

Singapore's Energy Efficiency Programmes

49th Meeting of the APEC Expert Group on Energy Efficiency & Conservation, 26 March 2017, Jeju, Korea

Background on Energy Efficiency Programmes

Industrial

- **Mandatory Energy Management Requirements**
- **Capability Building Programmes**
- **Incentive & Financing Schemes**

Building Energy Efficiency Programmes

Transport Energy Efficiency Programmes

Household Energy Efficiency Programmes

Singapore's GHG Emissions & Mitigation Plan

- Breakdown of projected 2020 BAU Greenhouse Gas (GHG) emissions (77 MT)



- Singapore targets to reduce its emissions intensity by **36% from 2005 levels by 2030**, and to stabilise emissions to peak around 2030



Industrial

- Incentivise investment in EE
- Strengthen regulations
- Build capability



Power Gen

- Adopt more efficient tech
- Facilitate greater deployment of solar PV



Buildings

- Raise EE standards
- Support on-site generation of solar energy



Transport

- Increase public transport mode share
- Encourage walking & cycling

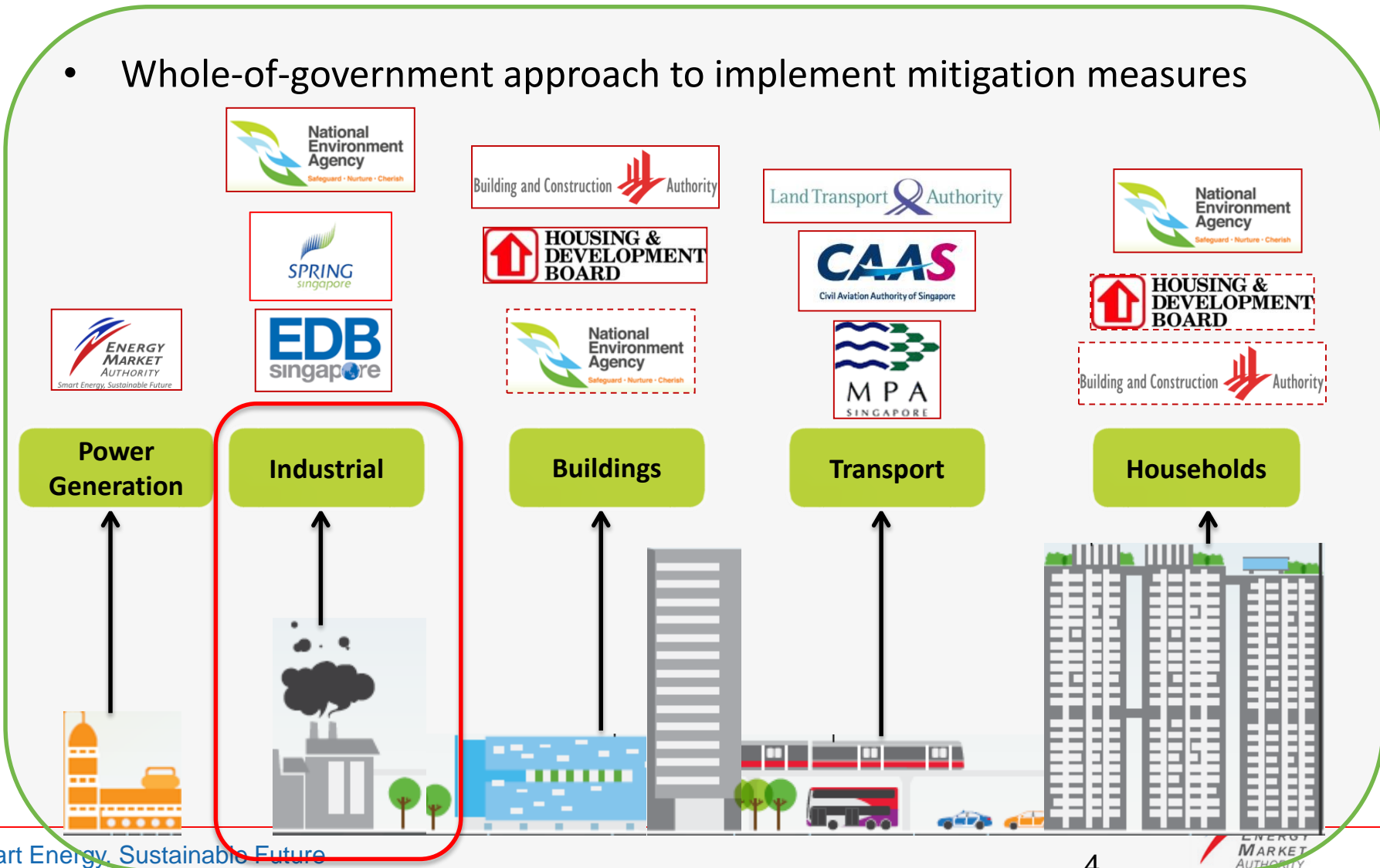


Household

- Raise EE of households appliances
- Promote energy-saving behaviour

Singapore's Approach to Mitigation

- Whole-of-government approach to implement mitigation measures



2 Industrial Energy Efficiency Programmes

Barriers to Energy Efficiency & Policy Possibilities

Barriers to Energy Efficiency

Bounded
rationality

Split incentives

Lack of
information

Limited
capital

Policy Possibilities

Facilitative/
regulatory
tools/stds

- Mandatory information reporting/audits
- Mandatory energy efficiency standards

Capability-
building tools

- Training programmes
- Educational campaigns

Fiscal tools

- Levies, subsidies, rebates, financing

Energy Efficiency Programmes

Management



- Mandatory basic energy management practices under Energy Conservation Act

Capital



- DfE
- EASe
- GREET
- IA scheme
- EE financing
- ICV, CDG

Capability



