What we know about households who are already off-grid

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Background

There is increasing concern from the utility industry and government in Australia about households leaving the electricity grid. There have been a number of reports on the issue [1-3], as well as significant media coverage. Reasons why customers might choose to move off-grid include: better performing and cheaper battery storage (including use of electric vehicles as storage) which can be coupled with embedded (household-scale) electricity generation, the high cost of mains electricity, electricity tariff changes, and environmental or social motivations. Australia has been identified as particularly vulnerable to the migration of customers off-grid because of its relatively high penetration of embedded generation, meaning there is already lower reliance on mains-generated electricity (e.g. photovoltaic panels are owned by 23% of households in South Australia [4]).

Plate One: Battery array in Tasmanian off-grid household

The research

Despite growing concern about households choosing to leave the electricity grid, there is curiously little research about who is already off-grid in Australia, and their motivations and experiences. This research has therefore concentrated on addressing such issues, using the State of Tasmania as a case study. Several different approaches have been used to establish how many households are currently off-grid in Tasmania, including: 1.investigating the availability of whole of market data: a phone survey of specialist installers & architects in Tasmania [9]; enquiries about data availability with key organisations such as the Clean Energy Regulator, Tasmanian Department of State Growth, and Living Off Grid Tasmania; and analysis of TasNetworks data on cancelled new connection applications (2012+); as well as 2.research on off-grid households' motivations and experiences: an online survey of householders [20], as well as follow up phone interviews and home visits [12].

Key findings

1.Lack of data – a key finding is that no one knows how many households are already off-grid in Tasmania: data is not currently being collected. Utility, government and other energy sector experts provided wide ranging estimates - from 200 to 10,000 off grid households - indicating profound uncertainty. In Tasmania since mid-2012 around 120 households each year provided with a quote for a new electricity connection are not progressing with the application. It is reasonable to assume that perhaps around quarter of these households (c.30/a) are doing so because they are opting to generate and store their own electricity off-grid.

2.Shift in type of households going off-grid – our household survey has so far identified 20 Tasmanian households who are off-grid. We have conducted follow up interviews or home visits with around half of these survey respondents. An early finding (from this modest sample) is that there has been a shift over time in the motivations for households to leave the electricity grid. In those households who have recently moved off-grid financial considerations have been an important factor in their decision. In contrast, households who have been off-grid for several years

or longer were more likely to mention environmental concerns or personal values.

3.Off-grid households in Tasmania are not part of a community – the decision to go off-grid has mostly been taken on an individual household basis, albeit facilitated by key organisations such as specialist battery and renewable energy installers. In other words, there is not a coherent community or network of off-grid households in Tasmania (although for an interesting exception see the community webpage Living Off Grid Tasmania).

4.Living off-grid gives rise to heightened awareness of energy use – as one might expect, the off-grid households whom we interviewed have an excellent understanding of, and attentiveness to, how they are using energy in the home. Households also typically demonstrated a high degree of flexibility in their routine, for example only doing certain tasks such as vacuuming and ironing when the sun was shining (and their PV panels were generating electricity). There is significant variation, however, in how constrained off-grid households are in their daily (energy) practices. For example, some households in our study had no appliances with high wattage heating elements (kettles, toasters), or only used such appliances during summer months, whereas one household used their (high-energy) tumble dryer to dry all their clothes year-round.

Implications & Recommendations

Data is required on who is already off-grid in order to facilitate planning and governance. If the State of Tasmania is representative of the rest of Australia with regard to a lack of information and data on off-grid households then this is a problem that needs to be addressed. Being able to track who is off-grid, where, and why, provides vital information to decision makers seeking to understand, and effectively govern, the off-grid sector.

Plate Two: Photovoltaic Panels in a Tasmanian off-grid household

Off-grid household energy practices and consumption patterns have the potential to provide important lessons for tariff reform and other electricity sector changes underway. The households in our study all demonstrate a high degree of flexibility in how and when they use energy in the home. They hence provide a potential (high-end) indicator of the extent to which households may adapt their routines in response to tariff reforms and other future shifts in electricity sector operation and governance.

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1. Clean Energy Council, *Australian Energy Storage Roadmap*. 2015.
2. Marchment Hill Consulting, *Energy Storage in Australia: Commercial Opportunities, Barriers and Policy Options*. 2012, report for the Clean Energy Council: Australia.
3. AECOM, *Australia's Off-Grid Clean Energy Market*. 2014, Research Paper for ARENA: Canberra.
4. Parkinson, G. *Rooftop solar at 23% of homes in South Australia – is storage next?* 2015; Available from: http://reneweconomy.com.au/2015/rooftop-solar-at-23-of-homes-in-south-australia-is-storage-next-25538.