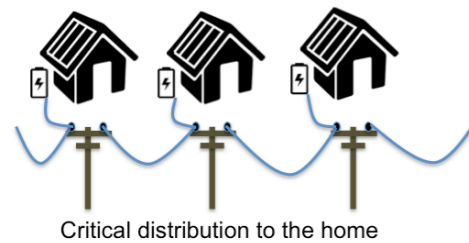


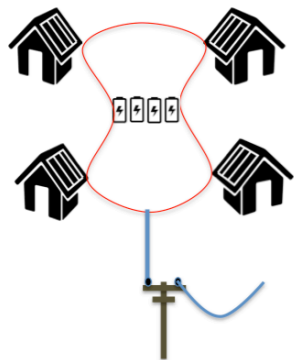
# LOCAL SHARING OF CRITICAL SERVICES

## Research Questions

**Can new communities be created around sharing critical services between neighbours? What kind of energy, environmental, social and economic efficiencies can be realised both for households and for infrastructure?**



Critical distribution to the home



Critical distribution to the node

Figure 1. Conventional housing grouped in to an energy sharing community and shared "node".

## Methodology

**The research will build on previous work done for ARENA measure A00833.**

Network embedding and energy trading systems which allow renewable energy to be exchanged locally will be examined along with means to share local water collection and wastewater processing. Social factors in sharing communities will be measured via qualitative means.

## Results

Energy research to date finds that shared DRE systems can be smaller for the same grid independence, or greater grid independence is achieved by combining existing systems on a private wire.

	Demand base (kWh)	Cost base (\$)	Optimal PV size	Optimal battery	Maximum NPV of saving over 10 years (\$)
K1	3619.2	1198.42	1.6	0	1506.8
K2	5610.9	1676.26	2.5	0	2707.8
K3	5739.8	1695.84	2.5	0	2437.65
K4	2149.6	873.44	1.1	0	812.4
K5	3233.1	1197.55	1.7	0	1486.6
Sum	20352.5	6641.51	9.4	0	8950.65
K1+ K2+ K3+ K4+ K5	20352.5	5509.170	8.3	0	9687.66

Figure 2: Sharing solar for low energy users (K1-K5) provides 9% better NPV (via reduced CAPEX and higher grid independence - difference of bottom two rows).

A test site and larger convenience sample survey find owner support for shared energy systems in Melbourne.

The projected cost of the grid to 2050 is AUD1300bn (with distribution costing four times transmission) and alternatives are being considered. These include private wire and embedded networks.

Off-grid and edge-of-grid communities already make profitable use of critical resource sharing.

## Conclusions

There are receptive communities for local energy generation and sharing who seek higher levels of grid independence. This may reduce distribution costs for the networks. Creation of communities for energy may lay the foundation for

sharing water and other services.

LCL research will pursue how these findings apply more broadly and more rigorously to new and existing communities sharing and contributing to critical services.



Figure 3: A neighbourhood energy community installs more solar (above) and shares a battery on a private network (below).

## Anticipated impacts

The energy distribution system is the most expensive and complex part of the grid. If grid energy can be delivered to the neighbourhood node and with lower reliability then distribution can be simplified (similar to "fibre to the node"). Sharing economies would mean consumers could co-own solar

equipment they could not afford otherwise. Less centrally generated energy (and emissions) would result and other reductions in critical supply may be achieved. Future research should examine how private infrastructure can make the best of limited critical services supply rather than shoring up very large, expensive and complex utility systems.

## Resilient sharing at the neighbourhood node could allow critical services security of supply to be relaxed

With many challenges in energy distribution, in resources consumption and a deteriorating climate, it will be more efficient to manage energy and other critical services *at the node*: groups of commercial or consumer sites connected together for this purpose.

New communities of this kind will be more socially effective since they share and benefit from something significant and important.

## Further information

<http://www.lowcarbonlivingcrc.com.au/partners/research/university-melbourne>

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