

Energy Efficiency Potential and Initiatives

Presented to: Regulators Forum

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Outline of Presentation

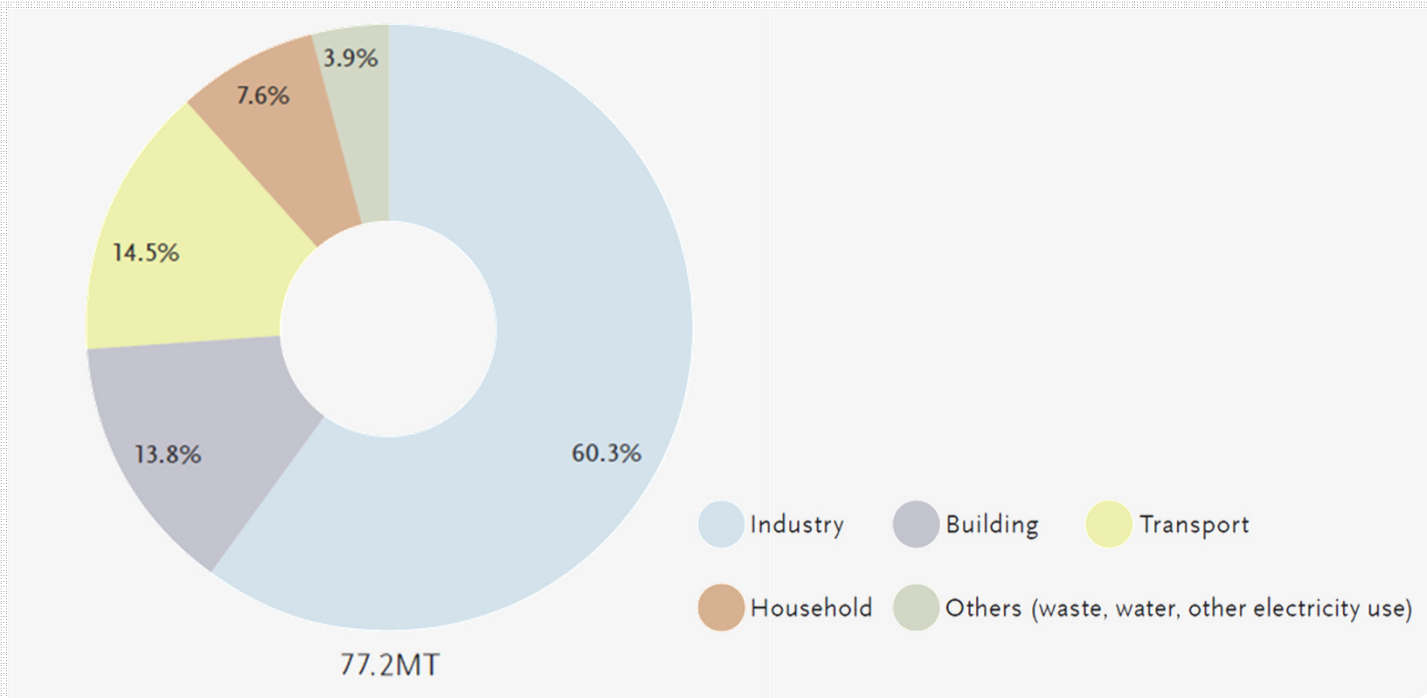
1. Singapore's Energy Profile
2. Energy Efficiency Initiatives



