

Sixth Regional 3R Forum in Asia and the Pacific

Plenary Session 2 :

Enabling a 3R Science-Policy-Business Interface in Building Smart, Resilient, Inclusive, Low Carbon and Sustainable Cities and Communities

Sustainable Waste Management and Energy and Resource Efficiency ~ Case of Singapore

17 Aug 2015

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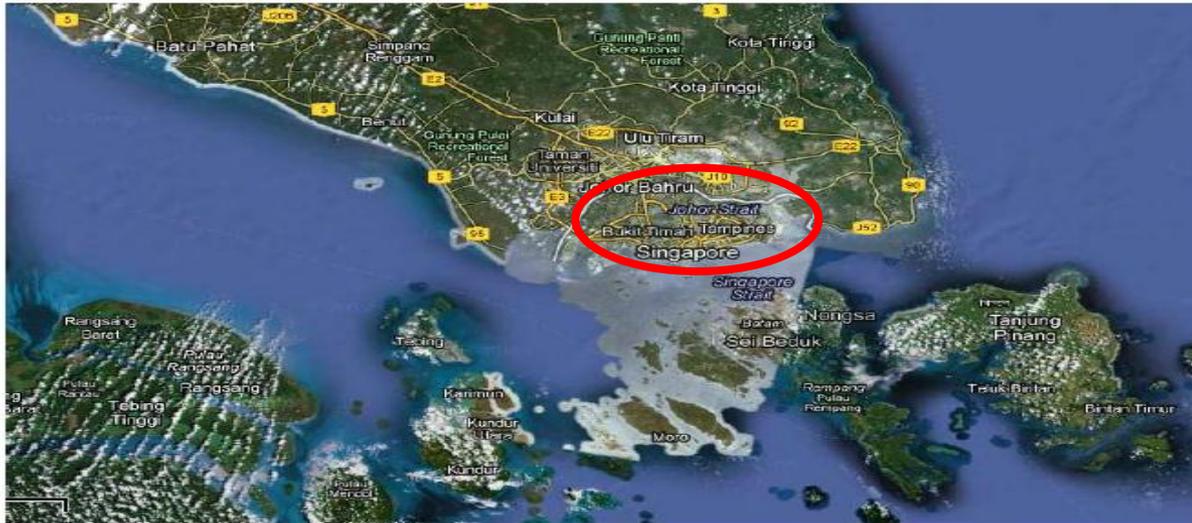
Outline

1. Introduce Singapore
2. Sustainable Singapore Blueprint (SSB) 2015
3. Case examples of Overcoming Resource Constraints
 - Sustainable Waste Management
 - Promoting Energy Efficiency



1 Introduce Singapore

Introduce Singapore



**Country and a
City-State**

**Small Land Area
718.3 km²**

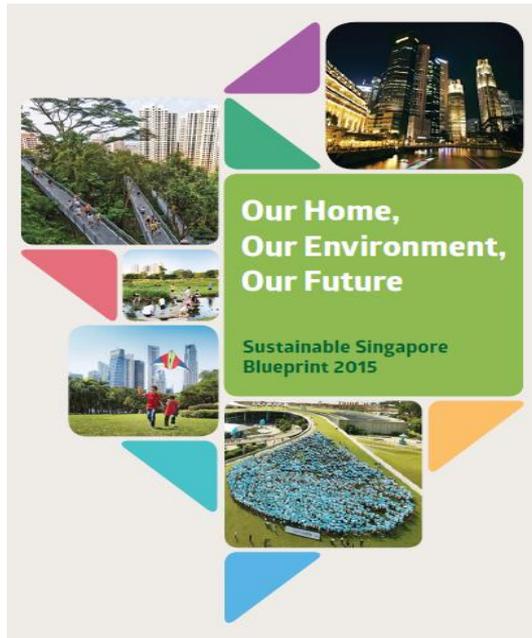
**Dense Urban
Setting
5.47 mil population**

