

Building Control (Environmental Sustainability Measures for Existing Buildings) (Amendments) Regulations 2016

Agenda

1. Expansion of prescribed buildings under Regulations 2016

What are the buildings covered under the Regulations 2016?

2. Minimum Environmental Sustainability Standards for Existing Buildings

I intend to change my chiller(s), what should I do?

3. Periodic Energy Audit

I have complied with the regulations, what happens next?

BC Regs 2016:

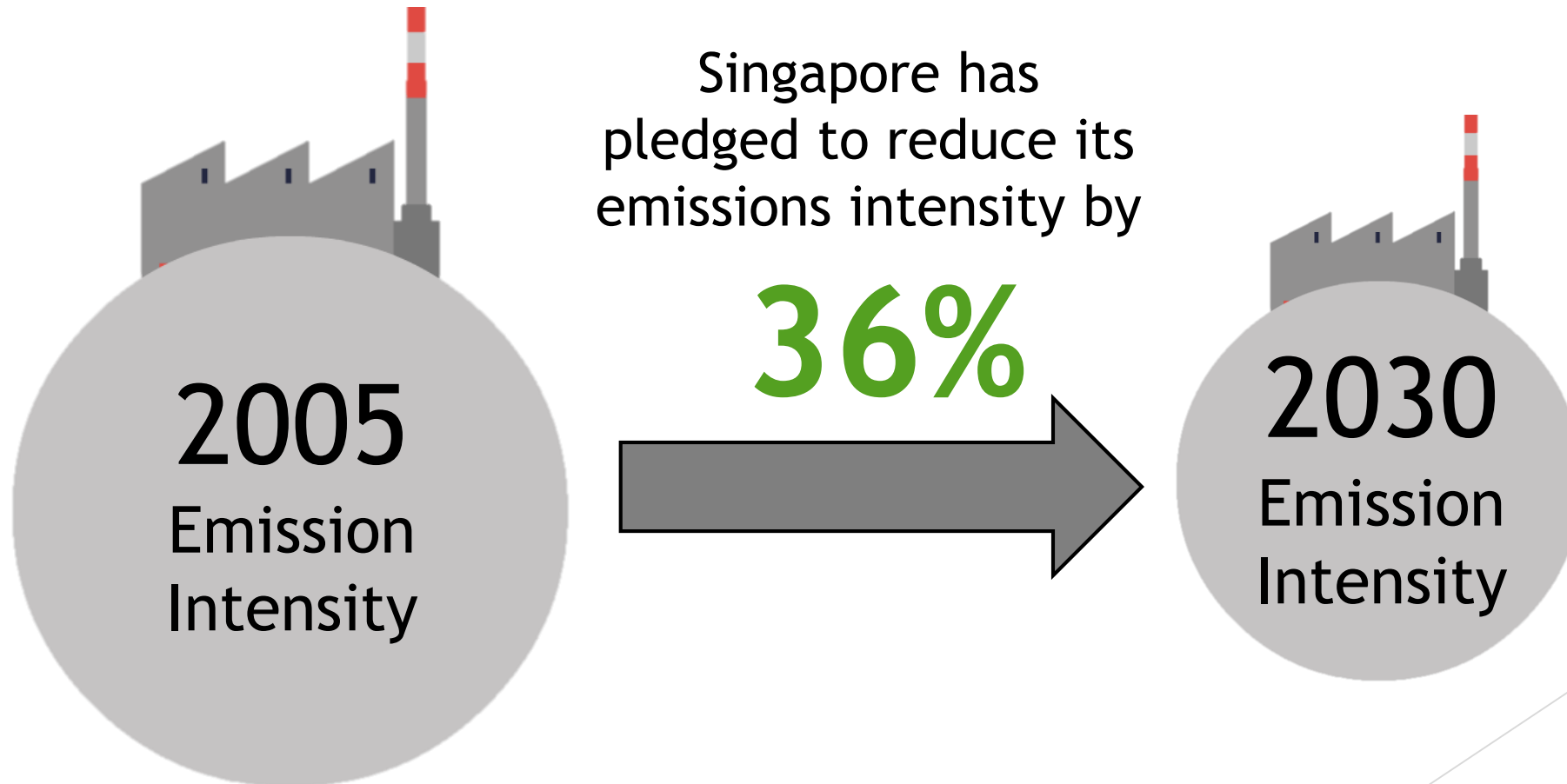
Gazetted on 1 Jul 2016

(effective from 2nd Jan 2017)



Background

Singapore's Pledge in Climate Change Fight



Emission intensity: kgCO₂e / S\$GDP

Strategies to meet Singapore 2030 Pledge



Today – 31%*

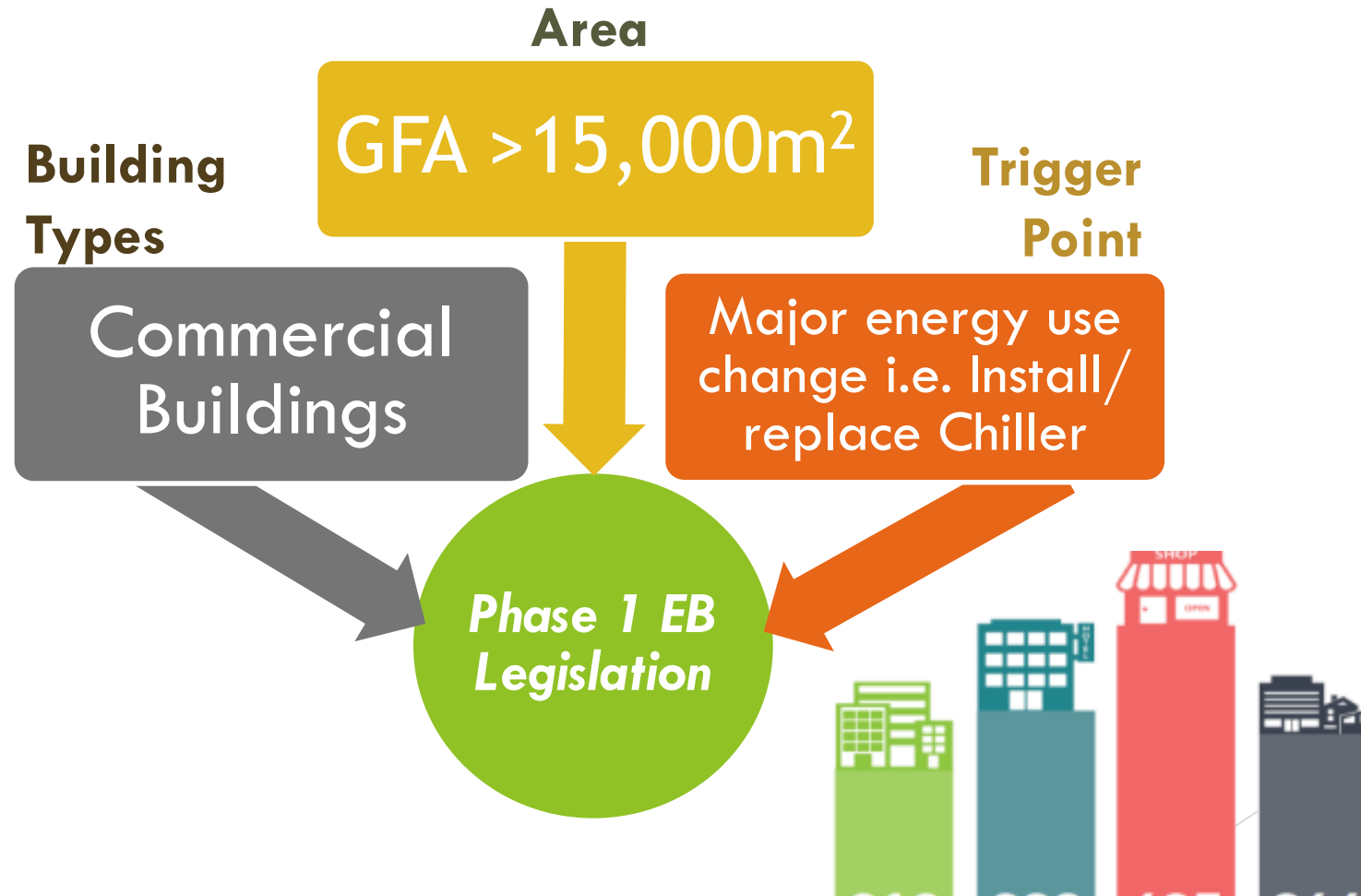
2030 – 80%

Huge stock of
existing buildings to be
'greened'