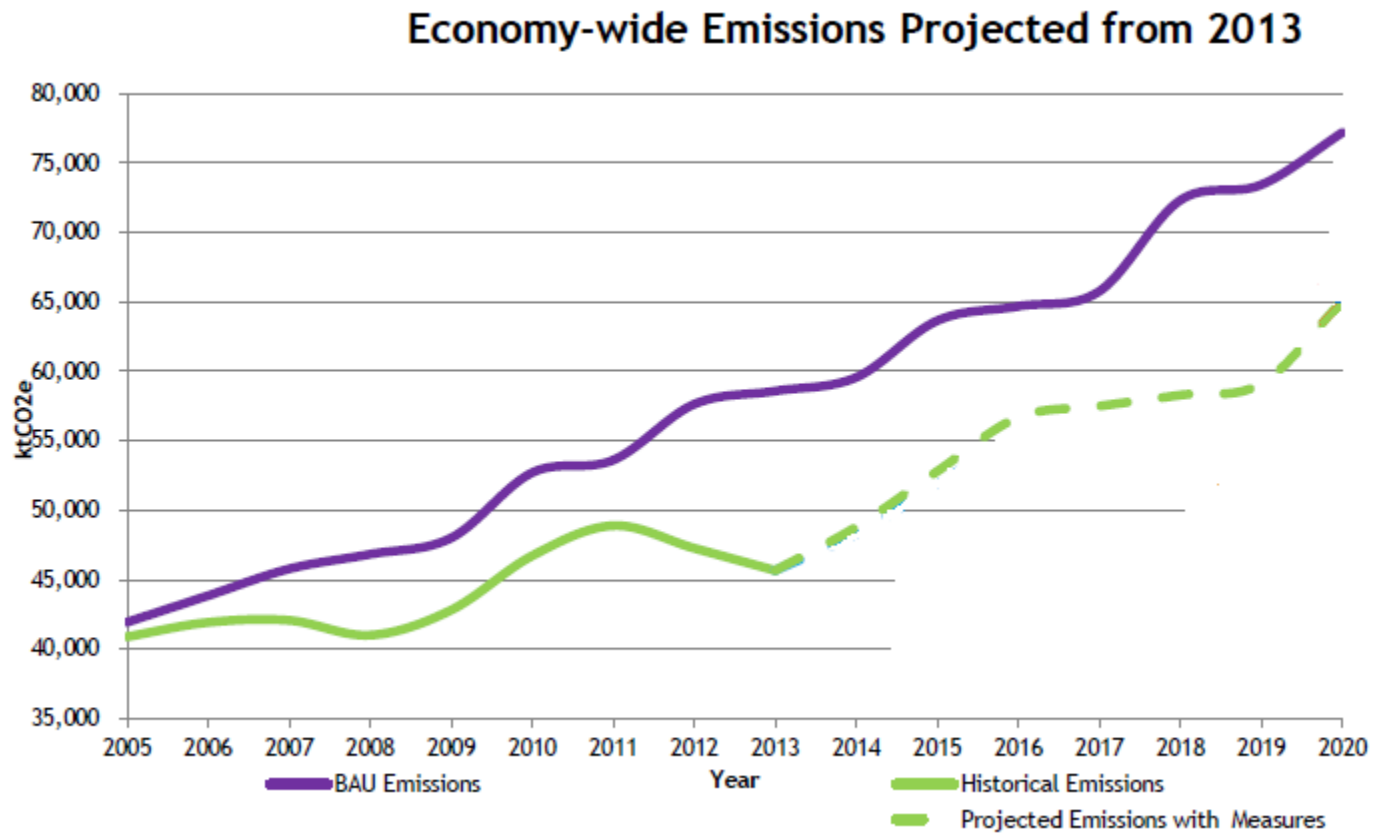
1 Singapore's GHG Profile

Greenhouse Gas Emissions in Singapore

- Singapore's GHG emissions stood at around 43 MT in 2010 & BAU GHG emissions are expected to reach 77 MT in 2020
- Breakdown of projected 2020 BAU emissions:

