

# Driving Emissions Reduction for SMEs through Energy Efficiency

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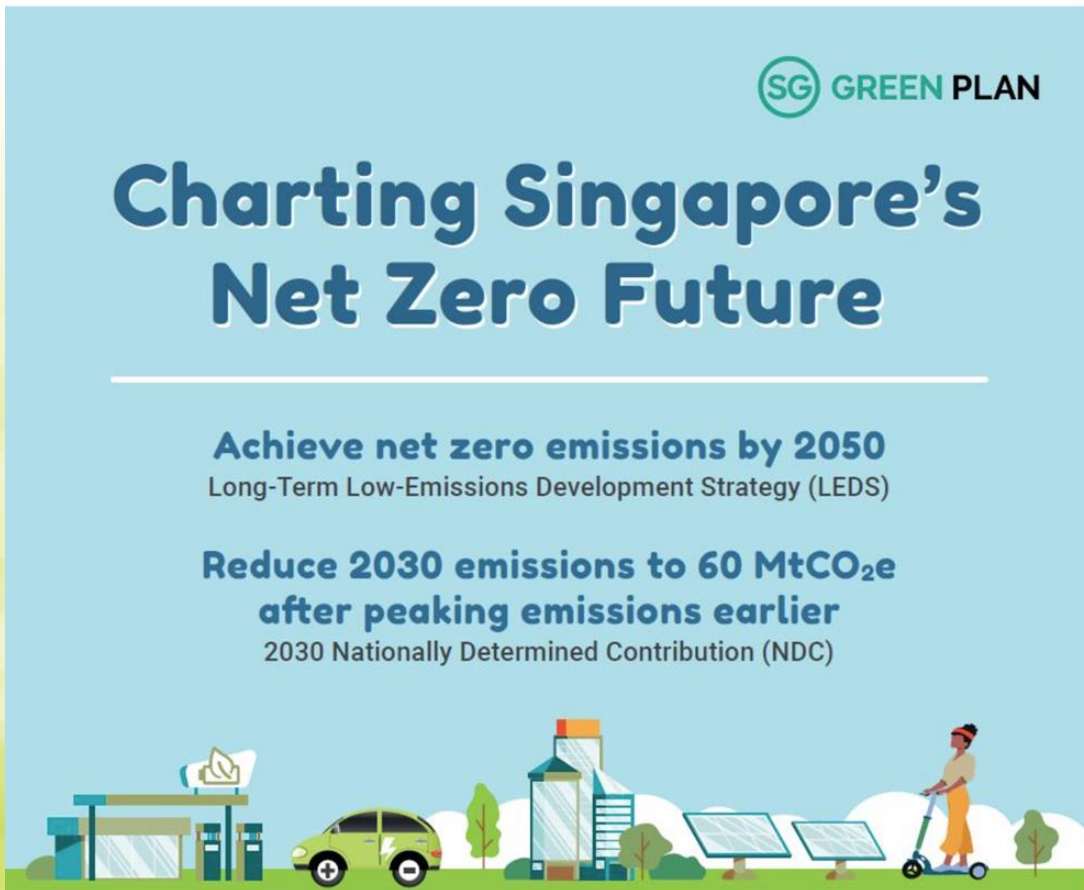
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# Synopsis

- SMEs play a crucial role in contributing to national goal of sustainability and address global climate change, especially with the rising cost of electrical tariffs.
- Embracing energy-efficient technologies and practices is the most cost-effective and sustainable pathway for SMEs to significantly reduce their emissions footprint while achieving operation cost-saving.
- This presentation shares the work of the Energy Efficiency Technology Centre (EETC) in supporting SMEs in decarbonizing their industrial systems and driving energy transformation efforts to improve competitiveness in the local environment.

# Singapore's Commitment & Plan for Net Zero Future



- SGP 2030 was launched in March 2021
- Charts concrete targets over the next 10 years to achieve net zero emissions by 2050
  - City in nature
  - Sustainable living
  - Energy reset
    - Greener infrastructure and buildings
    - Sustainable towns and districts
    - Cleaner-energy vehicles
    - Sustainable aviation
    - Sustainable maritime
  - Green Economy
  - Resilient Future

