

Buildings Energy Efficiency Ordinance and related Regulations

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Green Buildings and Energy Management Conference
8 Apr 2017, University of Hong Kong

COP 21

*Keep warming “**well below 2 degrees Celsius**”. Continue all efforts to limit the rise in temperatures to **1.5 degree Celsius**”*

Migration Action in HK

ENERGY SAVING PLAN

For Hong Kong's Built Environment
2015~2025+

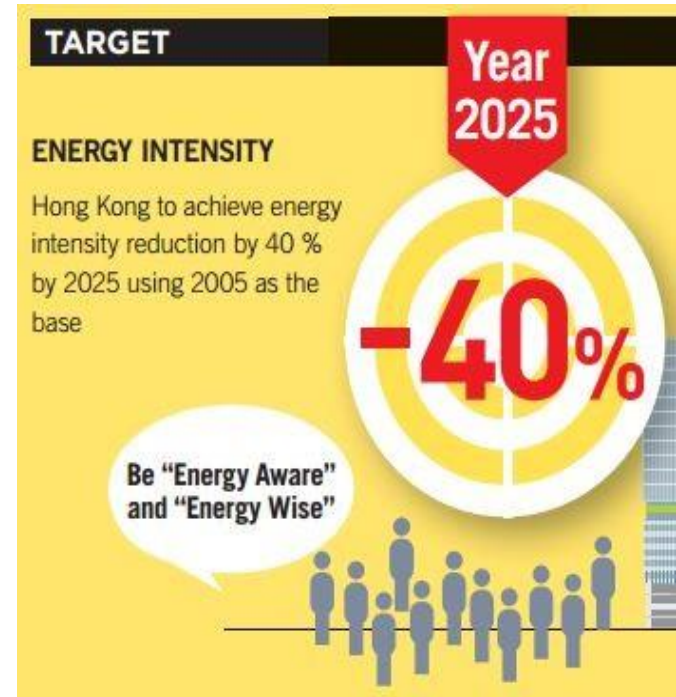


Environment Bureau in collaboration with
Development Bureau
Transport and Housing Bureau
May 2015



January 2017

www.climate-ready.gov.hk



Road Map on Energy Efficiency

ENERGY LABEL
能源標籤

機電工程署 EMSD

Established Energy Efficiency Office under EMSD

1994

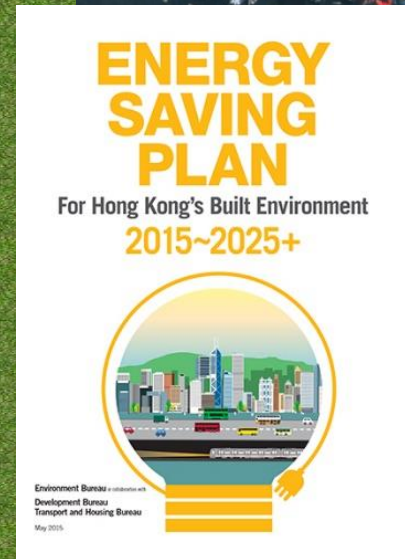
ENERGY LABEL 能源標籤	
more efficient 效益較高	Grade 1
2	
3	
4	
5	
less efficient 效益較低	
Annual Energy Consumption (kWh/year) 全年耗電量 (千瓦時/年)	250
Washing Capacity (kg) 洗衣容量 (公斤)	5
Water Consumption (litre) 耗水量 (公升)	72
Washing Machine 品牌	ABC
Model 型號	W1234
Reference Number/Year 資料提供日期	980123/2008
Information Provider 資料提供者	XYZ
機電工程署 EMSD	