*As of May 2016

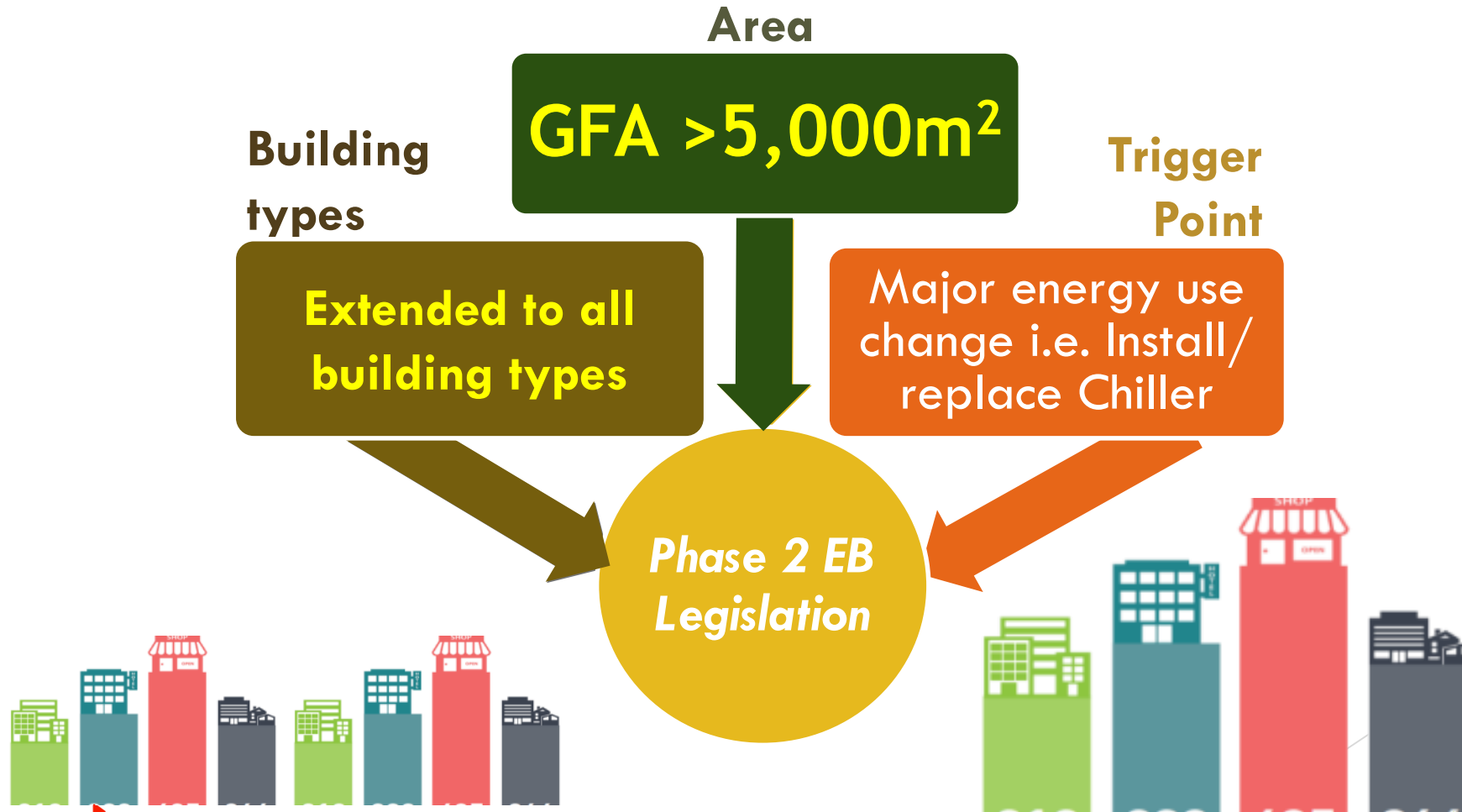
Prescribed Buildings under Phase I

(effective from 2nd Jan 2014)



Prescribed Buildings under Phase II

(effective from 2nd Jan 2017)



1. Expansion of prescribed buildings in Amended Regulations

Excluded Building Types

Some mixed-use buildings with component of Type A are excluded

Type A

- **Data Centres**
- **Utility buildings**
- **Religious buildings/ places of worship**
- **Residential buildings (but not including services apartments)**

All buildings with Type B are excluded

Type B

- **Port services and facilities**
- **Airport services and facilities**
- **Industrial buildings**
- **Railway premises**

Prescribed Buildings under Phase II

Single-use Buildings - example



A single-use building

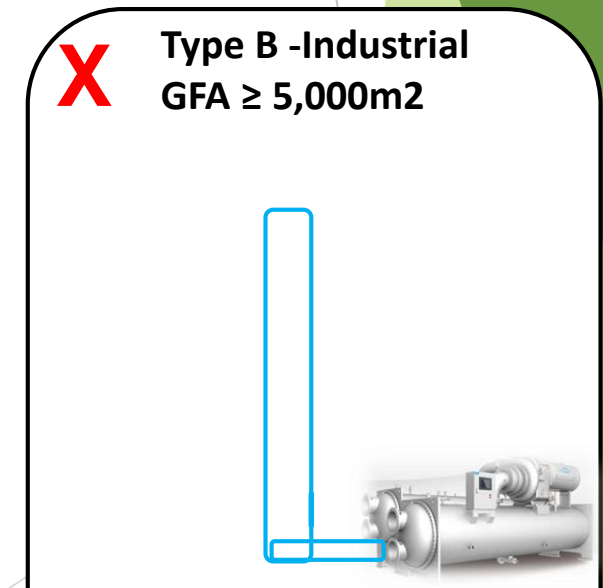
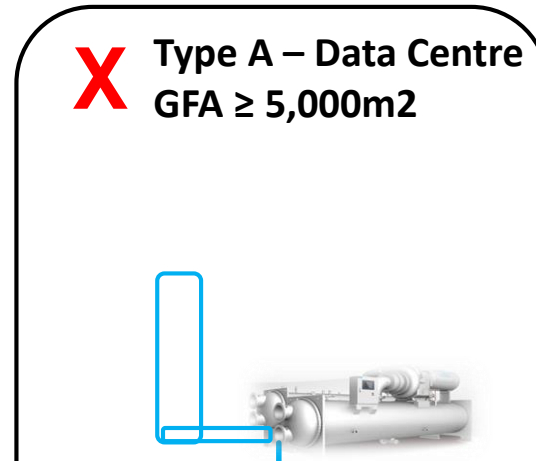
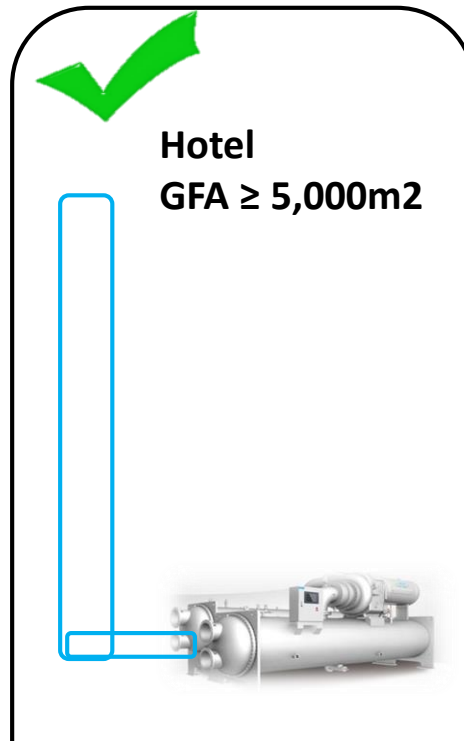
- 1) not used for Type A or Type B; and
- 2) total gross floor area of 5,000 m² or more

Type A

- Data Centres
- Utility buildings
- Religious buildings/ places of worship
- Residential buildings (but not including services apartments)

Type B

- Port services and facilities
- Airport services and facilities)
- Industrial buildings,
- Railway premises,



Disclaimer: For illustration purpose only

Prescribed Buildings under Phase II

Clause 3(1)(b): Mixed-use Buildings (1)

