What lies ahead for Singapore's industrial energy efficiency landscape? Scaling up the market with innovative solutions

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Overview

- About Singapore
- Singapore's Industrial Energy Efficiency Landscape
  - Singapore's Industrial Sector
  - Existing Mitigation Measures
  - Key Challenges in driving Industrial Energy Efficiency
- What lies ahead?

Singapore

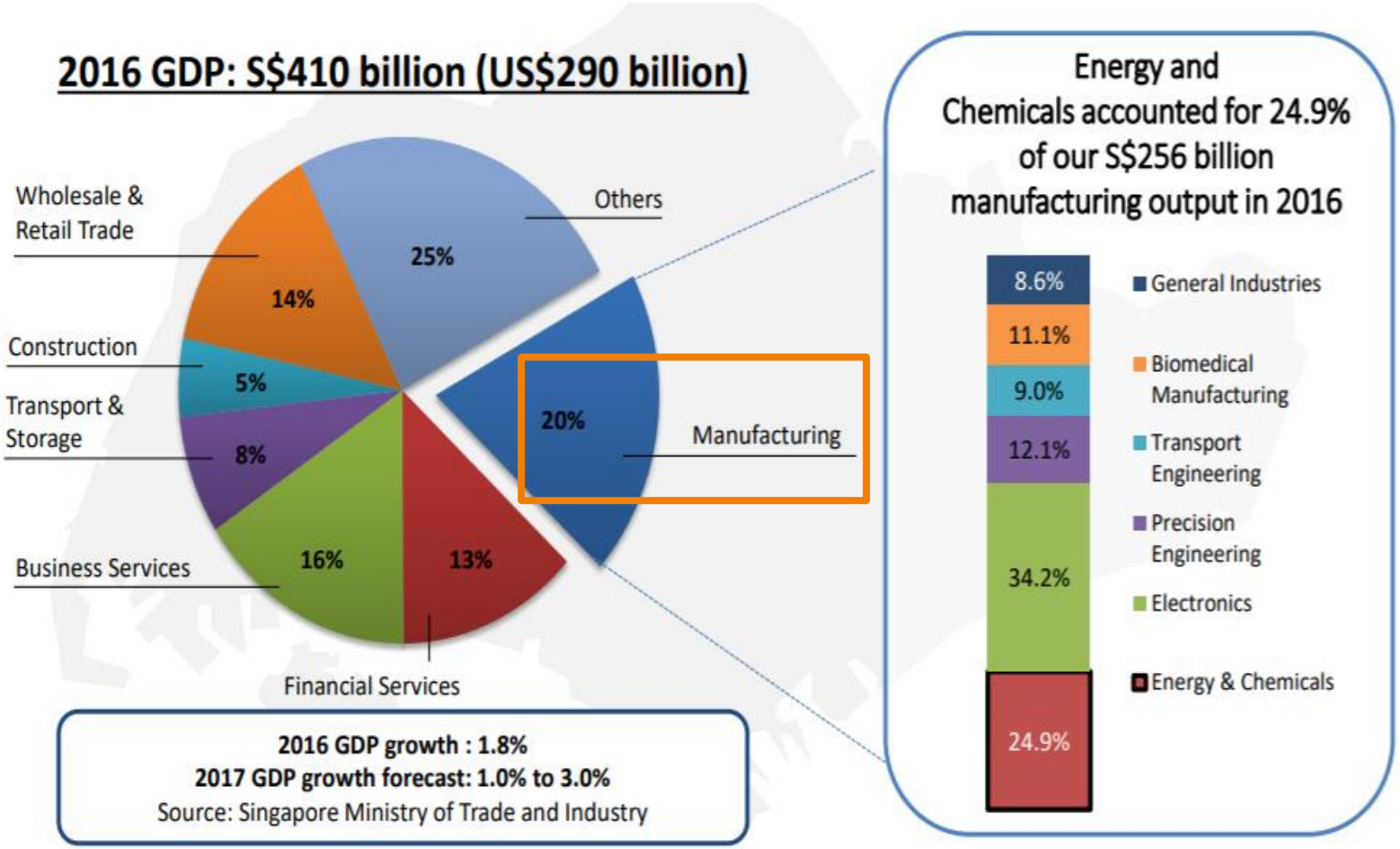
- **About Singapore**
  - Nominal GDP: S$491 billion in 2018
  - Per capita GDP: S$87,108 in 2018
  - Contribution to 0.11% of global emissions
  - Per capita emissions: 27th of 142 countries based on IEA 2018 data.
  - Carbon Intensity (Emissions per $GDP): 126th of 142 countries based on IEA 2018 data.
  - Renewable disadvantage country

"Everything else must bend at the knee to safeguard the existence of our island nation"
– Prime Minister Lee Hsien Loong, NDR 2019