Enacted BEEO and EELPO

Voluntary Scheme on Energy Labelling and Building Energy Efficiency

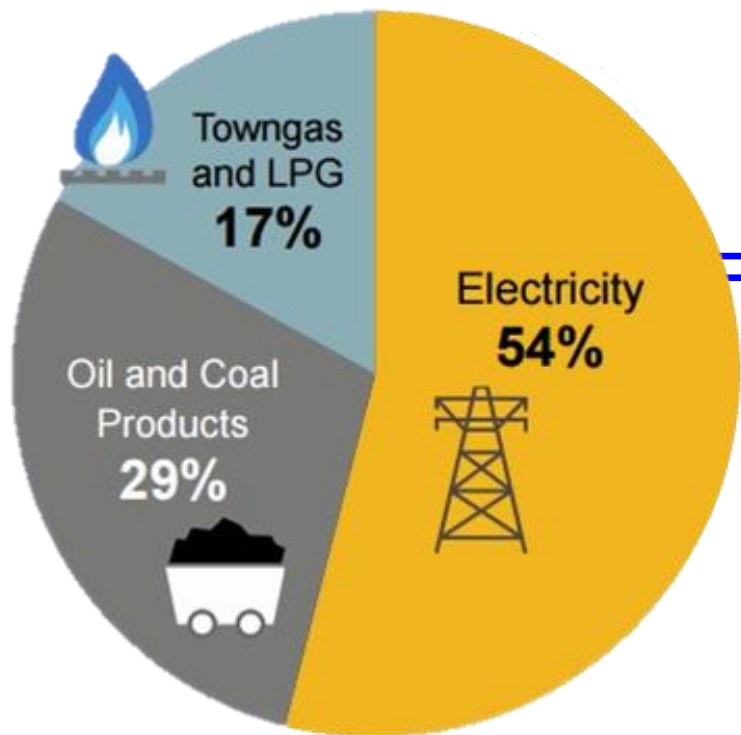


Implementation of DCS



Energy Consumption in HK

Buildings Consume **90%** of the City's Electricity.



