

Case study: Businesses share solar power to save money and reduce emissions



Clean Energy Knowledge Sharing Initiative



Summary

The Byron Bay Arts & Industry Estate Microgrid is a pilot project led by community-owned energy company Enova Energy, in collaboration with Essential Energy, the University of NSW (UNSW) and the NSW Government. With its eyes firmly set on reducing energy prices and emissions for the local community, Enova launched a microgrid project to allow the excess rooftop solar from local businesses to be shared with others within the microgrid. Its aim is to increase access to locally produced renewable energy and reduce energy costs for all involved.

A \$30,000 grant from the NSW Government's Clean Energy Knowledge Sharing Initiative helped fund the development of a preliminary pricing model for the microgrid, as well as recruiting businesses within the estate to join the pilot project. This resulted in 24 out of 33 businesses agreeing to participate, as well as the creation of a pricing model calculating the potential cost savings.

Over the next year Enova will continue to collect energy data from local businesses, which will then be used to test this pricing model. Furthermore, Enova will explore the concept of energy trading between the microgrid customers, as well as the viability of a shared battery system.

Fast facts



Microgrid project cost

\$500,000
(\$30,000 from NSW Government)



Participants in the pilot

24 out of 33 businesses



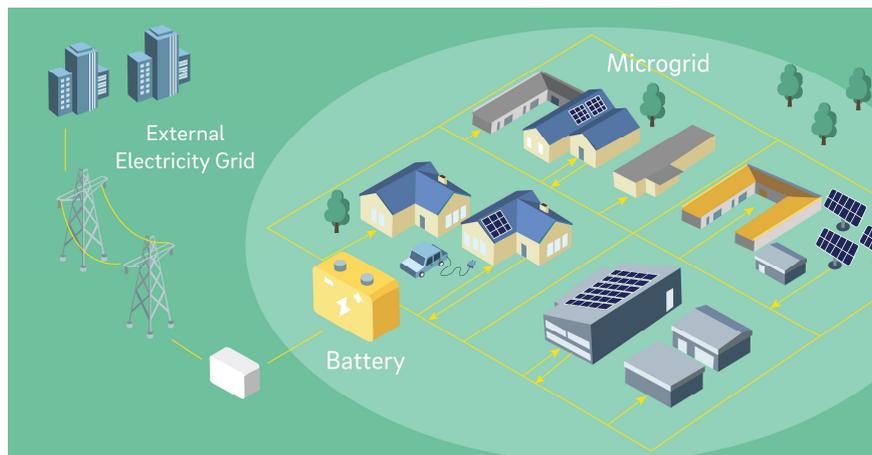
Proposed shared microgrid battery size

50 kilowatts, storage size 200 kilowatt hours

Background

Byron Bay is a hub for innovation in clean energy, highlighted by the commitment from the Byron Shire Council to achieve net zero emissions by 2025.

Enova Energy, Australia's first community owned energy retailer, is a key driver of the energy transition in the Byron Shire. As part of its efforts to develop local energy solutions, Enova is piloting a microgrid in the Byron Arts & Industry Estate.



How a microgrid works

A microgrid is a localised energy network operating on its own or while connected to the main electricity grid. It can power a small number of houses or buildings using energy generated and stored locally.

In this project, businesses in the estate generate energy from rooftop solar panels to power their own buildings. Excess electricity is sold to others in the estate who may not have the roof space or capital to install solar. When supply exceeds demand, excess energy will be stored in a centralised battery for later use within the estate or for selling externally.

Enova aims to reduce energy costs through sharing renewable energy that is locally generated, stored and distributed. This keeps money within the community, lowers greenhouse gas emissions and addresses grid capacity constraints.

Journey

The Byron Arts & Industry Estate presented the perfect opportunity to pilot the concept of a community microgrid, with the hope that the model can be replicated by communities across NSW.

With funding from NSW Government, Enova partnered with researchers from UNSW to design a pricing model and assess the value of the microgrid to its customers.

The model was developed using existing energy usage data from estate customers, solar generation data from neighbouring systems, and assumed tariff information that

will be refined in the next phase of the project. The model simulates the physical flow of electricity in the microgrid, as well as the financial flow between customers and utilities (such as solar export revenue and retailer revenue).

A key question asked by the researchers was how to share the excess solar power in the microgrid. This could be done based on who needs the most power, who is willing to pay the most or an equal split using quota. The researchers settled on quota, where each microgrid customer receives an equal share of surplus solar.

After developing the pricing model, Enova implemented a marketing campaign to recruit business owners to take part in the pilot project. The recruitment campaign comprised of a media launch, radio and newspaper advertisements, a webpage and brochures distributed to businesses within the estate.

