

- Until 2020, compliance to the standard will be mandatory for all newly built buildings and housings.
  - From April 2017, compliance with the standard will be mandatory for large scale non-residential buildings.

- NILIM and BRI have developed the on-line calculation tools for the new energy standard and certification system.

Masato Miyata, NILIM, Japan, miyata-m92ta@mlit.go.jp, SEforALL Workshop, February 14, 2017

Reference A. Operation of Model Building Method Input Support Tool

1) Access method

The model building method input support tool is a Web program operated on the Web browser. First, visit the webpage of Building Research Institute, Japan and access the site entitled “Engineering Information Concerning Energy Consumption Performance of Buildings”. Press the button entitled “Use the Model building Method Input Support Tool Ver. 2.1” which is located in “5.1 Program and Explanation based on 2016 Energy Conservation Standards” of the above-mentioned site, and you can have access to the tool. You can also download the “model building method input sheet” for supporting the calculation from this site.

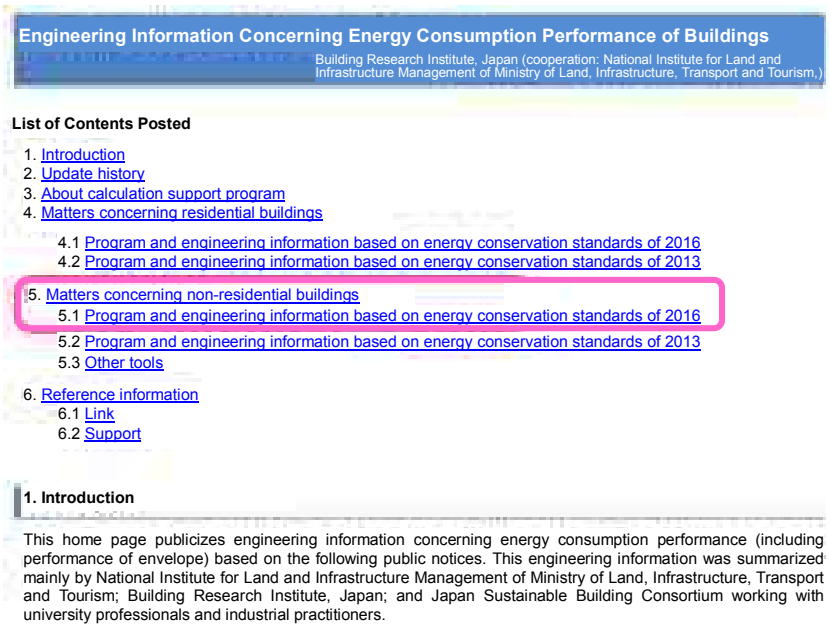


Fig. A.1 Engineering information site concerning energy consumption performance of buildings

http://www.kenken.go.jp/becc/indes.html

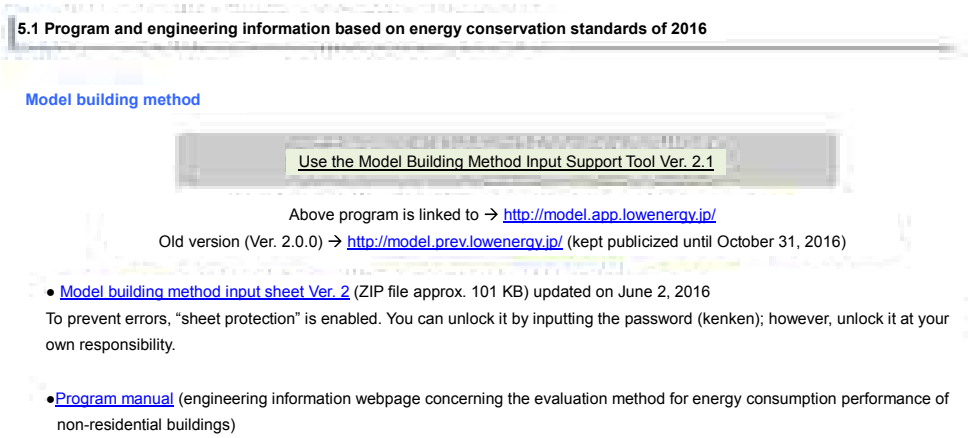


Fig. A.2 Access to the model building method input support tool

Use of the following browsers is recommended.

