Industrial Energy Efficiency Landscape in Singapore

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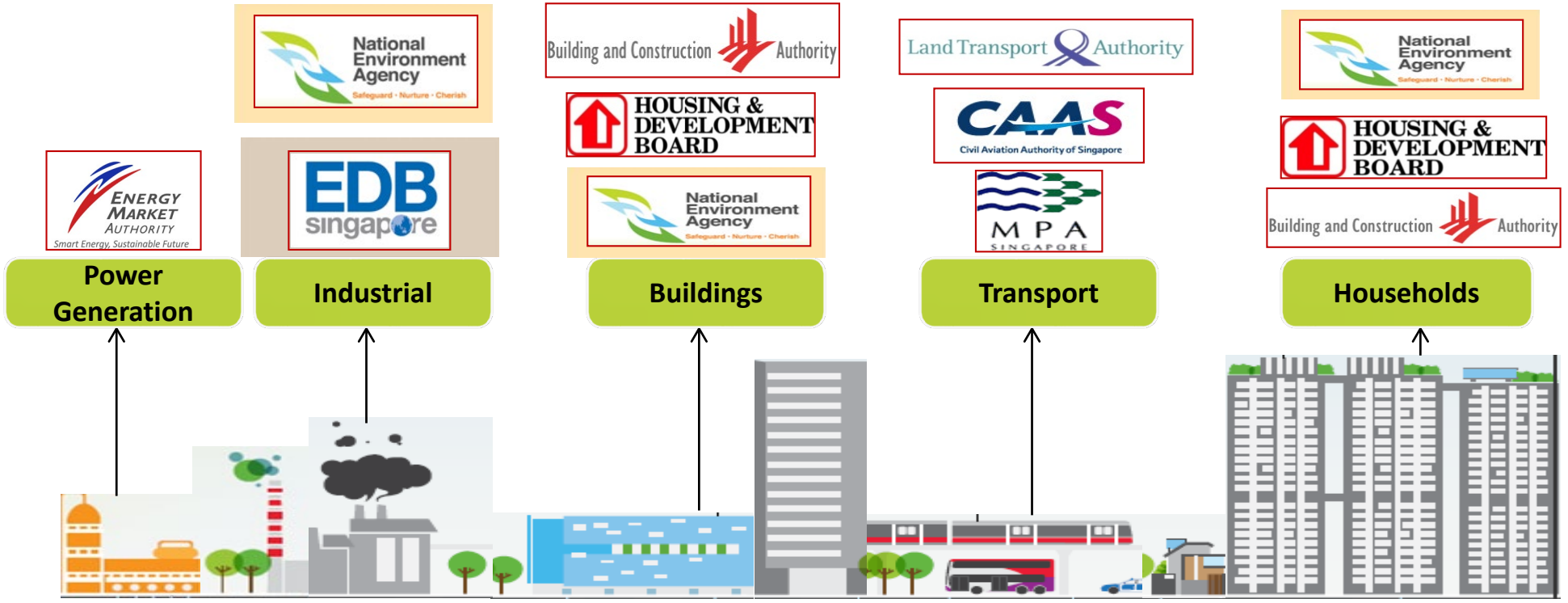
Background: Singapore's Climate Change commitments

- In 2015, Singapore made a commitment to reduce Emissions Intensity by 36% from 2005 levels by 2030, and stabilize our GHG emissions with the aim of peaking around 2030.
- Singapore adopts WOG effort to reduce carbon emissions and improve energy efficiency (EE)