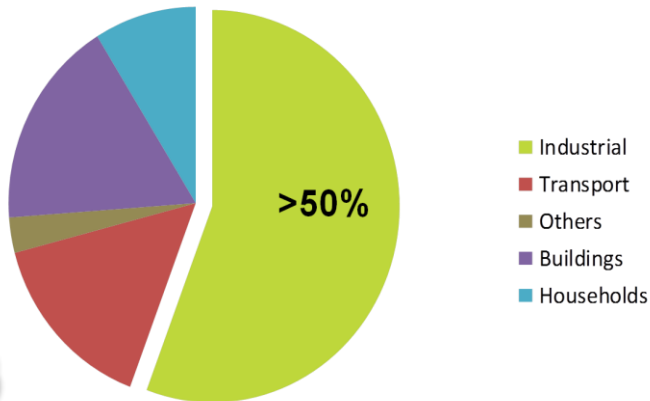
- Energy Efficiency National Partnership
- SCEM programme & grant
- Energy services companies accreditation
- Benchmarking

Rationale for Mandating Energy Management Practices

Industrial Sector

Largest energy consuming sector

Overall End-Use Consumption



Varying levels of implementation of energy management practices



Level up everyone so that energy is managed well



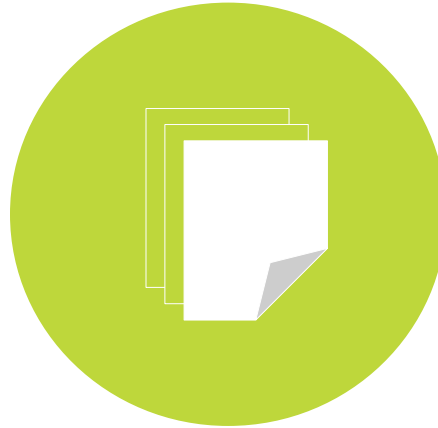
Better energy mgt → improvement in energy efficiency, lower energy costs



Mandating Energy Management Practices under Energy Conservation Act (ECA)



Appoint energy manager (SCEM-certified)



Monitor & report energy use & GHG emissions



Submit energy efficiency improvement plan

Energy sectors covered



1. Manufacturing & related services
2. Supply of electricity, gas, steam, compressed air & chilled water
3. Water supply & sewage & waste management

Energy-intensive consumers



≥ 54 TJ/yr

Key Milestones

2012



- Effective date of ECA - 1 Jun 2012
- One-to-one consultations on subsidiary legislation (SL) with around 170 corporations from Mar - Jun 2012

2013



- Effective date of ECA SL - 22 Apr 2013
- Site visits, briefings, communications - prepare corporations on reporting requirements
- Registration with NEA by corporations / appointment of energy managers – 22 Oct 2013

2014-
2015



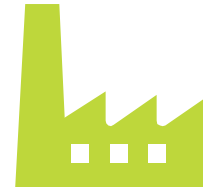
- 1st and 2nd energy use reports & energy efficiency improvement plans were submitted in 2014 and 2015 respectively
- Site inspections, verification of submitted data and approval of reports and plans were completed
- **175 registered corporations operating ~ 220 premises**

• Incentive & Financing Schemes



Design for Efficiency (DfE) Scheme

- Co-funds 50% of fees for design workshops, up to \$600,000



Energy Efficiency Improvement Assistance Scheme (EASE)

- Co-funds 50% of fees for energy audits, up to \$200,000

Grant for Energy Efficient Technologies (GREET)