Commercial
66%

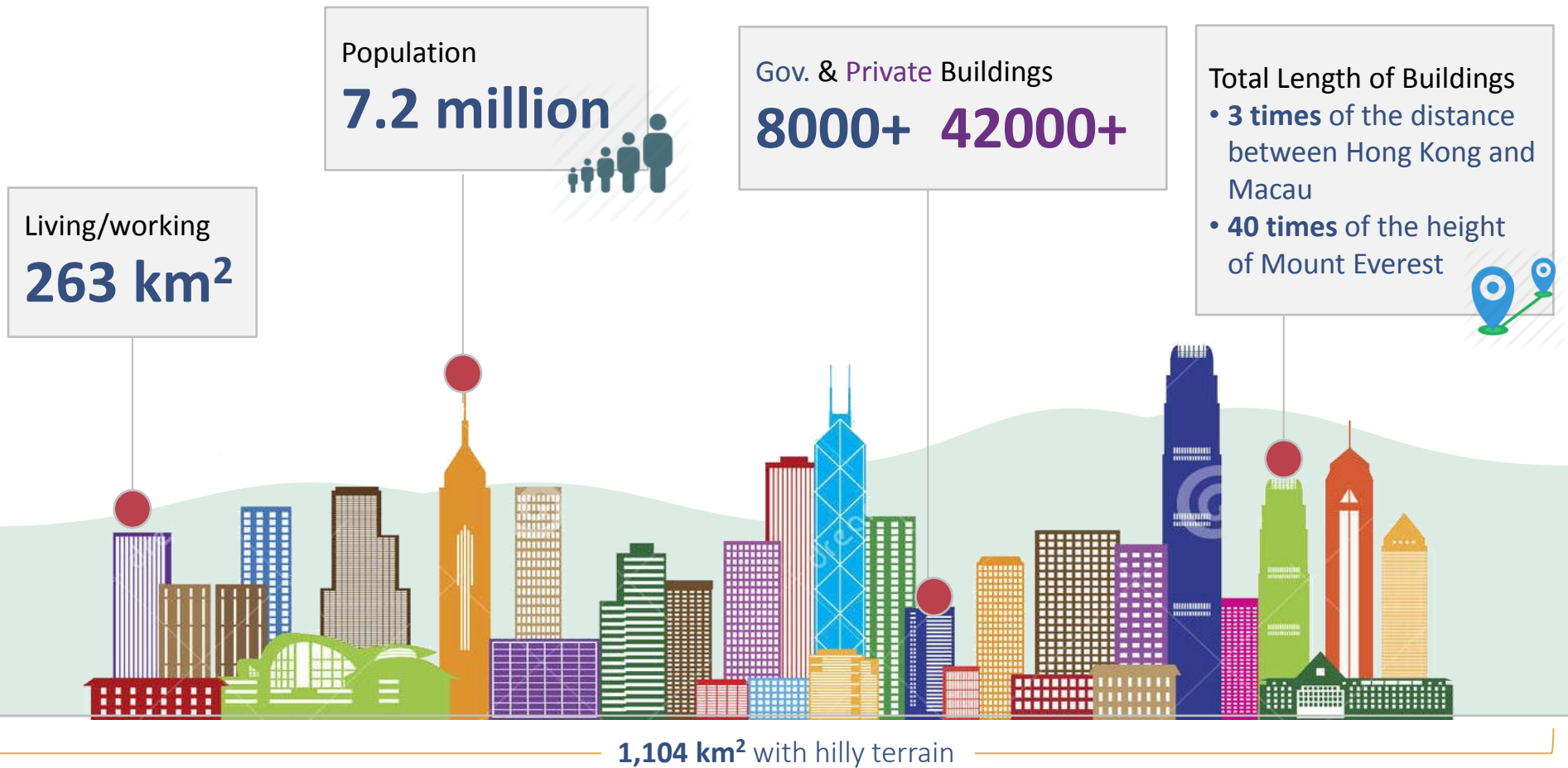


Residential
26%



Industrial and others
8%

Hong Kong Situation



Buildings Stock in Hong Kong



New Buildings – 500 buildings/year



Existing Buildings

Over 65% of Buildings with age over 20 years

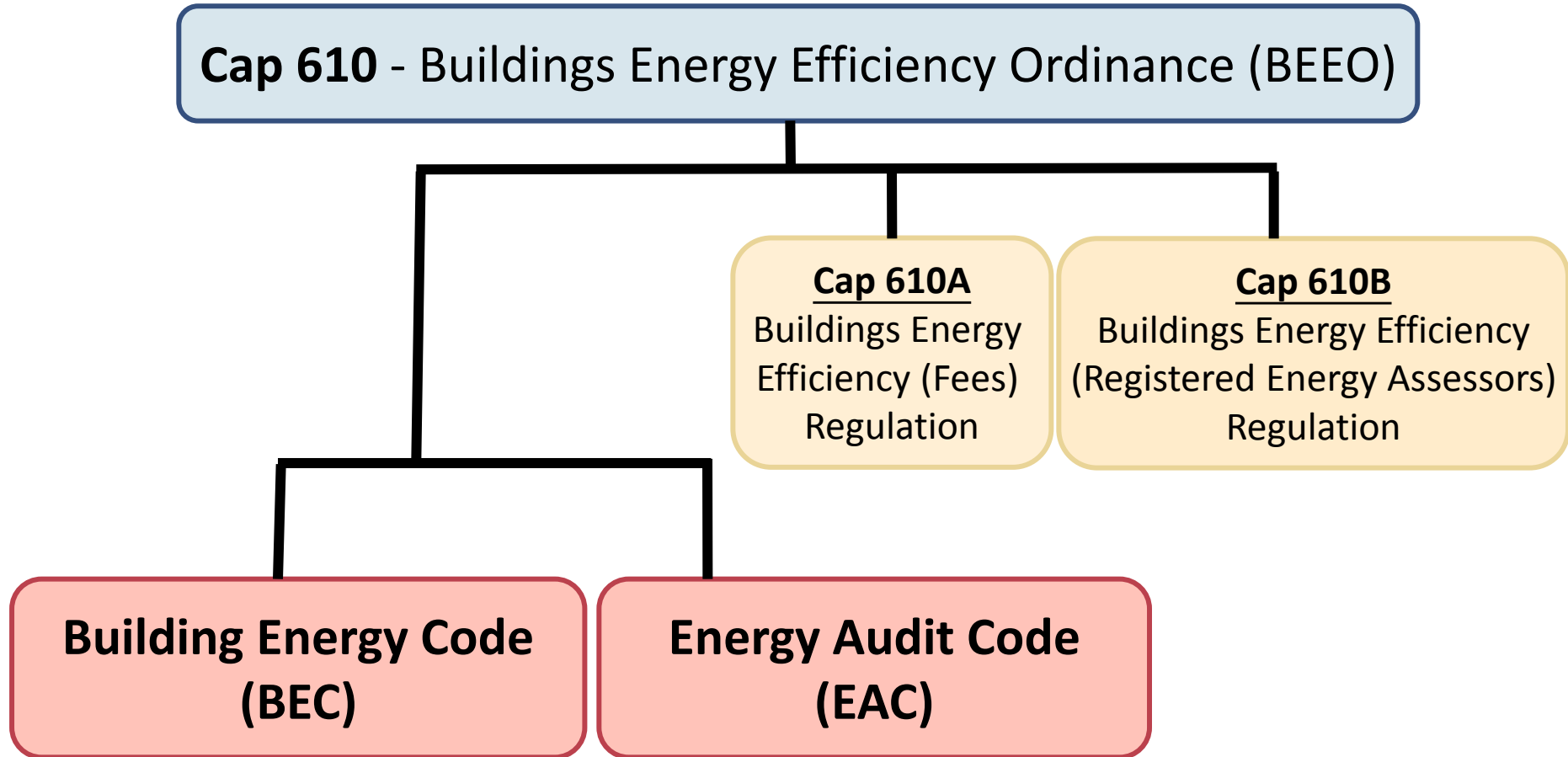
Age	No. of Buildings
<10	5814 (14%)
10-19	8569 (20.6%)
20-29	11148 (26.7%)
30-39	6688 (16.1%)
40-49	5712 (13.7%)
>50	3690 (8.9%)