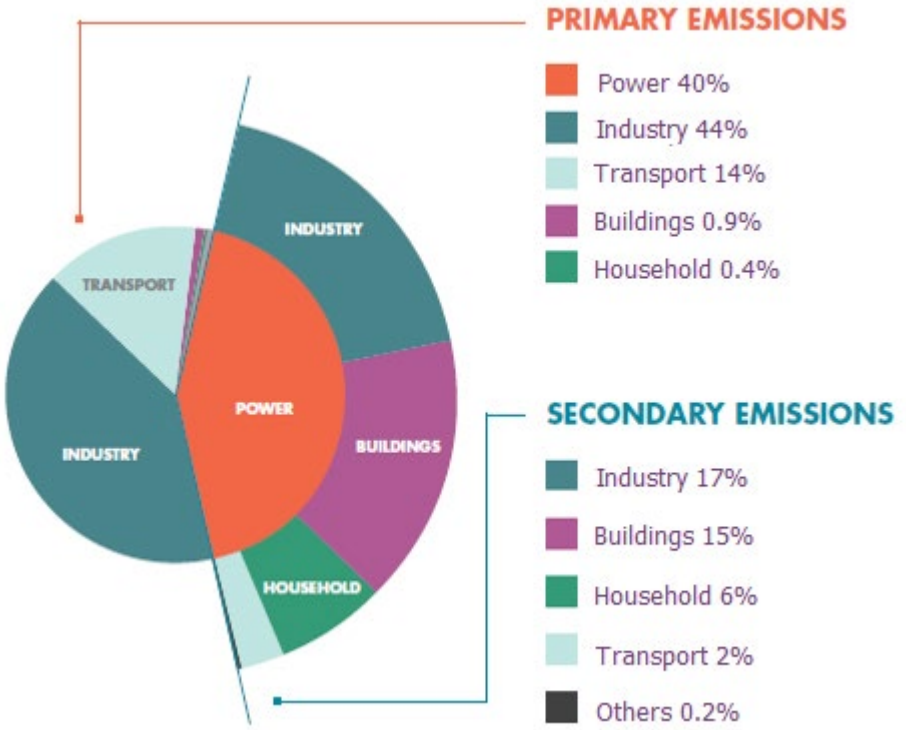


Industry EE Strategy

- Industry sector accounted for ~60% of Singapore's total GHG emissions in 2014, and has the largest potential for emissions reduction

- The sector can play its part in meeting Singapore's pledge through measures such as:
  - ✓ Improving energy efficiency of manufacturing facilities
  - ✓ Reducing use of non-CO2 greenhouse gases

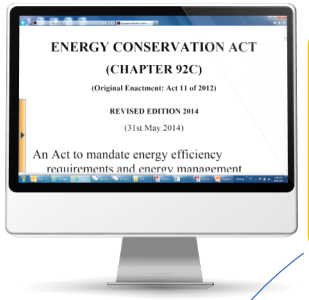
- Improving EE has been a key strategy to reduce energy use and emissions, and help companies remain competitive



Industry EE Strategy

- Promote good corporate energy management practices
- Encourage adoption of energy efficient equipment
- Develop capability

Approach to Improving Industry EE



Regulation and Standards

- Energy Conservation Act
- Carbon Tax

APPROACH

Incentives

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

Capability Development

- Energy Efficiency National Partnership
- Singapore Certified Energy Manager (SCEM) programme
- Energy Services Companies (ESCO) accreditation

Regulation and Standards

Mandatory Energy Management Practices under Energy Conservation Act (ECA)

- Energy management practices introduced for industrial sector in Apr 2013
- Requires energy-intensive companies in industrial sector* consuming 54 TJ of energy or more each year to:
  - Appoint at least one energy manager;
  - Monitor and report energy use and GHG emissions annually; and
  - Submit an energy efficiency improvement plan and review it annually
- 188 companies operating 240 energy-intensive facilities are regulated under ECA

Enhanced Mandatory Energy Management Practices under ECA

Existing energy-intensive facilities shall put in place a structured Energy Management System and conduct Energy Efficiency Opportunities Assessments

- New energy-intensive facilities and major expansions shall:
  - Plan for and install instruments and meters at system level
  - Report energy use and energy performance indicators based on measured data
  - Review facility design, develop economically feasible energy/carbon efficiency measures for incorporation into the new facility and report findings

Minimum Energy Performance Standard (MEPS) for Common Industrial Equipment and Systems

- Set at premium efficiency level (IE3) for single speed 3-phase induction motors (from Oct 2018)
- To be extended to other common industrial equipment and systems over time

