

A greener energy future

A new report published yesterday showed Singapore's power sector can reach net-zero emissions by 2050 without compromising energy security and affordability. **THE STRAITS TIMES** looks at how the Republic can decarbonise its power sector, which is responsible for 40 per cent of the country's emissions, under three different global scenarios outlined in the Energy 2050 Committee report commissioned by the Energy Market Authority.

What does net-zero emissions mean?

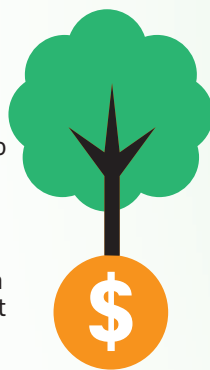
This means that the amount of greenhouse gas emissions released by a sector is balanced out by efforts to remove that same amount of planet-warming gases from the atmosphere.

There are usually two key prongs to achieving this:

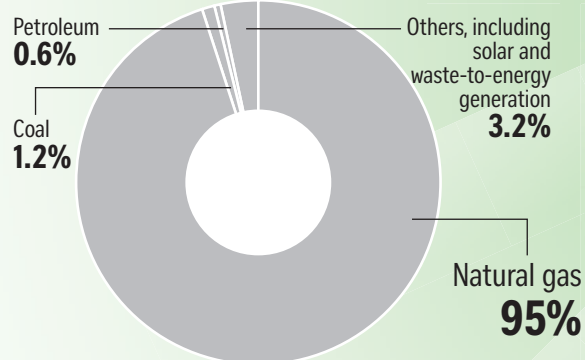
- By reducing the amount of greenhouse gases, such as carbon dioxide (CO₂), being released.



- Investing in efforts to absorb CO₂ from the atmosphere. This can include buying carbon credits from forestry projects, or investing in novel technologies that suck CO₂ from the air.

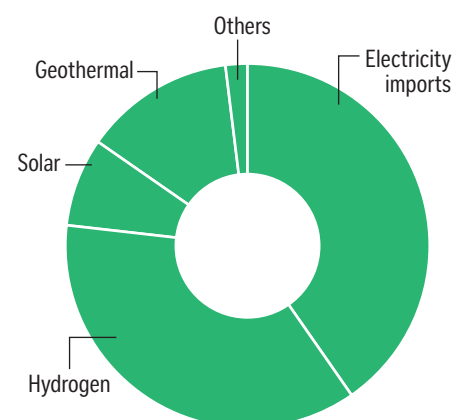


Singapore's current energy mix



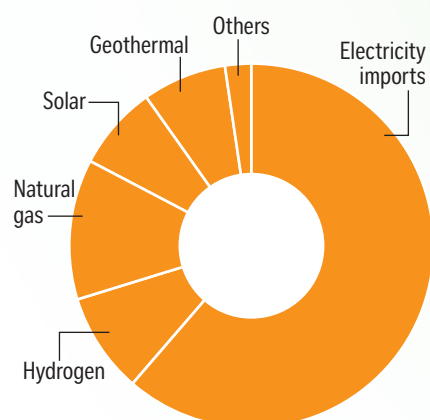
What Singapore's energy mix could look like by 2050 if...

The world sees a clean energy renaissance



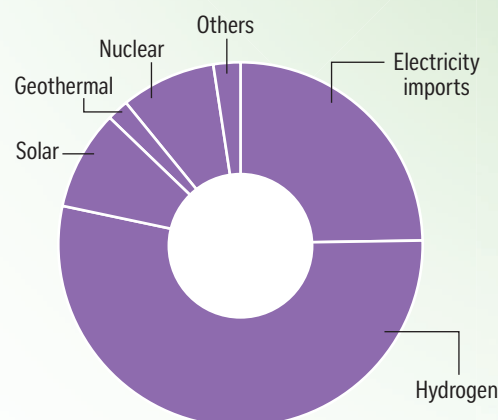
This is the most optimistic scenario, in which recovery from the Covid-19 pandemic starts immediately. Energy and digital technologies develop rapidly, and are complemented by strong global cooperation.

Singapore joins a climate action bloc



In this scenario, the world takes a longer time to recover from the economic fallout from the Covid-19 pandemic, delaying investments in clean energy research and development. Countries form a climate action bloc, even as technology advancements stagnate.

Singapore is an emergent technology trailblazer



Recovery from Covid-19 is protracted and foreseeable only in the later decades. A geopolitically fragmented world means Singapore cannot rely on cooperative mechanisms, like clean energy imports, to meet its 2050 target. Singapore initiates its own investments into new decarbonisation technology to achieve its goals.

What this means for:

Energy supply

- Singapore achieves a diversified supply mix in 2050, with electricity imports and low-carbon hydrogen as major contributors.
- Hydrogen is considered a clean fuel as it does not produce CO₂ when burnt. However, technologies to store and generate hydrogen from renewable energy sources are still nascent.
- Locally, key renewable energy sources include solar and geothermal energy, which refers to energy harnessed from underground heat.

Energy demand

- A greater proportion of users are more self-sufficient, with homes and businesses tapping solar power, for example.
- Users also use various systems and technologies to anticipate market conditions and manage how much they are drawing from the national grid.

What this means for:

Energy supply

- Singapore relies heavily on electricity imports, achieved through a wider regional grid involving partnerships with various countries.
- Hydrogen accounts for a relatively small share of Singapore's power generation mix due to relatively high costs.
- Natural gas is still used because of the lack of cleaner alternatives, but emissions from burning this fossil fuel are offset with international carbon credits.

Energy demand

- Advancement in smart systems for the national grid might have stalled, but large end users can tap smaller-scale systems in their microgrids to reduce reliance on the national grid.
- Microgrids refer to systems that can be controlled independently of the main grid and have alternative supply sources, such as solar panels.

What this means for:

Energy supply

- Low-carbon hydrogen dominates Singapore's energy supply mix, replacing natural gas as the main fuel.
- Building on earlier investments, Singapore starts deploying other low-carbon alternatives, such as nuclear energy, to diversify its supply mix. The country is well positioned to scale them up when commercially competitive.

Energy demand

- Large industrial and commercial users become more energy-efficient through district-level systems for their energy needs and by investing in digital solutions.
- Smaller end users have access to a wide range of solutions such as energy-as-a-service and tiered pricing plans which more closely reflect the price of electricity, and they can match their activities to gain maximum cost savings.

