



# Impacts of PV System Configuration, Retail Tariffs and Annual Household Consumption on Payback Times for Residential Battery Energy Storage

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Are we there yet?

When will we get there?

What factors influence the payback time of household PV + storage?

Energy Consumption?

Storage Size?

Tariff?

PV Size?

Solar Choice: Battery storage - Are we there yet? (BATTERY PLUS INVERTER)



<https://www.solarchoice.net.au/blog/battery-storage-price-index-august-2018/>

# Method

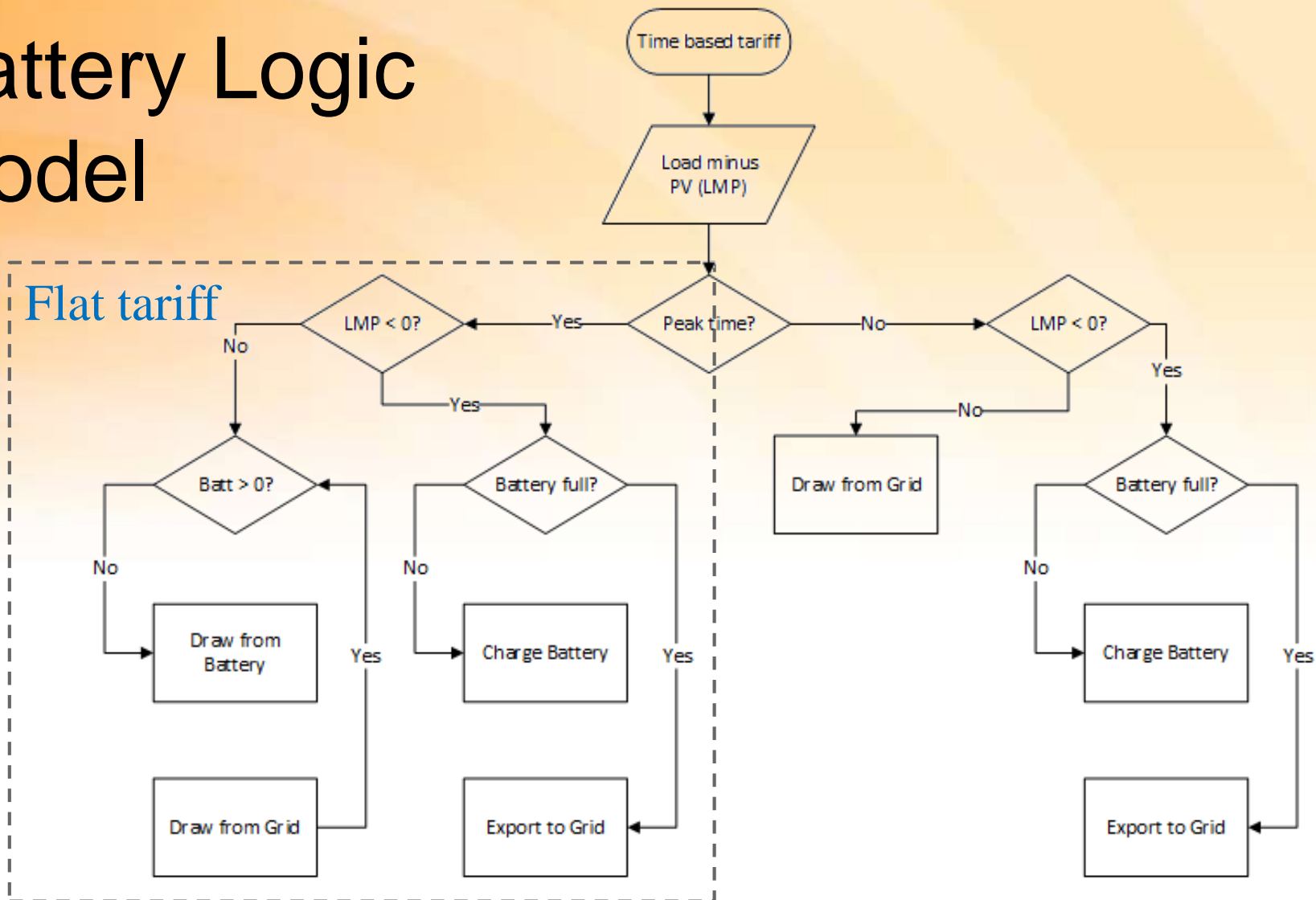
House size	Annual usage	PV size (small / medium / large)	Battery size (small/medium/large)
<b>Small</b>	<3200kWh	2kWp / 4kWp / 6kWp	3kWh / 6kWh / 9kWh
<b>Medium</b>	3200 – 7000kWh	2.5kWp / 5kWp / 7.5kWp	4kWh / 8kWh / 12kWh
<b>Large</b>	>7000kWh	3.25kWp / 6.5kWp / 9.75kWp	5kWh / 10kWh / 15kWh