* Covers manufacturing, utilities and sewage & waste management companies

Capability Development

- 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

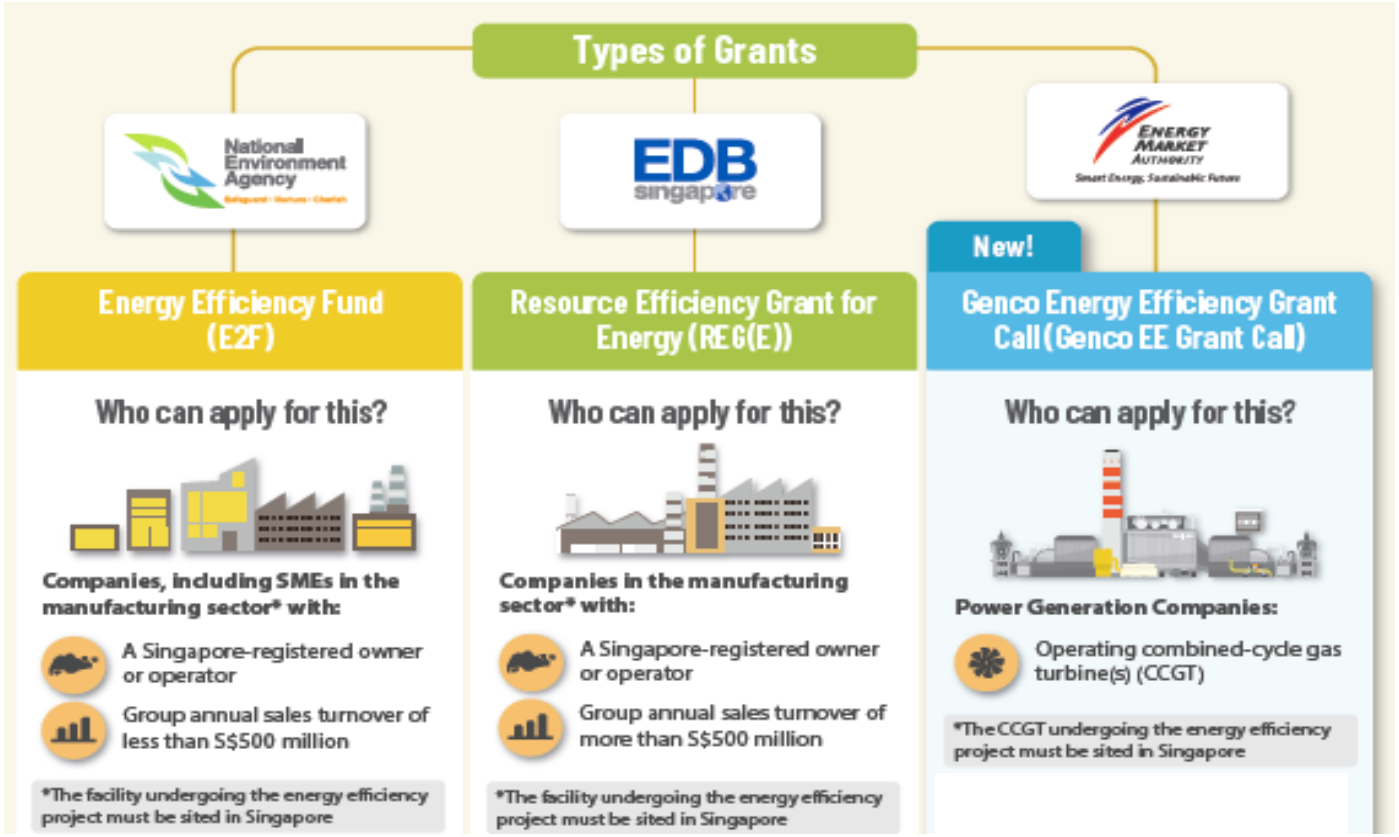
- Training and certification system in energy management
- Training grant to encourage companies to train their employees under SCEM programme

ESCO Accreditation Scheme

- Enhances the professionalism and quality of services offered by Energy Services Companies (ESCOs)
- 18 accredited ESCOs and 31 Qualified Energy Services Specialist (QuESS)

Incentives - Enhanced Industry Energy Efficiency Package

- NEA, EDB, and EMA have rolled out incentives under the Enhanced Industry Energy Efficiency package to support Singapore companies under the Industry sector to become more energy efficient.



Incentives – NEA's Energy Efficiency Fund (E2F)