# A Turning Point for Energy Efficiency?

Government actions in 2022 to boost affordability, security and climate action through energy efficiency

iea.org

<p>Countries mobilise over USD 1 trillion on efficiency measures in crisis response packages</p>	<p>National plans with a major focus on efficiency launched by 16 governments, representing over half of global energy use</p>	<p>Global wave of energy awareness campaigns is helping citizens take action to reduce demand</p>
<p>Digital demand response helps manage several major power supply emergencies</p>	<p>Heat pump incentives currently operating in countries covering half of global energy use in buildings</p>	<p>1 in every 8 cars sold is electric thanks to strong consumer demand and government support</p>
<p>Cooling efficiency policies implemented or under development in all ASEAN countries</p>	<p>31 emerging and developing economy governments are developing new building codes, bringing total to 111 once enacted</p>	<p>Efficiency savings made since 2000 saved IEA countries USD 680 billion in energy costs this year alone</p>

# International Energy Agency's update on

# Energy Efficiency

# Key points of IEA report

- Global energy demand grew by 1% in 2022, with energy-related CO<sub>2</sub> also growing by 0.9% to reach a new high of over 36.8 Gt.
- Energy demand growth could, however, have been three times higher had global energy efficiency progress not increased from around 0.5% per year in 2020 and 2021 to just over 2% in 2022.
- *The Decade for Action* – highlights that ramping up annual energy efficiency progress from 2.2% today to over 4% annually by 2030 would deliver vital reductions in greenhouse gas emissions and at the same time create jobs, expand energy access, reduce energy bills, decrease air pollution, and diminish countries' reliance on fossil fuel imports – among other social and economic benefits.

iea

# Energy Efficiency: The Decade for Action

The IEA's 8th Annual Global Conference on Energy Efficiency

Report  
June 2023

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## Energy Efficient Singapore

Singapore works towards reducing its greenhouse gas emissions by using less carbon-intensive fuels, and by improving energy efficiency.

In order to reduce its greenhouse gas emissions, Singapore has switched from carbon-intensive fuel oil to natural gas for electricity generation. Natural gas, which has lower carbon content per unit of electricity generated, now constitutes more than 95 per cent of Singapore's fuel mix for electricity generation. However, there are limits to how much further Singapore can reduce its emissions. Therefore, improving energy efficiency will remain a key focus for Singapore.

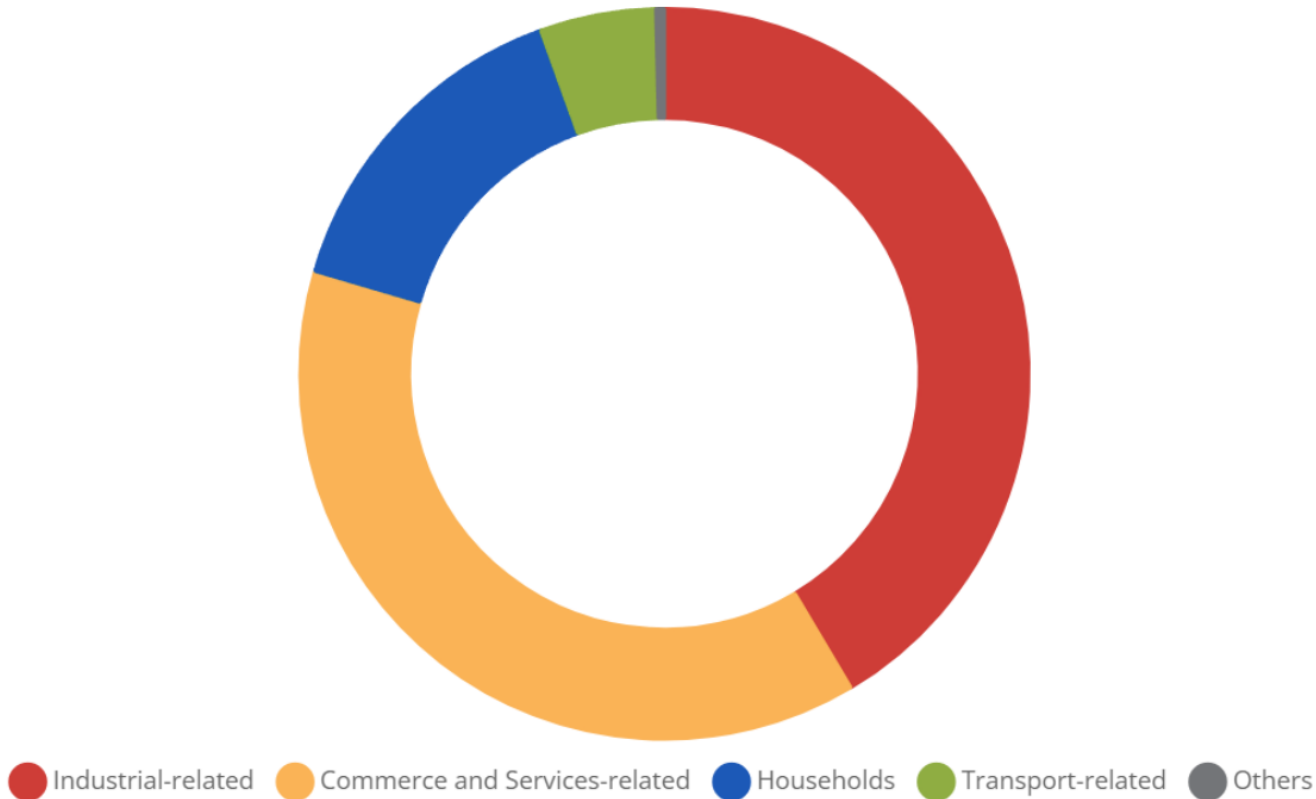
A whole-of-government approach has been adopted to implement measures to improve the energy efficiency and to reduce the energy use of various sectors. NEA actively promotes energy efficiency in the industrial, household, and public sectors through legislation, incentives, and public education. The Building and Construction Authority (BCA) and the Land Transport Authority (LTA) promote energy efficiency in the buildings and transport sectors, respectively.

