



**UNSW**  
SYDNEY

# Off-Grid Renewable Energy Based Active Distribution Networks

**Designing controls for flexible, off-grid electricity networks that can interconnect small renewable resources and loads in the same way as the main electricity grid.**

## Competitive advantage

- The ability for flexible integration of inverter-interfaced generation into off-grid electricity networks
- Design of control algorithms that include the dynamics of the generation devices
- Creation of dynamic models for active distribution networks
- Enabling small consumers to trade electricity with other users in distribution systems
- Innovative off-grid supply systems designed using these control methods are a fraction of the cost of the purpose-built, remote electricity supply systems

## Impact

- Ability to build off-grid flexible electricity networks for remote locations with inverter-interfaced generation
- Control methods that work in active electricity systems without the need for synchronous generators

## Successful applications

- An off-grid renewable-resources-based active distribution network, with complete flexibility for interconnecting new generation devices and loads, has been commissioned in India for a rural community

## Capabilities and facilities

- Developing detailed dynamic models for the entire active distribution network
- Detailed simulation using industry-standard software tools
- Design and analysis of various control techniques
- A world-class distribution energy resources laboratory, in partnership with the ANU and power distribution companies, with capability to interconnect new generation resources and perform experiments to test control and modelling for dynamic control

## More Information

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