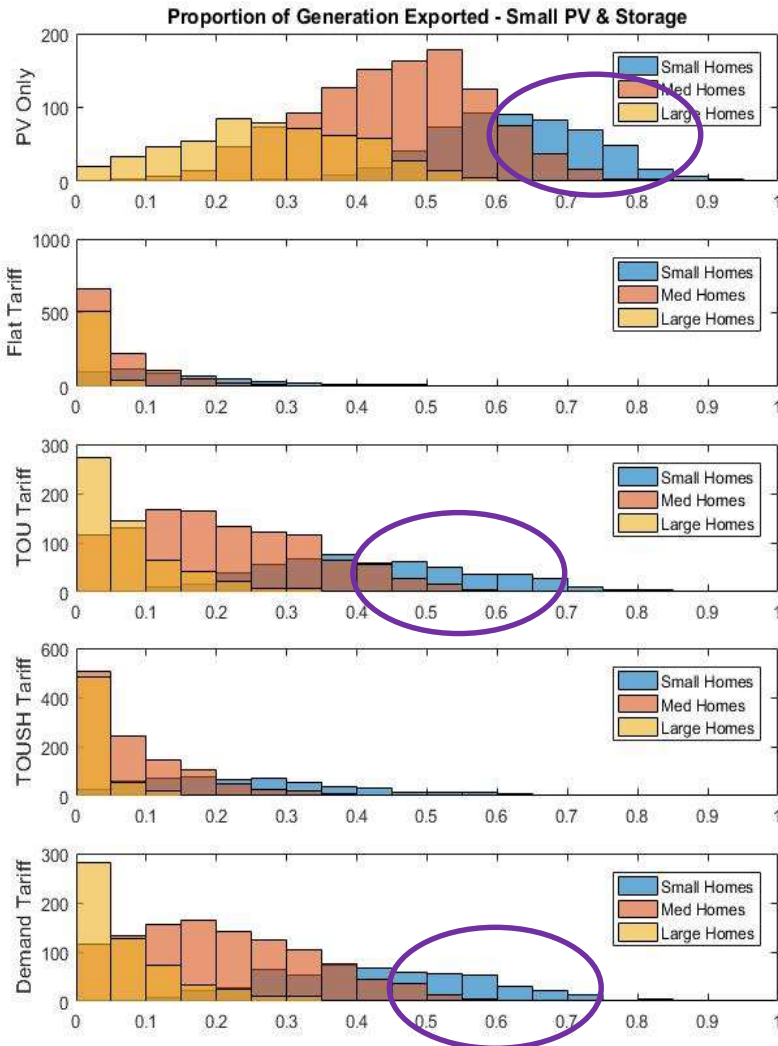
PV and BES allocated to all households, sized according to annual usage