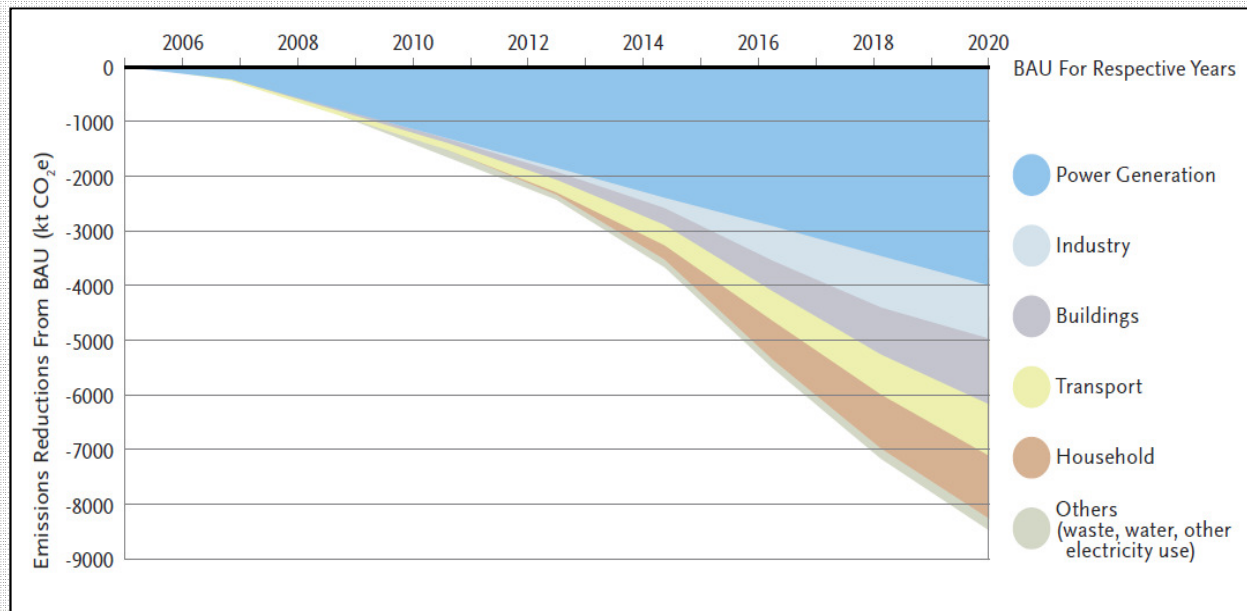


Greenhouse Gas Emissions in Singapore



Mitigation Measures To Reduce Emissions

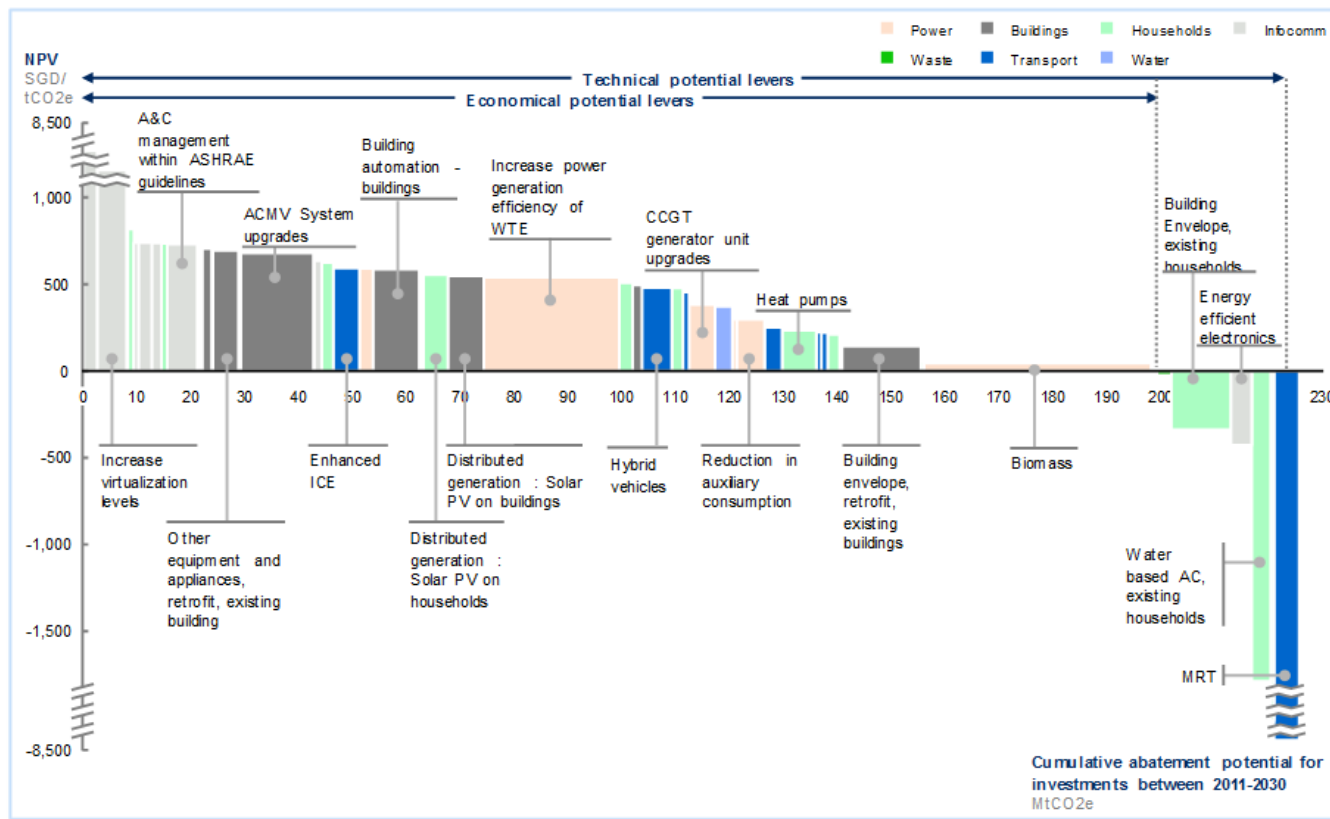
- Key mitigation measures are energy efficiency & fuel switching
- Singapore targets to reduce emissions by 7% to 11% below 2020 BAU levels
- Sectoral contributions to emissions reductions (from BAU)