- Co-funds up to 20% of investment in energy efficient technologies or equipment, up to \$4 million



Investment Allowance (IA) Scheme

- Additional 30% IA claim on CAPEX against taxable income

Energy Efficiency Financing

- Provides capital to finance installation of EE measures
- Allows investment to be paid from savings

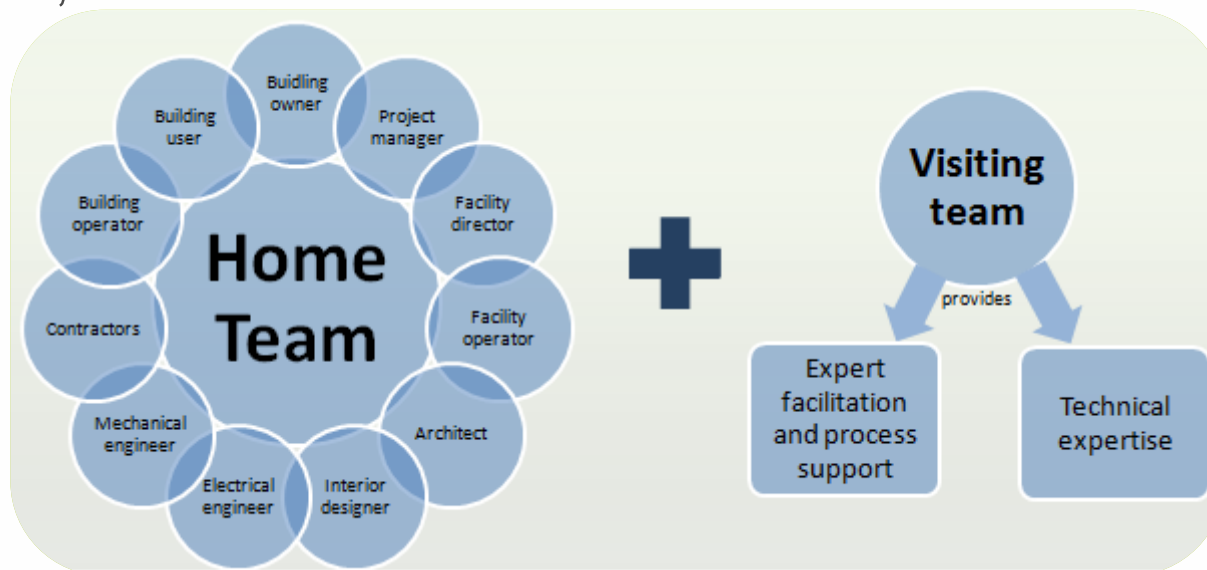


Singapore Certified Energy Manager (SCEM) Training Grant

- Co-funds 70% of training cost of SCEM Professional Level course

- Design for Efficiency (DfE) Scheme

- Encourages investors in new facilities in Singapore to integrate energy and resource efficiency improvements into manufacturing development plans early in the design stage
- Co-funds up to 50% of the qualifying costs capped at \$600,000



- Energy Efficiency Improvement Assistance Scheme (EASe)

- Co-funds up to 50% of energy audit fee, capped at \$200,000
- Encourages companies to engage accredited energy services companies to:
 - Conduct detailed energy audits
 - Identify potential areas for energy efficiency improvement



- Grant for Energy Efficient Technologies (GREET)

- Encourages the installation of energy efficient technologies or equipment
- Co-funds typically up to 20% of the qualifying costs, capped at \$4mil per project
 - Qualifying costs include manpower, equipment and materials, and professional services



- Investment Allowance (IA) Scheme

- Encourages industry to invest in capital equipment so that they become more energy-efficient in their operations
- Additional 30% allowance against taxable income on top of normal capital allowance for EE investment