Internet Explorer®	Version 8 or later
Firefox®	Latest version
Google Chrome™	Latest version

With browsers other than the above, information may not be accurately reproduced. Confirm your Web browser and its version before using this tool.

When you access the tool, the “Licensing conditions” window is displayed. Read them carefully and press the “Consent to the licensing conditions” button only if you consent to them before using the tool.

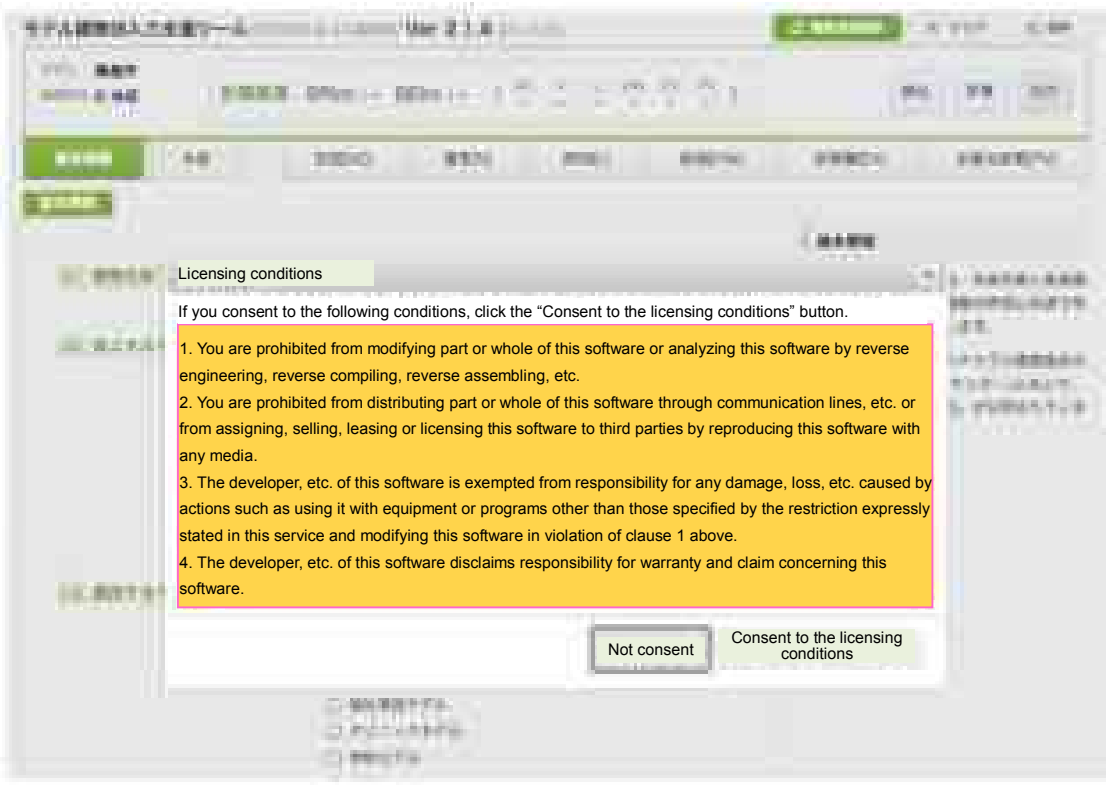


Fig. A.3 Licensing conditions

Model Building Method Input Support Tool

(For energy conservation standards of 2016) **Ver. 2.2.1** (October, 2016)

Total of multiple usages | Clear | Save

Model:
Offices
Category of region:
Region 6

Calculation result

Read | Calcu-late | Output

Basic information | Envelope | Air conditioning (AC) | Ventilation (V) | Lighting (L) | Hot water (HW) | Elevator (EV) | Photovoltaic power generation (PV)

