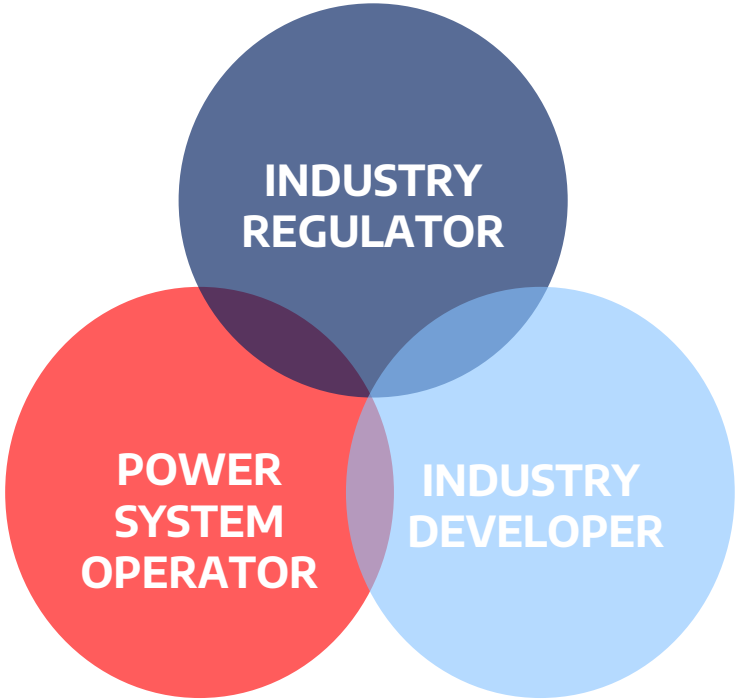
Advancing Singapore's Energy Transition

ENERGY MARKET AUTHORITY
Our Clean Energy Future

Singapore District Cooling System Study Tour and Workshop
10 May 2023

Role of Energy Market Authority



Regulate Singapore's electricity and gas industries as well as district cooling services.
Ensure the security, reliability and adequacy of electricity supply.

Operate the power system of Singapore to ensure reliable supply of electricity.
Oversee the electricity transmission system and generators in power stations and the operation of the natural gas transmission system.

Advance manpower capabilities, catalyse innovations and establish energy thought leadership.
Also stepping up efforts to promote residential energy efficiency.

Singapore's climate action

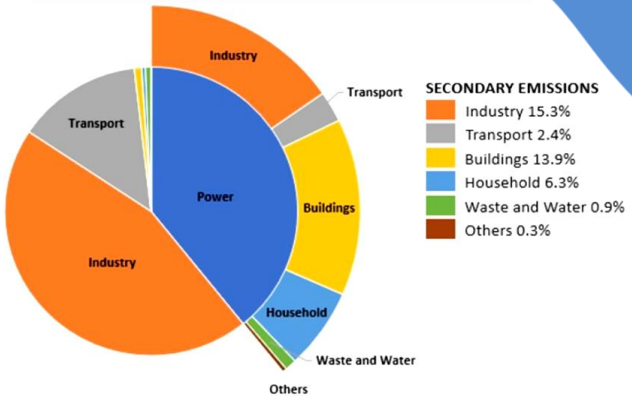
- Climate change is an **existential threat** for all of us, especially for a small island state like Singapore.
- Singapore is committed to reducing our emissions and advancing global climate action.

Achieve Net Zero Emissions by 2050

- Deputy Prime Minister Lawrence Wong at the Singapore International Energy Week 2022 -

- With the power sector contributing about 40% of Singapore's carbon emissions, it is important for the sector to **shift to low-carbon electricity to power our economy**.

EMISSIONS PROFILE (2019)
Total emissions: 51.6 $MtCO_2e$



Source: NCCS's published Singapore's 2019 Emissions Profile

Singapore Green Plan 2030 is a whole-of-nation movement to advance Singapore's national agenda on sustainable development.