**Limited Natural
Resources**



2 Singapore Sustainable Blueprint (SSB) 2015

Sustainable Singapore Blueprint 2015



- Sustainable Singapore Blueprint 2015 (SSB2015) was launched in Nov 2014
<http://www.mewr.gov.sg/ssb/>
- It outlines national vision with new and bold plans to create a more liveable and sustainable future for Singaporeans
- Every Singaporean has an important part to play in realising our vision for :

**A Liveable &
Endearing
Home**

**A Vibrant &
Sustainable
City**

**An Active &
Gracious
Community**

Key Focus Areas for SSB 2015

**A Liveable &
Endearing
Home**



“Eco-Smart” Endearing Towns



A “Car-Lite” Singapore

**A Vibrant &
Sustainable
City**



A Zero Waste Nation



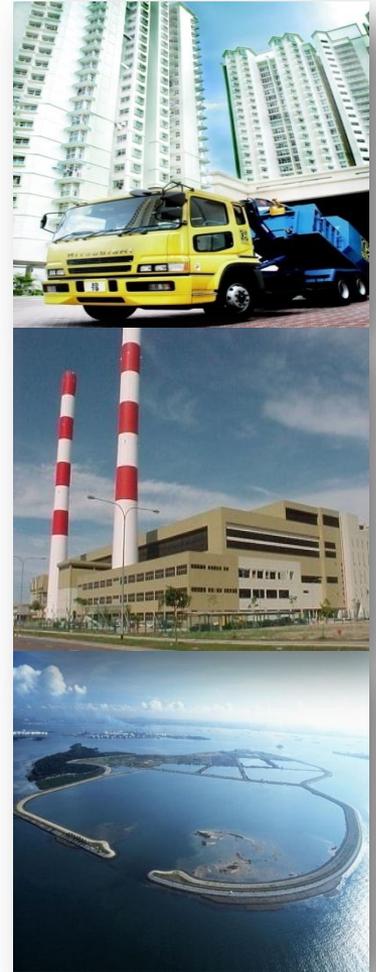
A Leading Green Economy



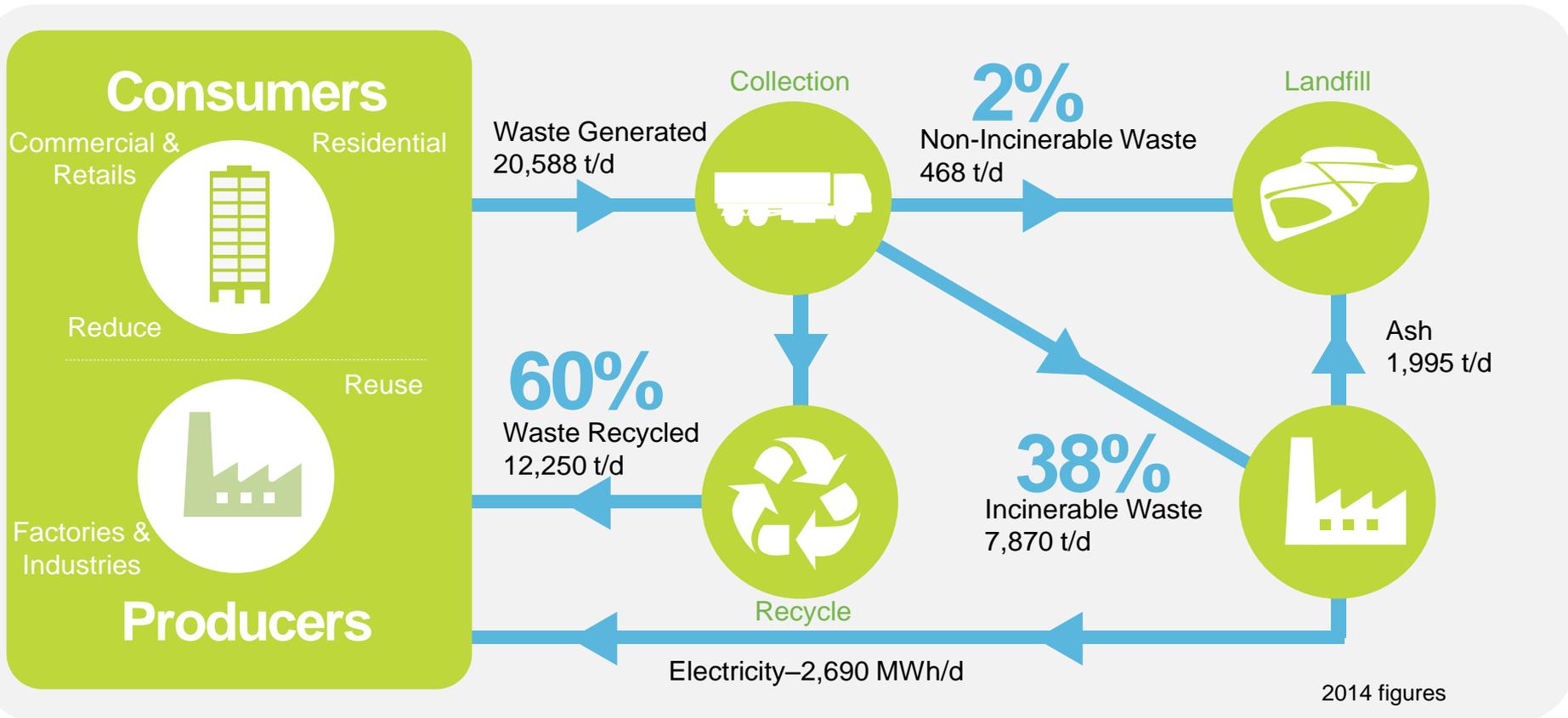
**An Active & Gracious
Community**

3 Case examples of Overcoming Resource Constraints

Case Examples: Sustainable Waste Management



Overview of our Waste Management System



SSB 2015: Target to achieve 70% overall recycling rate by 2030

Waste Management Strategies

To enhance the sustainability of our system as solutions to the waste growth challenge are being developed

Minimisation / Prevention

- Promote efficient use of resources in production processes
- Promote 3Rs & waste segregation at source in homes & businesses



Recycling

- Maximise resource recovery from waste
- Adopt better recycling methods to sustain clean environment



Waste-to-Energy / Volume Reduction

