Green Building Code in Thailand

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Department of Alternative Energy Development and Efficiency (DEDE)

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กระทรวงพลังงาน
MINISTRY OF ENERGY

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Building Code in Thailand

Department of Alternative Energy Development and Efficiency MINISTRY OF ENERGY		TGBI Thai Green Building Institute สถาบันอาคารเขียวไทย
Energy	Safety & Environment	Energy, Environment Innovation, Material Management
Ministry of Energy	Ministry of Interior	Thai Green Building Institute
Energy Conservation and Promotion Act.	Building Control Act.	Thai's Rating of Energy & Env. Sustainability (**TREES**)

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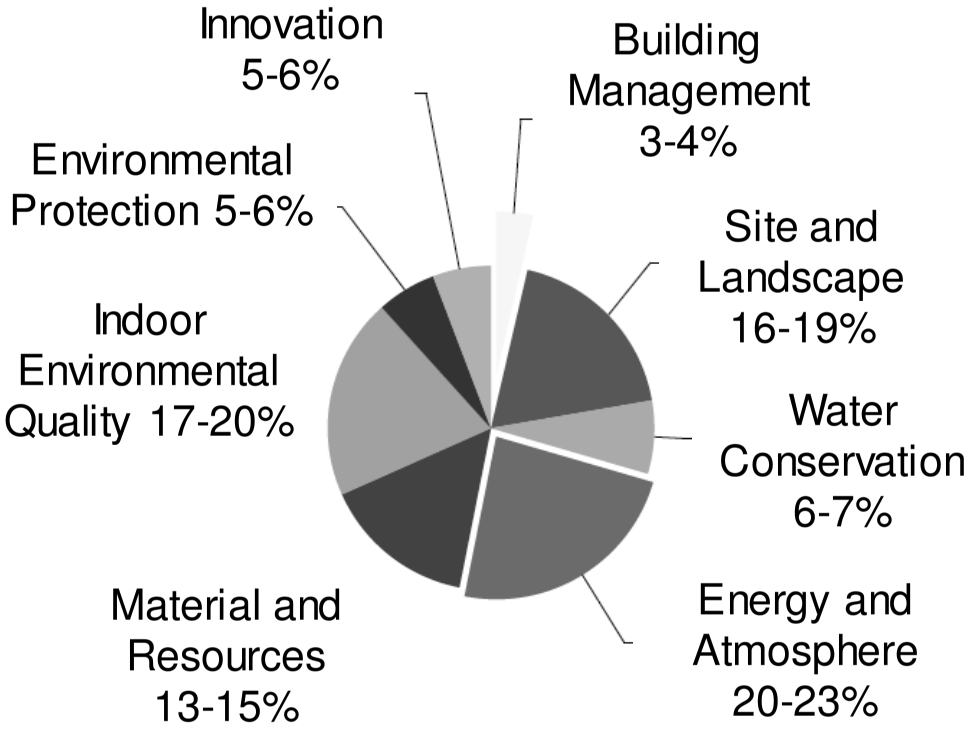
TREES



Platinum	> 61
Gold	46-60
Silver	38-45
Certified	30-37

ขั้นตอนการออกแบบแบบอาคารใหม่
New Building Design Procedures

แบบร่าง Prelim → การทำแบบก่อสร้าง Construction Drawing → การขออนุญาต Building Permission → การก่อสร้าง Construction → อาคารแล้วเสร็จ Construction Complete → ใช้งานจริง Operation

การลงทะเบียนกับ TGBI TGBI Registration	การยื่นแบบเพื่อประเมินขั้นต้น Design Submittals	การยื่นเอกสารทั้งหมด Construction Submittals การรับรอง TREES-NC จาก TGBI TGBI Approval