- **Singapore's 2030 pledge (Intended Nationally Determined Contribution, 2015)**
  - To reduce Emissions Intensity by 36% from 2005 levels by 2030 (0.176 → 0.113 kgCO2e/S$GDP), and stabilize our GHG emissions with the aim of peaking around 2030

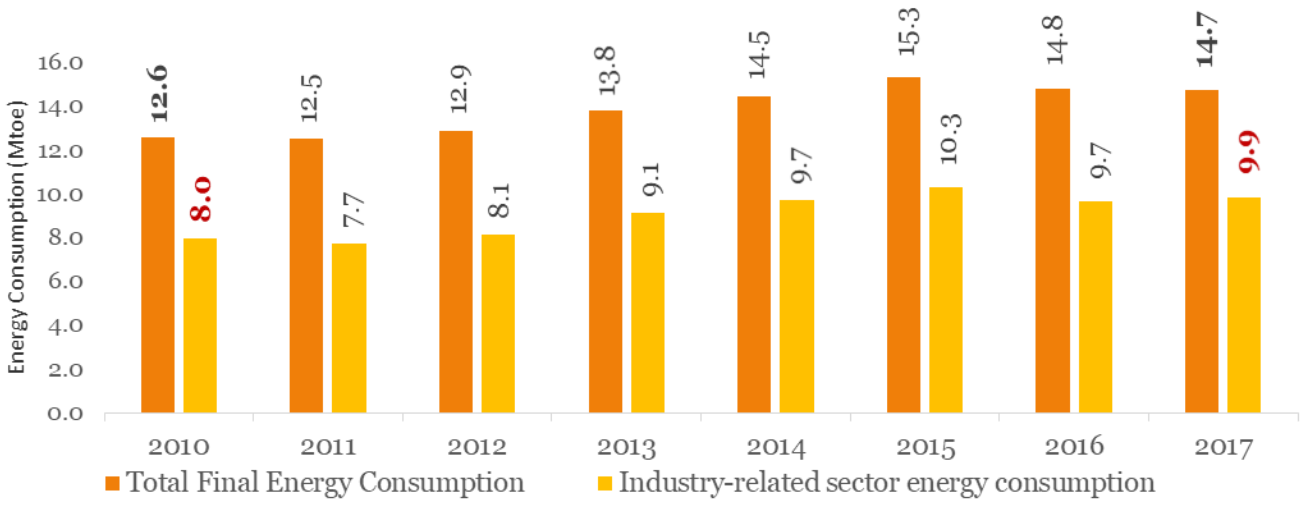
Source: National Climate Change Secretariat, Climate Action Plan 2016; MTI, Economic Survey of Singapore, 2019; NCCS, Impact of Climate Change on Singapore, 2019

Singapore's Industrial Sector



Source: EDB, Productivity Improvement Workshop 2017
http://www.aspri.com.sg/wordpress/wp-content/uploads/2017/08/1.-EDB-Slides_final.pdf

- Final energy consumption increased by **23.7%** (8.0 → 9.9 Mtoe) in the industrial sector of Singapore between 2010-17.