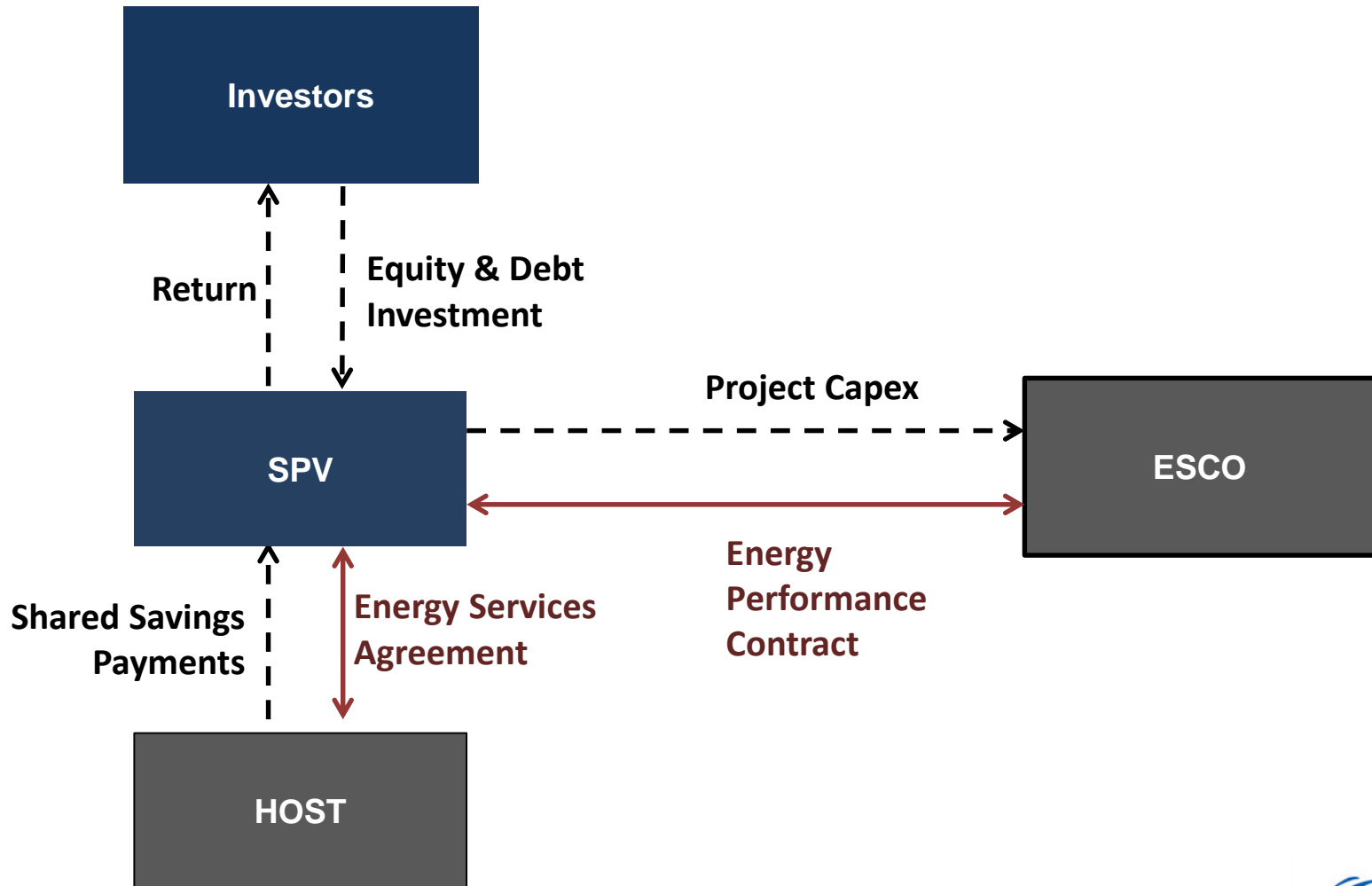


- Singapore Certified Energy Manager (SCEM) Training Grant

- Targeted at engineering professionals who manage manufacturing facilities and buildings, and provide energy services or engineering consulting services
- Subsidises 70% of the training cost at professional level



- Energy Efficiency Financing Scheme



Energy Efficiency National Partnership

Energy Management Systems

- Promote the adoption of Energy Management Systems among partner companies



EENP Learning Network

- Offers thought leadership, knowledge resources and learning events on best practices and the latest developments in EE to partners
- Major event is the biennial **National Energy Efficiency Conference**
- 74 learning events were organised since 2010

EENP Recognition Scheme

- Recognizes companies' efforts through annual EENP Awards
- Awarded 73 EENP Awards to companies and public agencies since 2011
- 4 award categories:
 - ❖ **Excellence in Energy Management**
 - ❖ **Best Practices**
 - ❖ **Outstanding Energy Manager of the Year**
 - ❖ **Best Energy Efficiency Practices for Public Sector Agencies**



Singapore Certified Energy Manager (SCEM)

144-hour programme, consisting of 4 core and 2 elective modules

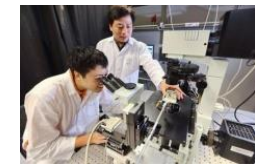
Core Modules

- Energy Measurement & Appraisal
- Energy Management & Economics
- Air-Conditioning and Mechanical Ventilation (ACMV) Systems
- Motor Driven Systems



Elective Modules

- Integrative Design for Energy Efficiency
- Steam and Compressed Air Systems
- Combined Heat & Power Systems
- Energy Recovery & Reuse
- Building Envelope & Lighting Systems