TGBI
Thai Green Building Institute
สถาบันอาคารเขียวไทย

www.tgbi.or.th

Building Control Act

- **Structure**
- **Fire Safety**
- **Plumbing**
- **Lighting**
- **Air Quality**
- **Materials**
- **Public Health**
- **Waste Management, etc…**

but no Energy

www.dpt.go.th

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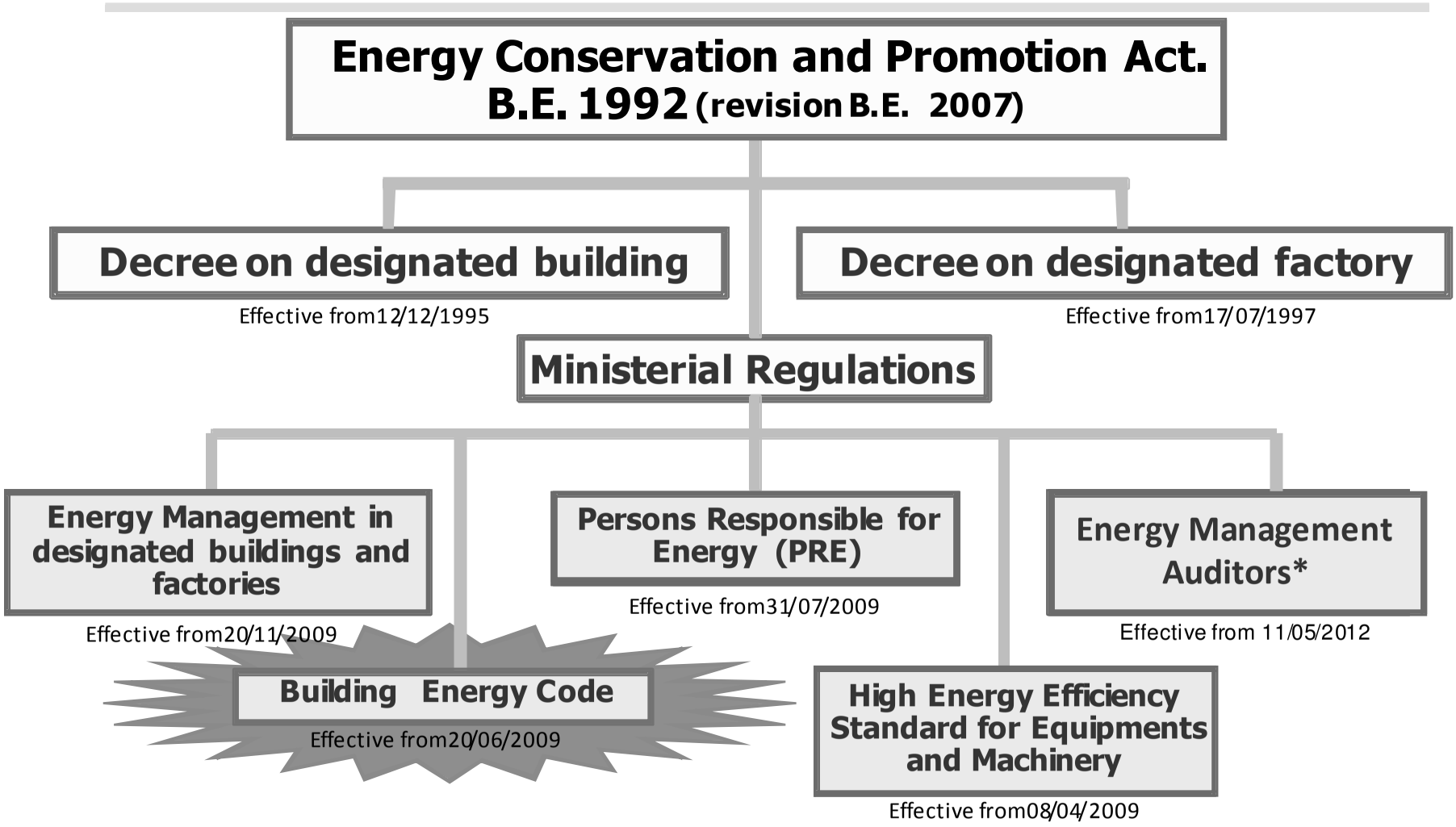
Development of Thailand BEC

Mid 1980s	**Study of BEC by energy research group under US & ASEAN Cooperation Program**	Guideline to develop BEC in Thailand and ASEAN
1995	**First mandatory BEC for designated buildings under ECP Act.**	Apply for existing and new buildings
2002	**A study project to revise existing BEC with the assistance from DANIDA**	Focus on codes improvement and target sector
2009	**Announcement of new BEC under the Energy Ministerial Regulation**	Apply for new & retrofitted buildings
	Fully enforcement in 2010	

