

Powering Singapore

How move towards renewable energy will affect our bills

Singapore's embrace of solar and other forms of clean energy may be good for our wallets.

David Broadstock

The year 2024 kicked off with an increase in the cost of living.

The goods and services tax rose to 9 per cent, and at the same time energy tariffs increased by around 4 per cent.

Lower- to middle-income households will receive support through the permanent GST voucher scheme to help defray these costs, yet it remains important to understand the immediate, and long-term, drivers of our energy prices, and the direction they are likely to take.

While energy tariffs frequently get revised up or down, the foundations of this latest price revision may be a little different.

The rise in the tariff rates was attributed by the Energy Market Authority (EMA) to several factors, among them being the carbon tax.

The rising carbon tax in Singapore in 2024, going from \$5 per tonne of emissions up to \$25 per tonne, was predicted by the National Climate Change Secretariat to add around 4 per cent to our tariffs, and that is roughly what we saw.

THE INCENTIVE FOR RENEWABLES

Renewable energy solutions, including solar and biomass power, and energy recovered from municipal waste, accounted for 4.4 per cent of the electricity power generation mix for Singapore in 2022. Yet they could play a pivotal role in keeping future energy costs low.

The share of renewables will grow significantly in the years ahead and, as we move to these low-carbon energy solutions, there will be less carbon tax to pay.

According to the International Renewable Energy Agency, global energy production cost in 2022 for electricity generated from onshore wind was 52 per cent cheaper than the cheapest fossil fuel-fired solutions. Solar power was 29 per cent cheaper.

There has been sustained growth in global renewable energy production.

The Energy Institute indicates that, between 2021 and 2022, total world energy generation from wind increased by around 14 per cent, while that from solar power increased by 25 per cent. At the same time, year-on-year generation costs reduced by 5 per cent and 3 per cent respectively.

In other words, there is sustained progress both in lowering the costs of renewable energy and in scaling up the amount of supply from these sources.

Some noteworthy

breakthroughs in this area include scientific discoveries, such as perovskite technology for solar energy, which set a world record for production efficiency in 2023, and was developed by Singapore researchers from the National University of Singapore.

There have also been innovations in supply, with more flexible solar panel designs allowing renewables to be integrated more easily into our built environment.

Meanwhile, oil-rich nations in the Middle East are seeking to pivot to renewable energy projects on a large scale. They want to start exporting the electricity they generate before oil resources become stranded assets.

One challenge has been that solar and wind energy depend on daylight and weather conditions.

Partnering such renewables with battery technologies can make for more stable renewable energy supply solutions.

The EMA, together with SP Group, has trialled a small utility-scale battery solution under the Accelerating Energy Storage for Singapore programme and more progress can be expected in this area.

LNG PRICE VOLATILITY

Today, around 95 per cent of Singapore's power generated is from natural gas, a fuel source that we do not wish to retain. First, it does not fit in with Singapore's aim of cutting down emissions and, second, it contributes to higher costs.

Natural gas prices are volatile. They are affected by financial market speculation, among other factors, which has been known to drive them up. This makes it all the more important to add renewables, whose costs are more predictable, to our energy mix. This will reduce the impact of liquefied natural gas (LNG) price volatility on our electricity prices.

SINGAPORE'S PUSH FOR RENEWABLE ENERGY

Despite its shortage of land, Singapore plans to have, or already has, renewable energy facilities on the islands of Jurong and Kusu.

Sembcorp Solar Singapore recently won a tender from JTC to develop the largest solar project (by capacity) awarded by a public-sector agency in Singapore to date. Meanwhile, Kusu, or "Turtle Island" as many know it, is 100 per cent powered by solar energy as of 2023.

These developments show how renewables can cater for different scales of power generation in contrasting

conditions.

Meanwhile, project SolarNova, spearheaded by HDB, is bringing solar power to more than 10,000 Housing Board blocks.

Singapore also plans to work with its neighbours to bring in clean energy imports from Cambodia, Indonesia and Vietnam. These may contribute as much as 30 per cent of Singapore's electricity supply by 2035. A regional grid is on the cards that will help South-east Asia to transition to low-carbon energy systems.

This is an exciting phase of development for power markets.

RETROFITTING PLANTS FOR GREEN HYDROGEN

In recent years, there has been much hype around hydrogen as a fuel source for power generation. Green hydrogen solutions refer to processes that can recover electricity with net-zero carbon emissions.

Japan, Australia, the Middle East and the United States are among the places trying to produce green hydrogen in a way that is commercially viable.

For Singapore, which is so dependent on natural gas, one positive factor is that there are ways in which natural gas power plants can be retrofitted to use hydrogen for power generation. Their equipment would be of immense value in the quest for a reliable and reasonably priced supply of green hydrogen.

In that scenario, we are close to a net-zero solution, with the only hurdle being the retrofit of our existing natural gas power generation equipment to be used with hydrogen.

The EMA has already set out regulatory provisions to make this pathway possible.

There is, for example, a new requirement that new and re-powered natural gas-based power generation facilities must be minimally 30 per cent hydrogen-compatible at the time of commissioning, with the additional requirement that they can be retrofitted to take 100 per cent hydrogen fuel in the future.

This puts the transition on a sound footing.

FAIR PRICING

When it comes to energy, Singapore has sought to keep the supply resilient, prices competitive and carbon footprint minimal. The priorities change over time. The concept of "fair" energy prices has evolved in recent years with our awareness of climate change.

Our current energy systems were developed when we did not have a full understanding of the harm that carbon emissions cause to the environment. Because of this, we priced energy too cheaply.

The carbon tax, which taxes the overall cost of using fossil fuels, is a way to push for cleaner energy solutions.

While households are mindful of rising costs of living, the transition is necessary. Already, advances in technology have made renewables cheaper and the trend looks set to continue.

If Singaporeans support this direction, we can be assured of securing reliable, clean and low-cost energy.

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