- Adopt innovative technology to maximise energy recovery, minimise ash & land use



Landfill

- Minimise waste to landfill



Enhancements to National Recycling Programme

Homes



Introducing enhancements to increase recycling accessibility & convenience

1 recycling bin for every block of flats rolled out in **2014**

Dual chutes (refuse and recycling) systems for all new public housing projects

Explore dual chutes to private housing projects

PWCS in selected HDB developments

Save-As-You-Reduce pilot projects in selected HDB blocks



Dual Chute System



Pneumatic Waste Conveyance Systems (PWCS) for GreenPrint at Yuhua

Singapore Packaging Agreement (SPA)

Businesses



Voluntary industry-government platform to promote packaging waste 3Rs

1st SPA launched in **July 2007**

20,000 tonnes of packaging waste avoided & **SGD44 mil** saved

2nd SPA has been **extended till 2020**

Introduce **Logo for Products with Reduced Packaging**

Develop **Packaging Benchmark Database**

Enhanced **Recognition** under 3R Packaging Awards



Recipients of 3R Packaging Awards 2014 with Min (EWR)



Mandatory Waste Reporting

Commercial Premises



Commercial premises can benefit by recycling more & saving on waste disposal cost

Large hotels & malls are required by law to submit waste reduction plans & targets from 2015

Working with hotels and malls to improve their waste management practices

Premises can tap on 3R Fund to co-fund initiatives on waste minimisation and recycling

