

There is no typical household: The distribution and drivers of Queensland household electricity use

The amount of electricity that homes consume from the grid is changing as technology and household behaviour evolve. Electrification of vehicles and appliances, growing uptake of rooftop solar and batteries, and improvements in energy efficiency are fundamentally altering household electricity use.

This report provides insight into the variability and drivers of how much electricity a household purchases from the grid. It analyses smart meter data for more than 1.1 million Queensland households (around half of households in the state) linked to demographic factors like type of home, solar ownership, and climate zone.

Energy policy often relies on assumptions about the electricity use of a “typical household”. By examining the full distribution of grid electricity use rather than relying on averages and by linking electricity use to observable household characteristics, this paper aims to better inform debates about pricing, equity, and the ongoing evolution of the electricity system.

The findings are clear: there is no “typical” household. Nor is there a “typical” household with solar or a typical high-income household. As we illustrate below, while some broad patterns are evident, electricity use varies widely within all sub-groups. A substantial share of this variation is driven by factors largely outside household control.

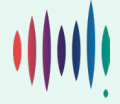
This diversity in household electricity use has important implications for energy policy. It highlights the limits of relying on pricing structures alone to deliver equitable outcomes. While pricing design remains important, it is unlikely to be a precise tool for targeting equity, given the wide variation in household circumstances and the role of factors outside household control. Policymakers will therefore need to take a more considered and holistic approach to ensure the energy system remains equitable and does not place an unfair burden on vulnerable households.

There is no “typical” electricity consumer

When monitoring prices and bill outcomes, analysis often focuses on an “average” or “typical” customer. For example, the Australian Energy Regulator’s Default Market Offer is presented as an annual bill estimate for a household with a specified level of electricity use.¹ Similarly, ACCC analyses of the retail electricity market commonly report average bills across all customers.² While these approaches provide a useful benchmark, they obscure variation in outcomes for individual households.

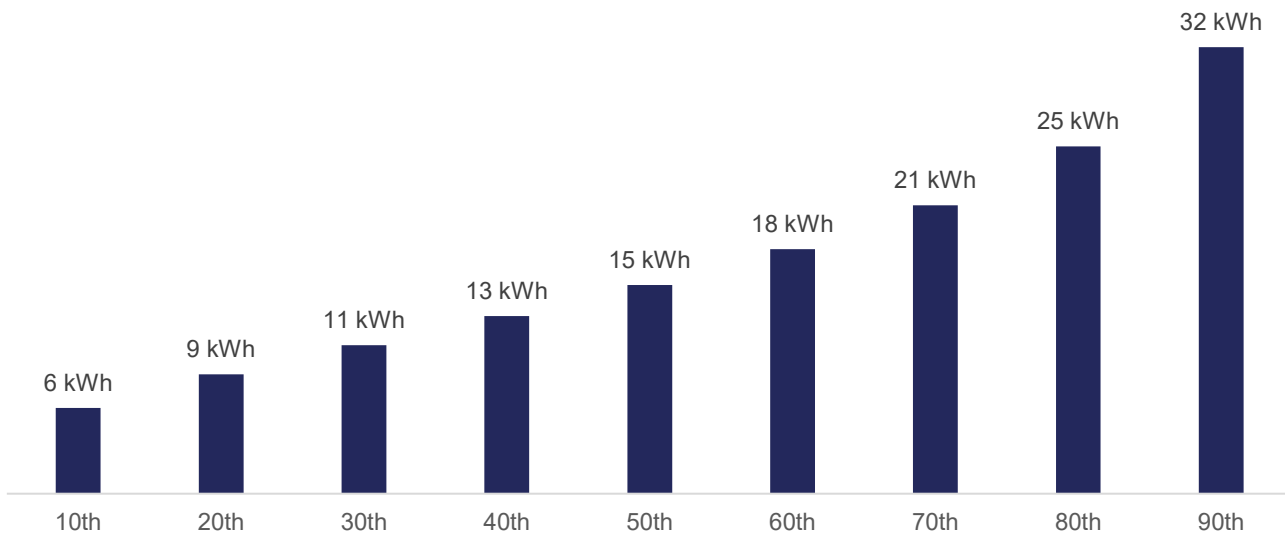
Figure 1 shows the distribution of average daily grid use of households in Queensland with a smart meter in 2025 by showing grid use percentiles. It shows that the median household used around 15 kWh of electricity daily from the grid in 2025. However, Figure 1 demonstrates the true underlying differences in household electricity use:

- 20% of households used less than 9 kWh per day on average
- 20% of households used more than 25 kWh per day on average.