2

A mixed-use building

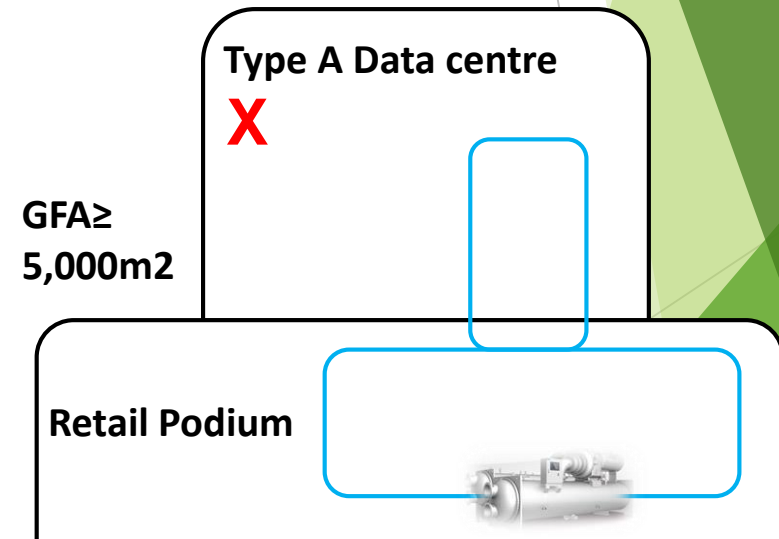
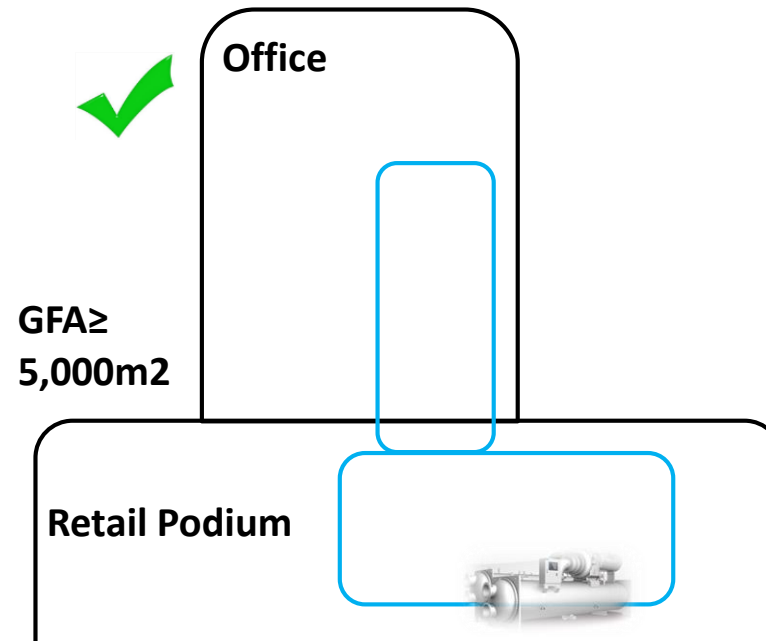
- 1) no part is used for Type A or Type B;
- 2) has only one chiller plant;
- 3) total gross floor area of 5,000 m² or more

Type A

- Data Centres
- Utility buildings
- Religious buildings/ places of worship
- Residential buildings (but not including services apartments)

Type B

- Port services and facilities
- Airport services and facilities)
- Industrial buildings,
- Railway premises,



Disclaimer: For illustration purpose only

Prescribed Buildings under Phase II

Clause 3(1)(c): Mixed-use Buildings (2)



A mixed-use building

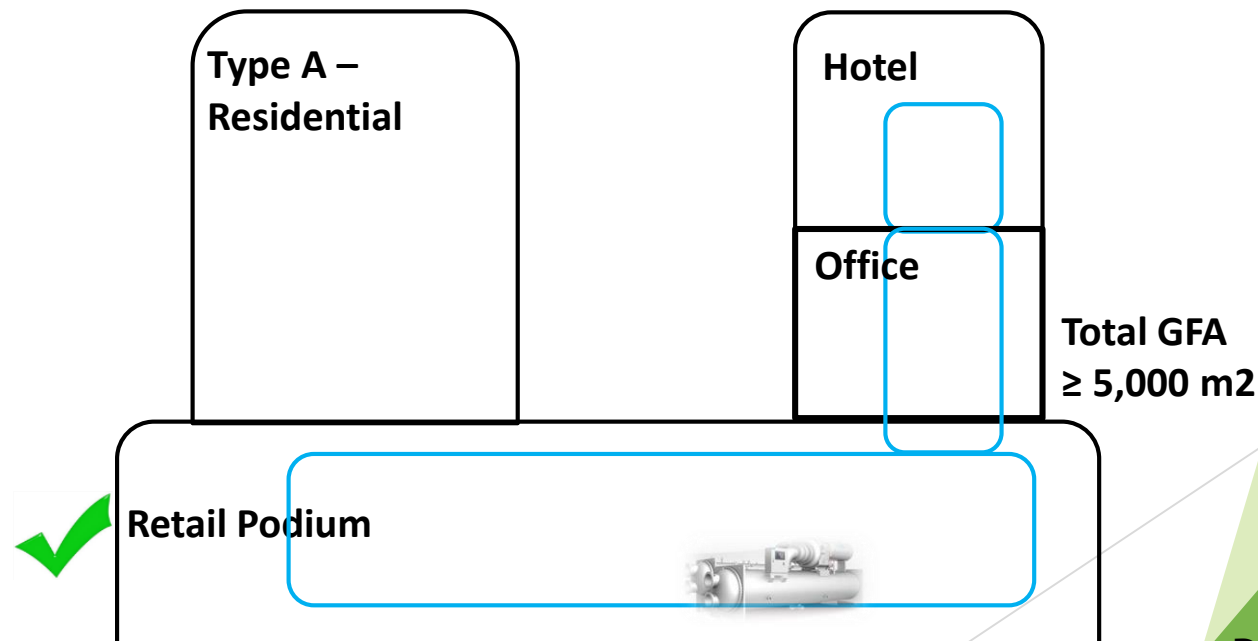
- 1) one part is used for Type A;
- 2) no part is used for Type B;
- 3) has only one chiller plant which does not serve Type A part;
- 4) Total gross floor area of 5,000 m² or more

Type A

- Data Centres
- Utility buildings
- Religious buildings/ places of worship
- Residential buildings (but not including services apartments)

Type B

- Port services and facilities
- Airport services and facilities)
- Industrial buildings,
- Railway premises,



Disclaimer: For illustration purpose only

Prescribed Buildings under Phase II

Clause 3(1)(d): Mixed-use Buildings (3)

4

Part of a mixed-use building

- 1) no part is used for Type A or Type B use;
- 2) has at least one chiller plant serving each part;
- 3) gross floor area of that part is 5,000 m² or more

Type A

- Data Centres
- Utility buildings
- Religious buildings/ places of worship
- Residential buildings (but not including services apartments)

Type B

- Port services and facilities
- Airport services and facilities)
- Industrial buildings,
- Railway premises,

Only the part that is served by the affected Chiller plant has to comply to the legislation.