City in Nature
Create a green, liveable, and sustainable home for Singaporeans, and build up our carbon sinks by extending nature throughout our island

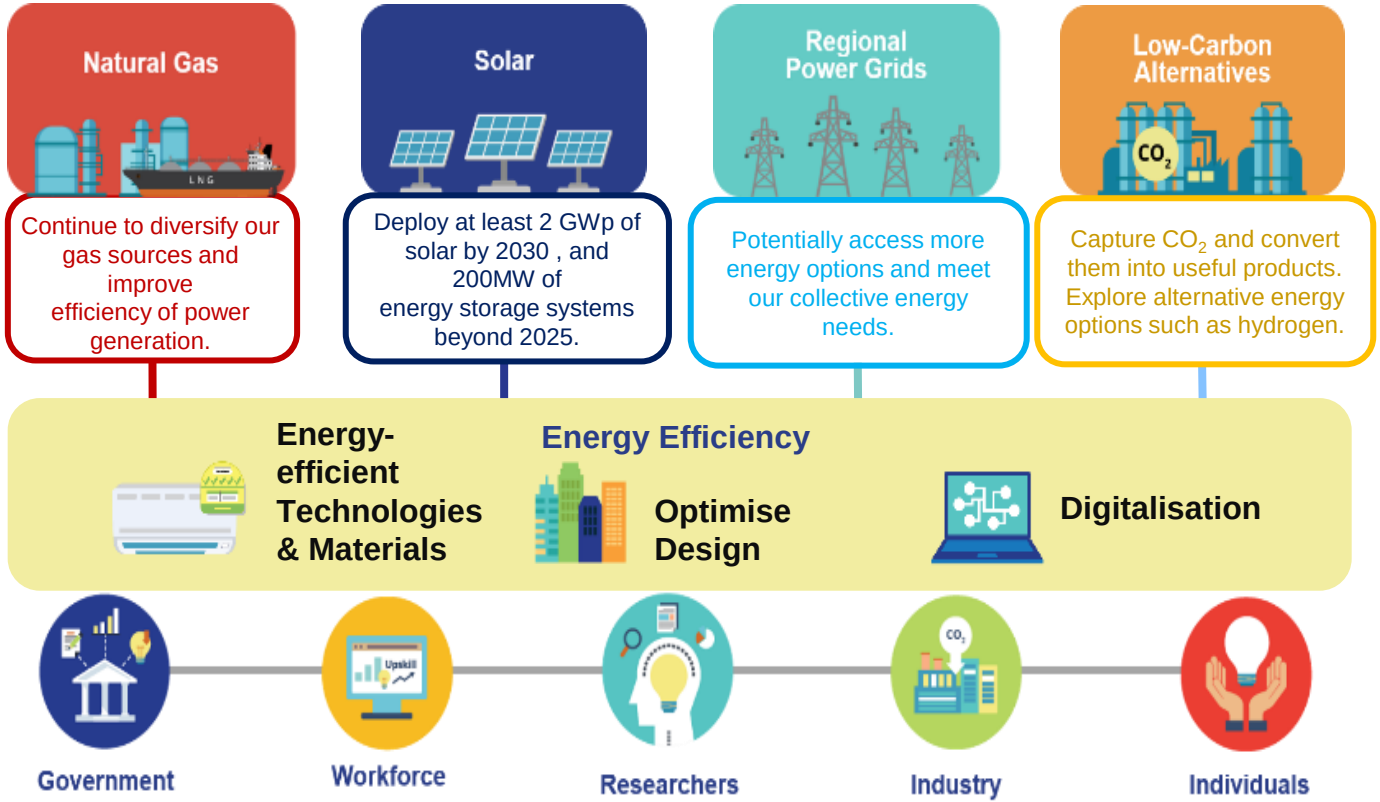
Sustainable Living
Make reducing carbon emissions, keeping our environment clean, and saving resources and energy a way of life in Singapore

Energy Reset
Use cleaner energy and increase our energy efficiency to lower our carbon footprint

Green Economy
Seek green growth to create new jobs, transform our industries and harness sustainability as a competitive advantage

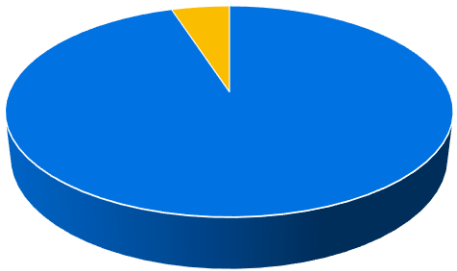
Resilient Future
Build up Singapore's climate defences and resilience, and enhance our food security

We are harnessing four “switches” to overcome Singapore’s energy challenges and work towards a reliable and sustainable energy sector.