Nine different size combinations (small/med/large) tested

Four different tariff-based operation strategies

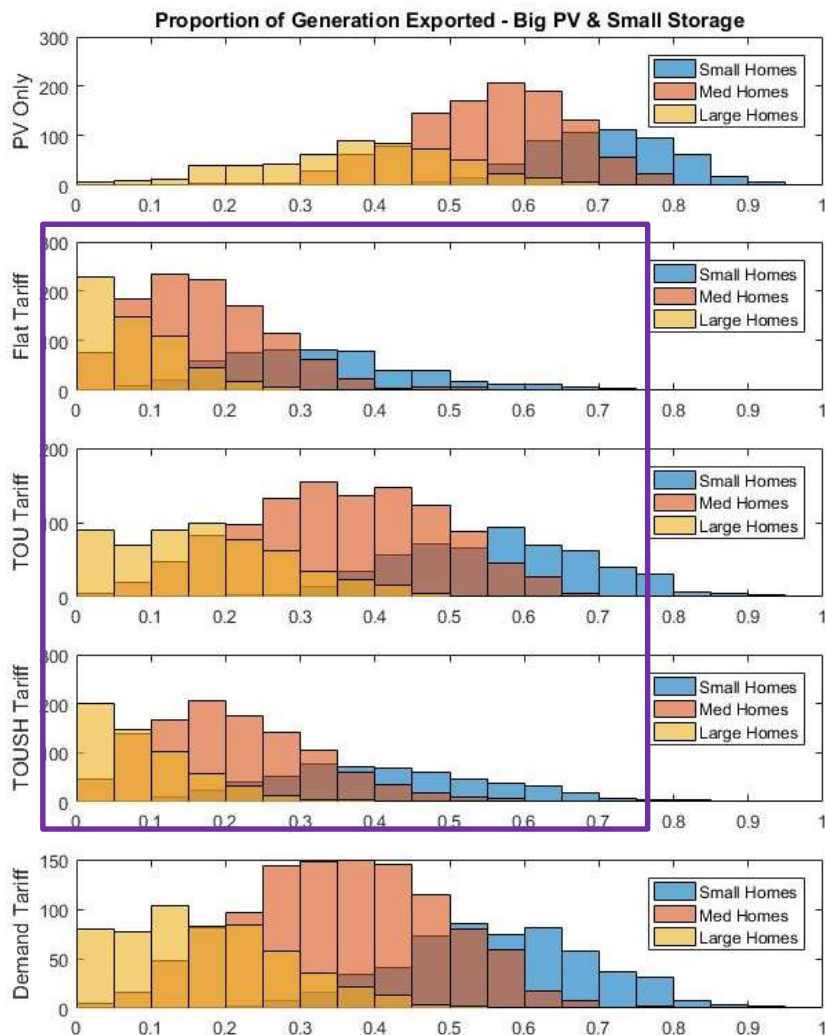
# Battery Logic Model





Homes with low energy consumption frequently export PV generation

Even with small PV

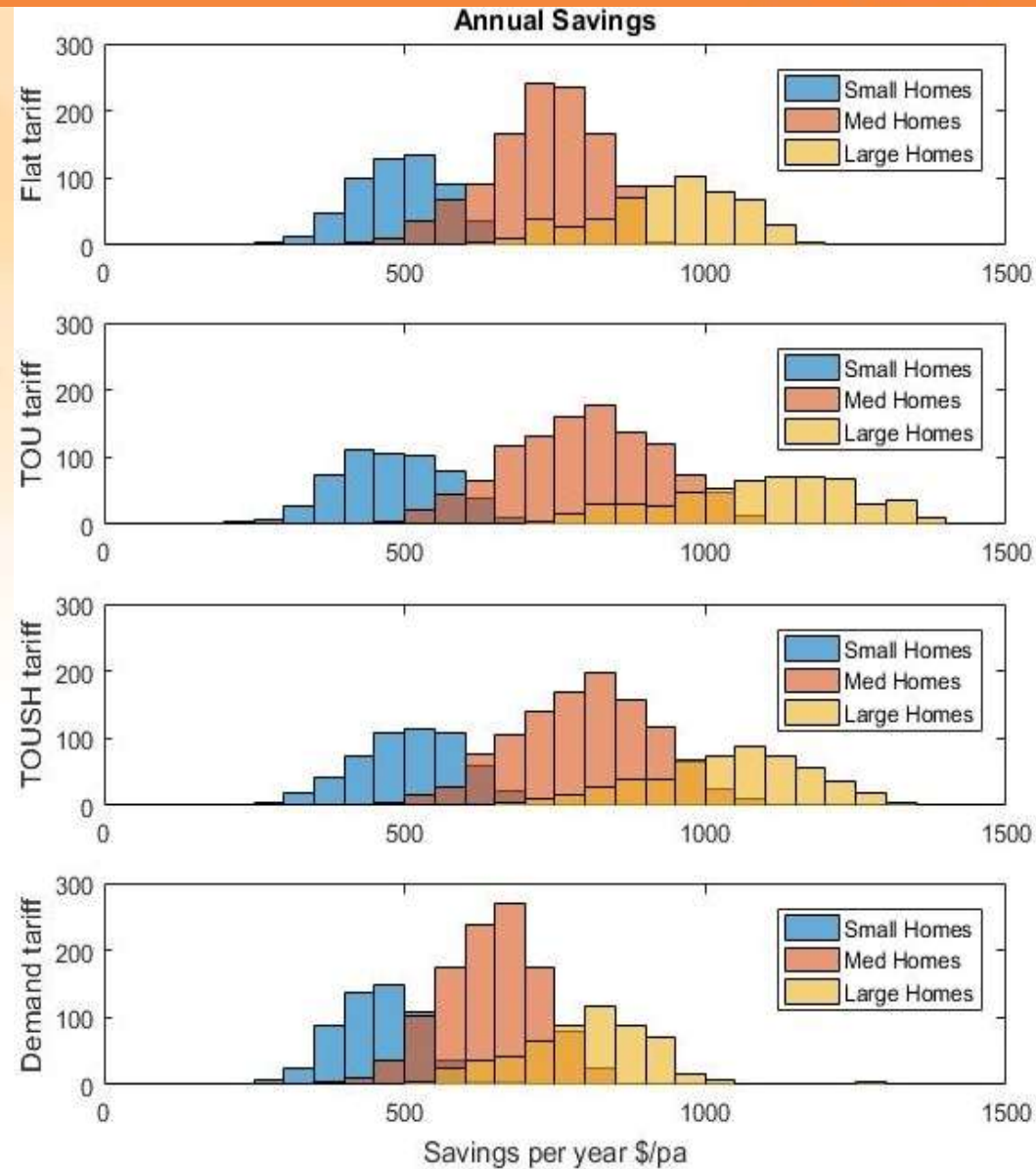


It doesn't take a lot of storage to make a big difference to exports

It's about how you use the storage

# Results

- Savings are proportional to annual consumption
- Savings are lower on demand tariff







But can't quite pay for itself yet in most cases...

# Payback times

Scenario	Small Homes		Medium Homes		Large Homes	
	PV Only	PV with BES	PV Only	PV with BES	PV Only	PV with BES
Sm PV / Sm Batt		11.45		9.3		9.09
Sm PV / M Batt	5.91	18.74	5.07	15.03	4.38	13.96
Sm PV / Lge Batt		25.82		19.76		17.57
M PV / Sm Batt		10.98		8.76		8.15
M PV / M Batt	6.31	17.47	5.29	13.72	4.51	12.06
M PV / Lge Batt		23.97		17.76		15.04
Lge PV / Sm Batt		10.77		8.56		7.58
Lge PV / M Batt	6.51	16.63	5.56	12.75	4.71	10.72
Lge PV / Lge Batt		22.52		16.58		13.54

If you only have PV, the smaller, the better.