Office
GFA ≥ 5,000m²



Retail Podium GFA
≥ 5,000m²



Disclaimer: For illustration purpose only

Prescribed Buildings under Phase II

Clause 3(1)(e): Multiple Buildings

5

Multiple buildings

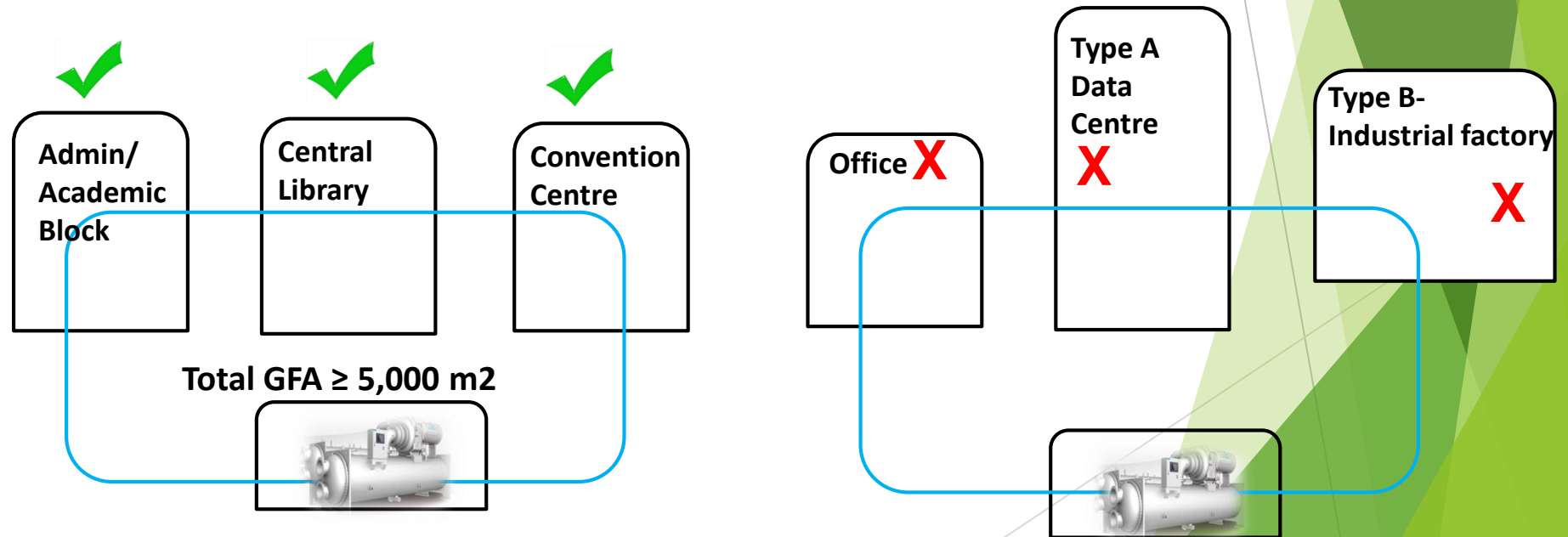
- 1) No buildings is used for Type A or Type B;
- 2) has only one chiller plant
- 3) Total gross floor area of all the buildings are of 5,000 m² or more

Type A

- Data Centres
- Utility buildings
- Religious buildings/ places of worship
- Residential buildings (but not including services apartments)

Type B

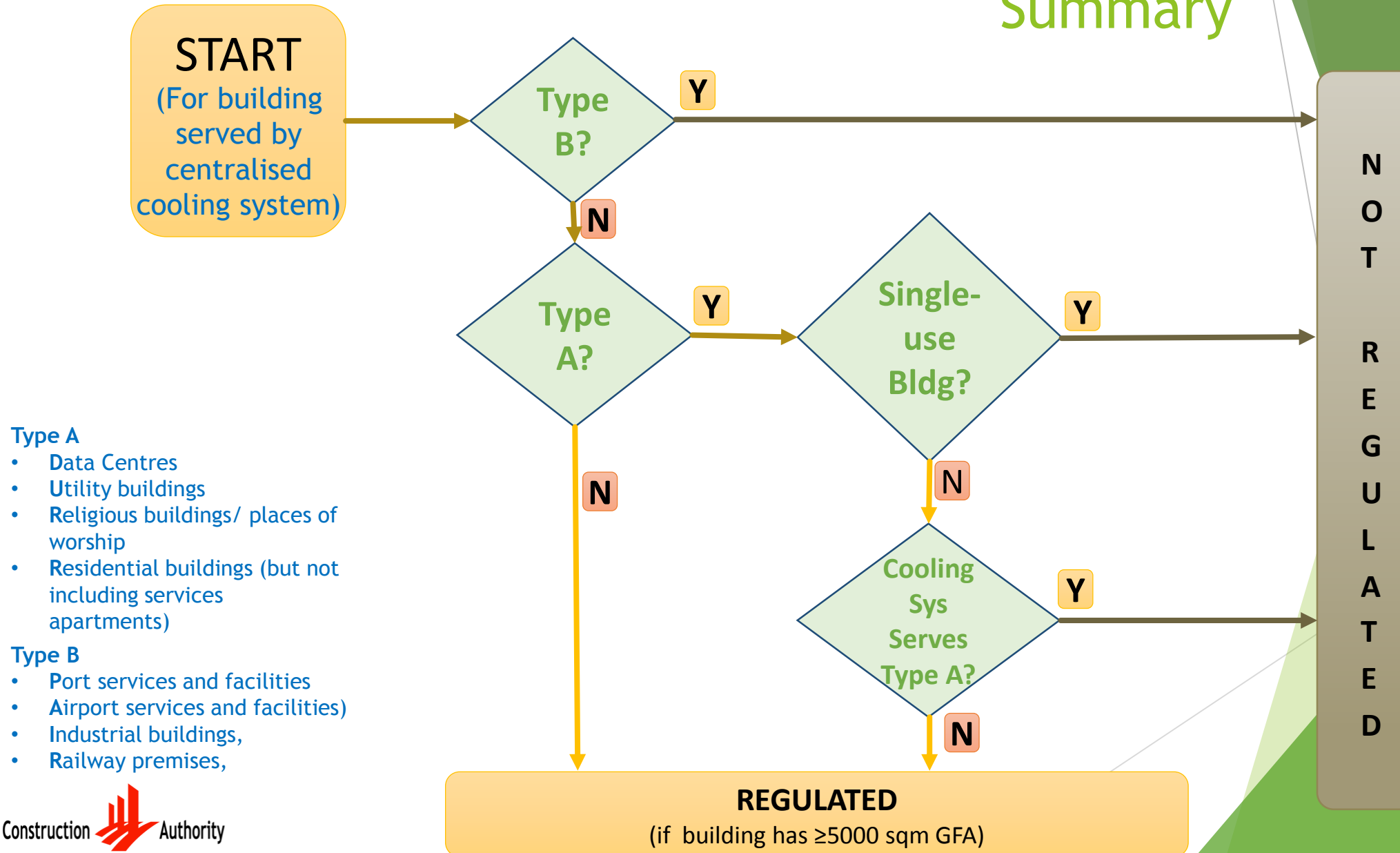
- Port services and facilities
- Airport services and facilities)
- Industrial buildings,
- Railway premises,



Disclaimer: For illustration purpose only

Prescribed Buildings under Phase II Summary

Disclaimer: For illustration purpose only



Type A

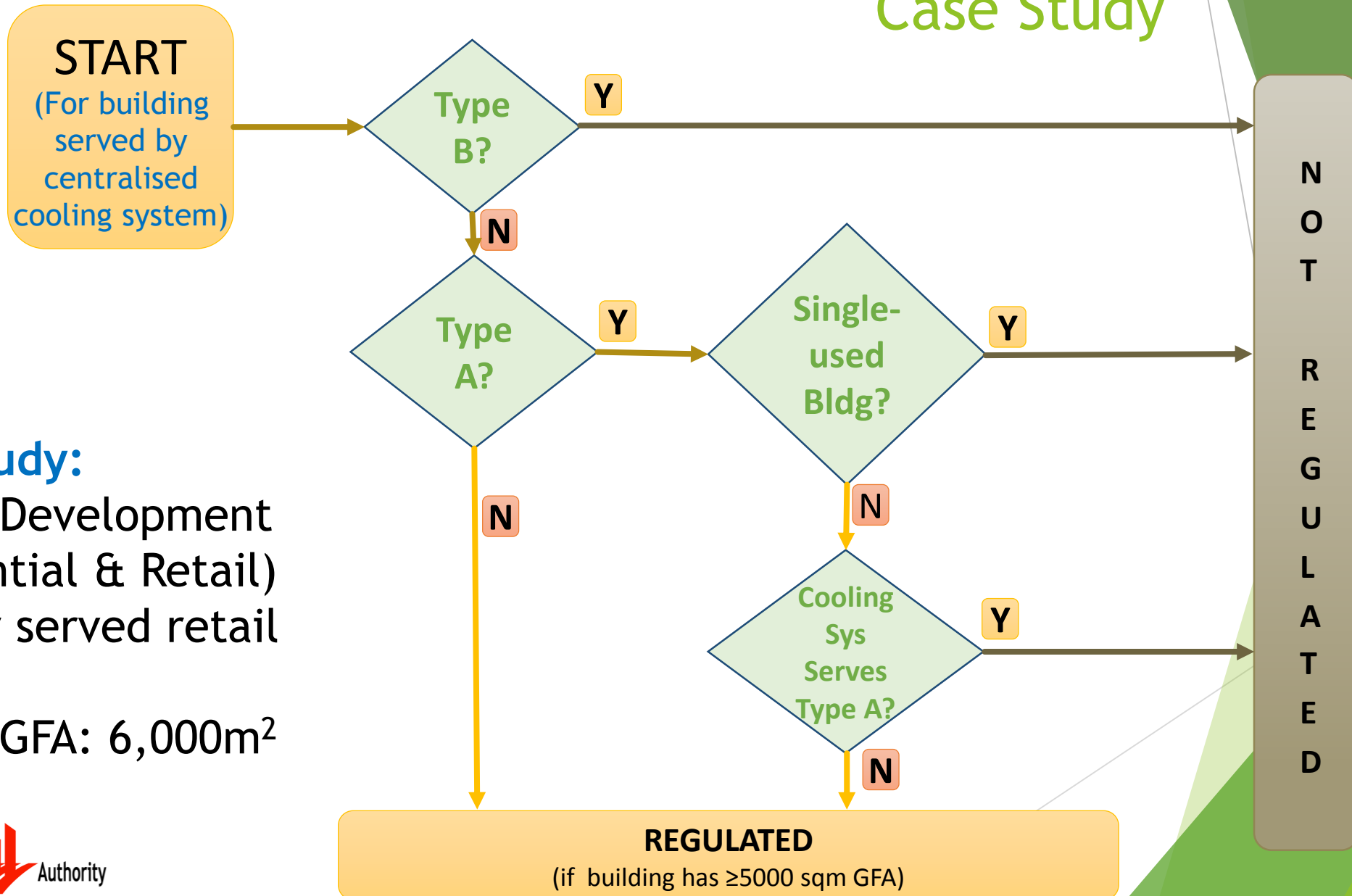
- Data Centres
- Utility buildings
- Religious buildings/ places of worship
- Residential buildings (but not including services apartments)