**The Energy Efficient Singapore website ([www.e2singapore.gov.sg](http://www.e2singapore.gov.sg)) was decommissioned on 28 April 2022. For more information on energy efficiency programmes in the respective sectors, please click on the following:**



Source: National Environment Agency

Overall Electricity Consumption:  
26.9 TWh in 2022\*



- The **industry sector** is the largest energy-consuming sector in Singapore and hence there is significant potential for energy savings through better and sustained energy management.
- Better energy management leads to improvement in energy efficiency, which minimizes energy wastages, cuts energy costs and helps companies reduce their bottom lines.

Source: Energy Market Authority

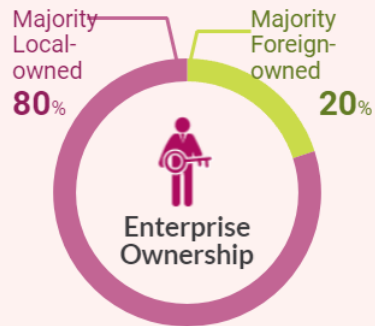
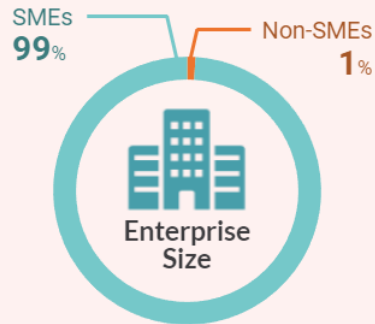


# Singapore's Enterprise Landscape 2022

## ENTERPRISE COUNT



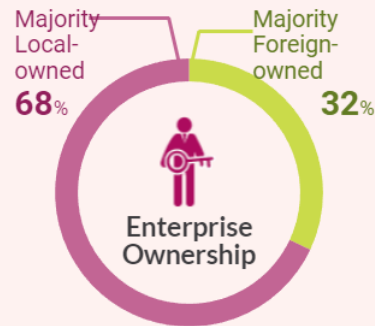
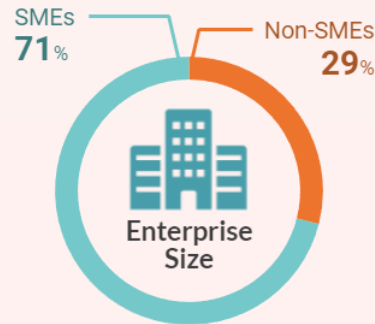
TOTAL  
299,800



## EMPLOYMENT



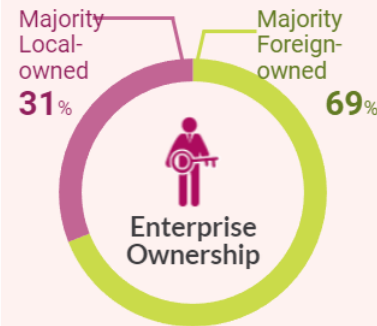
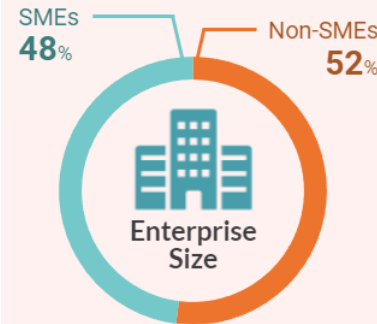
TOTAL  
3.63 Mil



## NOMINAL VALUE ADDED



TOTAL  
S\$591.7 Bil



- SMEs forms 99% of enterprise count, mainly local-owned
- Provides 71% employment, 48% value added
- Needs to capture new opportunities in the green economy by integrating sustainability into business
- Lacks financial resources and technical competency in sustainability practice
- Energy Efficiency is the low-hanging fruit