- ESCO Accreditation Scheme



19 accredited ESCOs and 29 Qualified Energy Services Specialists

- Enhances confidence in the energy services sector and helps to promote the growth of industry
- Enhances the professionalism and quality of services offered by ESCOs (energy services companies)

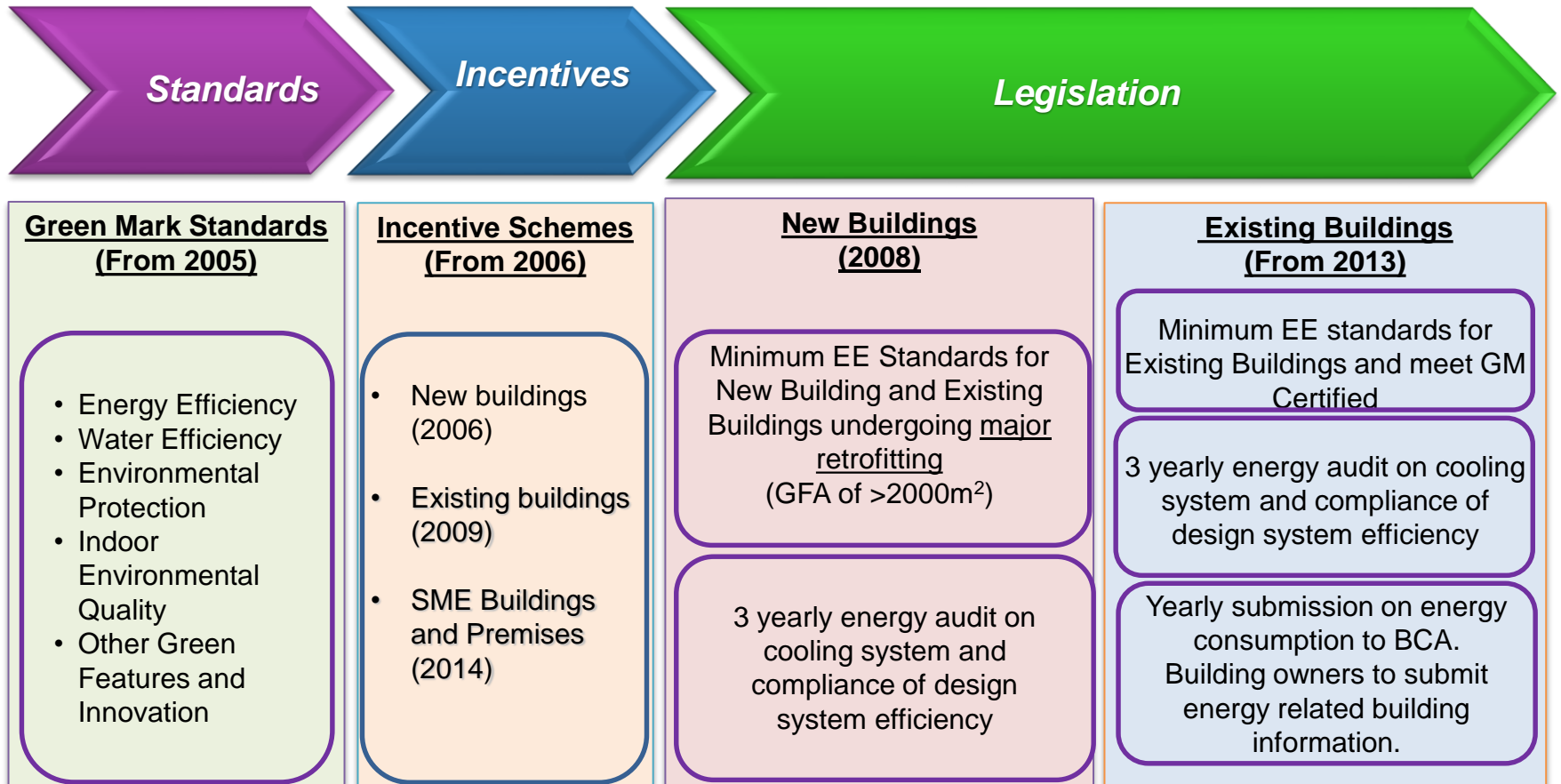


3 Building Energy Efficiency Programmes

Singapore's Green Building Journey



Three-Pronged Approach



Financing & Incentive Schemes for New & Existing Buildings

Non-Cash Incentive



- Green Mark Gross Floor Area (GMGFA)