Type B

- Port services and facilities
- Airport services and facilities)
- Industrial buildings,
- Railway premises,

Prescribed Buildings under Phase II Case Study

Disclaimer: For illustration purpose only

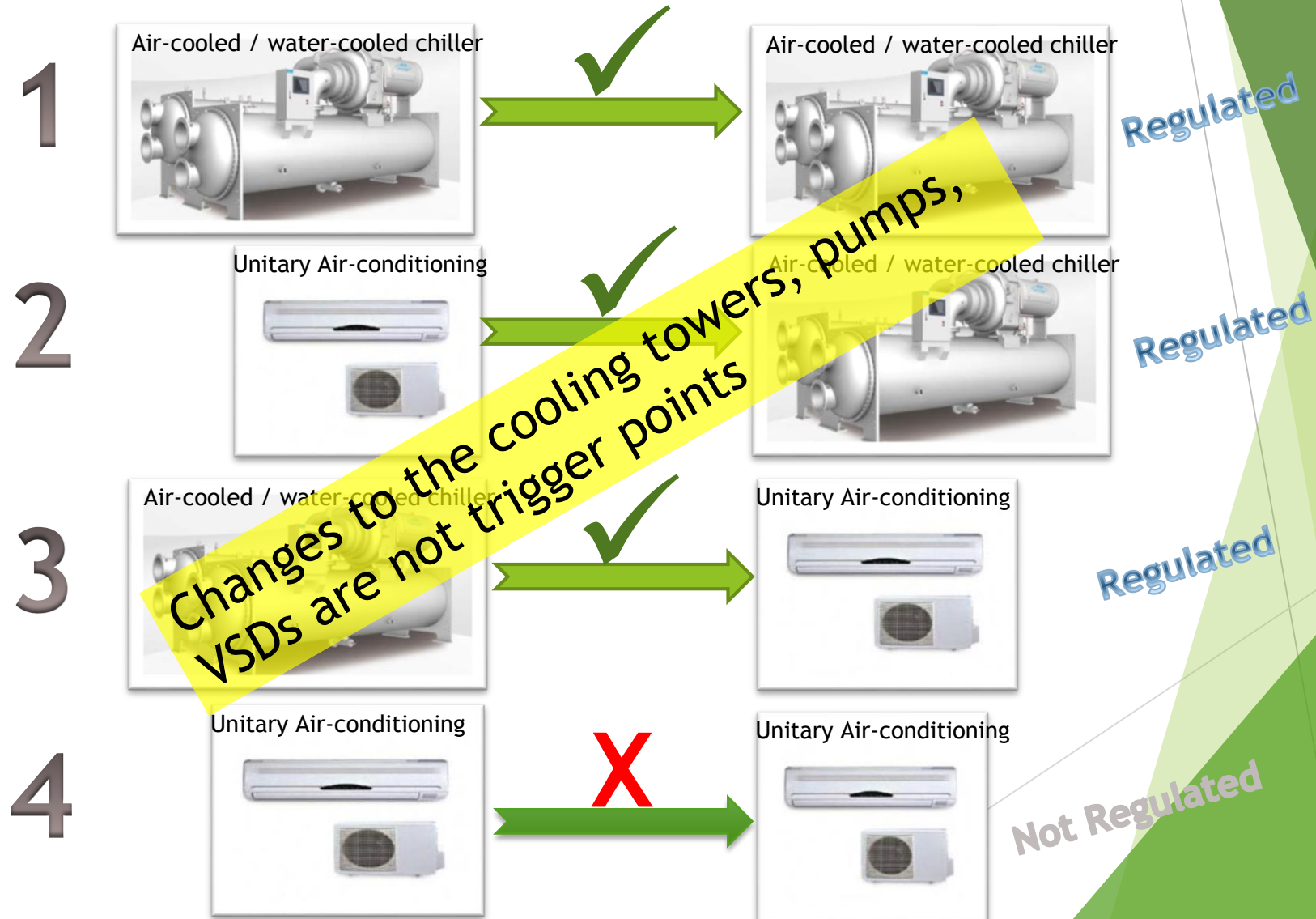


Case Study:

- Mixed Development (Residential & Retail)
- Chiller served retail only
- Retail GFA: 6,000m²