Notably, there is a small proportion of households with very low or very high average daily use. We found that more than 1% of Queensland households consumed under 1 kWh of grid electricity a day, and more than 1% of Queensland households consumed more than 58 kWh of electricity a day, on average.

Figure 1: Queensland smart meter household daily average grid use percentiles in 2025



Source: ECA and University of Queensland Collaboration Grant (2026). See [here](#) for further information.

The diversity in grid use translates into a wide range of bill outcomes for households. For example, under an illustrative flat rate plan of 30 cents per kWh and a \$1.20 daily supply charge, the median Queensland household would pay around \$2,080 per year. However, around 20% of households would pay less than \$1,420 annually, while a similar share would pay more than \$3,170. Importantly, close to 10% of Queensland households would likely face bills exceeding \$4,000 per year, leaving them particularly exposed to price changes.

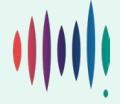
This wide dispersion highlights that “average” bill estimates can be misleading when assessing affordability and the impacts of price changes. Price changes will not be experienced evenly, with higher-use households facing disproportionately larger bill impacts. Below, we explain why this dispersion exists and examine the characteristics of high and low grid-use households to provide insight into equity impacts.

There are multiple and interrelated drivers of household electricity use

Household characteristics and dwelling and technology factors materially shape electricity use. Figure 2 shows the major sources of Australian household electricity use and their estimated share of total use. Heating and cooling systems are typically the largest single energy user in Australian homes – estimated to be around 40% of household energy use in 2021.³

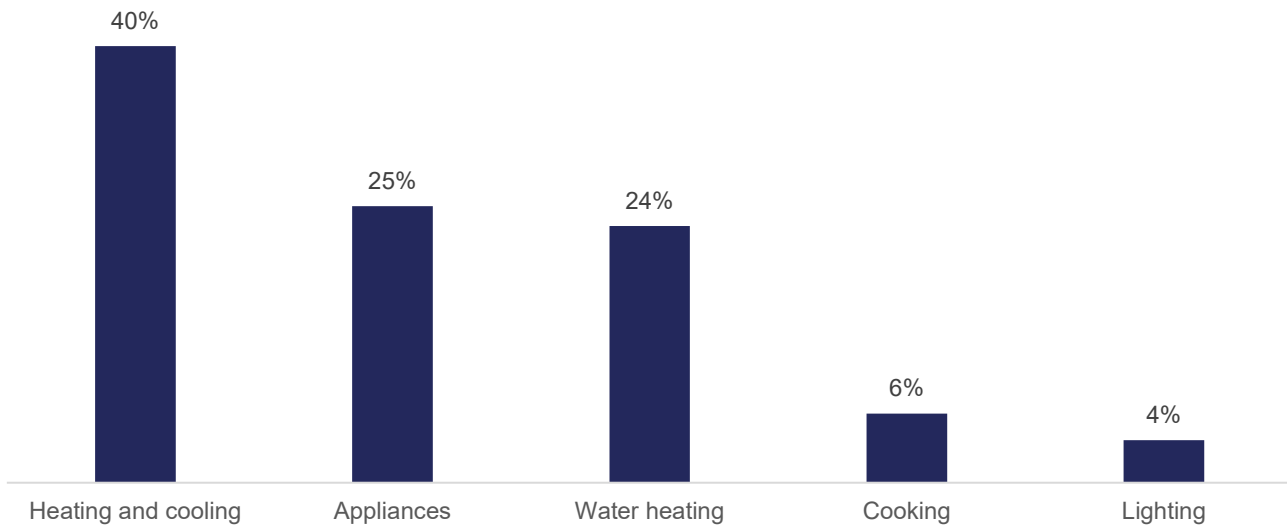
Several complex and interrelated factors determine heating and cooling use – and household electricity use more broadly. Factors include local climate, household demographics, household behaviour, building stock and the type and number of appliances.⁴

Empirical literature commonly groups these drivers into three broad dimensions:⁵



- economic factors, such as income and urbanisation;
- household characteristics, including family structure and education; and
- technological factors, such as building insulation and appliance efficiency.

Figure 2: Main sources of household energy use in 2021



Source: Energy Consult, Residential Energy Baseline Study (2022).

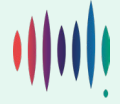
Household grid electricity use is also determined by access to rooftop solar and battery storage

Households with solar panels or batteries can use more electricity in their homes without needing to draw more power from the grid, because they can generate and store their own electricity. As a result, whether a household has solar or a battery is a key factor in how much electricity it needs to import from the grid.