Basic information

Building name

New building

Energy conservation standards category of region

- Region 1
- Region 2
- Region 3
- Region 4
- Region 5
- Region 6
- Region 7
- Region 8

Applicable model building

- Office model
- Business hotel model
- City hotel model
- General hospital model
- Welfare facility model
- Clinic model
- School model
- Kindergarten model
- University model
- Lecture hall model
- Large-scale store model
- Small-scale store model
- Restaurant model
- Meeting hall model
- Factory model

Calculation target area

Basic information

- Basic information used commonly for the evaluation of envelope performance and primary energy consumption of each facility is input into the “Basic information” tab.
- Japan Sustainable Building Consortium’s “Energy Conservation Support Center” publicizes “frequently asked questions and answers”.

Model Building Method Input Support Tool
(For energy conservation standards of 2016) **Ver. 2.2.1** (October, 2016)

Total of multiple usages | Clear | Save

Model:
Offices
Category of region:
Region 6

Calculation result

Read | Calcu-late | Output

Basic information | **Envelope** | Air conditioning (AC) | Ventilation (V) | Lighting (L) | Hot water (HW) | Elevator (EV) | Photovoltaic power generation (PV)

Building shape | External wall performance | **Window performance**

Evaluation of envelope performance: Not evaluate / Evaluate

Building shape

Building height

Number of stories

Total of floor height of each story

Length of outer perimeter

Length of building outer perimeter

Length of outer perimeter of non-air conditioning core

Direction

Direction of non-air conditioning core

- North
- East
- South
- West
- None

External wall performance

Area of external wall, roof and floor contacting outside air

External wall area, North

External wall area, East

Envelope

- Input envelope specifications of intended usage of calculation target building into the “Envelope” tab.
- The envelope means structures of the outer perimeter of a building, which include external walls, roof, floor contacting outside air (pilotis, etc.), and windows.
- Japan Sustainable Building Consortium’s “Energy Conservation Support Center” publicizes “frequently asked questions and answers”.

External wall area, South

External wall area, West

Roof area

Area of floor contacting outside air

Performance of external wall, roof and floor contacting and outside air

Average heat transmission coefficient of external wall

Average heat transmission coefficient of roof

Average heat transmission coefficient of floor contacting outside air

Window performance

Window area

Window area, North

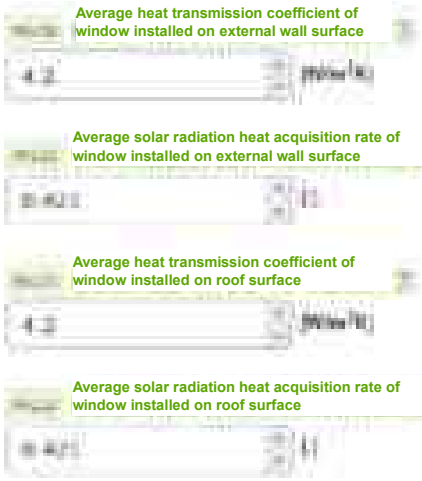
Window area, East

Window area, South

Window area, West

Area of window on roof surface

Window performance



Model Building Method Input Support Tool
(For energy conservation standards of 2016) **Ver. 2.2.1** (October, 2016)

Total of multiple usages | Clear | Save

Model:
Offices
Category of region:
Region 6

Calculation result

Read | Calcu-late | Output

Basic information | Envelope | Air conditioning (AC) | Ventilation (V) | Lighting (L) | Hot water (HW) | Elevator (EV) | Photovoltaic power generation (PV)

Heat source | Outside air processing

Evaluation of air conditioning facility

Not evaluate | Evaluate

Heat source

Heat source (cooling)

Main heat source (cooling)

- Water chilling unit (air cooling)
- Turbo refrigerator
- Screw refrigerator
- Absorption refrigerator
- District heat supply
- Packaged air conditioner (air cooling)
- Gas heat pump cooler and heater
- Room air conditioner
- Not used

Individual heat source ratio (cooling)

Input method of heat source capacity (cooling)