Buildings Energy Efficiency Ordinance

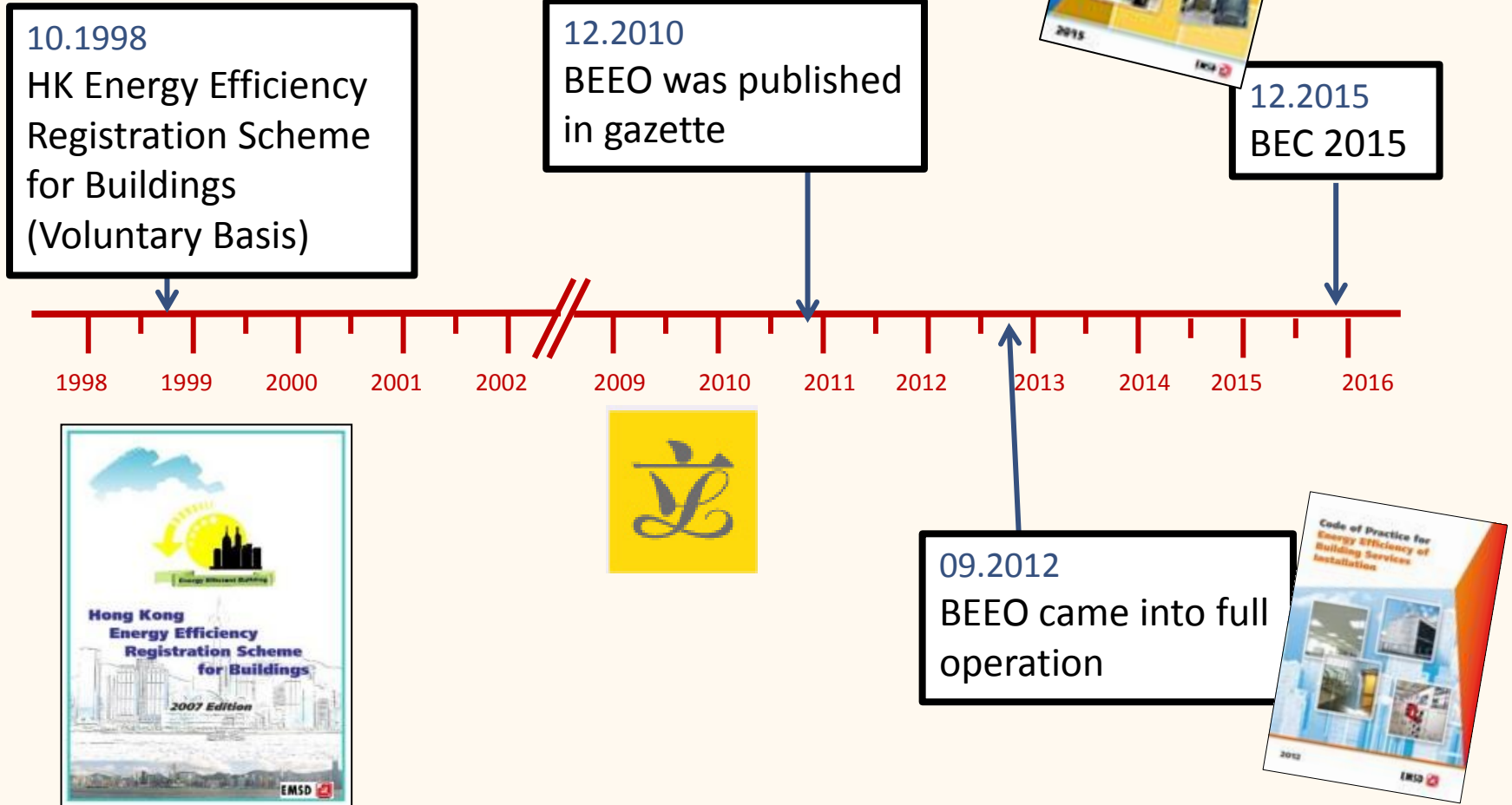
✓ Full Implementation on 21 September 12

