Singapore's Renewable Energy Initiatives

APEC EGNRET
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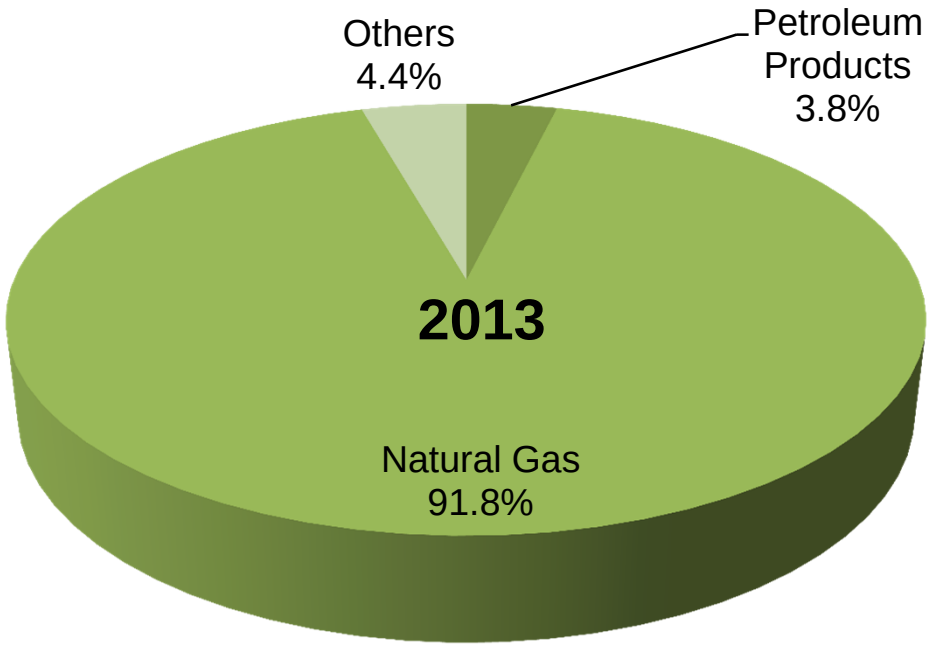
Singapore's Energy Mix