Large Commercial Premises =



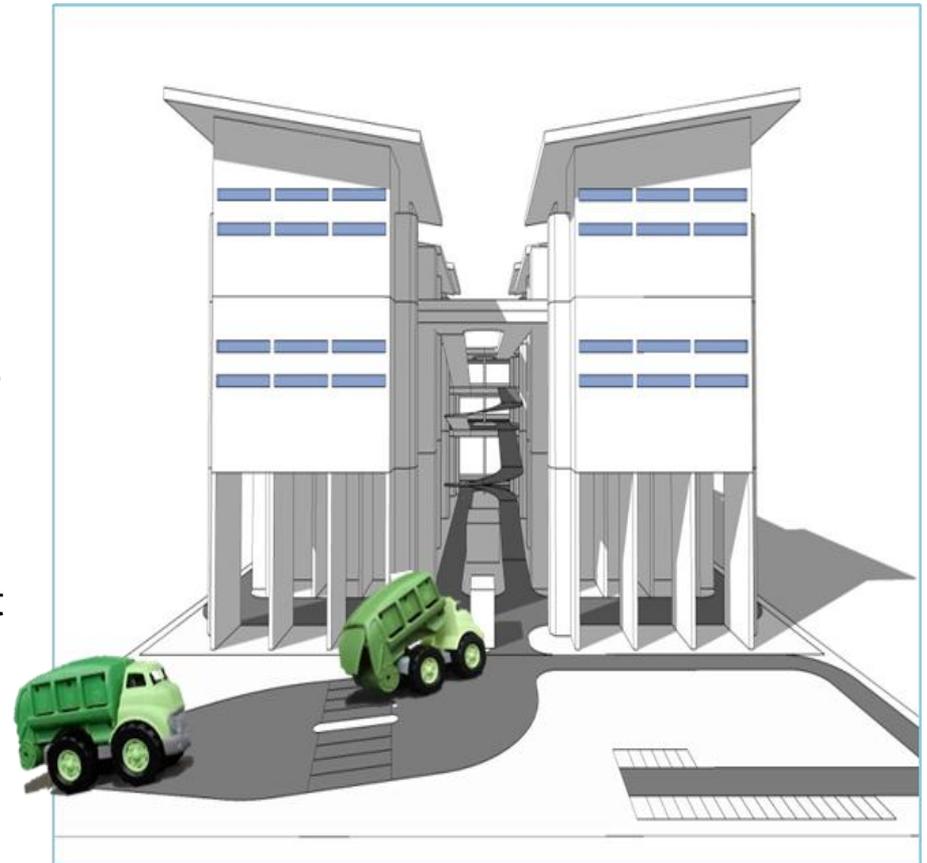
3R Awards and Seminar for Hotels 2014

Multi-Storey Recycling Facility (MSRF)