Natural Gas Accounts for 95% of Singapore's Fuel Mix.

Singapore's Electricity Fuel Mix



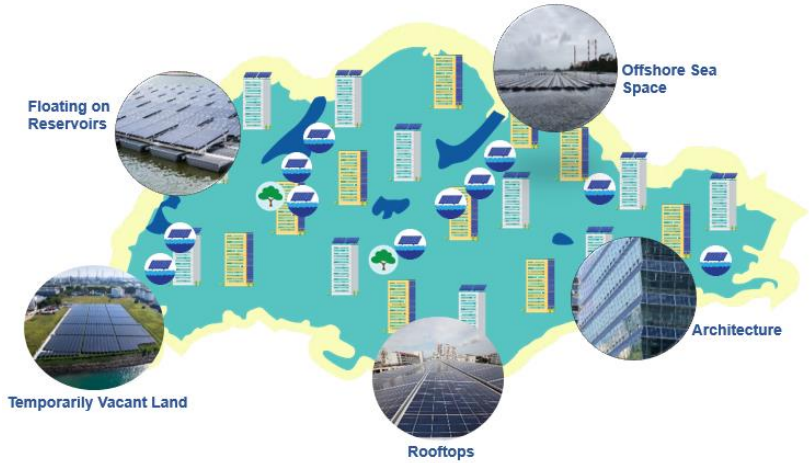
Natural gas is the cleanest fossil fuel. Our supply consists of piped natural gas (PNG) and liquefied natural gas (LNG).

PNG is imported from Indonesia and Malaysia, and LNG is imported from around the world to diversify and secure our energy sources.

Singapore LNG Terminal commenced operations on 7 May 2013, with total regasification capacity of 15 Mtpa.

Made up primarily of renewable energy, such as solar and waste to energy. Petroleum and diesel products make up less than one percent.

Solar is our most viable renewable energy source.



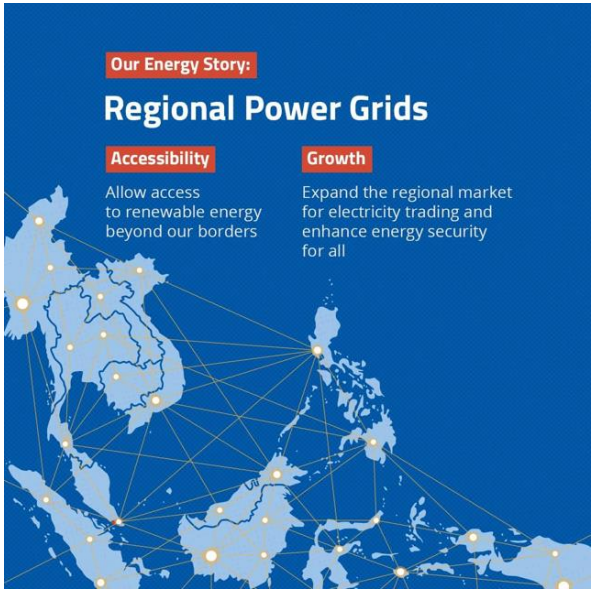
1.5 Gigawatt-peak (GWp) of solar by 2025, which can power around 260,000 households or able to meet ~6% of peak demand in 2025, on average

2 GWp of solar by 2030, which can power around 350,000 households or able to meet ~7% of peak demand in 2030, on average

We have deployed around 700 MWp as of 2022, which accounts ~2% of peak demand.

We have also exceeded our energy storage target of 200MW by 2025 with the opening of the Sembcorp Energy Storage System (ESS) in Feb 2023. It is the largest ESS deployment in Southeast Asia with a maximum capacity of 285MWh, and the fastest in the world of its size to be deployed.

To overcome our land constraints, we are connecting to Regional Power Grids to access low-carbon electricity beyond our borders.