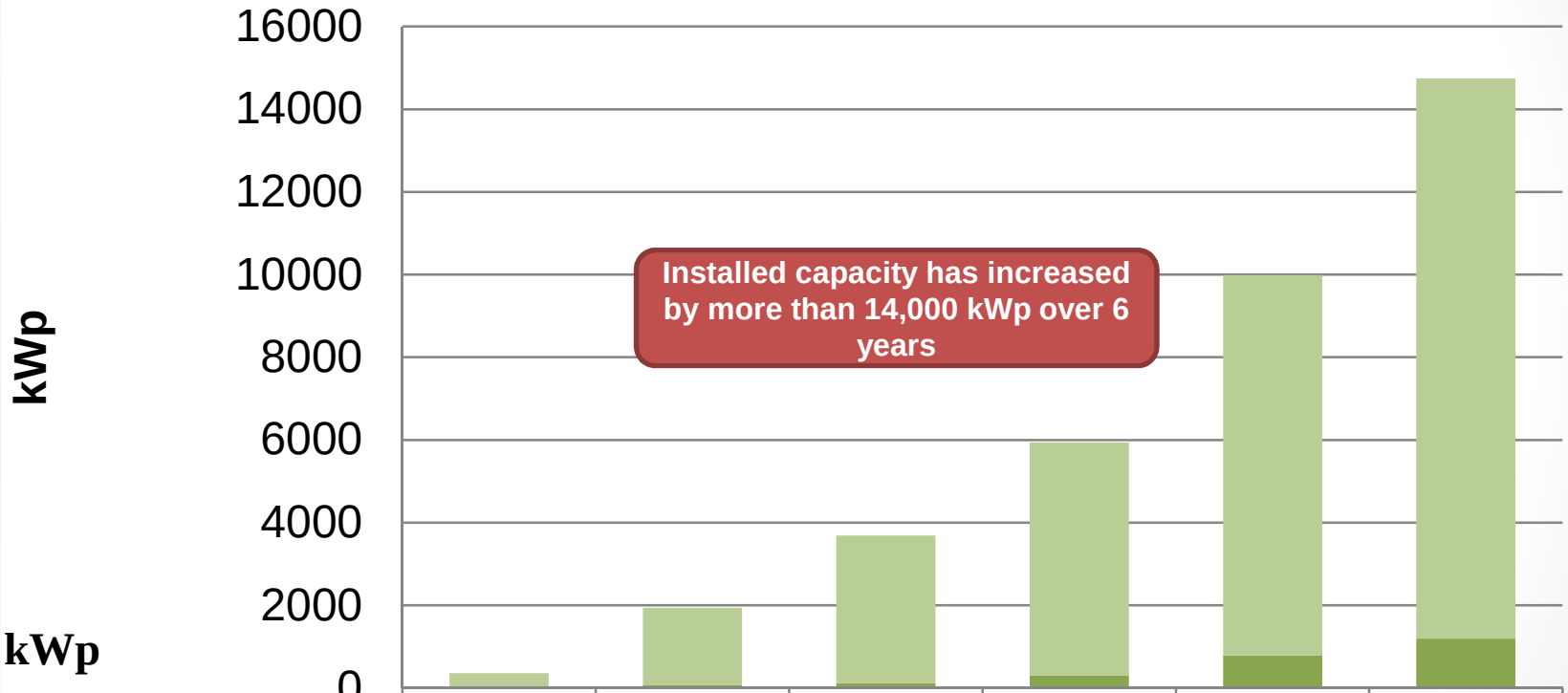


- **Singapore is an energy importer that is highly dependent on fossil fuels to power our economy**
- Constraints with renewable energy development: no hydro or geothermal resources
- Low wind speed (2m/s) and limited scope for solar energy

Promoting a Dynamic Energy Sector

Solar Energy

Installed capacity of solar PV systems



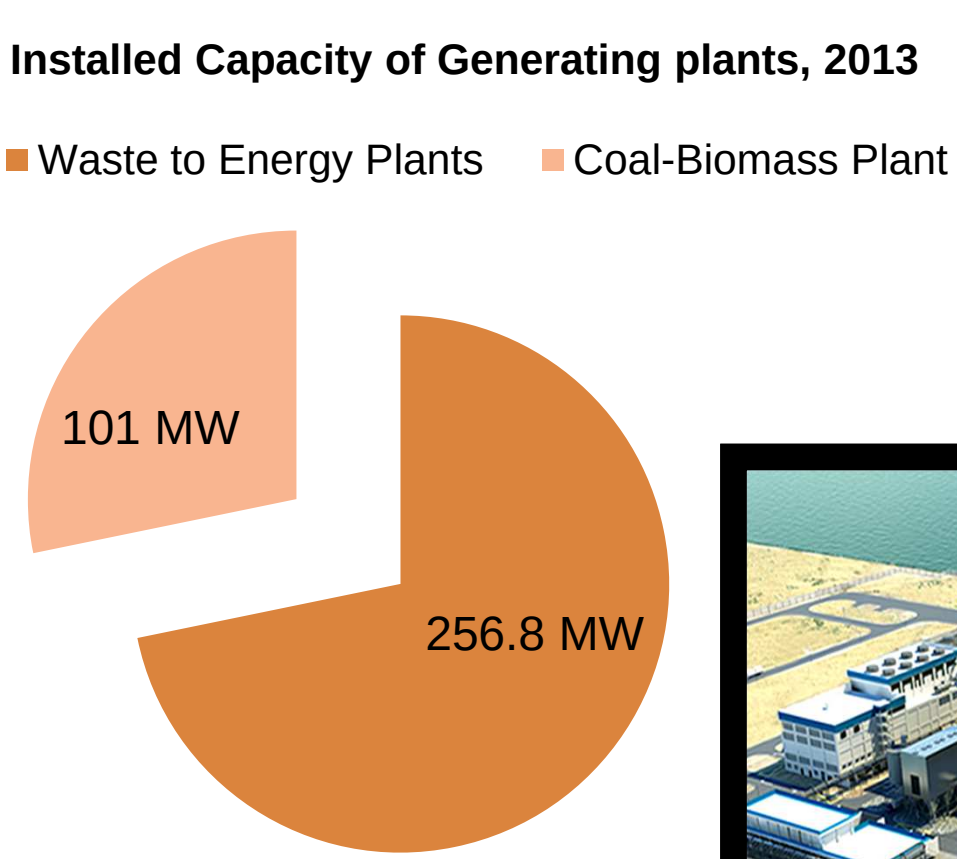
kWp

	2008	2009	2010	2011	2012	2013
Non-residential	319.1	1,866.5	3,574.6	5,632.7	9,198.6	13,548.
Residential	42.9	76.0	111.6	305.4	790.7	1,198.0

