

**Speech by Minister for Trade and Industry Gan Kim Yong for the  
Singapore Energy Lecture, 25 Oct 2021**

- Distinguished Guests, Ladies and Gentlemen. A warm welcome to all of you to the 14th edition of the Singapore International Energy Week (SIEW).
- Addressing climate change is a global imperative.
- The world is now more than 1°C warmer than it was before the Industrial Revolution.
- At this rate, the 1.5°C global warming threshold could be breached in the next 10 to 20 years.
- We are already seeing the devastating effects of climate change – from rising sea levels, to more extreme weather patterns, and the destruction of nature and biodiversity.
- With the power sector accounting for almost a quarter of global emissions, decarbonising electricity generation is at the core of the global climate change effort.
- Many countries around the world have already pledged to transition their power sector, reducing reliance on coal and other fossil fuels, and developing more renewable energy sources.
- But this energy transition is a challenging journey, and could even be risky if the transition is not managed well.
- When a country replaces large parts of its traditional energy sources with new ones in a short period of time, unanticipated security and reliability risks may arise.
- When the whole world is switching at the same time, the process becomes that much more complicated.
- This was evident in several energy markets where a shortage of renewable energy and an increased demand for gas caused electricity prices to rise.
- This does not mean we should abandon or slow down our electricity transition.
- The fate of our planet does not permit that.
- It does mean, however, that we must be more careful in our planning and minimise unintended disruptions.

- As Warren Buffet said, provide a greater “margin for error”. I will elaborate on this when I speak about Singapore’s plans.
- As a small island city-state, climate change poses an asymmetric challenge for Singapore.
- Even though Singapore contributes only 0.1% of global greenhouse gas emissions, the totality of global emissions affects us greatly.
- We are starting to see more extreme weather, such as unusually heavy rainfall and hotter dry spells.
- Singapore is therefore very invested in the success of the global energy transition and is committed to playing our part to combat climate change.
- Earlier this year, we launched the Singapore Green Plan 2030, our national roadmap towards sustainable development and net-zero emissions.
- A key pillar is the Energy Reset, which outlines our approach to decarbonise the energy sector.

### **Singapore’s Challenge**

- With limited indigenous renewable resources, the energy transition will be especially challenging for Singapore.
- Many of the options available to other countries are not available to us.
- We have little wind, hydro or tidal power. Solar is our most viable form of renewable energy, but we have heavy cloud cover and limited land available to harness solar energy.
- Despite these constraints, we have continued to push the boundaries to reduce the power sector’s carbon footprint.
- First, we have put in place measures to enhance the energy efficiency of existing power generation plants.
- Currently, about 95% of our electricity is generated using natural gas, the cleanest fossil fuel to date.
- Even as we ramp up various sources of renewable energy, natural gas will still remain an important source of energy for us over the next few decades.
- To reduce the carbon footprint of electricity generation, we provide grants to support our power generation companies in adopting more energy- and carbon-efficient technologies.

- We are also moving legislation to empower EMA to impose emission standards on our generation companies. We will be consulting the industry further on the specific standards.
- Second, we are finding creative ways to harvest more solar energy.
- For example, earlier this year, we launched one of the world's largest inland floating solar farms at our Tengeh Reservoir.
- We are also trialling the use of vertical solar panels which can be installed on external walls of buildings.
- These solutions help us to overcome our land constraints, making us one of the most solar dense cities in the world.
- Despite COVID-19, we have continued to press on with our solar deployment efforts and are on track to quadruple our solar panel deployment and achieve our target of at least 2 giga-watt peak of installed capacity by 2030.
- We will not stop here. We are reviewing our plans to further accelerate solar deployment.
- But these efforts alone are not sufficient.
- Increasing the energy efficiency of our natural gas power plants can, at best, reduce carbon emissions by about 10%.
- Even if we maximise all available space in Singapore for solar deployment, and accounting for efficiency improvements, we would still not be able to generate enough power to keep the lights on with solar energy alone.
- Meaningful abatement can only come through tapping on low-carbon energy beyond our shores, and by developing the use of low-carbon alternatives such as hydrogen in the long term.

**Regional power grid will be a key needle-mover**

- Importing low-carbon energy will be a key needle mover in Singapore's energy transition in the near to medium term.
- Even though Singapore is resource constrained, we lie in a region with abundant renewable energy resources.
- EMA has been studying the option of electricity imports for several years. A significant portion of our electricity can be imported safely and reliably if we have adequate safeguards in place.

- Today, most of our energy depends on supplies which are imported anyway. Instead of importing all of it in molecules, we will import some of it as electrons.
- The technology for importing electricity, even over long distances and across seas, is mature and well-established.
- Subsea electricity transmission technology is not new. In fact, it has already been widely adopted in Europe, UK and other Nordic countries for decades. There are numerous new electricity import projects being developed around the world even as we speak.
- I'm pleased to announce that Singapore plans to import up to 4 gigawatts (GW) of electricity by 2035. This will constitute around 30%, or about one-third, of Singapore's electricity supply. EMA will announce the details shortly.
- We will start with trials to iron out the technical and regulatory issues associated with cross border power trading. These include the trial to import 100 megawatts (MW) of electricity from Peninsular Malaysia as well as a pilot to import 100MW of solar-generated electricity from Pulau Bulan, Indonesia.
- These trials allow us to learn and improve our system and processes as we increase our imports.
- We will also import different types of low-carbon energy from different parts of the world to diversify our sources and enhance energy security. This is similar to our current approach of diversified natural gas sources.
- We will provide sufficient backups. Besides energy storage systems for short-term disruptions, we will also deploy some of the retiring combined-cycle gas turbines as backups in the event of a longer-term disruption.
- We will be conducting Requests for Proposal (RFP) for these electricity imports, to ensure that we get the best offers.
- The transition to renewable energy, including imported electricity may not mean cheaper electricity.
- While the cost of generation may be lower, the costs of transmission and backup, as well as necessary grid enhancements will add to overall costs. This is an inevitable but necessary trade-off in the energy transition.
- Beyond the bilateral imports, we hope that one day we will also have an ASEAN power grid.
- I am pleased that we are making steady progress in this regard.
- Last month, the Energy Ministers of Laos, Thailand, Malaysia, and Singapore came together to reaffirm our commitment to commence the Lao PDR-