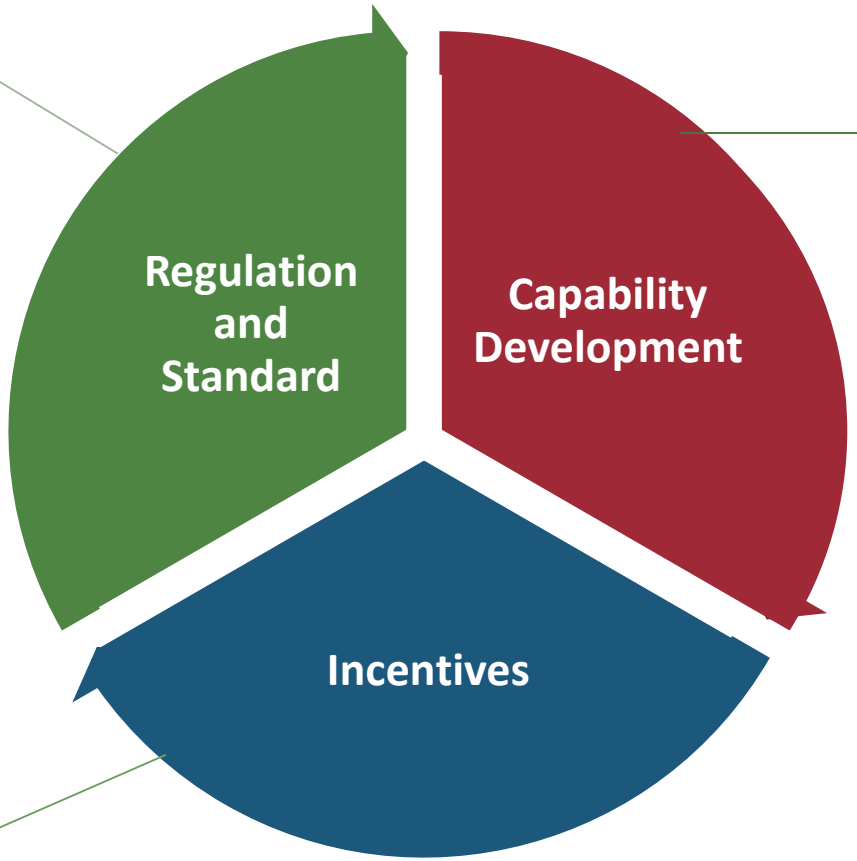


- By 2018, the industrial sector contributed to **60%** of GHG emissions (Tanoto, 2018).
- Energy Efficiency Policy targeted at improving industrial energy efficiency, within the context of an open trade-oriented economy.
  - In 2016, the state announced its goal under the Climate Action Plan to improve the manufacturing sector's energy efficiency at rates of **1-2 %** yearly between 2020 and 2030.

Source: EMA, Energy Snapshot of Singapore 2019

Existing Mitigation Measures

- Energy Conservation Act (2012)
- Carbon Tax (2019)



- Energy Efficiency Fund (E2F) (2017)
- Resource Efficiency Grant for Energy (REG(E)) (2019)
- Investment Allowance (2015)
- Energy Efficiency (EE) Financing (2013)

- Energy Efficiency National Partnership (2010)
- Singapore Certified Energy Manager (SCEM) Programme
- Energy Services Companies (ESCO) accreditation (2005)

Source: Joash Seng, Senior Lead (EDB) / Leow Beng Kwang, Senior Manager (NEA)
https://esi.nus.edu.sg/docs/default-source/doc/02-ee-landscape-in-singapore-21-mar-2019-(r2)-clean.pdf?sfvrsn=2

Carbon Tax

- **Fixed Price Credit Based (FPCB) system:** Single uniform carbon price of S$5 from 2019-2023.
  - Tax will be reviewed with intention to increase it to between S$10 – 15/tCO2e by 2030.

- **Targeted at direct emissions:** Companies emitting >25,000 tCO2e annually will be taxed on 100% of their emissions.

- **Covers 6 GHGs:** carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and Sulphur hexafluoride (SF6)

- **Applied upstream:** 30 – 40 large emitters which account for about 80% of Singapore's GHG emissions.

- **Revenue from carbon tax will provide grants and incentives** to help businesses reduce their emissions and become more energy and carbon efficient.

Responses to public consultation on Singapore's climate change strategy and carbon tax:
https://www.nccs.gov.sg/public-consultation

Energy Efficiency Financing (Pilot)

- Pilot Scheme with **Sustainable Development Capital LLP (SDCL)** to provide **3rd party financing for up to 100% of upfront cost** for EE improvement projects – i.e. Companies are not required to pay for upfront costs, but repay through energy savings.

- EDB supports via **partial credit guarantee agreements** with PFIs.

- Financing provided can potentially cover equipment, labor, installation costs, as well as the cost of measurement and verification of the energy savings resulting from energy-efficiency projects implemented.

- Case Study: Panasonic's replacement of air compressors
  - Challenges of ECO program: Lack of budget, ROI too long, lack of expertise in energy efficiency, high investment, other priorities
  - Air compressor system consume 28% of electricity (aged, inefficient)
  - Retrofit resulted in 22.6% energy improvement.

Panasonic

Capability Development for Energy Efficiency

- **Energy Efficiency National Partnership**
  - Promotes adoption of Energy Management Systems in partner companies
  - Provides partners with opportunities to learn and share energy efficiency ideas, strategies, technologies, best practices, standards and case studies
  - Accords recognition to companies through annual EENP Awards
  - As of 30 Sep 2019, a total of 291 companies have joined as Partners, including 3M, Asia Pacific Breweries, BASF and Hitachi Chemical

- **ESCO Accreditation Scheme**
  - Enhances the professionalism and quality of services offered by ESCOs
  - 19 accredited ESCOs (e.g. Honeywell, Johnson Controls and G-Energy) and 31 Qualified Energy Services Specialist (QuESS)

What lies ahead for Singapore's Industrial Energy Efficiency?

- Building on **existing programs**, *e.g. EE Financing Pilot*
- ESI is studying **financial** (e.g. publicly funded loans or grants/subsidies) or **market-based instruments** (MBIs: auctions, tenders, white certificate and obligation programs) which help to deliver a price signal to provide incentive for firms to invest in innovation or implement more energy-efficient technologies, and deliver energy savings whilst minimizing costs.

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