In 2021, EMA announced our plans to import up to 4GW of low-carbon electricity by 2035.

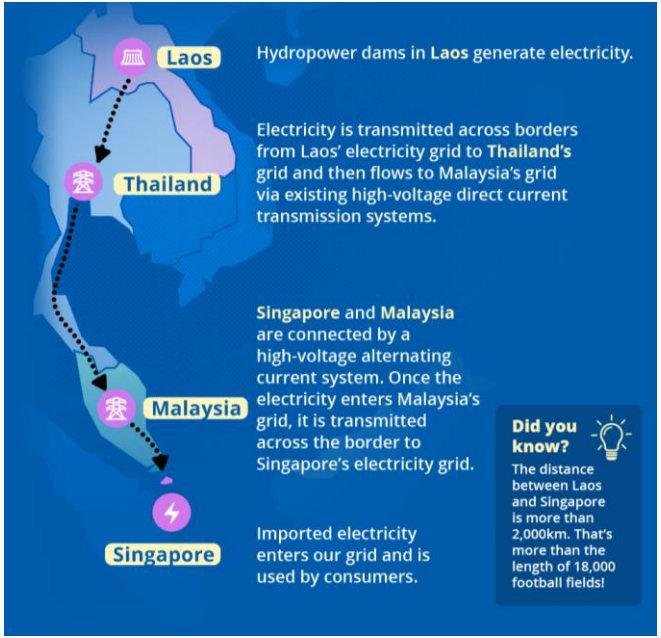
- ~30% of our projected energy supply by 2035. This is part of Singapore's efforts to develop regional power grids and support regional decarbonisation, while meeting our climate goals and diversifying energy supply sources.
- 100MW Lao PDR-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP) commenced flow in Jun 2022.
- EMA recently issued conditional award to Keppel Energy's proposal to import 1GW of low-carbon electricity from Cambodia.

The Lao PDR-Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP) is a historic milestone for ASEAN and Singapore.

1. The LTMS-PIP facilitates up to 100 MW of renewable hydropower from Lao PDR to Singapore via Thailand and Malaysia, using existing interconnections for a two-year period. This serves as a pathfinder towards the realisation of the ASEAN Power Grid (APG).

2. This represents the first multilateral cross-border electricity trade involving 4 ASEAN countries, and the first renewable energy import into Singapore, by Keppel Electric.

3. The four countries are in discussions on enhancements for the next phase of the project.



To further reduce our carbon footprint, Singapore is studying low-carbon alternatives such as hydrogen.

Hydrogen could play a major role in the future supply mix and is gaining global interest.

In order for H_2 to become viable, it requires:

- Established global supply chain
- Adequate import/transport infrastructure
- H_2 costs need to drop substantially

Under the recently launched National Hydrogen Strategy, Singapore will:

- Focus on hydrogen technologies and carrier pathways that have the potential to be commercially viable and have multiple applications, including ammonia.
- Issued Expression of Interest (EOI) for a small-scale commercial project utilising low-carbon ammonia for power generation.
- Support hydrogen R&D through the Low Carbon Energy Research Project (LCER). S$129 million for 2022 to support R&D projects on low-carbon technologies and projects that help us import, handle, and use hydrogen safely and at scale.
- Work with industry and international partners to advance low-carbon hydrogen developments (e.g. Guarantee of Origin certification methodologies recognised by other jurisdictions; building a financial ecosystem to facilitate global trade of low carbon hydrogen)

Singapore International Energy Week (SIEW)

SIEW 2023
SINGAPORE INTERNATIONAL ENERGY WEEK
23 – 27 OCTOBER 2023 | MARINA BAY SANDS

ENERGY TRANSITION TOWARDS A NET ZERO WORLD

SIEW 2022 BY THE NUMBERS

> 12,000
Onsite participants

> 450
Energy ministers and high-level speakers

> 35 MILLION
social media impressions
up from 16.6 million last year

1,229
MEDIA MENTIONS
of SIEW worldwide during the week, with over 135 media attendees

- The 16th SIEW will be held from **23-27 October 2023** at Marina Bay Sands Singapore with the theme "**Energy Transition towards a Net Zero World**". We welcome participants to join us at the SIEW.

Thank you.