Making Land Available for Recycling

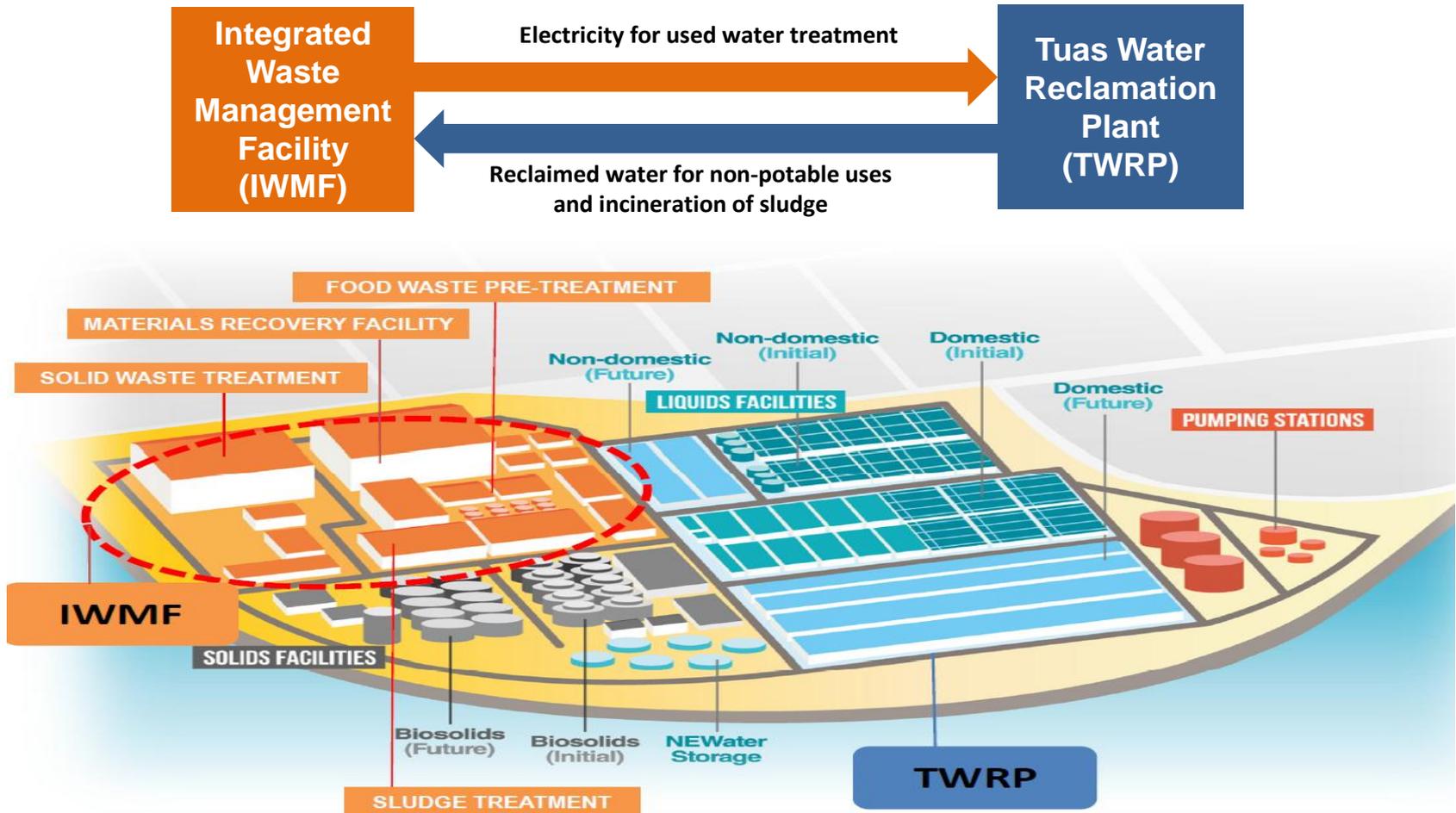
Increasing recycling rate = More land needed

- Potential land saving for higher value-added economic activities by consolidating recycling activities within the facility
- Exploring feasibility to develop a MSRF
 - A multi-storey, multi tenanted facility processing different waste streams that could share common facilities and services e.g. weighbridges, parking depot



Integrated Waste Management Facility (IWMF)

Realising Waste-Water-Energy NEXUS



This is an artist impression of the IWMF

Incineration Bottom Ash (IBA) Metal Recovery

Increasing Resource Recovery

- Increase resource recovery and extend the lifespan of Semakau Landfill
- Capacity: process up to 1,800 t/d of IBA
- Resource recovery: 90% of the ferrous metals of size above 4mm and a non-ferrous metals above 2mm
- Commenced operation: July 15



Semakau Landfill Phase II Development

Maximise Lifespan of Semakau Landfill

A single cell was created to form Phase II of the landfill, which was designed to:

- maximise the landfill capacity
- minimise the amount of sand used
- lowering the overall construction cost



To strive towards a “ZERO WASTE NATION”

- Reduce consumption, reuse and recycle all materials to conserve precious resources and free up land for more meaningful uses
- The Government, community and businesses will come together to put in infrastructure and programmes



Case Example:

Promote Energy Efficiency

Mitigation Measures To Reduce Emissions

Singapore's Intended Nationally Determined Contribution

2005

36% reduction in Emissions Intensity;
Stabilise emissions with the aim to peak around 2030