EE Legal Framework



Building Energy Code (BEC)

Building Energy Code

"New or retrofitted building with total area in all stories in the same building ≥ 2,000 m^2 must be designed to comply with Building Energy Code"

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Targeted Building

9 types of building

Hospital

Academic Institute

Office

Condominium

Exhibition Building

Theater

Hotel

Entertainment Service

Department Store

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Building Code Components

1. Building Envelope

2. Lighting system

3. Air-conditioning system

4. Hot water generating system

5. Renewable energy utilization

6. Whole building performance

Building Energy Code

1. Building Envelope

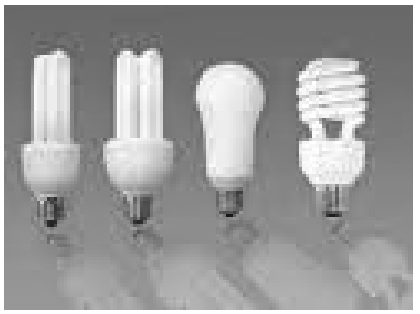
	Maximum OTTV/RTTV value	
	Wall	Roof
Office & Academic Institution	50 w/m²	15 w/m²
Super store	40 w/m²	12 w/m²
Hotel & Hospital	30 w/m²	10 w/m²

* OTTV = Overall Thermal Transfer Value
** RTTV = Roof Thermal Transfer Value

Building Energy Code

2. Lighting System

Allowable rated power



Office & Academic Institution	≤ 14 w/m²
Super store	≤ 18 w/m²
Hotel & Hospital	≤ 12 w/m²

$$LPD_a = \frac{\sum_{i=1}^{n}(A_i)(LPD_i)}{\sum_{i=1}^{n} A_i}$$

* Not include parking area

3. Air-conditioning System

- Apply for small and large size of A/C system
- All energy performance requirement is set by announcement of Energy Minister

Small size A/C : Spilt type

Size of A/C (Watt)	COP (Watt/Watt)	EER (Btu/hr/watt)
Less than 12,000	3.22	11

3. Air-conditioning System

Large size A/C : Chiller

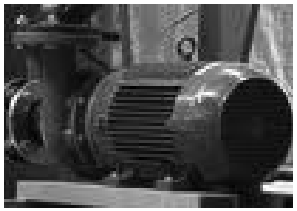
Type of Chiller		Cooling Capacity (ton refrigeration)	KW/TR
Cooling system	Compressor type		
Air-cooled	all types	< 300	1.33
		> 300	1.31
Water-cooled	Reciprocating	all sizes	1.24
	Rotary, Screw, Scroll	< 150	0.89
		> 150	0.78
	Centrifugal	< 500	0.78
		> 500	0.62

3. Air-conditioning System

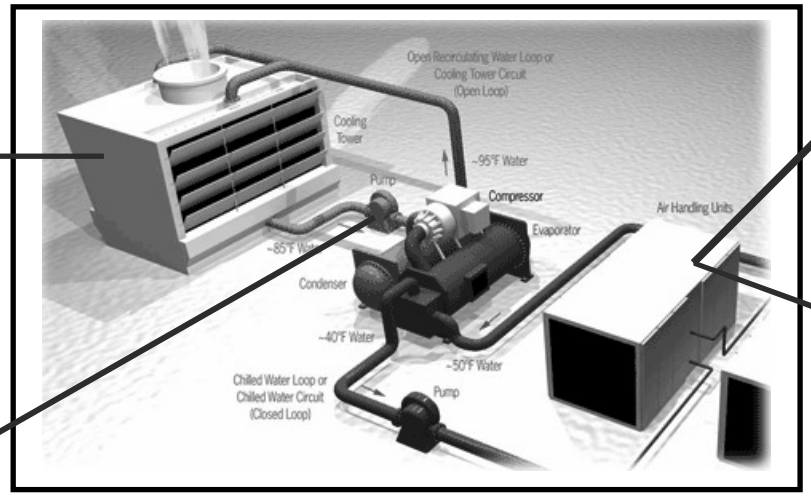
Large size A/C : Other parts

The air-handling system, condenser water cooling system, and chilled water transport system shall be considered to comply with the requirement, if taken together, the rated coefficient of performance must not exceed 0.5 kW/TR

