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Smart Energy Solutions

Jason Venning, Country Manager - Australia & New Zealand

Smart Renewable Energy Integration for Power System Resilience
ASEAN Energy Day, 30th July 2020

"A Smart Grid is an electricity network that can cost efficiently integrate the behaviour and actions of all users connected to it – generators, consumers and those that do both – in order to ensure economically efficient, sustainable power system with low losses and high levels of quality and security of supply and safety."

European Union Commission Task Force for Smart Grids

Agenda

- Evolution of the electricity grid - current challenges
- Energy storage in smart grids - residential and commercial & industrial applications
- Smart Energy solutions - bringing it all together

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Shaping the future of energy

FIMER

Established in 1942

1,100 Employees

Operate in 26 countries

90% of business is solar

11+ GW capacity / year
43+ GW installed capacity

3 R&D Facilities

3 production sites

23,500+ charging stations installed

01 Evolution of the electricity grid

From traditional to smart grids

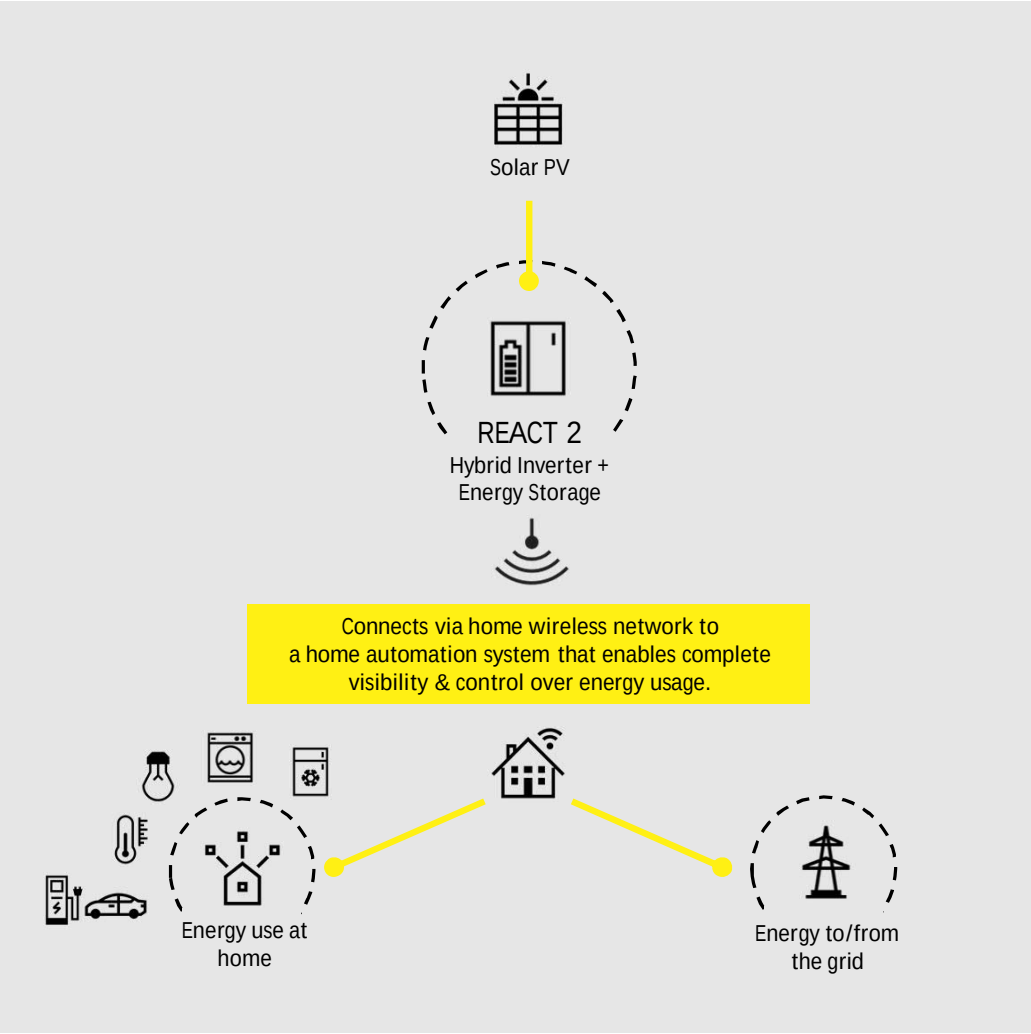
- There is now more energy produced closer to the point of consumption than ever before
- Grids need to support intermittent and diverse sources of energy like solar and wind
- Optimised, real-time and smart grid devices needed to address power quality and reliability issues
- More investment in smart energy solutions is necessary for continued growth of renewable energy

