

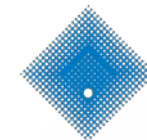
BTM prospects in Australia: observations from contemporary evidence of consumers' response to prices

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Bruce Mountain
Director, VEPC



**Victoria
Energy Policy
Centre**



**VICTORIA
UNIVERSITY**

MELBOURNE AUSTRALIA

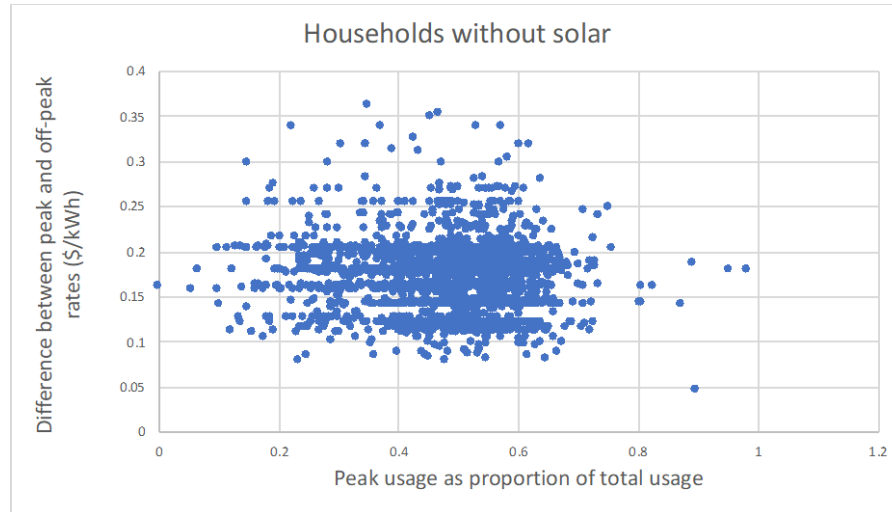
Outline

- ▶ What is BTM?
- ▶ Contemporary evidence of how consumers respond to prices
- ▶ Speculation about intrinsic value

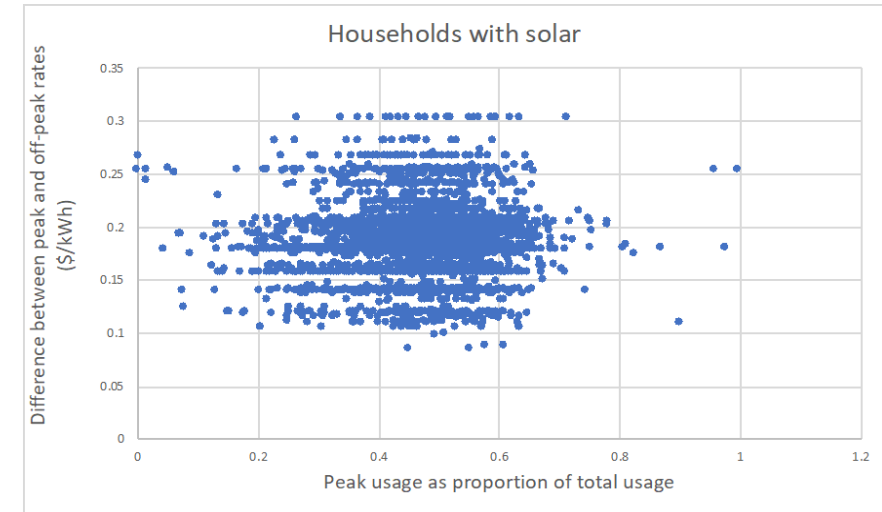
What is BTM?

- ▶ BTM = technology-driven step changes in consumption, production and storage behind a (small) customer's electricity meter.
- ▶ Contemporary BTM technologies:
 - ▶ **Consumption:** internet-enabled devices that can be co-ordinated automatically to shift or reduce consumption in a way that does not entail the loss of utility
 - ▶ **Production:** rooftop PV
 - ▶ **Storage:** batteries of various types and thermal storage (hot water)

Contemporary evidence (1): households in Victoria & time of use electricity tariffs



2,805 households



3,993 households

- Peak (7am to 11pm weekdays, remainder off-peak)
- Clearly no relationship between the difference in the peak and off-peak prices and the proportion of consumption in peak versus off-peak periods
- As expected, but how to interpret in context of evidence (Labandiera et al, 2017) of low short run price elasticity but high long run price elasticity?

Contemporary evidence (2): Switching retailers to reduce money left on the table (MLT): Victorian households

- ▶ Sample of 48,088 bills. What we found:
 - ▶ High switch rate (36% or which about 22% voluntarily)
 - ▶ Median MLT of remainers = \$281/year. But switching retailer only reduced this by \$45/year.
 - ▶ MLT ~ inversely proportional to tariff structure complexity
 - ▶ Discounts and poor advice from price comparison providers seem to be problems
- ▶ Households can not engage in the market effectively, switching is not the solution policy makers have thought it would be.

Contemporary evidence (3): The installation of rooftop PV in Australia

- ▶ Our analysis of 10,051 household bills (of which 2,062 had installed rooftop PV) lead us to conclude:
 - ▶ Households with higher consumption were more likely to install PV than households with lower consumption.
 - ▶ Regional differences in typical PV system size reflects regional differences in solar radiance and grid consumption.
 - ▶ The installation of PV was proportionately the highest in households most likely to value the benefits from it.

Contemporary evidence (4): Half-hourly prices for households in Great Britain

- ▶ Energy supplier, Octopus Energy's ("Agile") plan sets half-hourly energy charges which are posted day-ahead (at 4.30pm) and capped at 35p per kWh. Octopus use APIs, bills, online dashboards and emails to communicate. Study of first 47 customers on this plan shows:
 - ▶ 28% showed a statistically significant change in peak time usage, dropping peak usage from 16% to 11.5% of their daily consumption.
 - ▶ Overall, peak use was reduced by 28.19%, while electric vehicle (EV) drivers reduced peak consumption even further, by 47%.

Speculation on intrinsic value in BTM

- ▶ Main points from contemporary evidence, summarised as follows:
 1. Households in Victoria do not change pattern of consumption in response to prices in two-rate time of use tariffs.
 2. Rooftop PV uptake and usage in Australia seems to be explained by well-informed pursuit of private interests
 3. Households in Victoria do not engage effectively with retail (grid-supply) markets
 4. Households in Britain respond to day-ahead half-hourly prices.

Based on contemporary evidence, intrinsic value from BTM can be ranked as follows:

1. **Supply substitution:** PV gives 2-3 fold reduction in the price of around 35% of a typical customers' annual consumption. Load diverters or similar further improve the prospects for PV-based supply substitution.
2. **Exports:** For typical households ~ 70% of rooftop PV production is exported to the grid. Grid export prices ~ ½ or less grid purchase prices, exports add value at around ½ or less rate of supply substitution but export volumes > own use therefore exports to the grid provides ~ about same value as supply substitution. Decentralised export markets may improve prices but likely offset by highly supply by grid-scale and distributed PV.
3. **Arbitrage:** Value originates in PV to charge and substitute for expensive grid production. Declining battery costs and declining opportunity cost of foregone exports means bright future.
4. **Reduced consumption (other than from supply substitution):** continued progress but not a big deal
5. **Autonomy and independence:** Valuable for early adopters but maybe more said than done.