Cooling Tower



Pump



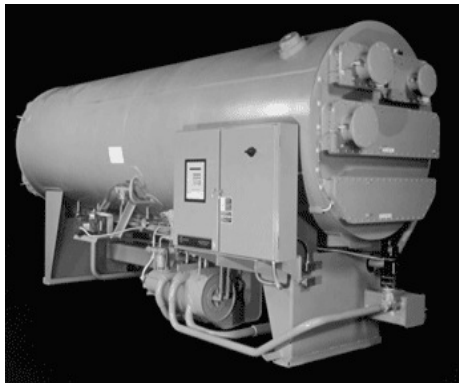
AHU

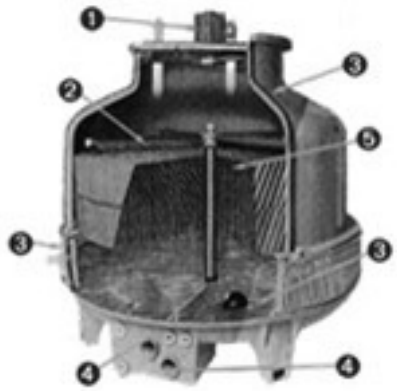
Fan-coil unit

3. Air-conditioning System

Large size A/C : Absorption Chiller

Type of Absorption Chiller	COP
Single effect absorption chiller	0.65
Double effect absorption chiller	1.10





4. Hot water generating System

Steam Boiler/Hot water Boiler

Type	Min. Eff.
Oil fired steam boiler	85
Oil fired hot water boiler	80
Gas fired steam boiler	80
Gas fired hot water boiler	80