Prescribed Buildings under Phase II

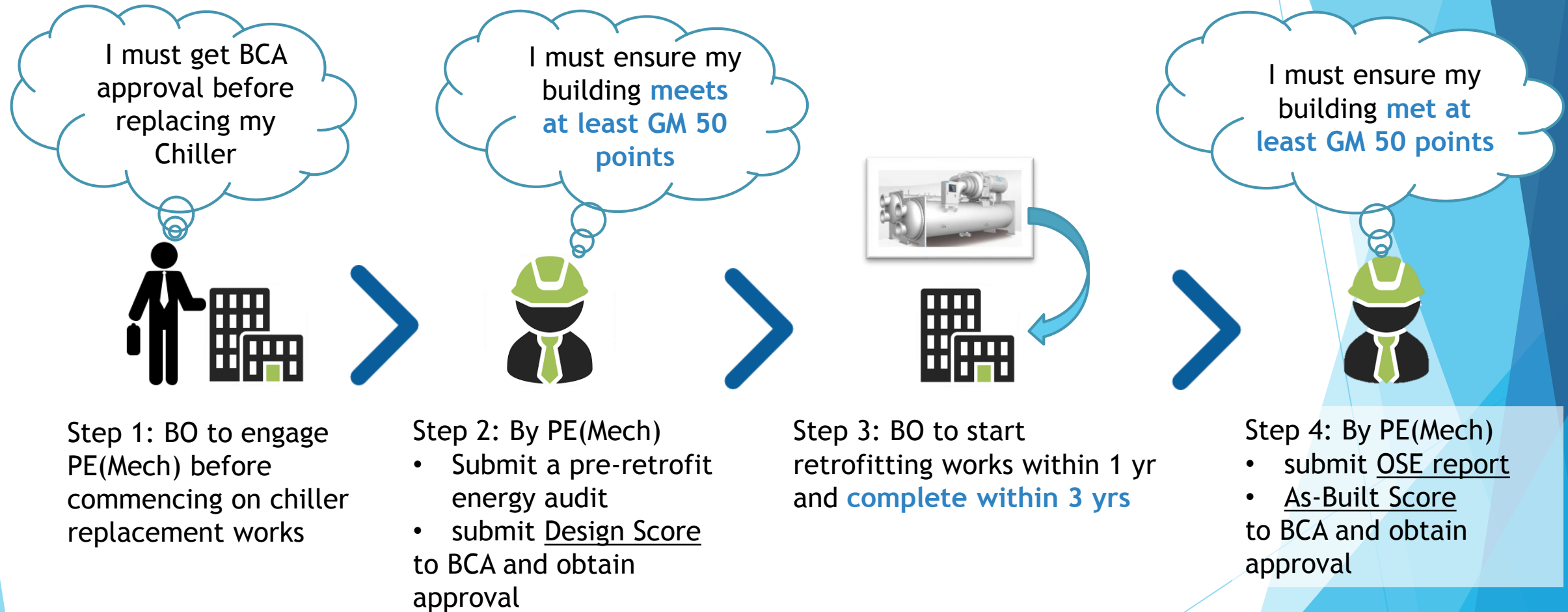
Trigger point



2. Minimum Environmental Sustainability Standards for Existing Buildings

Minimum Environmental Standards

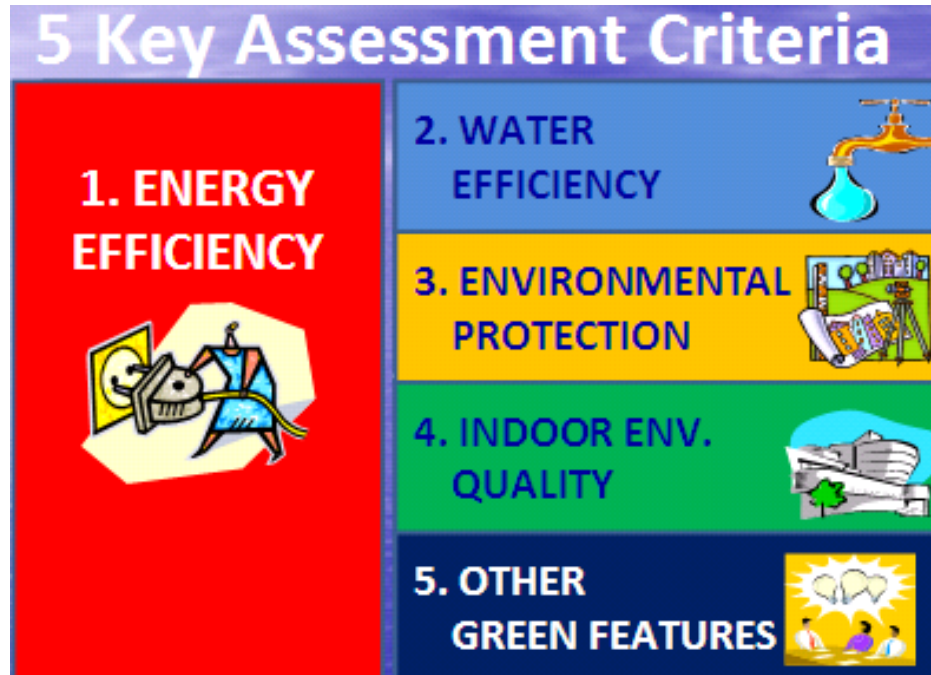
Current Application Process Flow



* for more information, please download

“Code on Environmental Sustainability Standards for Existing Buildings ”

What is Green Mark?



1. Reduce energy and water bills and material Use
2. Reduce environmental impact
3. Improve indoor environmental quality
4. Positive effect on corporate image, leasing and resale value of buildings

Green Mark	Try Again		Certified		Gold		Gold ^{Plus}		Platinum	
Score	0	49	50	74	75	84	85	89	90	100
Estimated Energy Savings			10% to 15%		15% to 25%		25% to 30%		> 30%	

Legislation requirements

GM Points: Pre-requisite

Criteria		EB Legislation	
		Points	Contribution %
Part 1	Energy Efficiency	89	49%
Part 2	Water Efficiency	24	13%
Part 3	Sustainable Operation & Management	39	22%
Part 4	Indoor Environmental Quality	18	10%
Part 5	Other Green Features	10	6%
Total points		180	

PRE-REQUISITES

1. Min 30 pts
2. Min 20 pts
3. Air-conditioning system efficiency
4. Accurate permanent M&V instruments
5. IAQ Audit

*for more information, please download
“Code on Environmental Sustainability Measures for Existing Buildings”

GM Points: Pre-requisite

- Air Conditioning System Efficiency

For buildings using **Water-Cooled Chilled-Water Plant**

Green Mark Rating	Building Cooling Load (RT)	
	< 500	≥ 500
	Efficiency (kW/RT)	
Certified	0.85	0.75

For buildings using **Air Cooled Chilled-water Plant or Unitary Air-Conditioner**

Green Mark Rating	Building Cooling Load (RT)	
	<500	≥ 500
	Efficiency (kW/RT)	
Certified	1.1	1.0

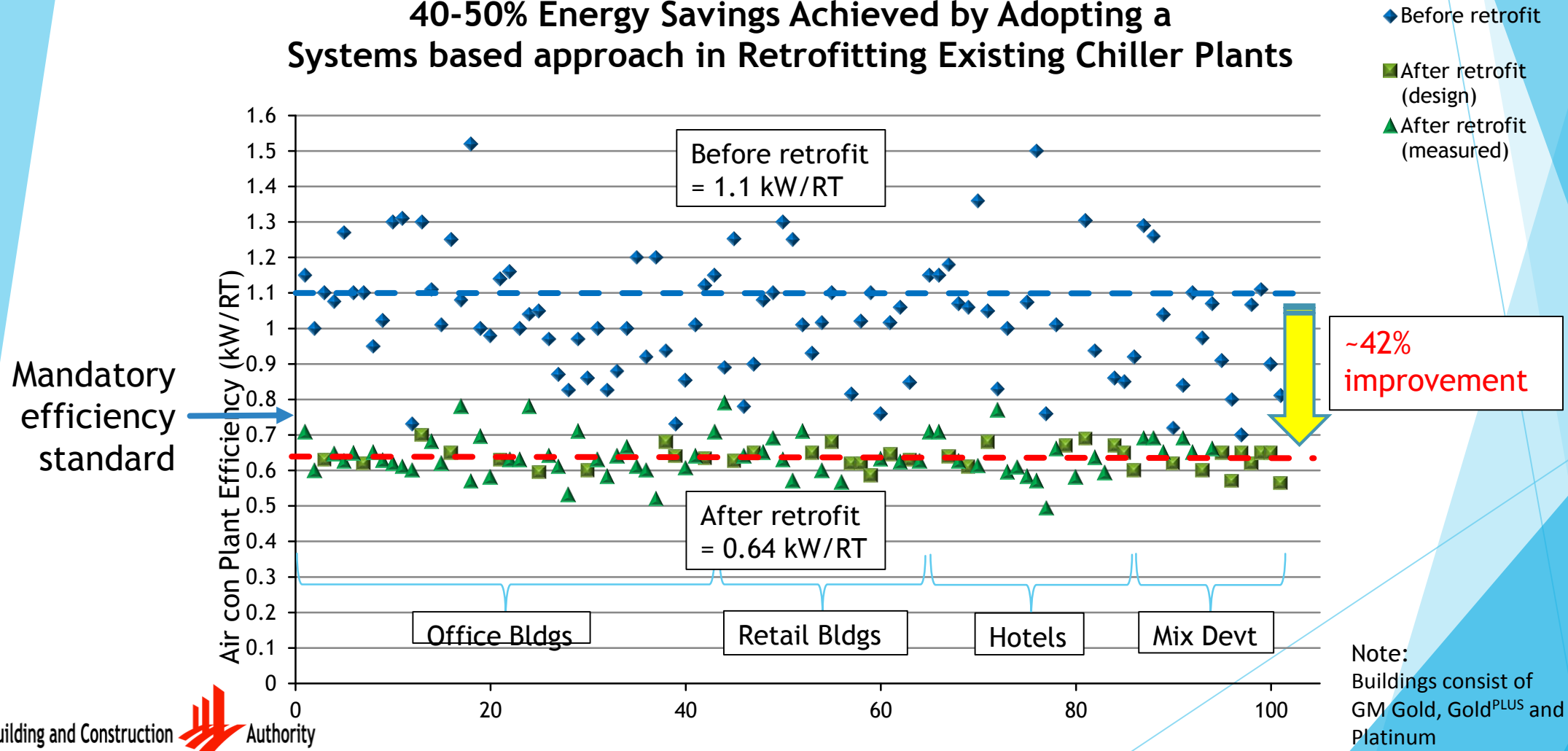
Example:

- Intends to install a water-cooled chiller
- Building cooling load is 600RT.