Thailand-Malaysia-Singapore Power Integration Project (LTMS-PIP) in 2022. The state utility company of Lao PDR, Electricite du Laos (EDL), and Keppel Electric also announced their partnership to import up to 100MW of hydropower into Singapore.

- This is an important milestone in our long-term vision of creating an ASEAN Power Grid.
- The advantages of developing the regional power grid are clear:
- First, it can help to open new markets for resource rich countries to sell more than what they need, while providing resource scarce countries access to low-carbon energy;
- Second, it can help to drive investments in low-carbon projects, especially in areas where demand for renewable energy has not yet caught up with the potential supply. This helps to accelerate the development of renewable energy in the region; and
- Finally, with an integrated regional power grid, countries benefit from enhanced electricity security and resilience. Grid operators across borders can share their energy reserves. This helps to improve overall efficiency and energy security. For example, the existing interconnector between Singapore and Malaysia provides mutual support should either side face power system issues.

### **Exploring new energy solutions**

- Electricity imports play an important role in our energy transition. But we cannot rely on them alone to decarbonise our electricity.
- We will also need to explore new energy solutions, to meet both our long-term energy needs and low-emissions target. In this, we adopt a technology neutral approach.
- We scan the world for the most promising solutions, and work with various parties – public and private – to develop and trial them here.
- Let me cite the example of hydrogen.
- Today, carbon intensive hydrogen is primarily used in industry for processes such as oil refining, and production of fertiliser.
- With technological advancements and as the cost of low-carbon hydrogen drops, we can unlock more uses for hydrogen.
- For example, turbine manufacturers are developing gas turbines that can burn pure hydrogen for electricity generation – a process that produces no carbon emissions at all.

- Using such hydrogen gas turbines would lead to a significant reduction in carbon emissions in our energy mix.
- Low-carbon Hydrogen has the potential to be a game-changer for Singapore's energy transition. For it to be deployed meaningfully, especially for the power sector, there are three major challenges that we must first overcome:
  - First, global supply chains for hydrogen need to be established;
  - Second, infrastructure for hydrogen import, storage, distribution, and end-use need to be put in place; and
  - Third, the costs of hydrogen transport, storage and use will need to be competitive, for widespread adoption.
- The Government is investing resources to understand the potential for hydrogen deployment in Singapore and overcome the barriers to adoption.
- We will be awarding \$55 million to research projects that are focused on improving the technical and economic feasibility of low-carbon technologies, particularly on hydrogen and carbon capture, utilisation and storage (CCUS), to enable local deployment in future.
- We have increased the funding amount, up from the \$49 million set aside last year, in response to the many good proposals that we had received.
- EMA is also working with the industry to explore trialling the use of Hydrogen Enriched Natural Gas (HENG) as a fuel at existing power plants, as well as trialling the import of low-carbon hydrogen.
- If successful, we will have another alternative to reduce the carbon footprint of our power sector, even as we explore and await the possibility of deploying gas turbines that can burn pure hydrogen for electricity generation.

### **The Energy Transition is a Collective Effort**

- Our two main thrusts for decarbonising our electricity generation share a common feature: they both rely on Singapore working with parties overseas.
- In fact, **energy transition is a collective regional and global effort.**
- It is only when the international community comes together to ensure access to renewable energy resources, financing and decarbonisation technologies, will we be able to reduce the power sector's emissions and slow down the effects of climate change.

- Singapore is working with like-minded partners such as Australia, Chile, New Zealand and the United States on low-carbon solutions, climate action and regional capacity building.
- Singapore will also continue to deepen our cooperation on regional energy transition initiatives with key international organisations such as the International Energy Agency and International Renewable Energy Agency who are present with us here at SIEW today. We will also continue to work with our ASEAN neighbours.
- The Singapore-IRENA High Level Forum and Singapore-IEA Forum, which will be held over the next few days at SIEW, will serve as important platforms for in-depth discussions in areas like energy efficiency, renewable energy deployment and infrastructure financing.

### **Closing**

- Let me conclude.
- The energy transition is an important part of our global climate change efforts.
- Each country's decarbonisation pathway will differ and will be heavily dependent on their domestic circumstances, in particular their access to renewable energy resources.
- But most, if not all Governments will need to work with regional and global partners, to navigate the transition. This is why it is important for the energy community to come together, share expertise, exchange ideas and explore solutions.
- I hope you will find the Singapore International Energy Week a useful platform for this purpose.
- This year also marks the 20th anniversary of the founding of the Singapore Energy Market Authority (EMA).
- The EMA has made significant achievements in developing Singapore's energy sector, while ensuring that everyone in Singapore continues to have reliable, sustainable and affordable energy around the clock.
- I thank all past and present staff of EMA and the energy workforce in Singapore, for their contributions. I am confident that EMA will continue to push the boundaries, and work collectively with all stakeholders - here and abroad - to create a more sustainable energy future.
- On that note, thank you for being here and I wish all of you a fruitful time at this conference.