The infographic features a central blue building illustration. At the top left, there is a logo for 'Energy Saving for All 2013' and the text '全民節能 全民節能 Energy Saving for All 2013'. To the right of this is the logo for the '機電工程署 EMSD' (Electrical and Mechanical Services Department). Further right are three language selection buttons: 'ENG', '繁體', and '简体'. The main title '《建築物能源效益條例》' is written in large blue characters, with 'The Buildings Energy Efficiency Ordinance' written below it in a smaller font. Five callout boxes are connected to the building by white lines: 1. '空調裝置 Air-conditioning installation' (pink box) pointing to the top of the building. 2. '電力裝置 Electrical installation' (yellow box) pointing to the base of the building. 3. '照明裝置 Lighting installation' (purple box) pointing to the interior ceiling of the building. 4. '升降機及自動梯裝置 Lift & escalator installation' (blue box) pointing to a lift shaft. 5. 'Energy Audit Form 能源審核表格' (blue box) pointing to a document icon. In the bottom right corner, there is a red logo with a white stylized figure.

BEEO Regulation Framework



Milestone of the BEEO



Framework of the Ordinance

Energy Efficiency Standards

- | | |
|------------------------------|---|
| • Hotel & guesthouse | • Commercial building |
| • Educational building | • Industrial building – common area |
| • Community building | • Residential building – common area |
| • Municipal services | • Composite building – |
| • Hospital & clinic | – commercial portion |
| • Government building | – common area of portion for residential or industrial use |
| • Airport passenger building | |
| • Railway station | |

Energy Audit

- Commercial building
- Composite building – commercial portion



BEEO – The 3 Major Requirements

Code of Practice for Energy Efficiency of Building Services Installation



(1) Newly constructed buildings

- Obtain **Certificate of Compliance Registration (COCR)** from EMSD

(2) Major retrofitting works in existing buildings

- Obtain **Form of Compliance (FOC)** from REA

Code of Practice for Building Energy Audit



(3) Energy Audit in commercial buildings

- Identify **Energy Management Opportunities (EMO)** and **Energy Utilization Index (EUI)**

(1) Newly Constructed Buildings

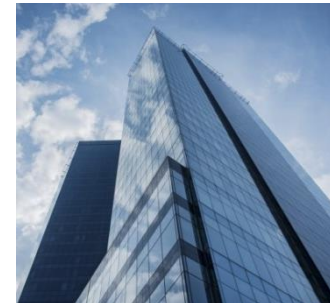
Stage One Declaration

- Developer engage **Registered Energy Assessor (REA)** to submit declaration **2 months after** obtaining consent to commencement of building works (開工紙)
- To declare the design of major building services installation to comply with the BEC



Stage Two Declaration

- Developer engage **REA** to submit declaration **4 months after** the Occupation Permit (完工紙) is issued.
- To confirm the energy efficiency requirements complying BEC




(2) Major retrofitting works in existing buildings

Works Area




Addition/replacement of a BS installation:

- total floor area covered by the works (i.e. works area) $\geq 500 \text{ m}^2$ in a unit or a common area



Central BS installation (CBSI)

Addition/replacement of **main component**:

 electrical circuit $\geq 400\text{A}$	 A/C installation $\geq 350\text{kW}$	 motor drive + mechanical drive
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OR



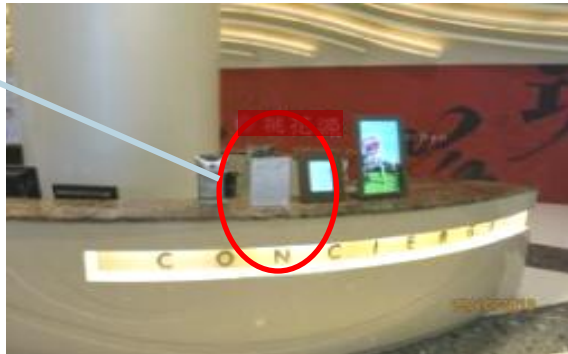
2 months

(3) Energy Audit

- ✓ From Registered Energy Assessor (REA)
- ✓ Energy Audit Report with Energy Utilization Index (kWh/m²/annum)