4. Hot water generating System

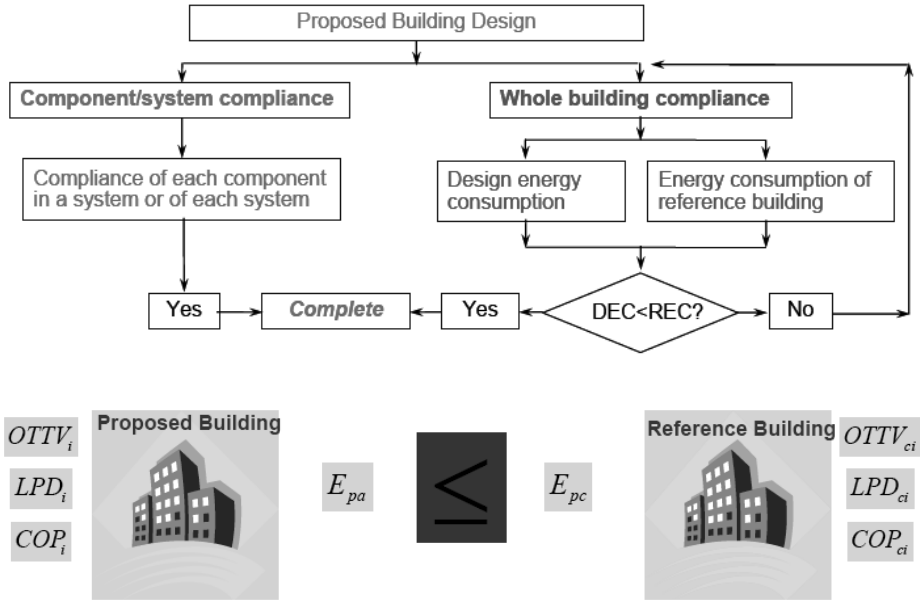
Air-source heat pump water heater

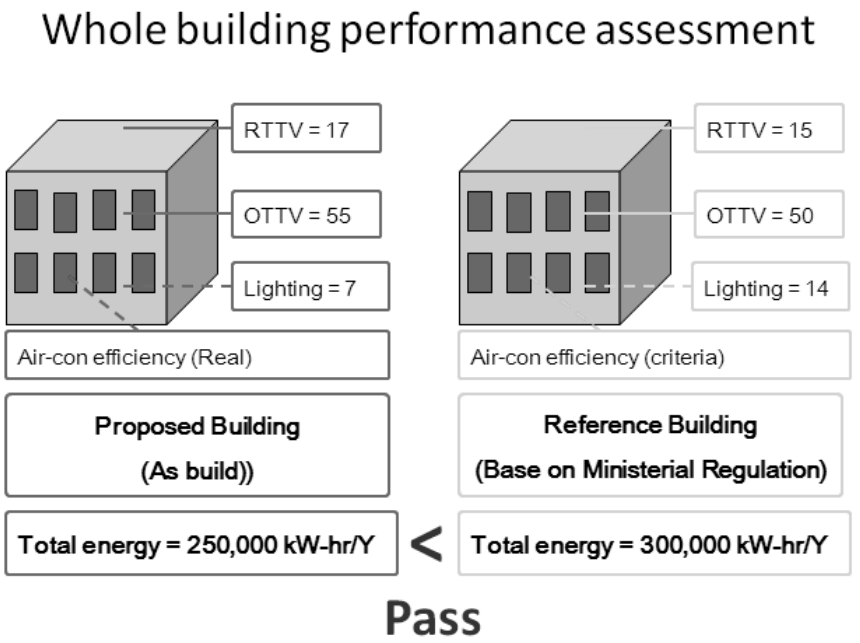
NO.	Rated condition	°C	Min. COP
1	Incoming water temp. Outgoing water temp. Air temp.	30 50 30	3.5
2	Incoming water temp. Outgoing water temp. Air temp.	30 60 30	3.0