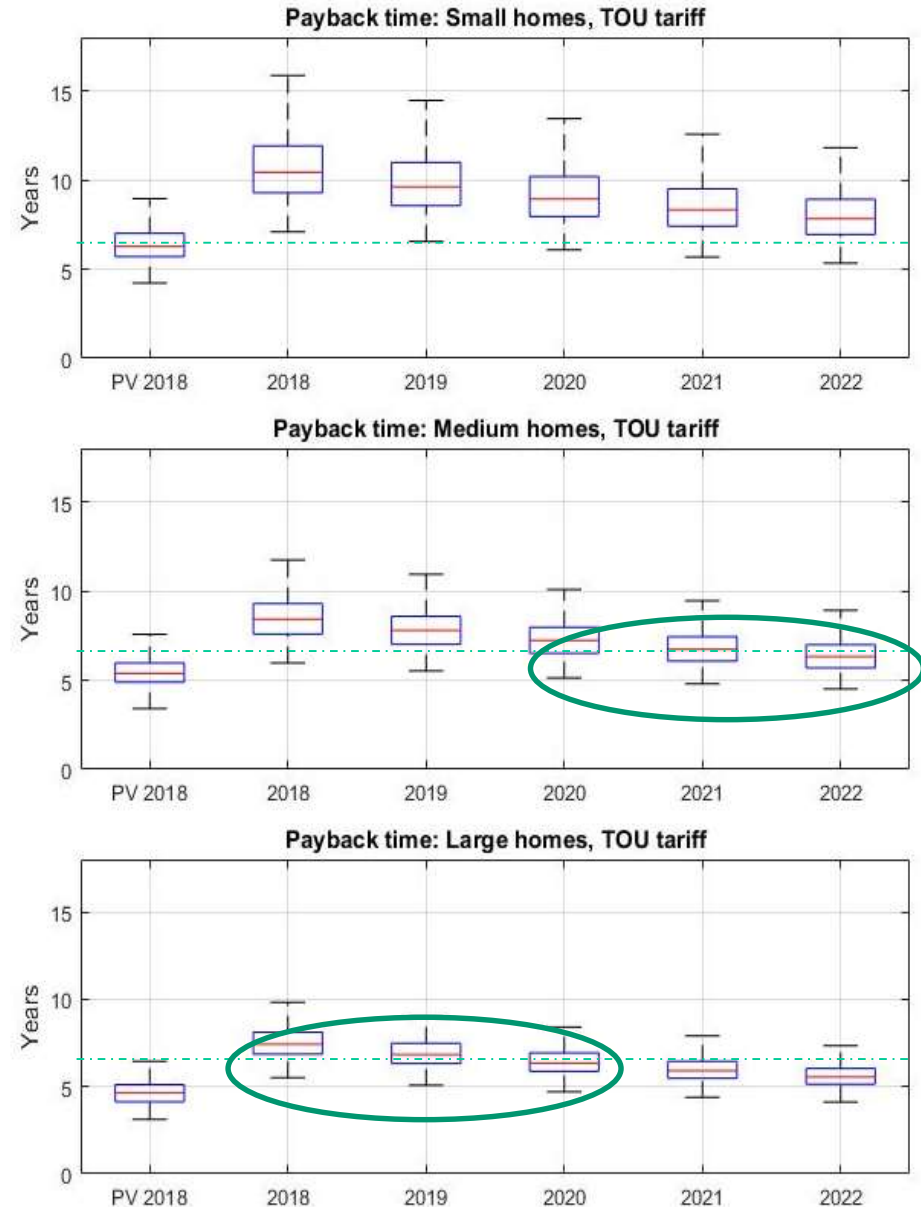
BUT

If you have storage, the more PV, the better!