Cash Incentive



- \$20 million Green Mark Incentive Scheme for New Buildings (GMIS-NB) [Fully Committed]
- \$100 million Green Mark Incentive Scheme for Existing Buildings (GMIS-EB) [Fully Committed. Health Check still available.]
- \$50 million Green Mark Incentive Scheme for Existing Buildings and Premises (GMIS-EBP)
- \$5 million Green Mark Incentive Scheme for Design Prototype (GMIS-DP)

Financing



Pilot Building Retrofit Energy Efficiency Financing (BREEF) Scheme

Incentives for New Buildings



\$20 million Green Mark Incentive Scheme for New Buildings (GMIS-NB) *[Fully Committed]*

- Encourage developers, building owners, project architects and M&E engineers who make efforts to achieve at least a BCA Green Mark Gold rating or higher in the design and construction of new buildings



Green Mark Gross Floor Area (GMGFA)

- Encourages private sector to work towards achieving higher-tier Green Mark ratings
- Applicable to all new and existing private developments that undergo substantial energy efficiency enhancements



S\$5 million Green Mark Incentive Scheme for Design Prototype (GMIS-DP)

- Introduced since 2010 to encourage greater emphasis at design stage
- Developments targeting beyond Green Mark Platinum standards are to demonstrate > 40% energy savings as compared to prevailing building energy efficiency standards

Incentives for Existing Buildings



\$100 million Green Mark Incentive Scheme for Existing Buildings (GMIS-EB)

- Cash incentive for upgrading and retrofitting: co-funds up to 50% (capped at \$3 million) of the retrofitting cost for energy improvements *[Fully Committed]*
- ‘Health Check’: an energy audit to determine the efficiency of the air-conditioning plants. BCA will co-fund 50% of the cost *[Extended to FY2019]*



\$50 million Green Mark Incentive Scheme for Existing Buildings and Premises (GMIS-EBP)

- Incentivise existing small and medium enterprises (SMEs) tenants and building owners, or building owners with at least 10% of its tenants who are SMEs to adopt energy efficiency
- Co-funds up to 50% of the retrofitting cost for energy improvements, or up to S\$3 million for building owners and up to S\$20,000 for tenants



Pilot Building Retrofit Energy Efficiency Financing (BREEF) Scheme

- To aid building owners in overcoming upfront costs of energy efficiency retrofits and in adopting Green Mark standards for existing buildings
- Increased risk share of 60% for any loan default with participating financial institutions

Success in Greening Buildings in Singapore

>3,000

**Green Mark
Buildings**



>33%

**of total GFA
greened**

Highlights of IGBC 2016 Conference



Opening ceremony and gaining insights from renowned speakers



Engaging discussions with thought leaders and industry speakers



Exclusive Green Mark Tours

Networking opportunities with international and local firms

 **28,000**
Delegates

 **50**
Countries

 **80+**
Speakers

 **22**
Events



Themed *"Build Green: Be The Change"*, IGBC 2017 seeks to catalyze behavioral change, at individual, interpersonal and community level.

What to anticipate at IGBC 2017:

- Positive/Zero/Super Low Energy Buildings
- Changing Behaviour towards Sustainability
- Building Healthy Spaces
- Outstanding Green Projects
- A Bird's Eye View of the Sustainable Built Environment
- Green Mark Tours

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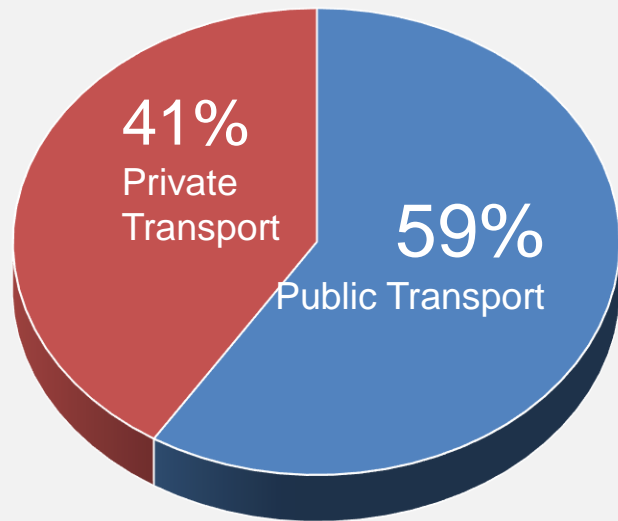
4 Transport Energy Efficiency Programmes