Energy Efficiency  
Technology Centre

# Sharing what we can help for SME Decarbonization



# Integrating SIT, Industry and Community

*Built with cutting-edge technologies and innovations that inspire...*



## Integrated Building Management System

*Controlling lifts, lighting, air-con and security*



## Sensors

*Collecting various data for responsive decision making*



## Living Lab

*Supporting learning and experimentation through real-life projects and test-bedding of smart technologies*



## IT infrastructure

*Supporting high-speed and high volume data access anywhere*



## District Cooling System

*Cooling campus in efficient and low carbon footprint way*



## Multi-Energy Micro Grid

*Supplying sustainable power to campus*



Launched on **3 Oct 2019** with signing of Memorandum of Understanding between SIT and NEA

Operational since June 2020



To **promote** and **develop energy efficiency capability** and **new technologies** in the **local** energy efficiency ecosystem for **industrial sectors**

# Objectives of EETC

## Build Capability for SMEs

- Offer low-cost high quality energy assessments to SMEs
- Help SMEs to achieve energy savings
- NEA grants available for SMEs

## Upskill Energy Professionals

- Offer Energy Efficiency Upskilling Programme Upskill industry professionals in industrial energy efficiency
- Training deep dives into industrial systems for e.g. Compressed Air Systems, Pump Systems and Electrical Power Systems
- 3-day theory + 2-day practical course
- Fulfill part of requirements to be in-house EEOA (Energy Efficiency Opportunities Assessor)

## Training of Talent Pipeline

- Attach SIT students to industry through Integrated Work Study Programme (IWSP) to work on energy assessment/ energy efficiency projects
- Opportunity to continue projects to capstone / MEng Tech projects

# Helping SMEs to Catalyse Energy Efficiency Improvements

## EETC provides affordable high quality energy assessments

- Energy assessment of industrial facilities owned by SMEs to be conducted by staff/students attached to EETC/SME and supervised/led by EETC Energy Specialists
- Scope of work include detailed metering, baseline and target energy performance, identification of improvement opportunities and implementation and investment plan
- Provision of specialized equipment for assessments
- **E2F application**



EETC works with various skilled and experienced energy managers to provide comprehensive assessments of the client's systems.

## Systems That We Work With

Category	Example (Non-Exhaustive)
Electrical System	Power distribution and cabling system , Transformers , Electric motors, , Power quality (including harmonics), Power factor and voltage drop, Generators, Power converters, etc.
Lighting System	Indoor and Outdoor Lighting
Mechanical System	Mechanical separators, grinders, blowers, and other motor driven systems, rotating equipment, process equipment , dust collector
Compressed Air System	Compressor, air dryers, pneumatic pipelines, air-controlled equipment
Boiler, Steam and Heating System	Burner, furnace, steam boiler, hot water system, thermal oil heater, heat exchangers, biomass boiler
ACMV System	Chiller, FCU, AHU, cooling towers, pumps, fans, dehumidification and humidification equipment, mechanical ventilation, variable refrigerant flow / volume equipment, and other unitary air-conditioning equipment, etc.
Process Cooling System	Cooling tower, and other cooling water equipment
Process / Production Systems	Heat treatment machines, refiners, conching machines, refrigeration equipment, etc.



# Upskill Energy Professionals

## Upskill professional competency through intensive EEUP

- Offer Energy Efficiency Upskilling Programme for industry professionals in industrial energy efficiency
- Training deep dives into industrial systems for e.g. Compressed Air Systems, Pump Systems, Boilers and Steam Systems, Motor-driven Systems, and Electrical Power Systems
- 3-day theory + 2-day practical course
- Fulfill part of requirements to be in-house EEOA



# 5-day energy efficiency upskilling programmes

## Courses successfully offered:

1. Pump and Piping Network: Energy Efficient Design, Audit and Analysis
2. Electrical Installations Audit and Analysis
3. Lighting Systems Energy Efficient Design: Audit and Analysis
4. Motor Driven Systems, Audit and Analysis
5. HVAC Audit and Analysis
6. Boiler and Steam Systems (Energy Efficient Design, Audit and Analysis)
7. Compressed Air System Audit and Analysis
8. Energy Efficiency and Process Optimisation for Process Industries

## New courses within next 12 months:

1. Low carbon Buildings
2. Solar PV Systems
3. Energy Sustainability and Energy Management Systems
4. Fans, Blowers and Mechanical Ventilation Systems
5. Carbon Accounting, Assessment, Reporting and Management
6. Sustainable Data Centres
7. Green Transportation





