

## MEDIA RELEASE

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### **Singapore's Future Grid Capabilities Roadmap to Pave the Way for a Resilient and Sustainable Energy Future**

As Singapore decarbonises its power sector, the nation's energy supply mix will become more diverse with the growing deployment of domestic solar and electricity imports. The electricity grid will also become more complex with the addition of distributed energy resources (DERs) such as rooftop solar photovoltaics, battery energy storage systems (BESS) and electric vehicle chargers. To support this transition, EMA has embarked on initiatives to develop capabilities for the future grid.

#### **Future Grid Capabilities Roadmap**

2. EMA, in collaboration with SP Group, is developing a Future Grid Capabilities Roadmap. The Roadmap will outline challenges associated with the changing context of Singapore's power system and identify key focus areas to transform the electricity grid to manage new complexities, including:

- i. Harnessing DERs to enhance grid resilience by providing energy, ancillary services or demand response services to shift energy usage to off-peak periods;
- ii. Enhancing grid planning, control and maintenance efforts such as through the development of digital solutions such as the grid digital twin, distributed energy resources management system to optimise manpower and reduce manual processes;
- iii. Exploring solutions to maintain grid stability as we increase the share of renewable energy sources within our energy mix.

3. The Roadmap, to be launched later this year, will set the direction to build Singapore's future grid capabilities through a combination of research and development, pilot projects and deployment efforts. The focus areas and initiatives are designed to support the energy transition by fostering targeted innovations that enhance grid resilience and reliability. By developing capabilities ahead of time and

across various phases, EMA and SP Group aim to anticipate and address emerging challenges, ensuring a robust and future-ready grid.

### **Regulatory Sandbox for Virtual Power Plants**

4. As part of efforts to harness DERs, EMA has launched a Consultation Paper and Call for Regulatory Sandbox Proposals to explore the benefits of virtual power plants (VPPs). A VPP is a digital platform capable of controlling, optimising, and aggregating a network of DERs across various locations, to operate as a single generator to provide energy and ancillary services to the electricity grid. This can unlock the potential for DERs to play a greater and broader range of roles in supporting the energy transition. EMA invites the industry to submit VPP sandbox proposals by 31 December 2024. Details are available at <https://go.gov.sg/harnessing-ders-via-vpps-to-provide-energy-and-ancillary-services>. Please also refer to the Annex for more information on VPPs.

5. To advance this initiative, EMA has entered a Memorandum of Understanding (MoU) with SP Group to collaborate on the research and development for a VPP to participate in the regulatory sandbox. The MoU involves the deployment of a 15 MW VPP comprising DERs such as solar photovoltaic sources and BESS in the initial phase. The VPP will participate in the electricity market to evaluate its benefits to the power system. This initiative will explore advanced ways to integrate these resources into the grid, driving a smarter and more resilient energy system. The sandbox will foster collaboration and push the boundaries of Singapore's future grid capabilities.

6. Mr Puah Kok Keong, Chief Executive of EMA, said, "Fostering innovation and collaboration with stakeholders is crucial to enhance Singapore's grid capabilities. By using advanced technologies and building a resilient grid that can address our challenges, we can harness opportunities to advance the transition towards a more sustainable energy future."

7. Mr Stanley Huang, Group Chief Executive Officer of SP Group said, "In our continuous efforts to uphold grid reliability and resilience, and support the incorporation of more clean energy sources, we work closely with EMA on various initiatives such as the Distributed Energy Resources Management System (DERMS), Digital Twin and VPPs. Augmenting capabilities is key to future-proofing Singapore's electricity network and enable the smooth transition to a low-carbon, smart energy future."

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### **About the Energy Market Authority**

The Energy Market Authority (EMA) is a statutory board under the Singapore Ministry of Trade and Industry. Through our work, we seek to build a clean energy future that is resilient, sustainable, and competitive. We aim to ensure a reliable and secure

energy supply, promote effective competition in the energy market and develop a dynamic energy sector in Singapore. Visit [www.ema.gov.sg](http://www.ema.gov.sg) for more information.

### Virtual Power Plants

- In the coming years, Singapore will see an increase in deployment of solar panels, small capacity BESS and electric vehicle (EV) chargers as part of the nation's journey towards achieving net-zero emissions.
- These assets are known as Distributed Energy Resources (DERs) as they typically have small capacities and are "scattered" across various locations on the island.
- By itself, an individual DER may not generate, store or consume a significant amount of electricity. Collectively, these DERs can be aggregated as a VPP to have enough capacity to work similarly as conventional power generation plants to provide energy and ancillary services to the Singapore Wholesale Electricity Market (SWEM).
- VPPs can benefit from receiving payments for their services provided to the SWEM. In turn, VPP aggregators may choose to share some of these benefits with consumers with DERs participating in the VPP.

#### How a Virtual Power Plant Works

- A VPP uses advanced communication technologies and data analytics to manage, coordinate and control these DERs under its portfolio. For instance, a VPP can:
  - Direct the excess energy generated from solar panels to be stored in BESS at another location for future use.
  - Aggregate the stored energy from BESS deployed at various locations to be injected into the grid.
  - Adjust the charging speeds of EV chargers to reduce their electricity draw from the grid.
- A VPP registers itself as a single power generator in the SWEM and performs these services:
  - Supply electricity to meet demand.
  - Provide regulation services by adjusting its energy use in real-time to balance the grid.
  - Provide contingency services by injecting energy into the grid when there is a sudden loss of supply (e.g. when there are power plant outages) in the power system.

# Infographic on VPPs