Building Energy Code

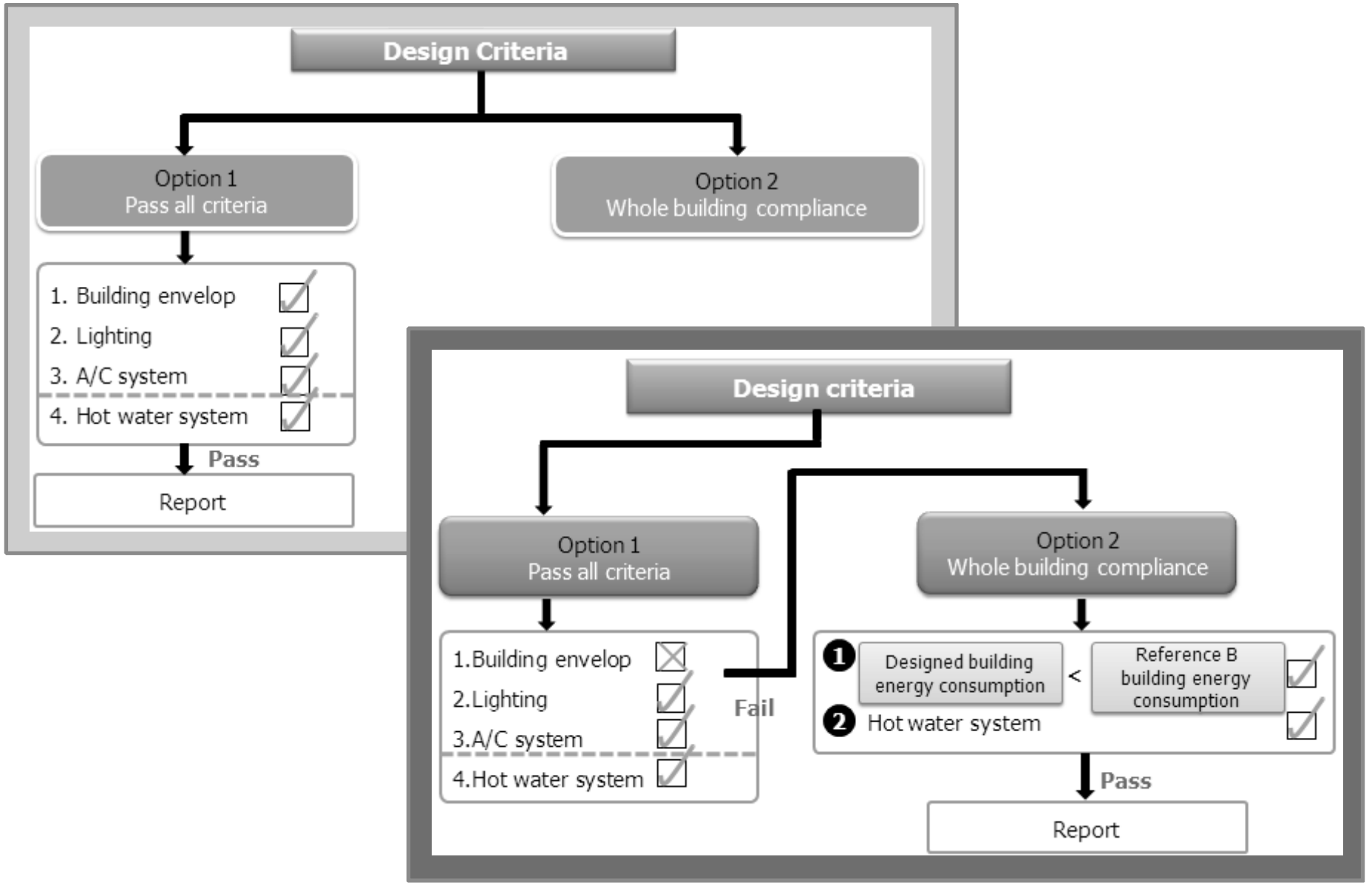
5. Whole building performance

- **The building which fails to comply with any one of major codes (Building envelope, Lighting system, A/C system, Hot water system) has to comply for the <u>whole building performance</u>**
- **The overall energy consumption of the proposed building must less than the overall consumption of reference building**





Passing Criteria

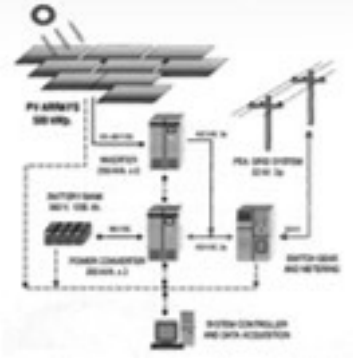


6. Use of Renewable Energy

- **Accreditation is given for use of solar energy through application of…**

- **Use of Day-lighting can be taken as a credit for the reduction of lighting equipments in lighting system under the following conditions;**
  - **Dedicated lighting control switches for luminaries covering area within 1.5 times height of window**
  - **Glass with effective shading coefficient not less than 0.3**
  - **Light to solar gain more than 1.0**

- **Energy generated from Solar used in the building can be taken as a credit for the reduction in whole building performance**



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BEC Coordination Centre

- Building Design Coordination Centre for Energy Conservation @ DEDE (Establised Oct. 2010)

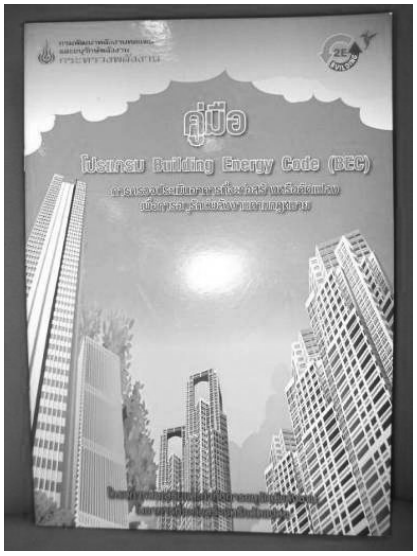
Services

- Evaluate building blueprint for compliance of building energy code
- Provide consultation and advice on energy efficiency building design
- Provide information and knowledge on energy efficiency building design

Supporting Materials

- Develop a computer program for code compliance evaluation / Handbooks
- Web site as a news and information centre on building energy code