2030

Examples of New/Enhanced Sectoral Measures



Power Generation

Adopt more efficient technologies

Facilitate greater deployment of solar PV



Buildings

Raise energy efficiency standards

Support on-site generation of solar energy



Households

Raise energy efficiency of household appliances

Promote energy-saving behaviour



Industry

Improve energy efficiency

Provide incentives

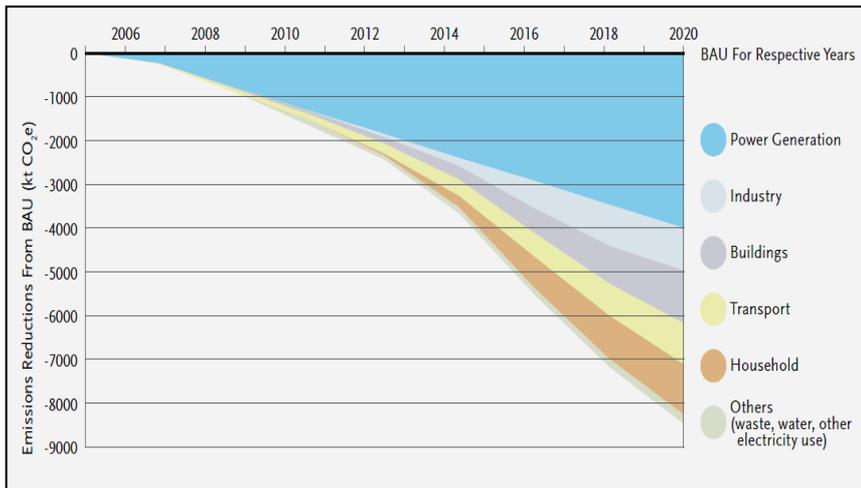
Strengthen regulations



Transport

Increase public transport mode share

Encourage walking and cycling



Mitigation target up to 2020

Whole-of-government approach to implement mitigation measures

Power Generation



Industry



Buildings



Transport



Households



Industry Sector

Mandatory Energy Management Practices



- Energy-intensive factories consuming ≥ 54 TJ /yr must:
 - appoint an energy manager;
 - monitor and report energy use and GHG emissions; and
 - submit energy efficiency improvement plans
- Sectors covered:
 - manufacturing & related services
 - supply of electricity, gas, steam, compressed air & chilled water
 - water supply & sewage & waste management

Incentives & Capability Building Programmes



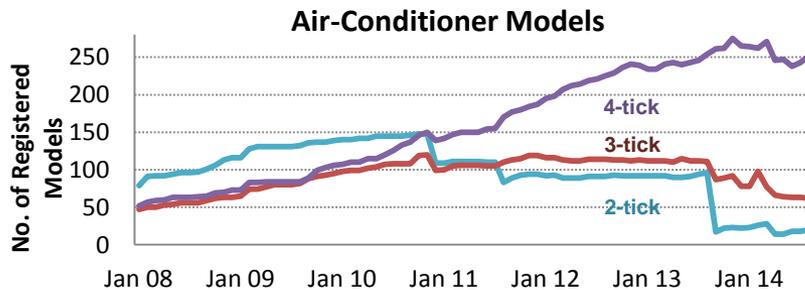
- Incentive schemes to help companies:
 - conduct energy audits;
 - implement energy saving measures; and
 - manage their energy use
- Capability building programme to:
 - raise awareness and stimulate interest among companies
 - train professionals in energy management

Households Sector

Regulations & Standards



- Mandatory Energy Labelling Standards (MELS) for air-cons, fridges, clothes dryers, TVs and lamps
- Minimum Energy Performance Standards (MEPS) for air-cons, fridges, clothes dryers and lamps



Higher number of registrations of more energy efficient models since MELS and MEPS introduction

Public messaging initiatives



- Outreach initiatives to raise households' awareness of energy saving habits
- Mobile applications :
 - NEA energy audit
 - Life Cycle Cost Calculator
- E2 Singapore website:
 - One-stop website for all EE information in Singapore

Public Sector

Framework for Public Sector Takes the Lead in Environmental Sustainability (PSTLES) 2.0

Put in place management process to drive sustainability efforts

Sustainability Manager



Sustainability Targets

Energy	Demonstrate savings equivalent to 15% reduction from FY13 levels
Renewables	Phase in targets after feasibility study
Water	Reduce Water Efficiency Index by 5% from FY13 levels
Waste	Phase in targets after FY15

Resource Management Plan



Build technical capability & enhance support

Training grants & learning network



Technical support from the Environmental Sustainability Advisory team



NEA, BCA, PUB, EDB

Demonstration projects (achieve savings beyond WOG sustainability targets)



Building energy management system



Deep retrofit



Integrative design



Food waste digester

Our Environment

Safeguard • Nurture • Cherish