Promoting a Dynamic Energy Sector

Waste-to-Energy & Biomass Plants

- WTE Installed Capacity: **256.8 MW**
- Coal – Biomass Capacity: **101 MW**

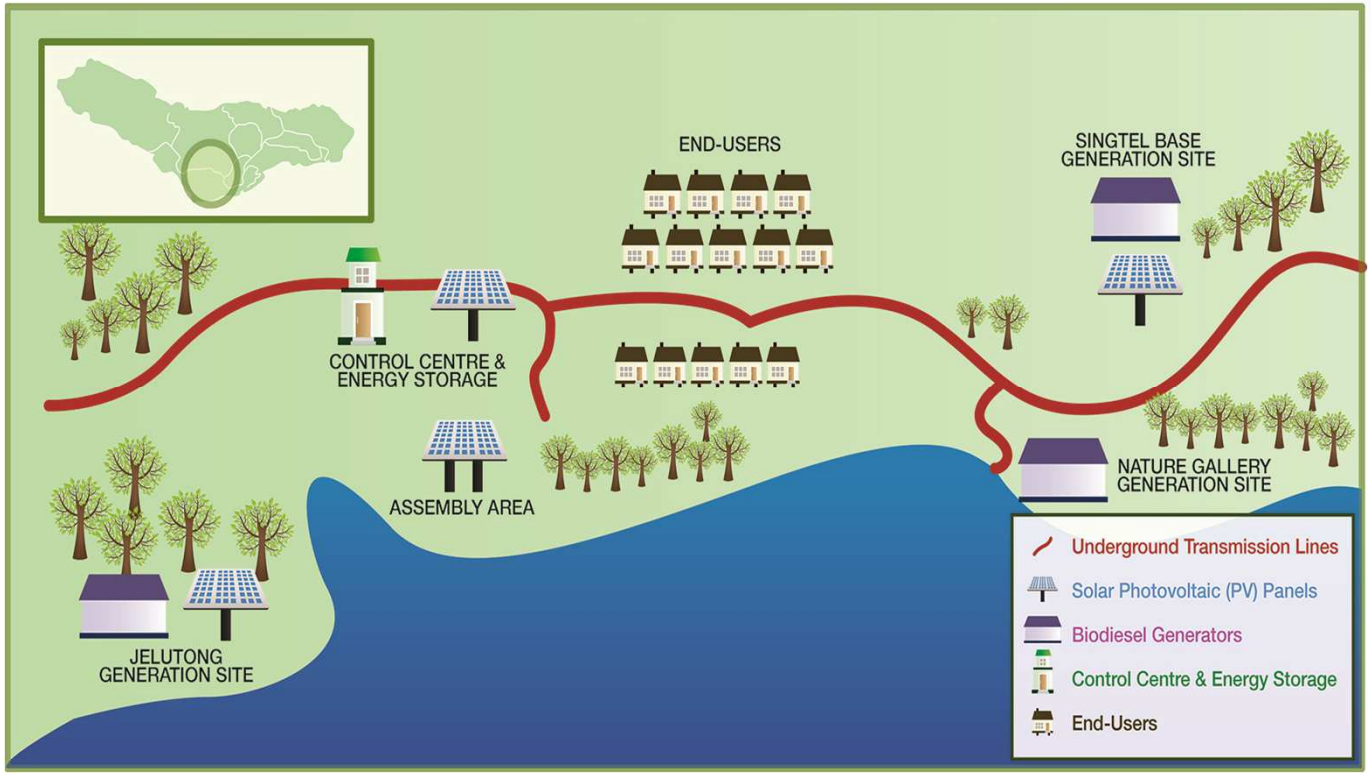


Tembusu Multi-Utilities Complex at Jurong Island

Biomass Clean Coal (BMCC) cogeneration plant complex burns coal, wood chips, palm kernel shells and gas or diesel to supply steam and electricity to industries in Jurong Island. Each boiler is highly efficient and has the capacity to produce up to 450 tonnes of steam per hour per unit.

Promoting a Dynamic Energy Sector

Pulau Ubin Micro-grid Test-bed



EMA launched a micro-grid test-bed at the jetty area of Pulau Ubin in Oct 2013. The test-bed aims to assess the **impact of intermittent energy sources like solar on power quality and stability.** Participating end-users enjoy **clean, reliable and cost-competitive electricity**.

Promoting a Dynamic Energy Sector

Pulau Ubin Micro-grid Test-bed

Previously

- Electricity from diesel generators is…
  - Pollutive and noisy
  - Costly (~S$1.50/kWh)
  - Unreliable due to frequent breakdowns
- Businesses are unable to scale up operations

Diesel generators on Pulau Ubin

Today

- Electricity supply that is…
  - Clean
  - Cost-competitive (~S$0.80/kWh)
  - Reliable
- Enables businesses to scale up their operations
- About 30 end-users have signed up for the test-bed

Appointed Consortium: DLRE OKH

Pulau Ubin Micro-Grid Test-bed

Review of the Regulatory Framework for Intermittent Generation Sources

Objective:

- To maximise the potential deployment of renewable energy sources in Singapore when technologies become commercially viable

Areas of focus:

- To simplify market registration procedures to allow small consumers with intermittent generation sources to be paid for supplying their excess electricity to the grid
- To implement a dynamic pathway framework based on the Intermittent Generation Threshold and Intermittent Generation Limit instead of the current hard cap framework
  - As a first step, we have raised the current hard cap from 350MWp to 600MWp
- To consider the implementation of a pricing mechanism to address the positive externalities of intermittent generation sources

Thank You