Land Transport Energy Efficiency Efforts

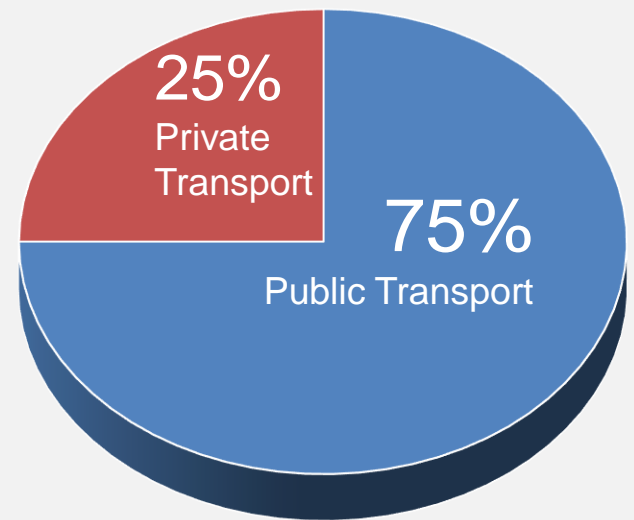
1. Improving Public Transport (PT) mode share
2. Reducing vehicular emissions
3. Encouraging walking and cycling

Improving Public Transport Mode Share to 75% by 2030

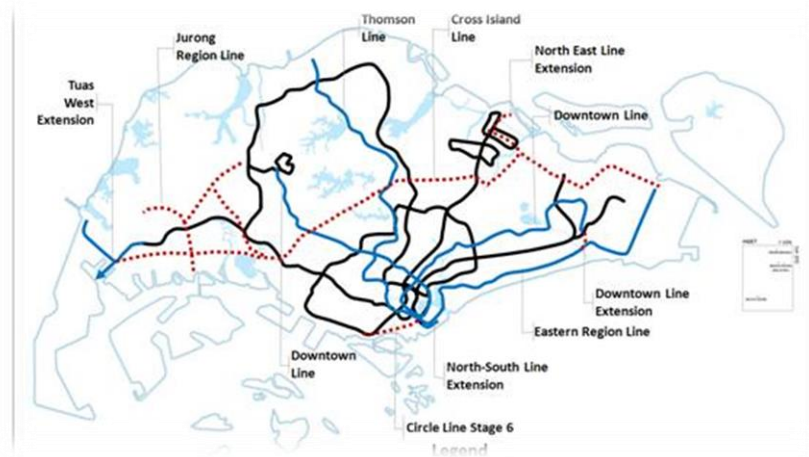
2008 Mode Share
(peak hour)



2030 Target Mode Share
(peak hour)

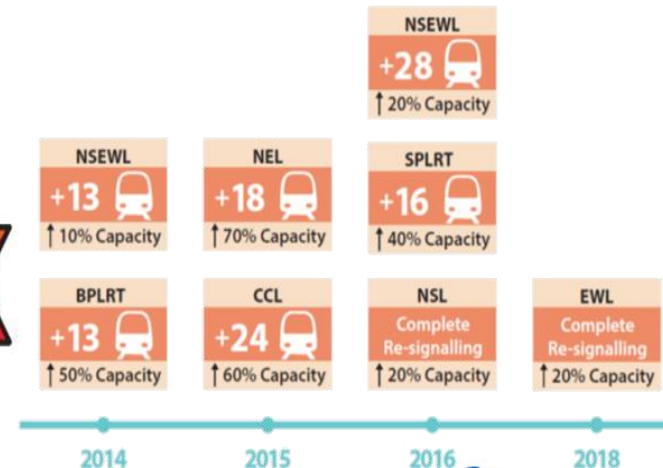


Expansion of rail and bus services



- Increase rail length from **182km** today to **360km** by 2030
- Add new trains
- Improve rail signalling

Bus Service Enhancement Program (BSEP) will introduce 1,000 buses from 2012-2017



Carbon-Emissions based Vehicle Scheme (CEVS)

- Carbon Emissions-based Vehicle Scheme (CEVS) was implemented from 1 Jan 2013 and will be revised from Jul 2015
- Revised Fuel Economy Labelling Scheme (FELS) from 1 Jul 2012 to provide emission information to potential car buyers

Band	Existing CEVS (Till 30 Jun 2015)			Revised CEVS (From 1 Jul 2015)			Rebates/ Surcharges
	Carbon Emission (CO ₂ g/km)	Cars	Taxis	Carbon Emission (CO ₂ g/km)	Cars	Taxis	
A1	Up to 100	\$20,000	\$30,000	Up to 95	\$30,000	\$45,000	Rebates
A2	101-120	\$15,000	\$22,500	96-105	\$15,000	\$22,500	
A3	121-140	\$10,000	\$15,000	106-120	\$10,000	\$15,000	
A4	141-160	\$5,000	\$7,500	121-135	\$5,000	\$7,500	
B	161-210	\$0	\$0	136-185	\$0	\$0	Surcharges
C1	211-230	\$5,000	\$7,500	186-200	\$5,000	\$7,500	
C2	231-250	\$10,000	\$15,000	201-215	\$10,000	\$15,000	
C3	251-270	\$15,000	\$22,500	216-230	\$15,000	\$22,500	
C4	Above 270	\$20,000	\$30,000	Above 230	\$30,000	\$45,000	