Mitigation Potential

- All sectors, except manufacturing industry

NPV curve : seven non-industrial sectors

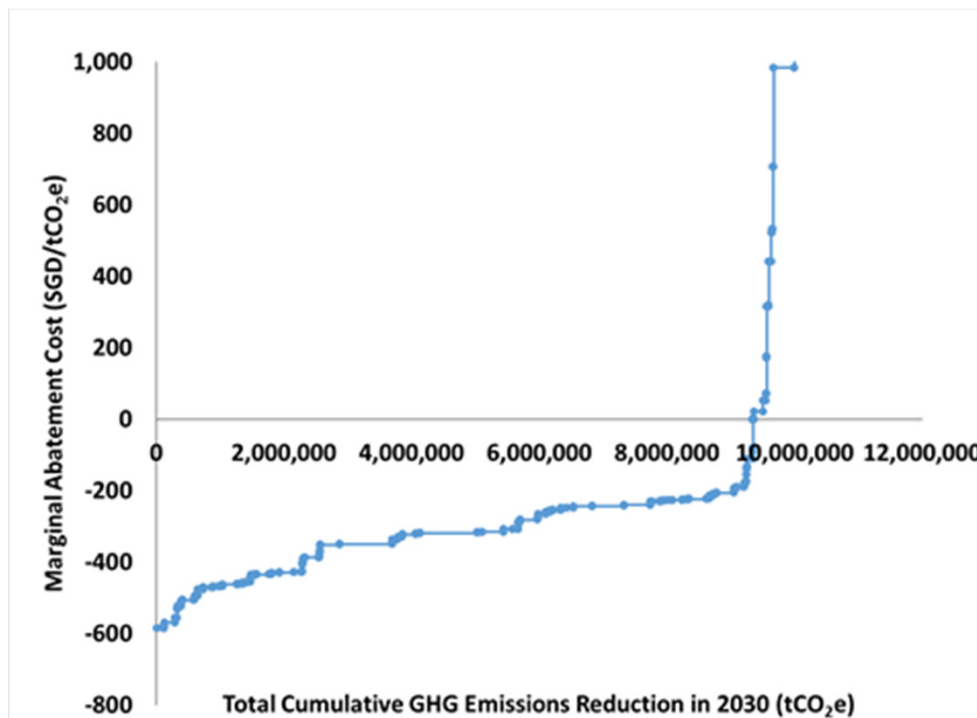


Note: Excludes the cumulative abatement achieved due to demand reduction resulting in avoiding new builds in the power sector