Energy Audit Form

To be exhibited at building main entrance



EMO

- Cat 1
- Cat 2
- Cat 3

- ✓ Identification of Energy Management Opportunities (EMO) for consideration of client department



Building CBSI (built-in equipment)



Lighting Installation



Electrical Installation

Air-conditioning Installation



Lift and Escalator Installation



Lighting Installation

Key Update on BEC2015

1. Tighten the LPD requirement (W/m^2)
2. New Requirement on Automatic Lighting Control



Occupant Sensing Control



Lower the
curtain or
insufficient
sunlight



Daylight Responsive Control

Electrical Installation

Key Update on BEC2015

1. Upgrade the motor efficiency (**IEC Motor**)
2. **Separate metering device** for major BSI (e.g. chiller plant, heat pump plant, lift and escalators)



Air-conditioning Installation

Key Update on BEC2015



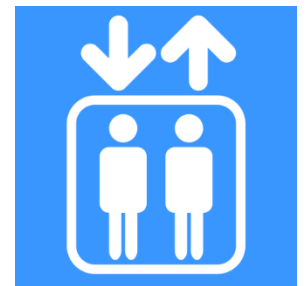
Air-conditioning
Installation

1. Tighten the Coefficient of Performance (**CoP**)
2. Introduction of chiller **part load** performance
3. Adoption of **Variable speed drive**
4. Provision of **demand control ventilation**

Lift & Escalator Installation

Key Update on BEC2015

1. Max. allowable power ↓ 3 ~ 5 % Declaration load ↓ 2 %
2. Lift Regeneration Braking



Lift & Escalator Installation

Key Update on BEC2015

Demand Control Escalator



Automatic Speed Reduction

BEEO Achievement



- ✓ Over **1,300** building declared to follow BEC
- ✓ Around **400** buildings with COCR
- ✓ Over **4,000** FOC for MRW
- ✓ Over **3,000** commercial buildings meet the energy audit requirements