02 Energy Storage in Smart Grids

Residential and Commercial & Industrial (C&I) Applications

Shaping the next generation of smarter homes

- Globally, the demand for solar energy in residential installations is on the rise
- Today's consumers want more control over their energy use and to manage this anywhere, at anytime
- There is a growing demand for solar inverters with integrated storage
- This demand for control and connectivity will unlock the real potential for smart energy power solutions in residential installations



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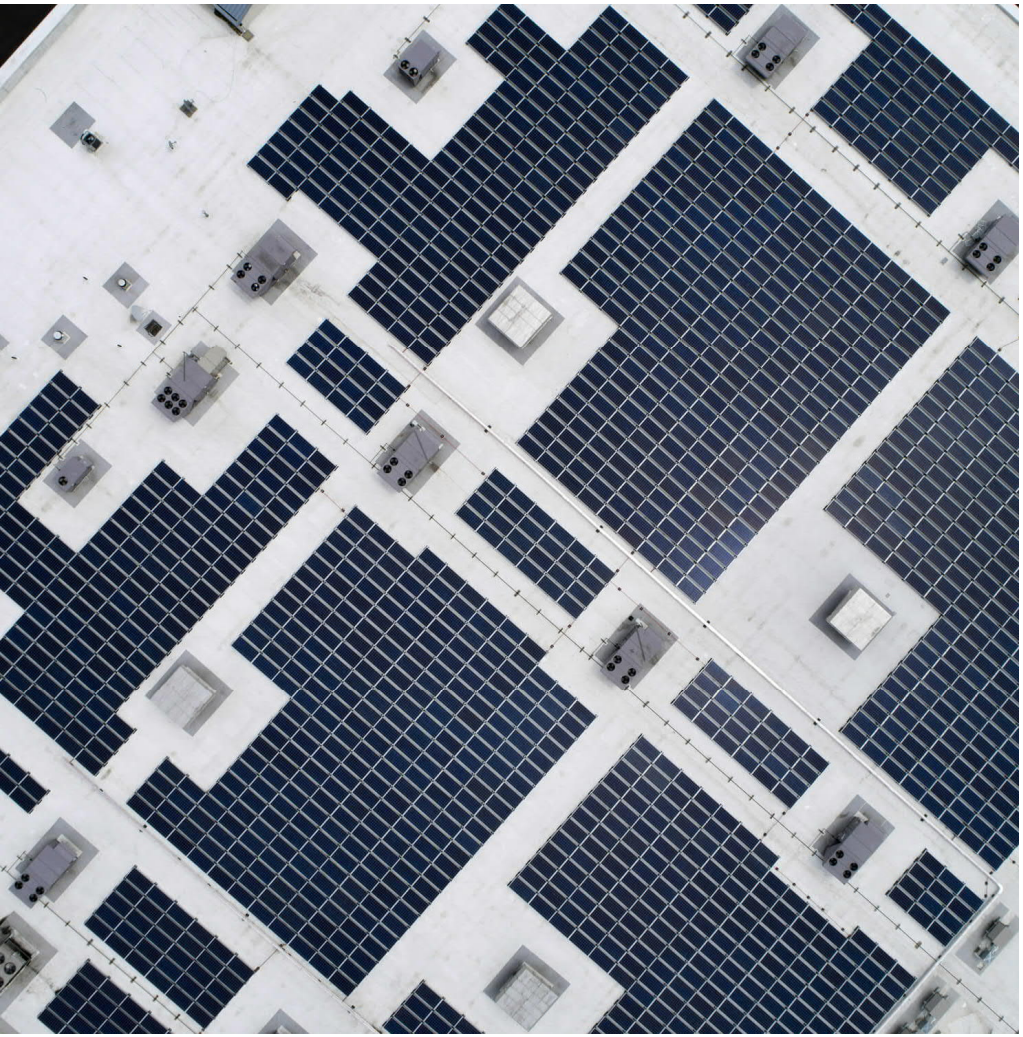


Energy storage for C&I applications

- Businesses can benefit greatly from the adoption of storage technologies
  - Enables peak shaving to generate savings on electricity bills by reducing peak demand
  - Maximises solar self-consumption
  - Load management translates into savings on additional energy cost and maximises energy autonomy for the site
- Battery storage is an alternative to grid upgrades, enabling integration of new peak loads such as EV charging infrastructure