SOURCE: McKinsey analysis

Mitigation Potential

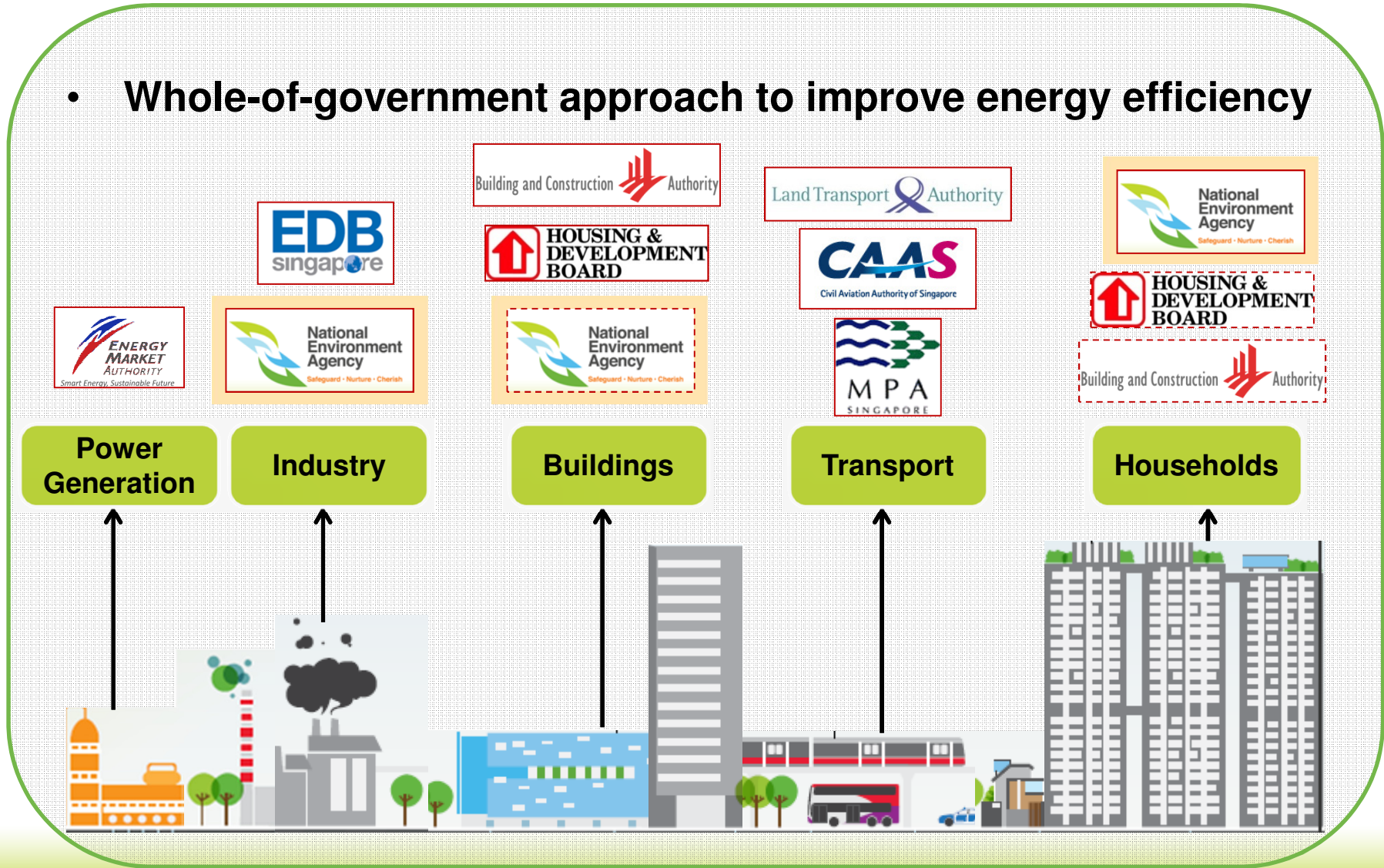
- Manufacturing



Top Ten Measures	MAC in 2030 (SGD\$/t CO ₂ e)	GHG Savings in 2030 (tCO ₂ e)
Minimize operating air pressure	-586	10,722
Low Grade Waste Heat Recovery (Electricity generation: ORC and comparable technologies)*	-586	109,404
Preventative Pump Maintenance	-579	413
Preventative refrigeration/cooling system maintenance	-579	48
Preventative Compressor Maintenance (pneumatic system)	-579	650
Preventative Compressor Maintenance (process air or gas system)	-579	244
Preventative Packaged HVAC Maintenance	-579	1,245
Optimized chilled water temperature and/or optimized condenser temperature	-579	1,290
Optimized condenser pressure	-579	4,014
Impeller Trimming or Inlet Guide Vanes	-569	7,342

WOG Approach on Energy Efficiency

- **Whole-of-government approach to improve energy efficiency**



2 Energy Efficiency Initiatives



Industry



Household



Buildings



Transport

Regulations and Standards



Industry



Mandatory Requirements

✓ Energy Conservation Act

- New requirements on energy management practices introduced for industry and transport sectors in Apr 2013 and Jan 2014 respectively
- Requires energy-intensive users in industry and transport sectors consuming more than 54 TJ of energy each year to
 - Appoint an energy manager;
 - Monitor and report energy use and GHG emissions; and
 - Submit energy efficiency improvement plans



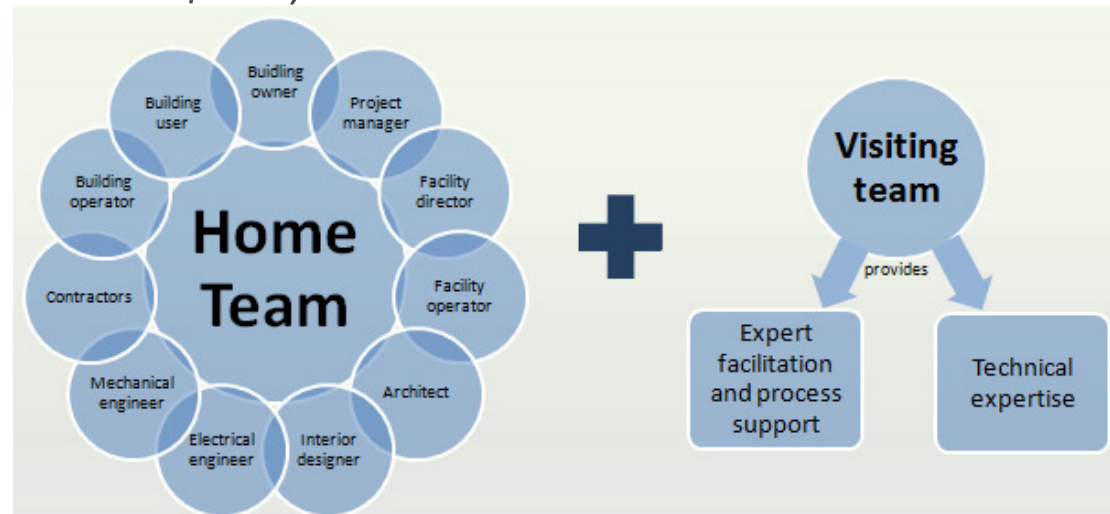
Incentives



Industry

✓ Design for Efficiency Scheme (DfE)

- 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 a design workshop, capped at \$600,000



Incentives



Industry

✓ Energy Efficiency Improvement Assistance Scheme (EASe)

- Encourages companies to engage accredited energy services companies
 - To conduct the detailed energy audit
 - To identify potential areas for energy efficiency improvement
- Co-funds up to 50% of energy audit fee, capped at \$200,000



Incentives



Industry

✓ Grant for Energy Efficient Technologies (GREET)

- Encourages the installation of energy efficient technologies or equipment
- Co-funds up to 20% of the qualifying cost, capped at \$4 million



Incentives



Industry

✓ Investment Allowance (IA)