Marketing material was supplemented by visiting businesses in person to discuss the microgrid's concept and benefits. The relationships developed through this process proved vital to the success of the campaign.

The campaign also partnered with 'business champions', or local business owners, to promote the project. These individuals raised interest and fostered acceptance of the initiative within the community.

Enova concluded the current phase of the recruitment process by conducting a survey, clarifying what mattered most to the businesses in terms of microgrid participation and energy trading.

Challenge	Solution
Accessing and getting the support of business owners at the estate	<ul style="list-style-type: none"> Engaged in one-on-one consultation with businesses to explain the microgrid and its benefits Worked with 'business champions' to build trust
Lower network charges are required to generate cost savings to microgrid customers High capital cost of the battery	<ul style="list-style-type: none"> Close collaboration with network service provider Essential Energy to identify co-benefits and to share costs, including the costs of installing a battery
The current technology/meters on the estate did not generate the data required for designing the microgrid's tariffs to share energy, revenue and costs.	<ul style="list-style-type: none"> Microgrids can gather data through smart meters or other data loggers. Data access agreements with participants are needed before customer data can be collected.

“Confirming the interest of business owners was the biggest success of this project. With the community on board, the microgrid can move forward.”

Felicity Stening, Chief Executive Officer, Enova Community Energy Retailer

Outcomes

The preliminary model developed showed solar energy purchased from another microgrid participant could be over 7 cents per kilowatt hour cheaper than grid power, assuming the following lower network and retail charges.

	DUOS (Network charges)	Retailer charges	Value of exported solar	Purchase \$ (c/kWh)
Original tariff	11 cents	16 cents	9 cents	36
Microgrid tariff	8 cents	9 cents	12 cents	29

Furthermore, 24 out of 33 businesses indicated their interested in joining the microgrid, which was a great outcome for the project. Enova attributed this success to the campaign's individualised, face-to-face communication approach and the support from business champions, which built a sense of trust and rapport with the business owners. Importantly, business owners cited keeping money within the community as one of the key factors appealing to them, followed by environmental benefits.

The impact of potential cost savings according the research are estimated as the following:

- Over 85 per cent of the businesses would join the microgrid if tariffs were lower than now
- 40-60 per cent would join if tariffs were equivalent to current rates
- 10-15 per cent would participate if tariffs were higher

Most participants were also interested in participating in a microgrid in their residential areas, indicating the potential to replicate this project in other locations.

Takeaway points

- Community microgrids with batteries can unlock potential bill savings, use locally generated renewable energy, lower greenhouse gas emissions and help address grid capacity constraints.
- Bill savings in the microgrid will mainly depend on whether participants install a solar system, how much energy can be traded locally, their tariffs and when energy is used during the day.
- Personal, one-on-one engagement with potential customers is highly effective in encouraging participation in a microgrid project.

Next steps

The next stage of the project will involve inputting real time data collected by the Wattwatcher data loggers into the model and determining the optimal tariff for the microgrid.

Following this, Enova and LO3 Energy will trial peer-to-peer trading. Participants will be able to share excess solar energy with neighbours, and Enova hopes this will encourage more solar PV installations in the microgrid.

Together with Essential Energy, Enova also plans to test how a commercial-scale battery

could benefit businesses. They will explore the concept of storing excess solar for use at times of low solar radiation or low demand.

Although developed for a site in Byron Bay, the microgrid project is relevant for the rest of NSW and Australia. Ultimately, it is hoped microgrids will be set up across the country to localise the use of renewable energy, prolong the life of network assets and reduce costs for households and businesses.

“The next stage will test and improve the tariff model, so we can confidently state a microgrid will reduce energy costs by using locally generated solar energy.”

Rob Passey, Project Partner, the Centre for Energy and Environmental Markets at UNSW

About the Initiative

The NSW Clean Energy Knowledge Sharing Initiative supports the NSW Government’s objective to achieve net zero emissions in the state by 2050. The Initiative gives innovators and early adopters an opportunity to test and trial new clean energy solutions. To find out more or learn about similar projects, visit www.energy.nsw.gov.au/clean-energy-initiative.

© State of New South Wales through Department of Planning, Industry and Environment 2019. The information contained in this publication is based on knowledge and understanding at the time of writing (October 2019). However, because of advances in knowledge, users are reminded of the need to ensure that the information upon which they rely is up to date and to check the currency of the information with the appropriate officer of the Department of Planning, Industry and Environment or the user’s independent adviser. Images courtesy of Enova Community Energy