

Are solar citizens getting a free-ride from non solar citizens ?

Webinar prepared or Solar Citizens

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Outline

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2. Method
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Research question

Taking account of how the market actually works, are households that install rooftop PV imposing costs on other consumers ?

Method

- ▶ Dataset of 7,212 bills from VIC households with PV, part of a bigger dataset of 48,677 household bills.
- ▶ Step 1. Using data on PV exports to grid, and grid consumption, estimate for each household:
 - ▶ PV capacity
 - ▶ Gross PV production
 - ▶ PV own-use
- ▶ Step 2. Estimate impact of PV self-consumption on foregone revenue from households with PV, and hence impact on network prices.
- ▶ Step 3. Using econometric model, estimate impact of rooftop PV on wholesale market prices.

Findings: Production, consumption and bill impact

- ▶ **On average** for each of the 400,000 households in Victoria with rooftop PV at the end of 2019:
 - ▶ Gross annual electricity production of 3,800 kWh
 - ▶ Self consumption of 1,600 kWh
 - ▶ Net export to the grid of 2,200 kWh
 - ▶ Annual bills reduced by \$590 (including \$244 export income)
- ▶ Therefore, **in aggregate** for 400,000 PV homes in 2019:
 - ▶ 1,540 GWh of large-scale electricity production has been replaced;
 - ▶ 648 GWh has been used on-site
 - ▶ 890 GWh has been exported
 - ▶ \$98m export income

Findings: impacts of foregone network revenue on electricity prices

- ▶ Quantity of electricity shipped on Victoria's networks reduced by 648 GWh
- ▶ Distributors' income from households with PV reduced by \$58.3m (from what it otherwise would have been).
- ▶ This means network charges for all customers rose by \$1.3/MWh
- ▶ This is equivalent to a price increase of 0.35% for a typical residential customer.
- ▶ In addition, most distributors have sought regulatory approval to increase capacity of networks to import surplus from distributed PV. But bill impact is inconsequential: e.g. for Ausnet Services = 72 cents per customer per year)

Findings: impacts of PV on wholesale prices

- ▶ PV has a production cost of zero. Like other renewable generation it displaces production from more expensive sources. This can reduce wholesale prices (which are based on the price received by the most expensive generator). This is known as the “merit order effect” (MOE).
- ▶ Our econometric analysis finds the MOE of rooftop solar over the period is \$6.4/MWh.
- ▶ This means in 2019 rooftop solar reduced wholesale prices by about 8%. This was worth \$275m.

Findings: net effect

- ▶ In aggregate in Victoria in 2019, residential PV:
 - ▶ Pushed up network prices by \$1.3/MWh
 - ▶ Pushed down wholesale prices by \$6.4/MWh
- ▶ The net effect is that in Victoria in 2019, residential rooftop PV reduced prices for all consumers by \$217m.

Main conclusions

1. Households with PV on average reduced their bills by \$590 per year, of which \$244 was export income.
2. The aggregate net benefit of residential rooftop PV on market payments is \$217m. Therefore rooftop PV reduces prices for all consumers.
3. Additional expenditure by network service providers to accommodate higher PV grid exports, is inconsequential

Why are we even having this conversation ?

- ▶ Some customer advocates think, as a matter of principle, that households with PV should pay to use the grid when they export surplus rooftop solar.
- ▶ Some customer advocates have not considered the evidence, or how the market or network access arrangements actually work.
- ▶ Distributed energy is a commercial threat to incumbent producers, shippers and retailers.