Program **Handbook** **www.2e-building.com**



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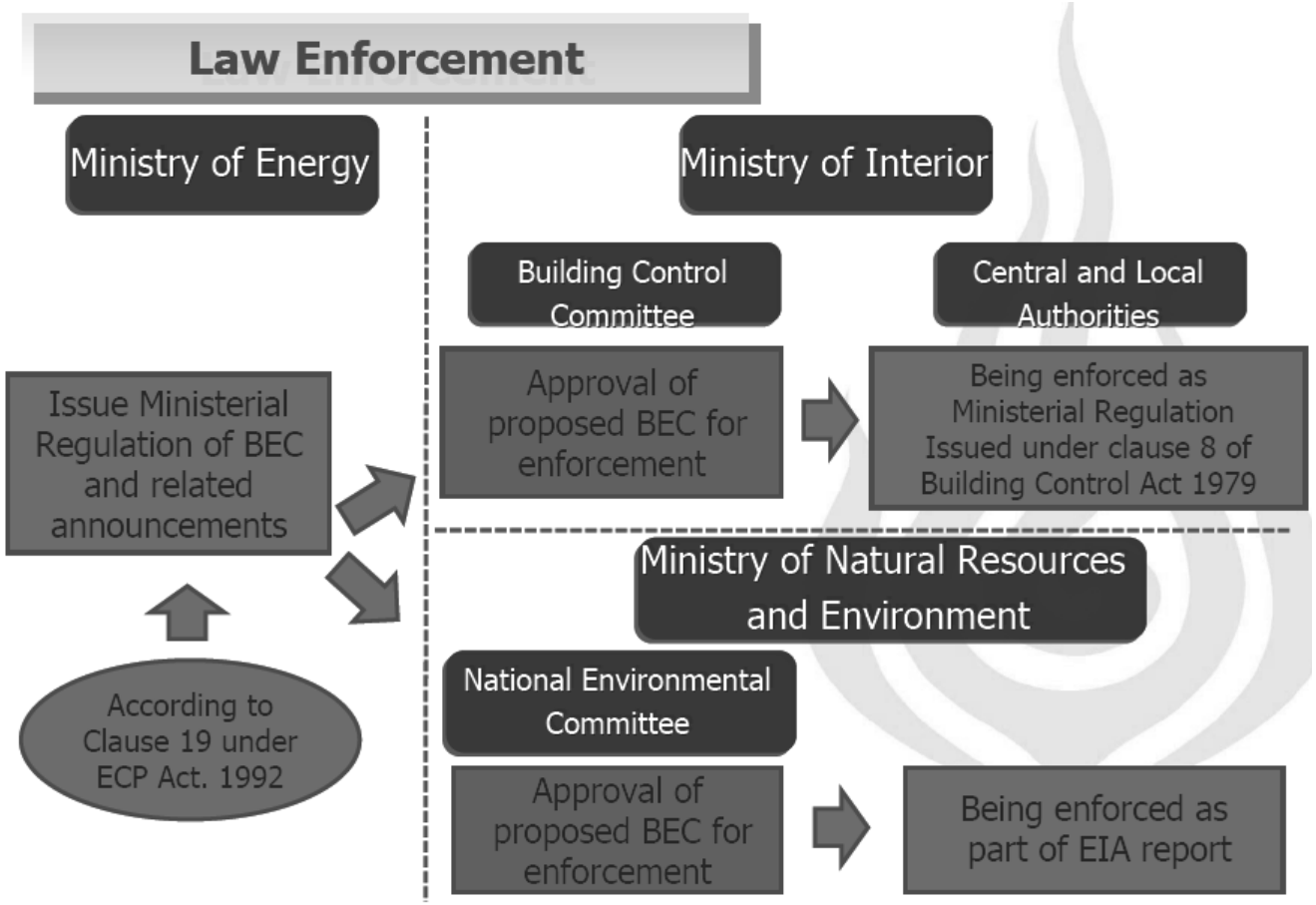
Training for Building Designer

18 trainings (>1,000 participants mostly architect and engineer)

Law Enforcement

- Coordinating with Ministry of Interior (Building Control Act.) and Ministry of Natural Resources and Environment (EIA) for enforcement



Barriers / Solutions

Law Enforcement	1. Review the Act. > Give Authority 2. Try more with MoI.
Seek Cooperation	1. MoNRE on EIA 2. Cabinet Resolution on Government Building
Weak Code	Revise and Strengthen Passing Criteria
Promotion / Awareness	Incentive / Education, Capacity Building

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