GM Points: Pre-requisite

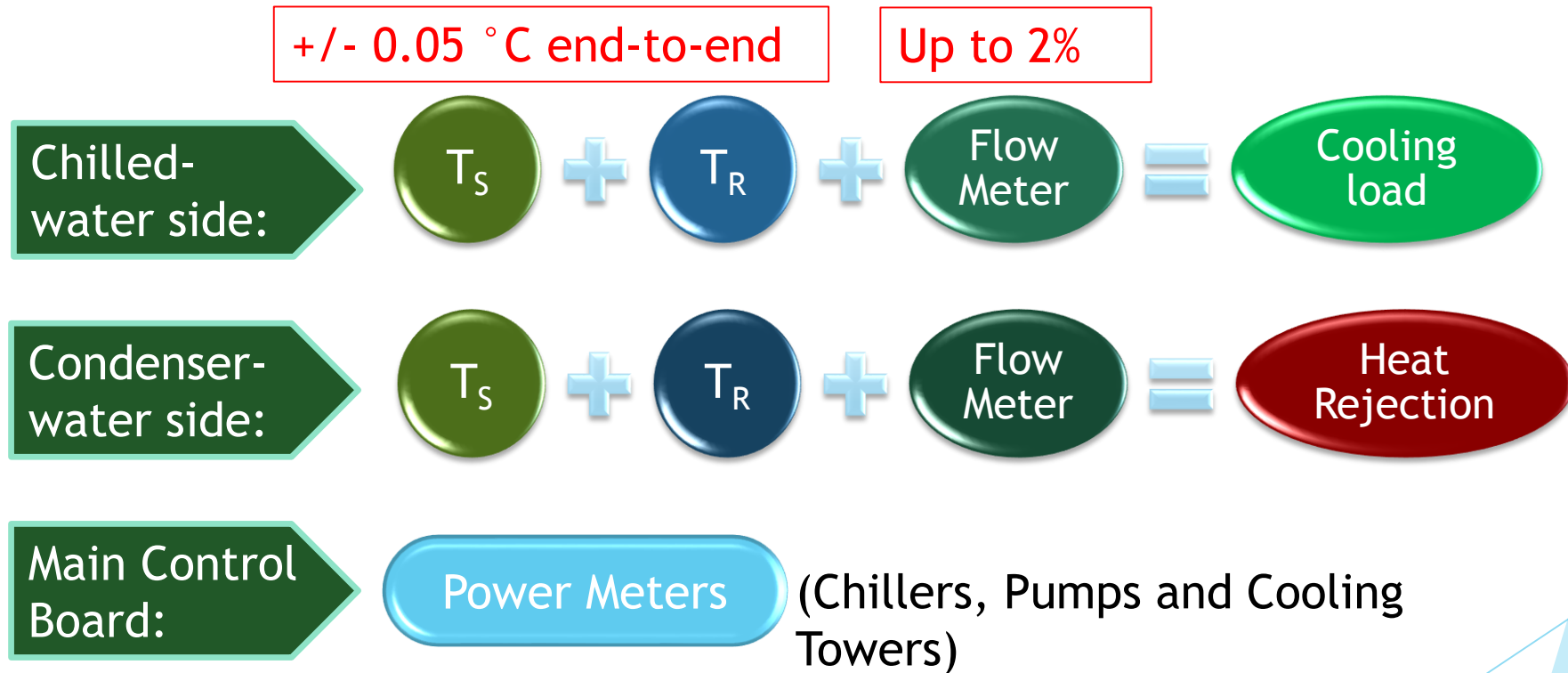
- Air Conditioning System Efficiency

40-50% Energy Savings Achieved by Adopting a Systems based approach in Retrofitting Existing Chiller Plants



GM Points: Pre-requisite

- Accurate Permanent M&V instrumentation



GM Points: Pre-requisite

- Indoor Air Quality Audit

- To conduct full IAQ audit
- IAQ audit to be performed by an accredited laboratory under Singapore Accreditation Council
- IAQ audit to comply with NEA's Guidelines for Good Indoor Air Quality in Office Premises or SS554:2009 Code of Practice for 'Indoor air quality for air-conditioned buildings'



Case Study to Achieve Minimum 50 pts

Part 1 - Energy Efficiency

Criteria	Energy Efficiency Features	Point Score
Part 1-2 System Energy Efficiency	System Efficiency = 0.75 kW/ton	14
	Permanent M&V instruments and heat balance	2
	VSD control for Air-con plant	1
Part 1-3 Artificial Lighting	30% improvement in Lighting System	9
Part 1-4 Ventilation in Carparks	Efficient MV System in Carparks	2
Part 1-6 Ventilation in Common Areas	Natural ventilated staircases, Mechanical ventilated toilets	2
Part 1-7 Lifts and Escalators	Efficiency Lift system (VVVF/Sleep Mode)	1
Total Points in Part 1		31

Case Study to Achieve Minimum 50 pts

Part 2 to Part 5 Other Green Requirements

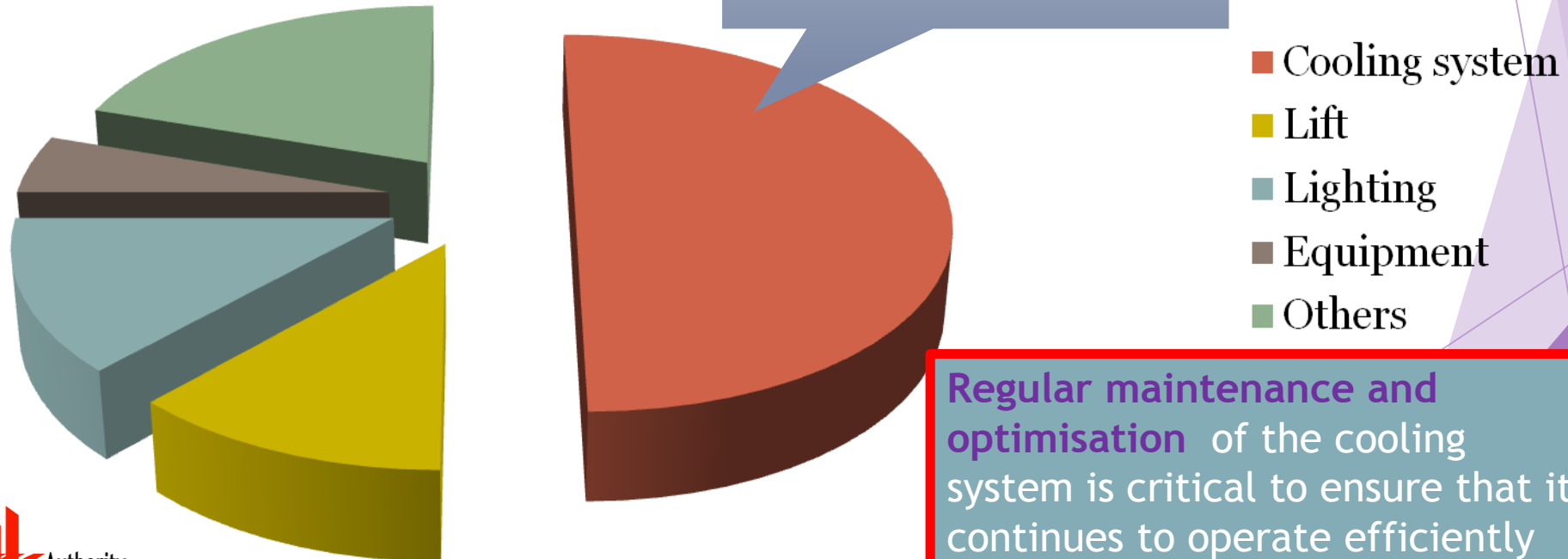
Criteria	Green Features	Point Score
Part 2-1 Water Monitoring	Monitor water consumption monthly	1
Part 2-2 Water Efficiency Fittings	Obtain a PUB Water Efficient Building certification	9
Part 3-2 Post Occupancy Evaluation	Post occupancy survey & corrective action	3
Part 3-3 Waste Management	Provision of recycling facilities & promotional programme on recycling	4
Part 4-1 IAQ Performance	Conduct IAQ Audit	4
Part 4-3 Lighting Quality	Lighting level compliance (Lux)	1
Part 4-4 Thermal Comfort	Temperature & RH	1
	Total Points in Part 2 to 5	23