- Encourages industry to invest in capital equipment that allows them to be more energy – efficient in their operations
- Provides an allowance of 30% or more approved fixed capital expenditure on top of normal 100% capital allowance depending on the % in EE improvement at the facility , equipment or system level



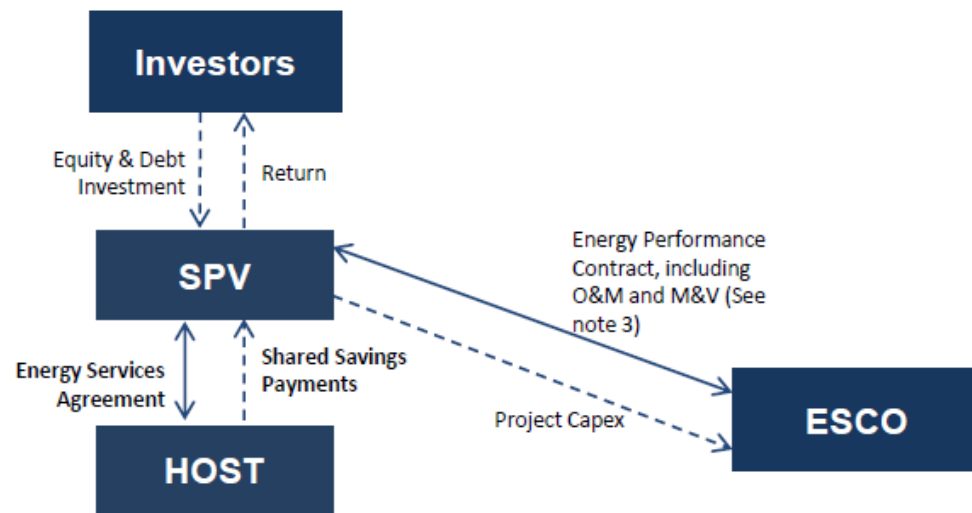
Incentives



Industry

✓ Energy Efficiency Finance Pilot

- Encourages owners and operators of existing industrial and manufacturing facilities to implement EE projects
- Provides project finance to EE projects



Capability Development



Industry

Energy Efficiency National Partnership

Energy Management Systems

- Promote the adoption of Energy Management Systems among partner companies



EENP Learning Network & National Energy Efficiency Conference

- Provide partners with opportunities to learn and share energy efficiency ideas, strategies, technologies, best practices, standards and case studies

EENP Recognition Scheme

- Accord recognition to companies through annual national awards



Capability Development



Industry

Singapore Certified Energy Manager (SCEM) Programme & Training Grant

- Training and certification system in energy management
- Training grant to encourage companies to train their employees under SCEM



Energy Services Companies (ESCO) Accreditation Scheme

- 19 accredited ESCOs and 27 Qualified Energy Services Specialist (QuESS)



* Requirement for energy managers under the ECA

Regulations and Standards



Households



Mandatory Requirements

✓ Minimum Energy Performance Standards (MEPS)

- Improve average efficiency of household appliances by setting minimum energy efficiency standards
- Implemented for air-conditioners and refrigerators in Sep 2011
 - Standards raised in Sep 2013
- Extended to clothes dryers in Apr 2014

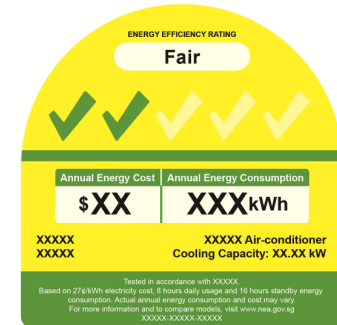
Regulations and Standards



Households

✓ Mandatory Energy Labelling Scheme (MELS)