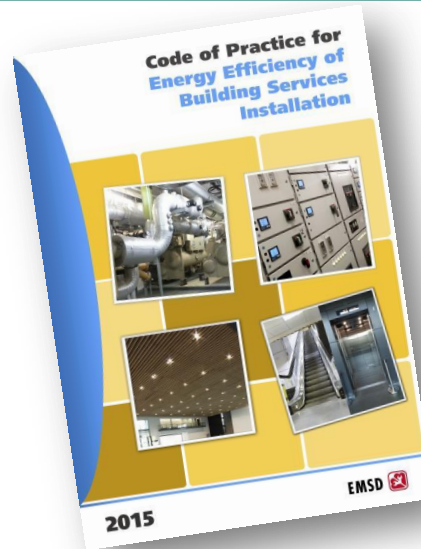


The saving of **5 billion kWh** for newly constructed buildings up to 2025

BEC Review & Update



2012 version



2015 version

10% energy saving



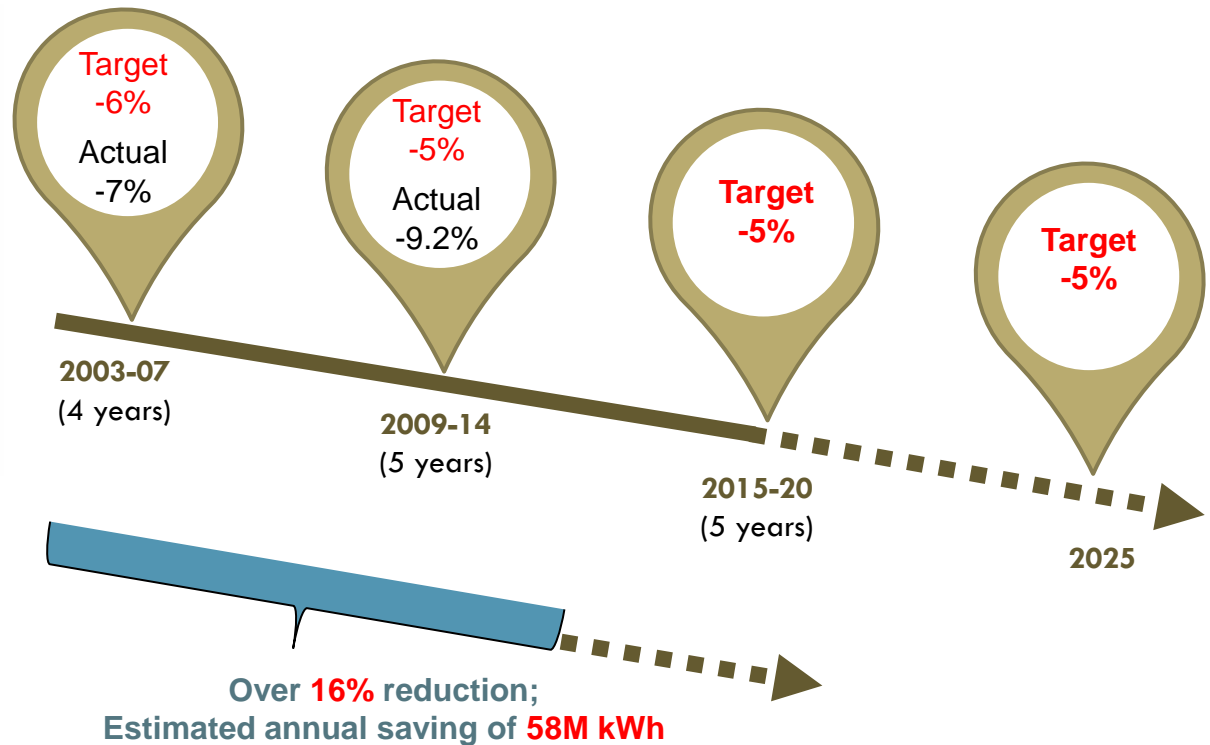
2018 version

- Review in a 3-year basis
- Carried out by a Technical Taskforce and 6 Working Groups
- Reference to *International Standards, Technology Advancement, feedback from stakeholders*

