

# GREEN Grid Leadership Team



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Lead – Cost-effective, functional and safe distribution network



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Lead - Managing supply variability of renewable energy in the network

Co Lead – Cost-effective, functional and safe distribution network



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Lead – Identification and management of household demand variability



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More information and news about the GREEN Grid programme can be found on the EPECentre's web site.

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**GREEN Grid is funded by: Ministry of Business, Innovation & Employment (MBIE)**

**Co-funded by: Transpower and the Electricity Engineers' Association**

### Supported by:

Electricity Engineers' Association	Fisher & Paykel Appliances
Transpower	University of Otago
WEL Networks	University of Canterbury
Orion	Mitton ElectroNet
Unison	Marlborough Lines
Vector	Mainpower
Electricity Authority	Network Tasman
Meridian Energy	Northpower
Powerco	

### Research lead:



### Research partners:



Centre for Sustainability  
Kā Rakahau o Te Ao Tūroa





GREEN Grid  
programme

Renewable  
Energy and the  
Smart Grid

## GREEN Grid

The EPECentre is the Centre of Excellence for electric power engineering. The EPECentre is leading the GREEN Grid programme to ensure that New Zealanders have access to reliable, safe, and affordable renewable energy.

The New Zealand Energy Strategy sets out a goal to have 90% of generation from renewable sources by 2025. Much of this is likely to come from wind and geothermal generation, with some new hydro. Solar electricity (photovoltaics) is also likely to contribute to this. Wind and photovoltaics have inherent short term variability due to the nature of their energy sources, and because they have little storage associated with them. Furthermore, photovoltaics may be embedded in the distribution network, as residential roof-top solar. The GREEN Grid programme aims to deal with the variability of the renewable sources, in particular wind and photovoltaics, and with the issues arising from embedding photovoltaics in the distribution network.

To deal with short term variability of renewable generation, the GREEN Grid programme has posited that rapid demand response could be used to balance renewable energy generation. Hence the official title of the GREEN Grid programme: Renewable Energy and the Smart Grid. The smart grid in this context refers to en-mass demand response embedded in homes and businesses across the country, with fine control over the amount of demand response. The use of smart grid also refers to new ideas for protection of the distribution network with large amounts of

photovoltaic generation in it. Electric vehicles (EVs) may also form part of the solution, by acting as temporary storage devices to provide demand response (known as vehicle-to-grid) or storage of photovoltaics generated energy, although the impact on the vehicle (through battery degradation) needs to be understood.

Understanding consumers' choices and preferences around roof-top photovoltaics, EVs, and demand response is an important part of the research, to give us an idea of the likely uptake of these. Technical aspects of photovoltaics and the distribution network, renewable energy variability, the transmission network and electricity market pricing and dispatch mechanisms are also important to the research. The research is being undertaken by a multidisciplinary team from the Universities of Canterbury and Otago, with significant contribution from industry. The primary funder of the research is the Ministry of Business, Innovation and Employment.

## GREEN Grid Themes

Cost-effective, functional and safe distribution network

- Technical and economic study of large scale distributed renewable generation connected to the medium voltage distribution network
- Technical and economic impacts of different scales of photovoltaic deployment and wind generation on the low voltage network
- Smart methods and guidelines for protection and automation in the low voltage network experiencing bidirectional flows
- Customer service level and low voltage network power quality

Manage supply variability of renewable energy in the network

- Identification and management of supply variability of renewable resources
- Identification and management of household demand variability
- Balancing variable supply with demand side management

## Industry Advisory Panel

The research is overseen by an industry group.

The purpose of this group is to:

- Assist in transferring the findings of the research to industry
- Assist researchers – for example, providing industry specific knowledge and data.

The industry advisory panel has representation from:

- Distribution companies
- The System Operator
- The Electrical Authority
- General Energy Market
- Consumer Appliances & Home Automation
- The Transmission Asset Owner
- Renewable Generation
- Retail