- Not specified
- Input values

Input method of heat source efficiency (cooling)

- Not specified
- Input values

Heat source (heating)

Main heat source (heating)

- Water chilling unit (air cooling)
- Absorption refrigerator
- Small once-through boiler
- Hot water generator
- District heat supply
- Packaged air conditioner (air cooling)
- Gas heat pump cooler and heater
- Room air conditioner
- Electric heater, etc.
- FF heater, etc.
- Not used

About air conditioning facilities

- Input specifications of air conditioning facilities located in the intended usage of the calculation target building into the “Air conditioning” tab.
- All of the air conditioning facilities installed in the intended usage of the calculation target building are subject to calculation.
- To evaluate air conditioning facilities, PAL6 to PAL23 of the “Envelope” tab also need to be input.
- Japan Sustainable Building Consortium’s “Energy Conservation Support Center” publicizes “frequently asked questions and answers”.

Individual heat source ratio (heating)

[redacted] (%)

Input method of heat source capacity (heating)

- Not specified
- Input values → [redacted]

Input method of heat source efficiency (heating)

- Not specified
- Input values → [redacted]

Outside air processing

Total heat exchanger

Availability of total heat exchanger

- Not available
- Available

Stoppage of air-intake when pre-heating

Stoppage of air-intake when pre-heating

- Not available
- Available

Carriage control

Secondary pump

Variable flow rate control of secondary pump

- Not available
- Available

Air conditioner

Variable air flow control of air conditioner fan

- Not available
- Available

Model Building Method Input Support Tool
(For energy conservation standards of 2016) **Ver. 2.2.1** (October, 2016)

Total of multiple usages | Clear | Save

Model:
Offices
Category of region:
Region 6

Calculation result

Read | Calcu-late | Output

Basic information | Envelope | Air conditioning (AC) | **Ventilation (V)** | Lighting (L) | Hot water (HW) | Elevator (EV) | Photovoltaic power generation (PV)

Room usage "Machine room" | Room usage "Bathroom" | Room usage "Parking lot" | Room usage "Kitchen"

Evaluation of machine ventilation facility
○ Not evaluate ● Evaluate

Room usage "Machine room"

Availability of mechanical ventilation facility

Availability of mechanical ventilation facility
○ Not available
● Available

Ventilation system

Ventilation system
● Class 1 ventilation system
○ Class 2 or Class 3 ventilation system

Motor output

Input system for motor output
○ Not specified
● Input motor output per unit air volume

Control system

Availability of high-efficiency motor
○ Not available
● Available

Availability of air volume control
○ Not available
● Available

Room usage "Bathroom"

Availability of mechanical ventilation facility

Availability of mechanical ventilation facility
○ Not available
● Available

Ventilation system

Ventilation system
○ Class 1 ventilation system
● Class 2 or Class 3 ventilation system

About ventilation facilities

- Input specifications of mechanical ventilation facilities located in the intended usage of the calculation target building into the "Ventilation" tab.
- The mechanical ventilation facilities installed in the "machine room", "bathroom", "kitchen" and "parking lot" in the intended usage of the calculation target building are subject to calculation. However, input is not necessary for the room usages which do not exist.
- Japan Sustainable Building Consortium's "Energy Conservation Support Center" publicizes "frequently asked questions and answers".

Motor output

Input system for motor output

- Not specified
- Input motor output per unit air volume

Control system

Availability of high-efficiency motor

- Not available
- Available

Availability of air volume control

- Not available
- Available

Room usage “Parking lot”

Availability of mechanical ventilation facility

Availability of mechanical ventilation facility

- Not available
- Available

Room usage “Kitchen”

Availability of mechanical ventilation facility

Availability of mechanical ventilation facility

- Not available
- Available

Model Building Method Input Support Tool

(For energy conservation standards of 2016) **Ver. 2.2.1** (October, 2016)

Total of multiple usages | Clear | Save

Model:
Offices
Category of region:
Region 6

Calculation result

Read | Calcu-late | Output

Basic information | Envelope | Air conditioning (AC) | Ventilation (V) | **Lighting (L)** | Hot water (HW) | Elevator (EV) | Photovoltaic power generation (PV)

Room usage “Office”

Evaluation of lighting facility

Not evaluate | Evaluate

Room usage “Office”

Availability of lighting facility

Availability of lighting facility

Not available

Available

Electric power consumption

Input method for electric power consumption

Not specified

Input values

Control system, etc.