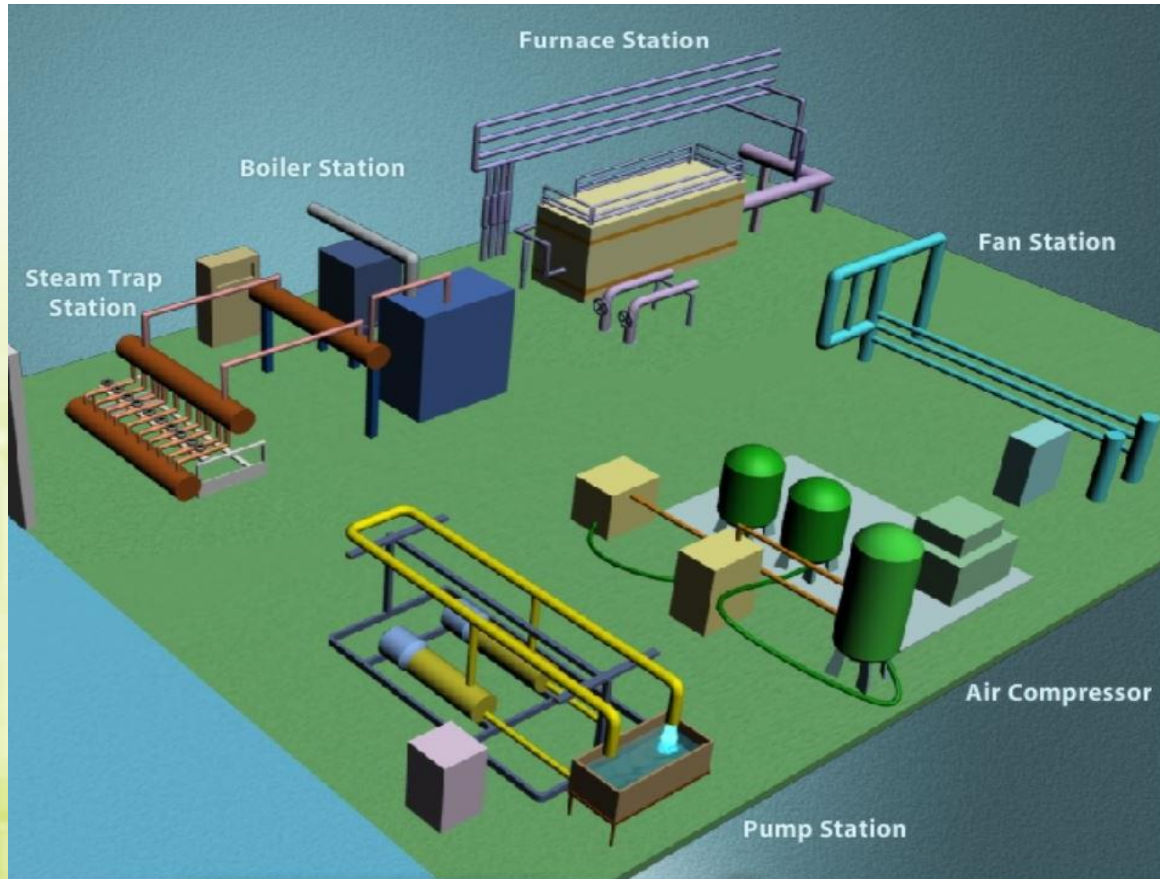
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3 ←



**Integrated Work Study Programme –**  
Students work at EETC from 6 to 12 months will acquire competencies through actual industrial energy audits.



# Energy Efficiency Technology Laboratory



Competencies to be acquired through hands-on training on authentic industrial systems  
- **Experiential learning**

# Applied Research

- **Establish a living lab testbed of an Intelligent Energy Management System for energy efficiency monitoring, management and reporting. The developed system will be able to perform:**
  - *Energy and GHG carbon emissions monitoring and reporting*
    - Monitor asset performance through cost-effective solutions
    - Continuous tracking of energy consumption and plant performance
    - Effective carbon emissions tracking aids in achieving environmental goals
    - Adherence to emission standards including Scope 1 & 2 reporting
    - User-friendly GUI for real-time visualization and reporting
  - *Energy management of loads and sources*
    - Optimize energy usage to reduce costs and carbon emission
    - Load scheduling optimization for efficient energy consumption management
    - AI to analyze historical and real-time data for energy insights

# Industry Benchmarking Studies

- Industrial sector-specific energy efficiency benchmark
- Data centres
- Others

# THANK YOU

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