

Rooftop solar PV curtailment raises fairness concerns for those losing 20% of generation

Solar PV curtailment is the intentional reduction of power output from solar energy systems to the grid, allowing management of voltage to prevent possible unsafe increase in voltage levels, but also limiting the potential for the solar system owner to earn revenue from exporting their excess solar, which can affect different households at different levels.

On average, the reduction in rooftop solar export to the grid due to curtailment is less than 1% but in some areas with low voltage networks, a small number of households are found to recurrently lose up to 20% of their generation, raising concerns of fairness.

These findings are part of a recently released report from the Australian PV Institute (APVI) “Curtailment and Network Voltage Analysis Study (CANVAS)” – a RACE for 2030 Australian technical and social science study conducted by the Collaboration on Energy and Environmental Markets at UNSW, with industry partners AGL, SA Power Networks (SAPN), and Solar Analytics.

The scoping study looked into two solar inverter quality response modes for curtailment – tripping/anti islanding/limits for sustained operation, and Volt VAR settings – and investigated losses for 1000 PV and battery sites, and 500 PV-only sites in metropolitan Adelaide.

Dr. Baran Yildiz, the lead researcher of the CANVAS project says, “The results indicate that average curtailment loss is less than 1% of the generation, and greater for PV -only sites. However, a small number of households lost a lot more than the others, up to 20% of their generation, which clearly raises fairness concerns.”

The range of factors that result in higher levels of curtailment than others include the size, type, location, and age of the PV or battery system.

Analysis of the Solar Analytics data of 500 sites in Adelaide indicates that overall, the proportion of generation lost due to anti-islanding curtailment is very low, with an average of 0.35% generation being curtailed across all sites across all days. A small proportion of sites are found to be significantly impacted with the most impacted site experiencing around 20% curtailment over the entire 10-month period. Of all the other sites, a maximum of 10% curtailment was experienced, and the majority experienced negligible curtailment.

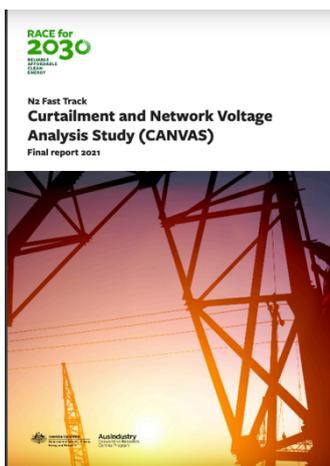
The proportion of days on which *some* curtailment occurs due to anti-islanding is relatively high, with 20% of sites experiencing curtailment on at least 21% of days over the 10-month period. This suggests, that whilst curtailment due to anti-islanding activation impacts a small proportion of overall generation, it does appear to occur frequently.

The financial revenue loss due to the studied modes of curtailment were small for an average energy user (less than \$5 per year). On the other hand, the most impacted site's revenue loss was calculated to be around \$40 per year, based on average tariff assumptions. These losses may also result in potential revenue loss for VPP aggregators.

Focus group participants in the study, most of whom had no prior knowledge of distributed energy resource curtailment, found the concept of curtailment 'off-putting' and questioned whether grid-connected PV owners should be made to bear any losses, given the perceived benefits of their PV helping the environment and the energy sector. They additionally identified the uneven distribution of curtailment impacts as a matter of 'unfairness'.

Findings from the social science analysis suggest that all three dimensions of energy justice – distribution, recognition, and process – are relevant in considering the impacts of distributed energy resource curtailment and possible measures to manage it. Focus group participants expressed that recognition of the positive role of distributed PV, and transparency and information about the extent to which they are, or may be affected by curtailment, are both required to help make informed decisions about investment in and management of their DER system. These were outlined in terms of the need for consumer education campaigns, clear causes in contracts, notifications about curtailment events, and household-scale modelling of the likely impacts of curtailment on electricity bills.

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[Full Report:](#)

CANVAS: Curtailment and Network Voltage Analysis Study Project Report

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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. www.apvi.org.au