Occupancy detection control

Not available

Available

Brightness detection control

Not available

Available

Time schedule control

Not available

Available

Initial illuminance correction function

Not available

Available

About lighting facilities

- Input the specifications of the lighting facilities located in the intended usage of the calculation target building into the “Lighting” tab.
- The lighting facilities installed in the room for the main intended room usage specified for each intended building usage are subject to calculation.
- Japan Sustainable Building Consortium’s “Energy Conservation Support Center” publicizes “frequently asked questions and answers”.

Model Building Method Input Support Tool

(For energy conservation standards of 2016) **Ver. 2.2.1** (October, 2016)

Total of multiple usages | Clear | Save

Model:
Offices
Category of region:
Region 6

Calculation result

Read | Calcu-late | Output

Basic information | Envelope | Air conditioning (AC) | Ventilation (V) | Lighting (L) | **Hot water (HW)** | Elevator (EV) | Photovoltaic power generation (PV)

"Face-wash, hand-wash" usage | "Bathroom" usage | "Kitchen" usage

Evaluation of hot water supply facility

Not evaluate | **Evaluate**

"Face-wash, hand-wash" usage

Availability of hot water supply facility

Availability of hot water supply facility

- Not available
- Available

Hot water supply facility specifications

Input method for heat source efficiency

- Not specified
- Input values

Pipe heat retention specifications

- Bare pipe
- Heat retention specification 2 or 3
- Heat retention specification 1

Hot water saving equipment

- Not available
- Automatic hot water supply faucet

"Bathroom" usage

Availability of hot water supply facility

Availability of hot water supply facility

- Not available
- Available

"Kitchen" usage

Availability of hot water supply facility

Availability of hot water supply facility

- Not available
- Available

About hot water supply facilities

- Input the specifications of the hot water supply facilities in the intended usage of the calculation target building into the "Hot water" tab.
- The hot water supply facilities for "face-wash, hand-wash", "bathroom", and "kitchen" in the intended usage of the calculation target building are subject to calculation. However, input is not necessary for the room usages which do not exist.
- Japan Sustainable Building Consortium's "Energy Conservation Support Center" publicizes "frequently asked questions and answers".

Model Building Method Input Support Tool

(For energy conservation standards of 2016) **Ver. 2.2.1** (October, 2016)

Total of multiple usages | Clear | Save

Model:
Offices
Category of region:
Region 6

Calculation result

Read | Calcu-late | Output

Basic information | Envelope | Air conditioning (AC) | Ventilation (V) | Lighting (L) | Hot water (HW) | **Elevator (EV)** | Photovoltaic power generation (PV)

Input for elevator

Availability of elevator

Availability of elevator

- Not available
- Available

Speed control system

Speed control system

- AC feedback control, etc.
- Variable voltage, variable frequency control system (without regeneration)
- Variable voltage, variable frequency control system (with regeneration)

Model Building Method Input Support Tool

(For energy conservation standards of 2016) **Ver. 2.2.1** (October, 2016)

Total of multiple usages | Clear | Save

Model:
Offices
Category of region:
Region 6

Calculation result

Read | Calcu-late | Output

Basic information | Envelope | Air conditioning (AC) | Ventilation (V) | Lighting (L) | Hot water (HW) | Elevator (EV) | **Photovoltaic power generation (PV)**

Input for photovoltaic power generation facility | Panel 1 | Panel 2 | Panel 3 | Panel 4

Availability of photovoltaic power generation facility

Availability of photovoltaic power generation facility

- Not available
- Available

About photovoltaic power generation facilities

- Input the specifications of the photovoltaic power generation facilities located in the intended usage of the calculation target building into the “Photovoltaic power generation” tab.