Recent analysis by the ACCC and AEMO has found that households with solar and batteries tend to use less electricity from the grid than households with solar only. This suggests that battery adoption will be an emerging driver of changes to household grid use, just like solar before it, though more research will be needed to understand the long-term impacts.

A common misconception is that households with solar necessarily use considerably less grid electricity than households without it. Figure 3 shows that households in Victoria, New South Wales, South-East Queensland and South Australia with solar tend to consume similar, if not more, grid electricity than households without solar. This is because solar reduces grid imports for a given level of household demand, but solar households often have higher underlying electricity use to begin with. This occurs for several reasons, including:

- Households with detached dwellings and higher baseline electricity demand are more likely to have solar.⁶ While solar decreases overall household grid use, households with solar tend to have higher electricity use to begin with.



- The ‘solar rebound effect’ is an observed phenomenon of households increasing electricity use after installing solar.⁷ For example, people feel ‘free’ to run their air conditioning more often, when they historically may have limited their use.

Figure 3: Annual grid use by residential households with and without solar – 25th, median and 75th percentile



Note: This chart covers all households in New South Wales, Victoria, South-East Queensland and South Australia. Source: ACCC, Retail Electricity Pricing Inquiry (2025).

The major drivers of Queensland household grid use

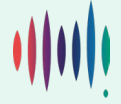
Along with smart meter data on grid electricity use, we obtained data on whether a Queensland household has a pool; has solar; has a battery; is a unit; has a connection newer than 20 years or older than 50 years; and has life support. In addition, we were able to use postcode data to determine the SEIFA index and climate zone that the home is in.ⁱ

Figure 4 shows the estimated difference in annual average daily grid use associated with each household characteristic, holding the other modelled variables constant. In plain terms, it estimates how much daily electricity use increases or decreases for households with different characteristics, on average. The modelled differences shown in Figure 5 were all statistically significant.

Four characteristics were modelled to have an above 3 kWh per day impact on daily average grid use. As a point of comparison, a typical dishwasher will use around 1 kWh of electricity.⁸ These were:

- whether the home has a pool (increasing daily grid imports by around 5.8 kWh)
- the house type and size, with units estimated to have much lower grid use than other dwelling types (by around 5.8 kWh).

ⁱ The Australian Bureau of Statistics provides SEIFA indexes that measure socio-economic conditions by geographic area. For more information see [here](#). Climate Zone data divides regions with similar climatic conditions. Homes in each climate zone are likely to require differences in housing design and energy needs. For more information, see [here](#).



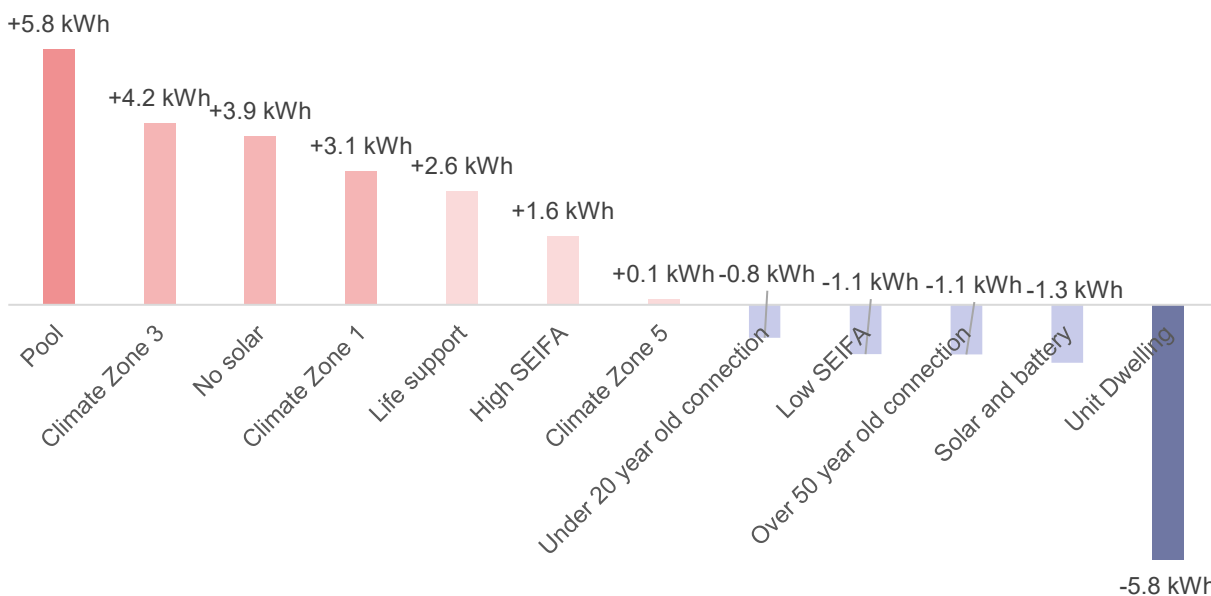
- the climate zone of the house, with living in Climate Zone 1 correlated with higher grid use. Climate Zone 1 is in north Queensland, categorised by a hot humid summer and a warm winter. Households in Climate Zone 3 were also found to have higher grid use. Climate Zone 3 is central and western Queensland, categorised by a hot dry summer.
- whether the home has solar (decreasing daily grid imports by around 3.9 kWh)