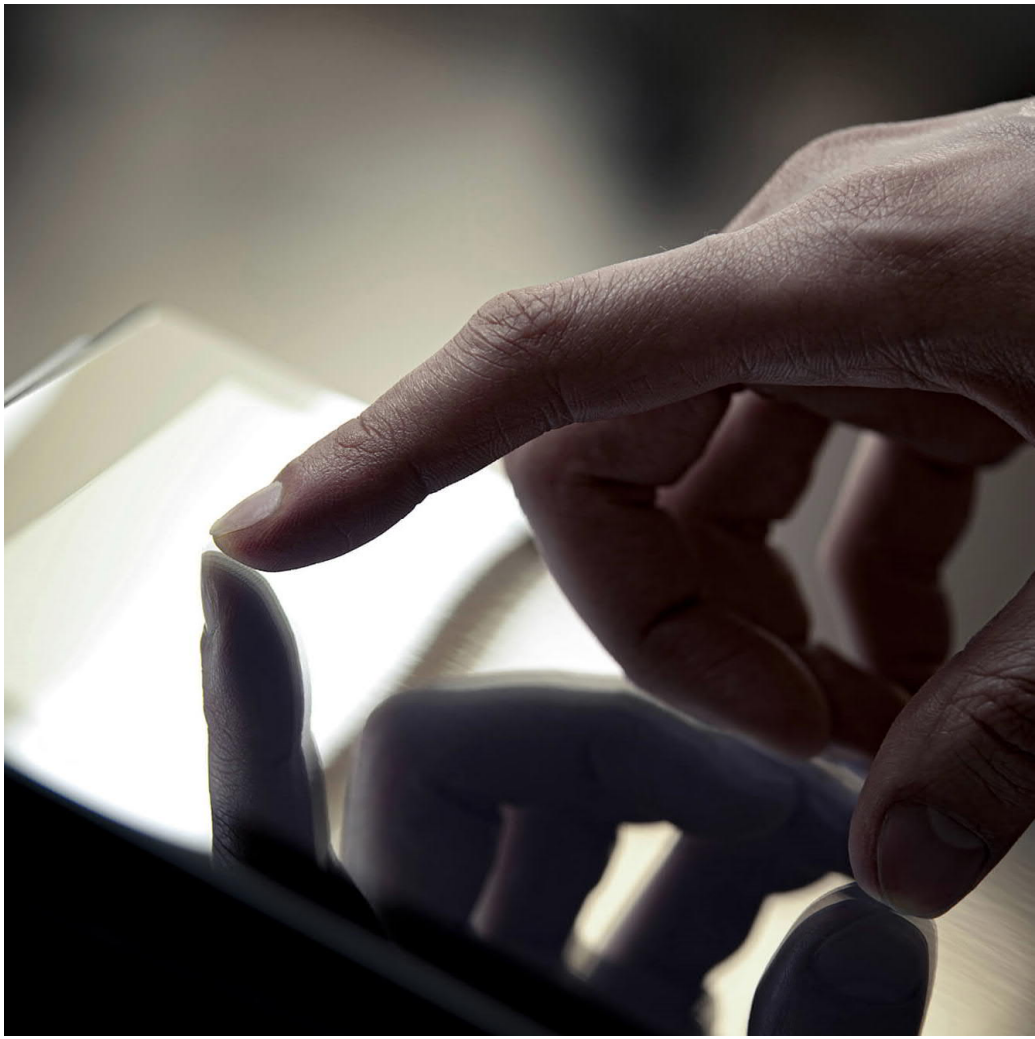
03 Smart Energy Solutions

Towards a smart, flexible energy system

- Combination of energy storage, demand side response (DSR), smart networks as well as increasing interconnection
- Energy efficiency improvements which target peak demand
- Real-time and accurate consumption metering to adjust power generation sources according to the needs of each consumer
- With smart energy solutions we can maximise power efficiency, reliability and resiliency of energy from renewable sources

Smart meters and IoT

- Smart meters are a fundamental building block of the smart grid and digital energy network
  - Facilitates digital retail services such as tariff optimisation
- With IoT technology, smart meters provide the gateway to services at a consumption level:
  - Demand response
  - Remote building control
  - Home energy management
  - Centralised programming and energy optimisation for C&I customers



Energy Independence

- There has been rapid advancements in battery management systems and cloud-based analytics
- Cost effectiveness is improved through digital innovation in peer-to-peer electricity trading and distributed electricity aggregation into VPPs.
- Enhanced life cycle and effectiveness of storage through maximising the charge/discharge value
- Value generation for the customer through significant cost savings and income generation
- Third-party ownership or financing models that reduce or remove upfront costs

04 Conclusion

Without smart grid and energy solutions, it is impossible to take renewable energy resources to their full potential, making smart grid integration necessary for the continued growth of renewable energy.

Contact us

FIMER Thailand
161/1 SG Tower, 1st-4th Floor, Soi
Mahadlekluang 3
Rajdamri Road,Lumpini, Pathumwan,
Bangkok 10330

FIMER Australia
84-90 Hotham Street
Preston VIC 3072

info@fimer.com
fimer.com