Encouraging Walking and Cycling

1. Expanding cycling path network

- Intra-town cycling paths of **190km** by 2020
- Island wide network of **700km** by 2030



2. Walk2Ride Programme

- 200 km of sheltered walkways to be built (stretch 400m around MRT stations)



5 Household Energy Efficiency Programmes

Enhancement of MELS Labels

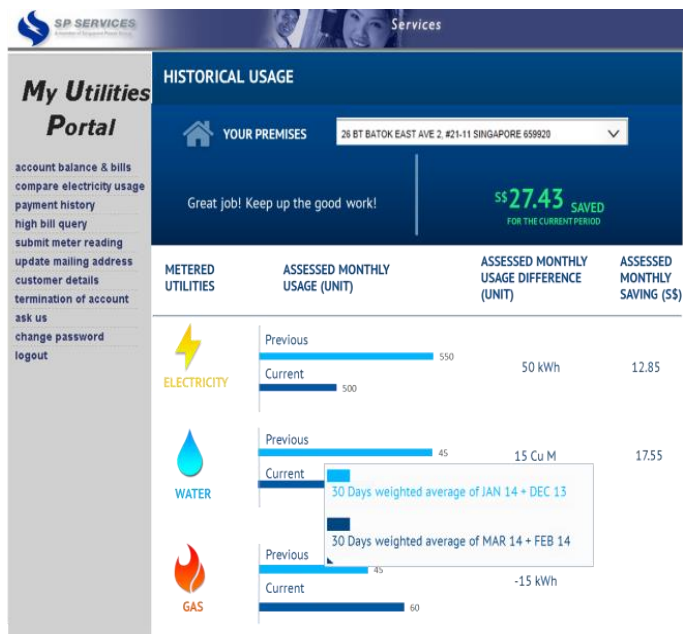


The new label uses a more stringent rating scale that requires appliances to achieve greater energy efficiency for each tick rating. This enables consumers to identify more energy efficient appliances.

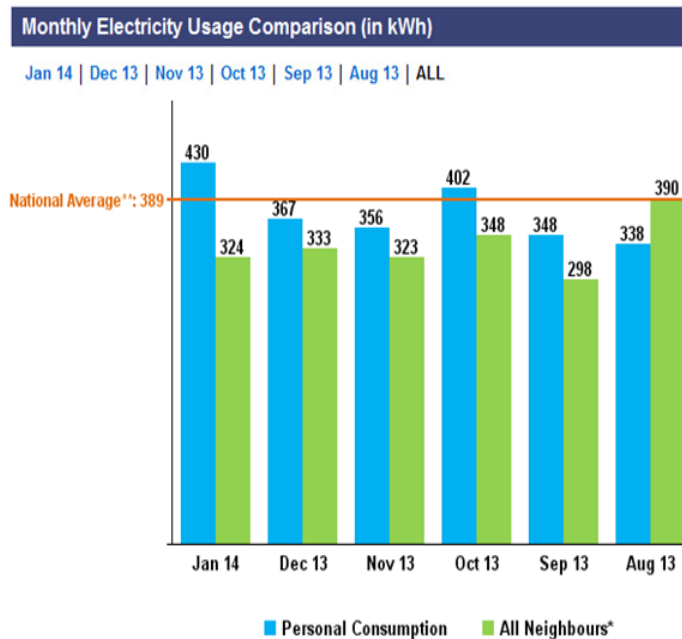
The new label also translates the energy performance into the estimated annual energy cost of using the appliance, so that consumers can consider this when deciding what to buy.

Mobile app to raise awareness for domestic consumers to reduce electricity consumption

Launched a mobile application and upgraded web portal of retailers to spur residential consumers to save energy, water and gas consumption by providing enhanced feedback on their consumption



Web portal



Six-month comparison against peers



Home Utility Audit

For more information

Energy Efficiency (E2) Singapore Website

✓ E2 Singapore Website

- One-stop website for all EE information in Singapore
- Platform to educate and inspire web users to internalize the need for efficient use of energy
- For more information on energy efficiency initiatives, visit www.e2singapore.gov.sg
- <https://www.mypower.com.sg/Services/Interactive%20Bill.html>

Thank You