

PV systems step up to support the grid

Photovoltaics (PV) is fast becoming a major source of electricity worldwide. In countries like Australia, PV already provides more than 10% of total energy production, and this percentage is projected to increase over the coming years. With this increase, PV systems and PV hybrids will need to take on more responsibility for grid stability by providing ‘ancillary services’.

‘Ancillary services’ are the services necessary for the secure and reliable operation of a transmission or distribution power system. All grid users, including conventional power plants, renewable energy sources, storage units, and flexible loads, are responsible for providing these services.

The status and potential of PV ancillary services is explored in a new report “PV as an Ancillary Service Provider 2021” released by the International Energy Agency PV Power System Programme.

Regulatory frameworks and grid codes are expected to need to change significantly over the next ten years with increasing uptake of PV and other renewable energy systems levels. The report targets stakeholders and decision-makers, providing insights on the technical capabilities of PV systems, PV hybrids and PV grid integration lessons learned from other countries or regions.

According to APVI member Dr Niraj “there is an astonishing ability and potential for solar PV systems to support the grid to be more reliable, resilient and secure.” Dr Lal is with ANU and AEMO and contributed to the report along with Associate Professor Iain MacGill of UNSW.

The technical report provides numerous case studies from around the world that highlight current best practice examples of PV ancillary services, including a lightning strike in Queensland that led to a significant grid disturbance. Iain MacGill says, “In Australia, distributed rooftop PV systems played a valuable role in managing a major power system disturbance in the Australian National Electricity Market (NEM) in August 2018. A sustained period of excessive frequency in Queensland, following its separation from the rest of the NEM, saw rooftop PV curtailing its output to assist in reducing frequency back to its normal operating band.”

State-of-the-art PV systems can already provide a wide range of grid support functionalities. These grid support functionalities are, for example, voltage and

frequency ride-through, active and reactive power control, voltage and frequency control, dynamic grid support.

The report recommends actions to optimise the benefit of PV as an ancillary service, including the establishment of international standards, digitalisation of the grid, continuous monitoring, and compliance evaluation.

PV and PV hybrids are currently providing important ancillary services, as Dr Lal notes, “solar PV systems are already demonstrating the critical importance and existing ability of careful integration into the grid, an area that will require further concentrated effort as we progress rapidly towards 100% renewable energy penetration.”

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[Full Report:](#)



PV as an Ancillary Service Provider 2021

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About the IEA PV Power Systems Programme

The objective of Task 14 of the IEA Photovoltaic Power Systems Programme is to promote the use of grid-connected PV as an important source of energy in electric power systems. The active national experts from 15 institutions from around the world are collaborating with each other within Subtask B – Operation and planning of power systems with high penetration of Solar PV and Renewable Energy Sources (RES) – in order to share the technical and economical experiences, and challenges. These efforts aim to reduce barriers for achieving high penetration levels of PV Systems in Electricity Grids.

About the APVI

The Australian PV Institute is a not-for-profit, member-based organisation which focuses on data analysis, independent and balanced information, and collaborative research. Our objective is to *support the increased development and use of PV via research, analysis, and information*. The APVI promotes solar through its live solar mapping platform [<http://pv-map.apvi.org.au>], the national solar research conference and Australia's participation in two International Energy Agency (IEA) programs – PVPS (Photovoltaic Power Systems) for solar photovoltaics and SHC (Solar Heating and Cooling), concerned with new solar thermal products and services.

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