Interpretation of the results should nonetheless be framed with some care. Most notably, the characteristics modelled are not close to an exhaustive list of factors. Importantly, heating and cooling load data were unavailable for this data set.

For some characteristics, a direct causal link to higher electricity use is well established. For example, pool ownership unambiguously increases electricity use through pool pumps, heaters and filtration systems. However, other characteristics are more likely to reflect correlated household traits rather than a direct causal impact. For example, dwelling type and socioeconomic status are each correlated with household size and appliance use, which are more likely to be causal factors.

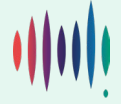
Relatedly, several of our explanatory variables are correlated with one another. For example, solar ownership is strongly correlated with living in a detached dwelling. As a result, the estimated contribution of any single characteristic should be understood in the context of the other characteristics included in the model, rather than as an independent or additive effect.

Figure 4: Estimated contribution of household characteristics to daily grid use (Queensland households with a smart meter)



Note: Climate Zone results are shown as relative to households in Climate Zone 2; Solar and battery results are shown as relative to households with just solar; SEIFA results are relative medium SEIFA score locations; and Connection age results are in reference to connections 20 to 50 years old.

Source: ECA and University of Queensland Collaboration Grant (2026). See [here](#) for further information.



Within each major group, there is substantial diversity in grid electricity use

While some factors are clearly correlated with higher use, this does not mean households with a given characteristic are consistently high or low users. To illustrate this, Table 1 shows the distribution of daily average use across key groups: households with and without a pool; unit and non-unit dwellings; households with and without solar; Queensland's four climate zones; and high, medium and low socio-economic postcodes.ⁱⁱ

Substantial variation remains within each group. Although households with a pool use more grid electricity across all percentiles, around 30% consumed 14 kWh per day or less in 2025—below the overall median. Conversely, around 10% of households without a pool used more than 30 kWh per day. Together, these results highlight the complexity of household electricity use.

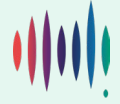
Table 1: Queensland household grid electricity use – selected percentiles (kWh)

	10th	30th	50th	70th	90th
All households	6	11	15	21	32
Pool	9	14	19	26	38
No pool	6	10	14	19	30
Unit	5	8	11	14	22
No Unit	7	11	16	22	33
No solar	6	11	16	22	34
Solar only	6	10	14	20	30
Solar and battery	4	9	14	19	31
Low SEIFA	5	10	14	19	30
Medium SEIFA	6	11	15	21	32
High SEIFA	7	12	17	23	35
Life Support	7	11	16	23	37
No Life Support	6	11	15	21	32
Climate Zone 1	7	12	17	24	36
Climate Zone 2	6	10	15	20	31
Climate Zone 3	5	12	17	25	40
Climate Zone 5	6	10	14	19	30

Note: Values have been rounded to the nearest whole number for simplicity.

Source: ECA and University of Queensland Collaboration Grant (2026). See [here](#) for further information and the full distributions.

ⁱⁱ Low: SEIFA scores of 1 and 2, Medium: SEIFA scores of 3, 4, 5, 6 and 7; Large: SEIFA scores of 8,9 and 10.