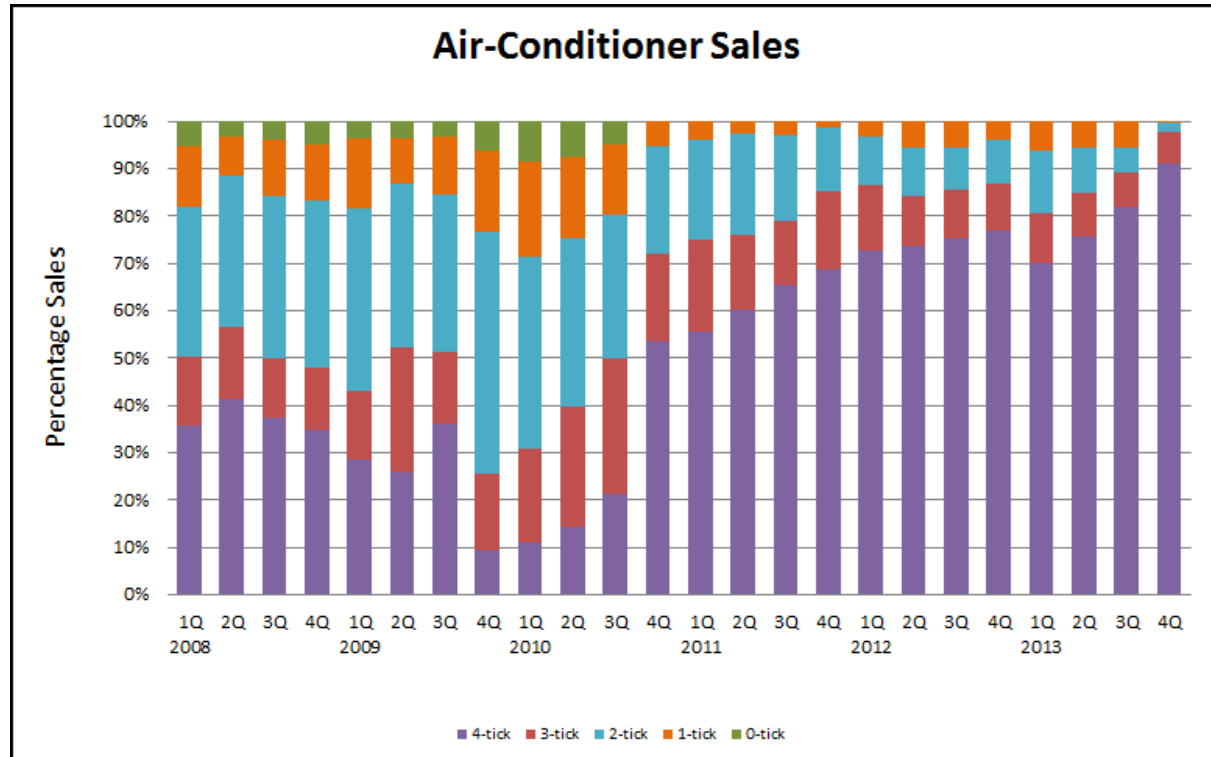
- Allows consumers to compare energy efficiency performance and lifecycle costs of different appliance models in order to make informed purchasing decisions
- Revised energy label and rating system introduced in Sep 2014
- Covers air-conditioners, refrigerators, clothes dryers, televisions and lighting



Regulations and Standards



Households



Public Messaging



Household

✓ 10% Energy Challenge

- Programme to help households reduce electricity bills by educating them on simple energy saving measures and habits.
- 6 Key EE Tips for Publicity



- Use a fan instead of an air-conditioner to keep cool.



- Consider running the air-conditioner for a short while and switch to a fan after that to cool the room.



- Switch off home appliances at the power socket



- Switch off the water heater after a shower



- Choose EE lighting

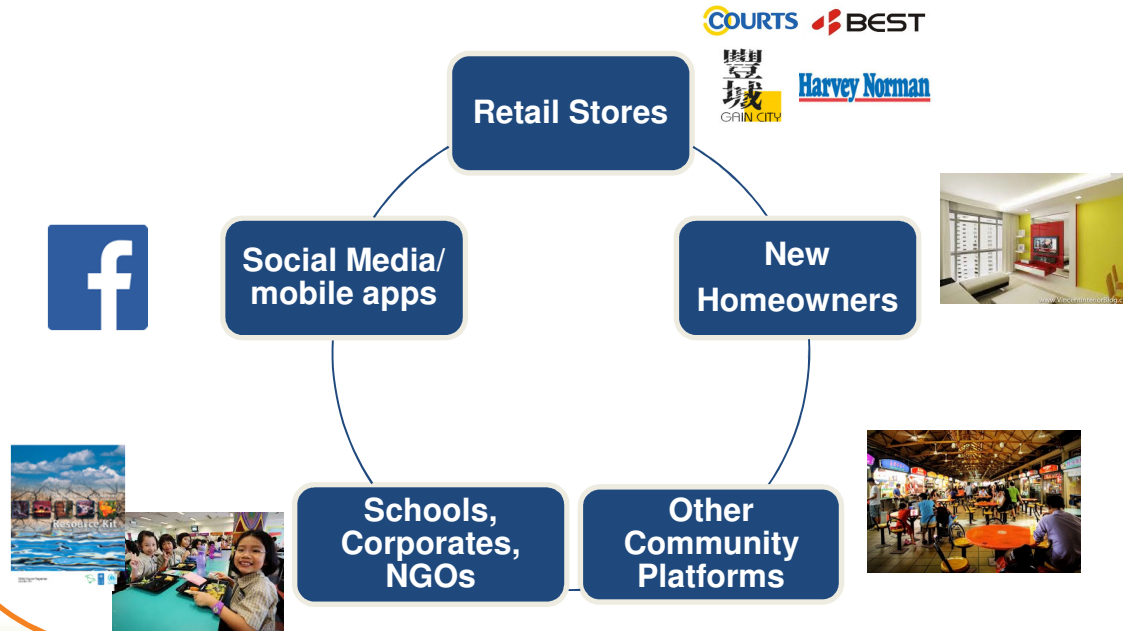
- Choose EE models of household appliances that have more ticks on the energy label.