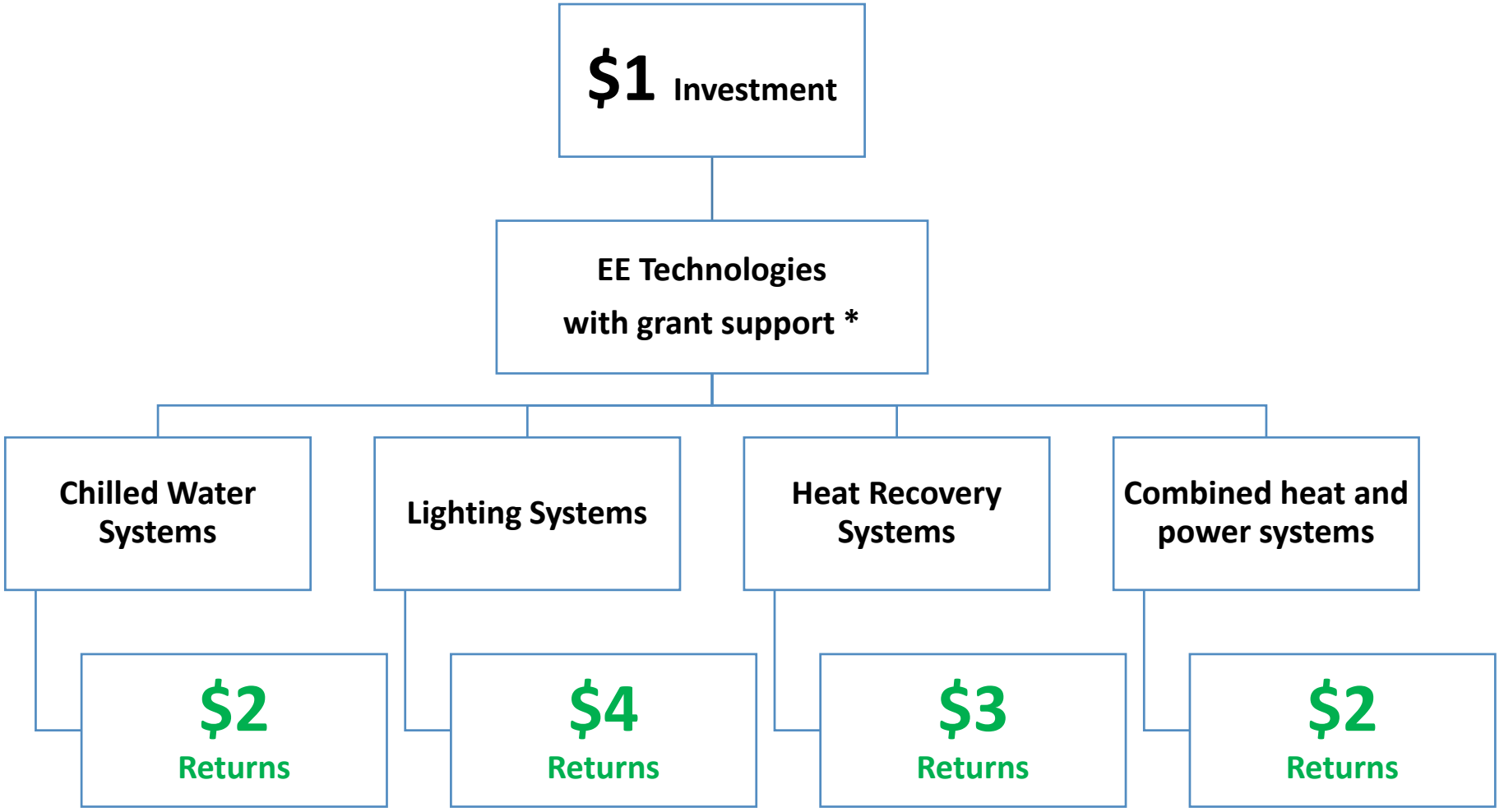
- Introduced in Apr 2017, E2F provides up to 50% co-funding for the following:
  - Resource efficient design
    - Encourages investors in new facilities or major expansions to integrate resource efficiency improvements into manufacturing development plans early in the design stage
  - Energy assessments
    - Encourages industrial companies to conduct detailed energy assessments to determine energy consumption profile and identify potential improvements
  - Energy efficient technologies
    - Encourages manufacturing companies, including SMEs, to adopt energy efficient technologies

Incentives – NEA's Energy Efficiency Fund (E2F)

- Checks are in place to ensure projects are technically viable and energy savings are achievable
  - Product registration for air-con and motors with NEA
  - Technical Evaluation Panel, comprising academia and government representatives, to evaluate complex systems
  - Companies conduct measurement and verification (M&V) (witnessed by NEA) before and after project completion to prove that the estimated annual energy savings are achieved
  - More than 95% of past applicants were able to achieve at least 90% of estimated annual energy savings

Reasons for not achieving estimated annual energy savings	Previous grant framework and requirements	New grant framework and requirements
Company unwilling to conduct post-implementation M&V due to high cost and low grant quantum	Support was only up to 30%	Typical projects should receive 30 - 50% support
Under-estimation of system baseline performance at point of application	Pre-project M&V required only after application approval	Pre-project M&V required before application approval
Provision of incorrect information in application at point of application		

Typical Returns from EE Investments



* Based on past grant data and an equipment lifespan of 15 years

Incentives – EDB's Energy Efficiency Schemes and Incentives

- REG(E) will support Singapore-registered owners / operators of industrial facilities in the sector to implement projects that present measureable and verifiable carbon abatement, or equivalent energy savings.

Resource Efficiency Grant – Energy (REG-E)	Investment Allowance – Energy Efficiency (IA-EE)	Energy Efficiency Financing Pilot (EE Financing)
• Supports EE improvement and removal of non-CO_2 GHG projects • Grant support is outcome based and tied to the amount of carbon abatement achieved by the supported project	• Supports EE improvement projects • Provides typically 30% of tax allowance, above usual Capital Allowances for fixed CAPEX incurred within 3-year qualifying period.	• Pilot scheme with Sustainable Development Capital (Asia) Limited to provide 3rd party financing for up to 100% of upfront cost for EE improvement projects. • EDB supports through partial credit guarantees agreements with PFIs.
• Min Criteria: CO_2(e) abatement of 0.5 kilo-tonnes per annum • Support capped at 50% of qualifying cost	• Min Criteria: 3% improvement in EE at the facility level OR 10% improvement in EE at the equipment or system level	• Companies are not required to pay for upfront costs, but repay through energy savings.

Thank You

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