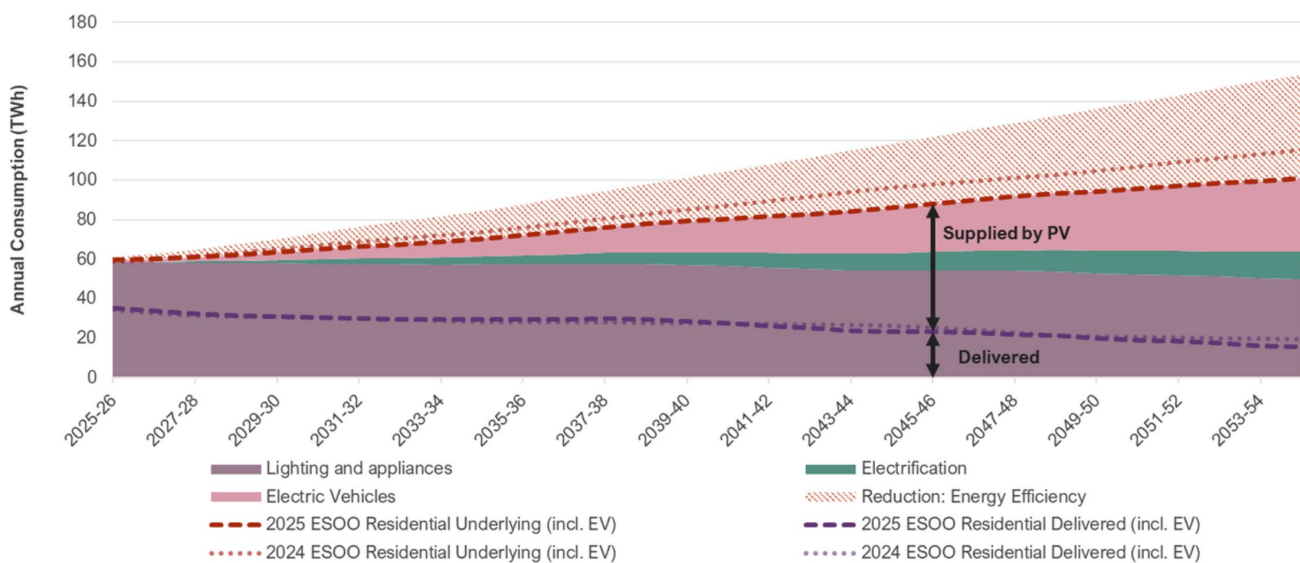
Looking forward

In recent years, household grid use has been declining. AER analysis shows that since 2006, average household grid use has fallen by 26%.⁹ Increased adoption of rooftop solar and improvements in appliance efficiency and the thermal performance of new homes likely explain these trends.

The outlook for household grid electricity use is uncertain. Electrification of vehicles and gas appliances is likely to increase household electricity use. Households may also require more heating and cooling as climates become more extreme. However, this will be somewhat offset by: uptake of household solar and battery storage; improvements in the energy efficiency of appliances; and improvement in the thermal energy performance of homes.

Figure 5 shows the Australian Energy Market Operator’s 2025 National Electricity Market Electricity Statement of Opportunities forecast of residential underlying electricity demand and residential delivered demand. It shows that growth in electricity use from electrification of homes and transport is forecast to be offset by growth in behind-the-meter generation, storage and energy efficiency improvements. As such, while underlying household electricity demand is expected to increase, this may not necessarily result in increased residential grid use overall.

Figure 5: AEMO 2025 Step Change scenario residential electricity demand forecast

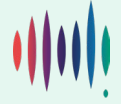


Note: 'Lighting and appliances' includes residential battery losses.

Source: AEMO, 2025 ESOO, p. 18

Note that this forecast was made before the introduction of the Federal Government’s Cheaper Home Batteries Program. As such, the forecast may understate the impact of batteries on reducing how much electricity households will import from the grid. Analysis by IEEFA has found that battery adoption rates are on track to exceed AEMO’s 2030 battery forecast by the middle of 2026.¹⁰

Naturally, aggregate household forecasts shown in Figure 5 will hide the diverse experience of individual consumers. For example:



- Only a subset of households will install solar and batteries. Our previous research has estimated that around 1 in 2 households face a major barrier to the adoption of solar and batteries.¹¹
- Some consumers will adopt new technologies first. For example, there are concerns that renters will be the last to transition off gas.¹²

As such, we will likely see household grid electricity use become more diverse over time:

- Some households will see grid electricity use increase as they adopt electric vehicles or electrify gas use.
- Some households will see grid electricity use fall as they adopt solar, batteries and more efficient appliances.
- Some households will only have minor changes to household use in the short to medium term given barriers to CER access, electrification, or barriers to charging EVs at home.
- Others may have little to no change in net grid use, as increased electricity use from electrification may be offset by the adoption of solar and batteries.