3. Periodic Energy Audit

Rationale

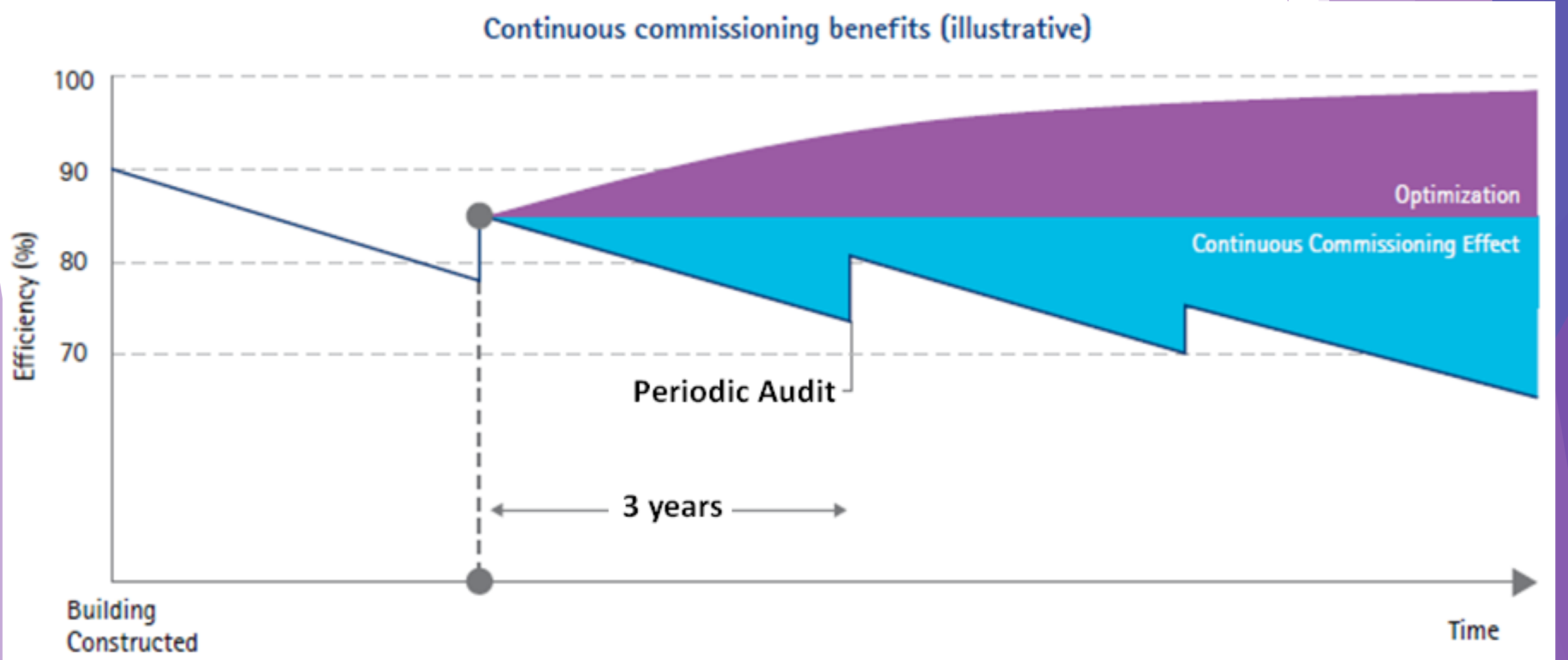
Mandating Periodic Energy Audit of Chiller Plant

Energy Consumptions in Buildings



Rationale

Mandating Periodic Energy Audit of Chiller Plant



Periodic Energy Audit Application Process Flow

6 months to
submit OSE
report to BCA..



Step 1: **3 yrs after
As-Built Approval**,
BCA issue OSE notice
to BO

I should do
this in 1.5
months!



Step 2: BO engage a
PE(Mech) or a **BCA
registered Energy Auditor**

I should do
this in 4.5
months!



Step 3: By PE(Mech)/EA

- to **conduct an OSE audit**
- to carry out necessary actions to ensure chiller plant meets the minimum efficiency standard

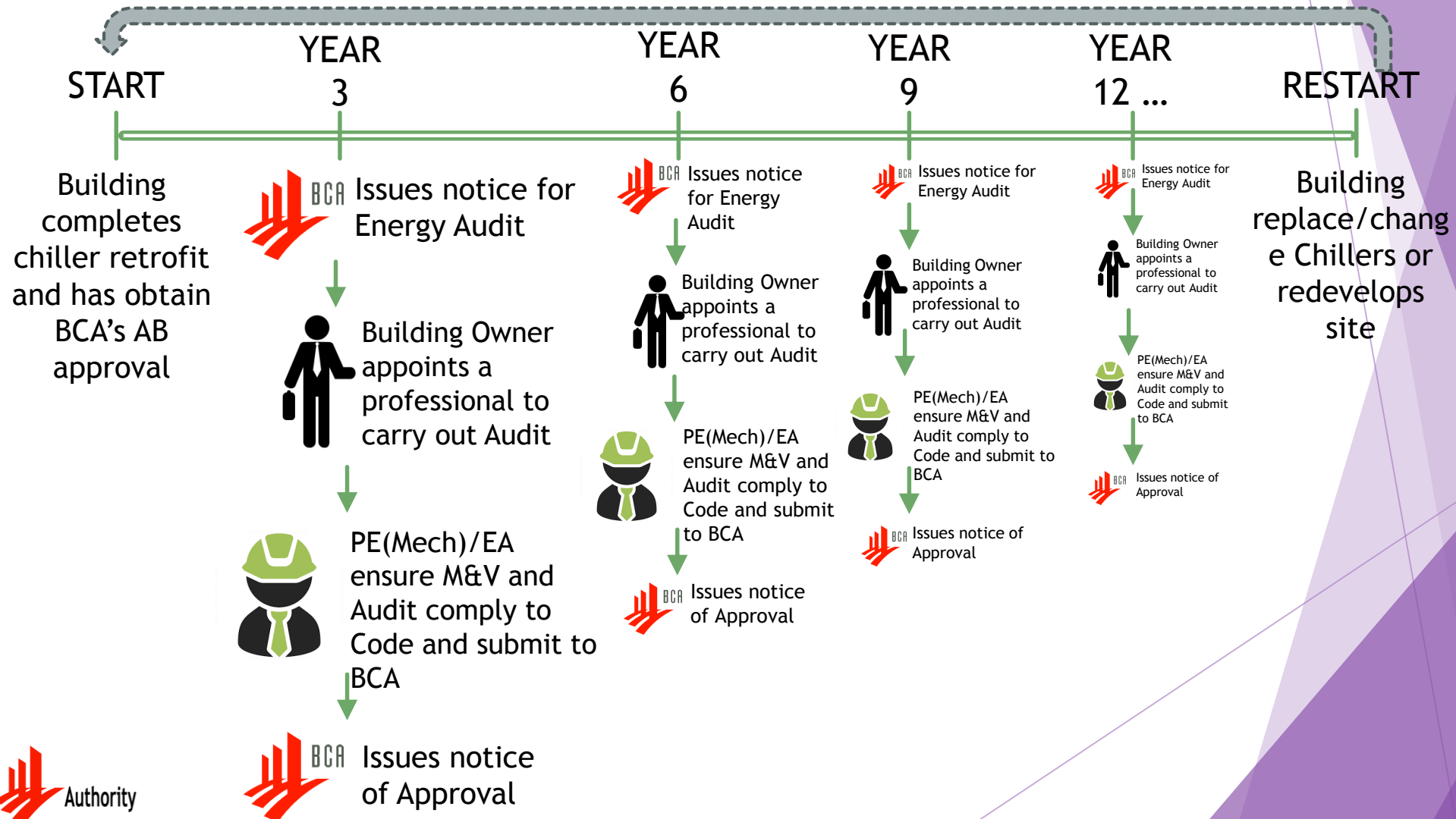
The next notice
can come 3 yrs
after the previous
notice



Step 4: By PE(Mech)/EA

- To submit OSE report to BCA for approval and arrange for site verification

3 Yearly Cycle of Periodic Energy Audit



Relevant Links

- ▶ Existing building regulations and codes

https://www.bca.gov.sg/EnvSusLegislation/Existing_Building_Legislation.html

- ▶ BCA Registered Energy Auditor Registry

https://www.bca.gov.sg/EnvSusLegislation/Registered_Energy_Auditors.html

Thank you