Public Messaging



Households

Target audience		Key Benefit	Platforms to Engage
<u>Primary</u> Homemakers/ Working adults*		Monetary savings*	<ul style="list-style-type: none"> • Retail stores • Community platforms
<u>Secondary</u> Students		Environment/ Climate change	<ul style="list-style-type: none"> • Schools



* MEWR COMBI study shows female homemakers and working adults are the main influencers of EE behaviours in households, and monetary saving is the main motivation for households EE practices.

Public Messaging



Households

✓ Mobile applications

- Life Cycle Cost Calculator & Home Energy Auditor mobile phone apps



✓ Community Outreach Programmes by 5 Regional Offices



Regulations and Standards



Buildings



Mandatory Requirements



✓ Green Mark (GM) Certification

- Minimum environmental sustainability standard (Green Mark Certified Level) is required for new buildings with an area of at least 2,000 m², and existing buildings comprising hotel, retail or office with an area of 15,000m² or more, when the building cooling systems is installed or replaced

✓ Building Control (Environmental Sustainability Measure for Existing Buildings) Regulations

- Require building owners to :
 - Submit building info & energy consumption data
 - Achieve min GM Standard for existing buildings
 - Submit periodic EE audit of building cooling system

Regulations and Standards



Buildings



Voluntary Standards

✓ Green Mark Certification

- Assess environmental performance of buildings and other infrastructure
- 4 Green Mark levels
 - Certified, Gold, Gold^{PLUS}, Platinum

✓ SS564: Singapore Standard for Data Centres (DC)

- Management system standard that provides DC with a recognised framework & logical and consistent methodology to achieve EE

Regulations and Standards



Buildings



Mandatory Standards

✓ Public Sector Taking The Lead in Environmental Sustainability (PSTLES)

- Public agencies to adopt environmentally sustainable practices that are cost beneficial

Energy	Water	Waste
Energy Audits	Water Efficient Building	Recycling Programme
Chiller Plant Eff.		
Indoor Air Temp.		
Data Centre		
Energy Star		
Training		
Eco-Office		
Green Mark		

Incentives



Buildings



✓ Green Mark Incentive Schemes

❖ Gross Floor Area

- Allows developers to build additional floor area if they achieve higher-tier Green Mark levels

❖ Existing Buildings and Premises (*NEW)

- Provides building owners & tenants with grants to undertake Energy Efficiency Improvement Works involving the installation of energy efficient equipment

❖ Design Prototype

- Provides developers and building owners with grants to focus effort at the design stage to strive for higher energy efficiency levels beyond Green Mark Platinum standards

❖ Building Retrofit Energy Efficiency Financing (BREEF)

- Provides loans to building owners and energy services companies to carry out energy retrofits

Promoting EE in Transport Sector



Transport

- ✓ **Promote public transportation via bus and rail**
- ✓ **Promote non-motorised transport like cycling and walking**
 - Through provision of off-road cycling path network in selected towns to improve connectivity from their homes to MRT stations, bus interchanges and key amenities

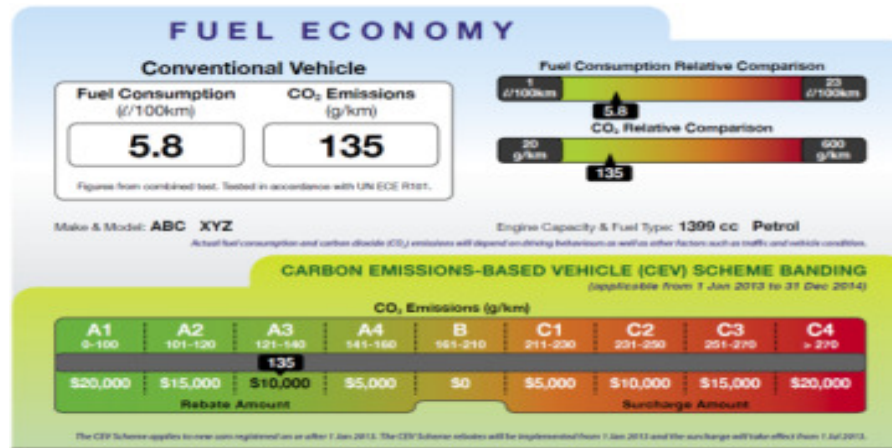
Regulation and Standards



Transport

✓ Fuel Economy Labelling Scheme (FELS)

- Helps car buyers to choose fuel-efficient vehicles by highlighting each vehicle model's fuel consumption per 100 km



Incentives



Transport



✓ Carbon Emissions-based Vehicle Scheme (CEVS)

- Fee-bates to encourage consumers to shift to fuel efficient and low emission vehicle models

Band	Previous 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	

Information



Industry



Household



Buildings



Transport

✓ 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



Our Environment

Safeguard • Nurture • Cherish