Policy implications

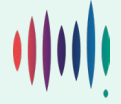
The diversity and complex determinants of household grid electricity use have important implications for equity and policy design. First, analysis based on average consumption or the “typical” household is misleading. Monitoring prices alone does not give a full picture of the bill outcomes households ultimately face.

Second, while many households will increasingly be able to influence how much electricity they consume from the grid, a substantial portion of grid use will continue to be shaped by factors outside an individual household’s control. These include the climate in which a household is located and whether the household rents, limiting agency over some of the largest drivers of electricity use.

Last, and importantly, our findings also show how vulnerability can be associated with both higher and lower grid electricity use. For example, households living in areas of low socioeconomic advantage were found to have lower than typical grid use on average, whereas households with life support requirements had slightly higher than typical grid use.

Socioeconomic advantage (in its limited extent measured in this study) was associated with higher grid electricity use. But its direct effect was found to be relatively smaller than the larger factors of pool ownership, living in a unit or a standalone house, climate zone, and having solar panels. These four factors are themselves linked to socioeconomic status, interestingly in both directions. For example, higher-income and owner-occupied households are generally more likely to have pools and to live in larger, standalone homes—both of which are associated with higher electricity consumption. In contrast, owner-occupied and larger homes are also more likely to install solar, which can reduce grid electricity use.¹³

The link between climate zone and household energy use raises further equity implications. Most Queensland households live in the Greater Brisbane area, which is in the more moderate Climate Zone 2. Our results find that households in Climate Zone 3 (inland central Queensland) and Climate Zone 1 (far north Queensland) tended to have higher energy consumption than households in Climate Zone 2.



Households in metropolitan areas tend to have higher incomes than households in regional areas,¹³ and are more likely to be areas of higher economic advantage¹⁴. This suggests that some households from more disadvantaged, regional areas may face higher energy needs due to climatic conditions. Notably, a 2019 study found that energy poverty in Queensland was more prevalent among households in Climate Zone 1, where electricity expenditure was higher relative to other zones.¹⁵

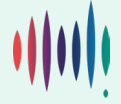
However, Table 1 shows the underlying diversity of household grid electricity use. For example, while pool ownership is associated with higher use on average and higher socio-economic advantage, around a third of Queensland households with a pool have below median grid use. Importantly, it is worth recognising that many households with a pool have low incomes or rent.¹³

Taken together, these results suggest that it is difficult to draw firm conclusions about which types of households are high or low electricity users. Relatedly, this highlights the difficulty of reaching definitive conclusions about the distributional impacts of energy bills.

The most robust conclusion under current arrangements is a simple one: households that consume more electricity from the grid tend to pay more, and households that consume less pay less. Within each group, there remains substantial diversity, including households with or without solar, with high or low levels of agency, and with varying degrees of socioeconomic advantage.

Therefore, policymakers should consider how total system costs are allocated across consumers, recognising that some households face structural limits in their ability to reduce consumption. This includes exploring complementary measures, such as targeted financial support, investment in energy efficiency, and reforms to system cost recovery that better reflect both capacity to pay and capacity to respond.

A policy framework grounded in these principles will be better placed to maintain equity as the energy system evolves, ensuring that no group is systematically disadvantaged by the way costs are recovered or by the transition itself.



Methodology

This data was collected as part of a Collaboration Grant with The University of Queensland, funded by Energy Consumers Australia's Grants Program. Deidentified smart meter data was provided by Energy Queensland.

For further information on the methodology used for the University of Queensland project, please see [here](#). Please cite their work as:

Dolnicar, S., Grün, B., Layeghy, S., Portmann, M., Serati, R., & Zinn, A. (2026) *Queensland energy market insights: Empirical findings from the collaborative research project between Energy Consumers Australia, Energy Queensland, and The University of Queensland*. Brisbane: The University of Queensland. <https://uq.pressbooks.pub/energy-insights/>. DOI: 10.14264/6ec48f8.

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⁷ See for example Mahdavi Mazdeh, Nariman. Solar PV Rebound Effect on Regional Demand. In: IEEE sustainable power and energy conference 2022; 04 to end of 07 Dec 2022; Perth. IEEE; 2023. 1-5. csiro:EP2022-4120. Nguyen, LT; Ratnasiri, S; Wagner, L; Nguyen, DT; Rohde, N, Solar rebound effects: Short and long term dynamics, *Renewable Energy*, 2024, 223, pp. 120051

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