Average simple payback time in years according to scenarios for homes on the TOU tariff

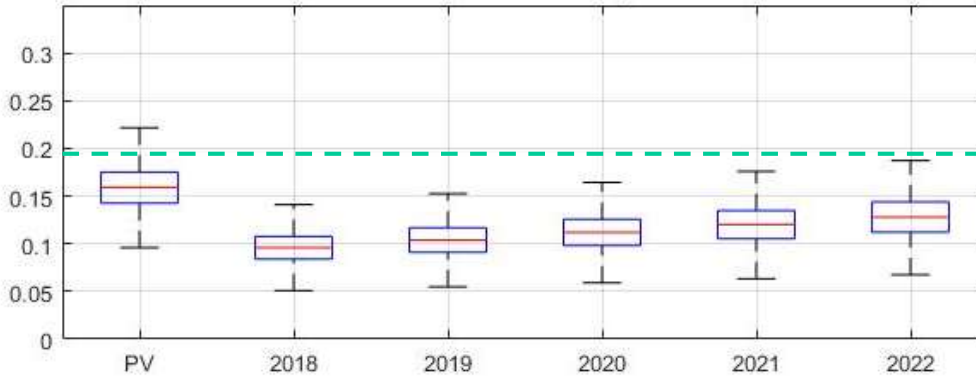
With the optimal setup  
payback doesn't take  
long

Rapid household uptake  
in coming years is likely

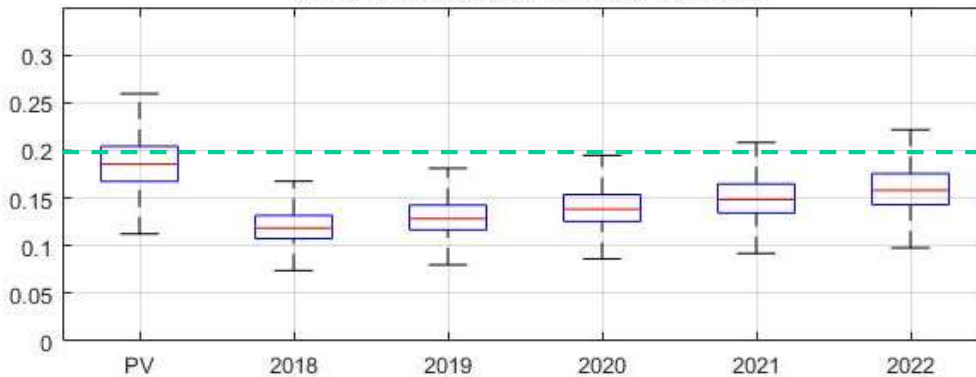


Payback times for homes on a TOU tariff with a large PV system and a small battery

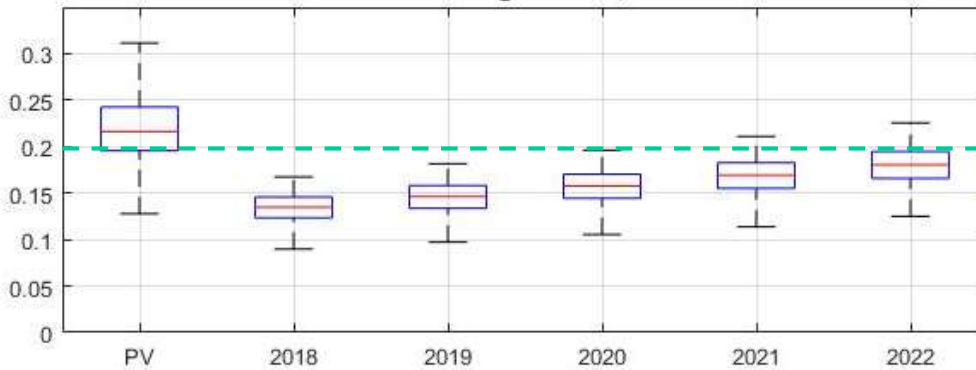
1st Year ROI Small homes, TOU tariff



1st Year ROI Medium homes, TOU tariff



1st Year ROI Large homes, TOU tariff



# Return on Investment

At no time in the next 5 years does PV+BES beat PV alone

Small homes match ROI with PV first

But large homes have higher ROI

Not in paper



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