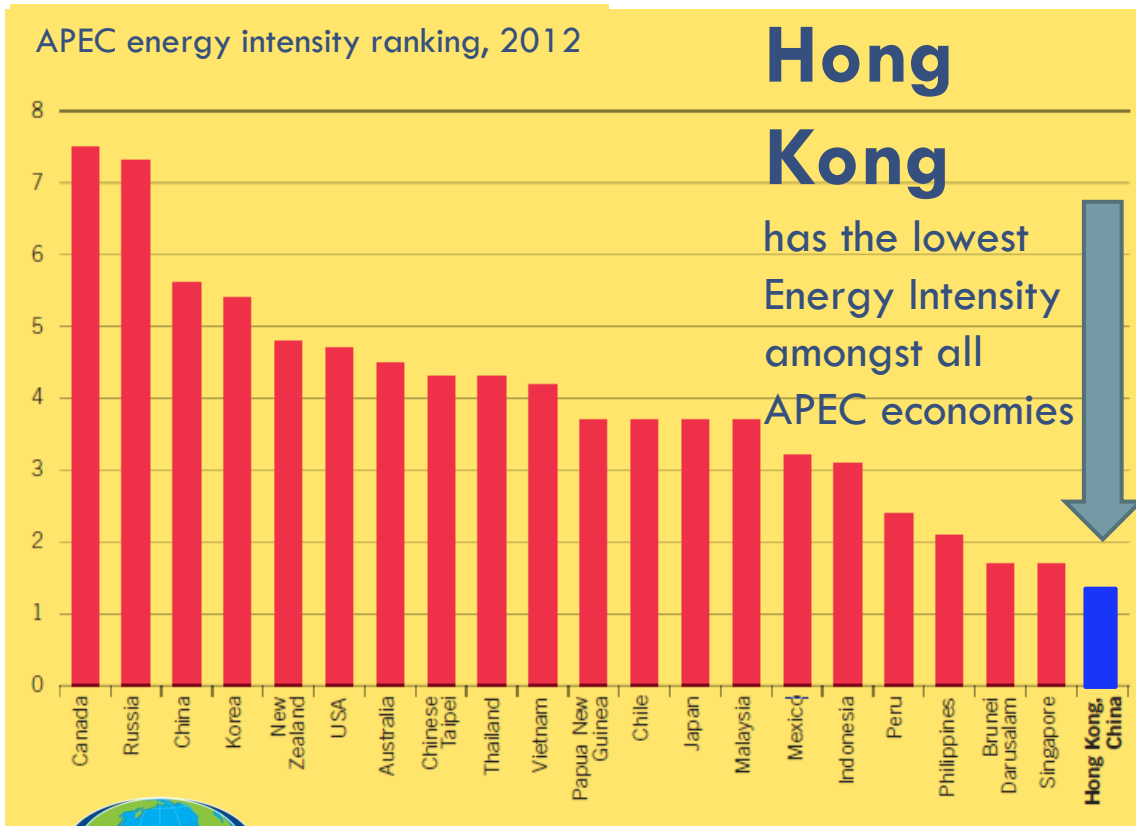
Energy Saving from Government



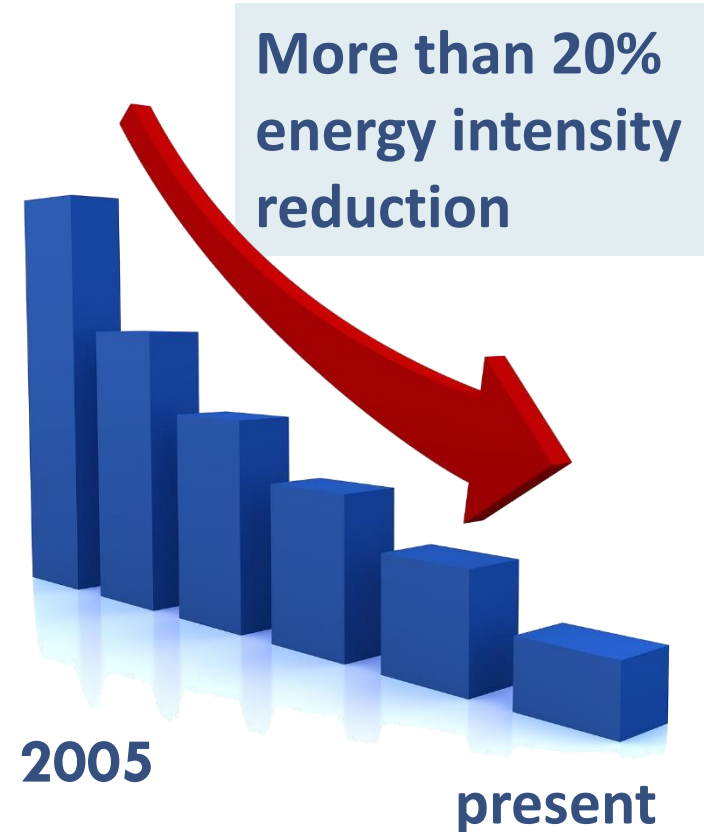
Government Buildings/Facilities



Energy Efficiency in Past Decades



Asia-Pacific Economic Cooperation



4Ts & Partnering with stakeholders

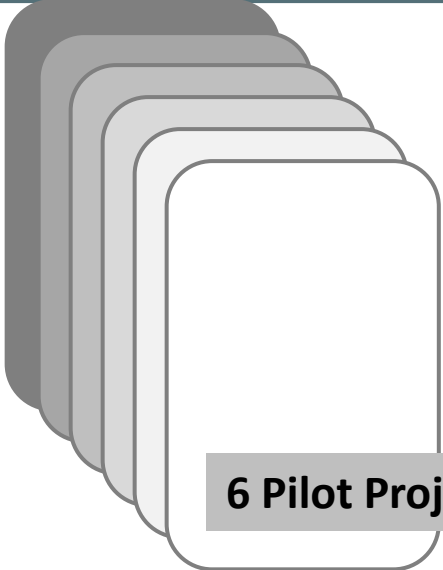


- Targets
- Timeline
- Transparency
- Together

Apply 4Ts & Partnering with stakeholders to improve energy saving

Development – Retro-commissioning (RCx)

Energy Initiative in Existing Building



6 Pilot Projects

Draft Technical Guidelines on Retro-Commissioning

Public Engagement



School Outreach & Education Tour



“Energy Saving for All” Campaign



Information Gateway



Energy Saving Charter



“Education Tours at EMSD”



Thank You

機電工程署



EMSD