



Cost-reflective Tariffs - Customer Insights Knowledge Review

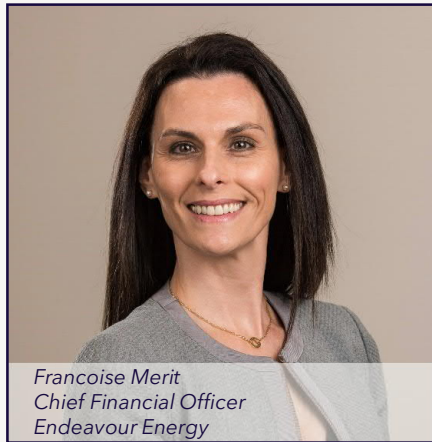
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Foreword



Françoise Merit
Chief Financial Officer
Endeavour Energy

A customer-led and customer-centric energy transition remains our priority as the economy and energy markets have become increasingly volatile.

During our most comprehensive engagement program for future services and costs, Endeavour Energy has been single-minded in our focus on the long-term interests of our 1.1 million customers in Greater Western Sydney, the Blue Mountains, Southern Highlands, Illawarra and South Coast of NSW. That means delivering affordability while maintaining a safe, resilient, reliable electricity network, servicing the unprecedented growth of our communities and increasingly facilitating new customer energy choices and new technologies.

Throughout our engagement program we constantly heard customers prioritise initiatives that would allow them to take greater control of their energy use and save money. We also heard our customers prioritise support for others experiencing vulnerable circumstances.

We have commissioned our research and engagement partner, SEC Newgate, to undertake research that can help inform how we can accelerate a transition to cost-reflective tariffs in a way that empowers our customers. While we received broad support from customers for cost-reflective tariff reform, this support weakened over time as cost-of-living pressures and energy market volatility increased, and when we proposed to mandate this change for all customers with smart meters. This research therefore aims to understand the non-technological barriers to this reform in order to best support customers in this transition.

Time of Use (TOU) tariffs are a means of achieving cost-reflectivity of our services, which is a requirement of regulatory rules. Time of Use tariffs, which include both peak and off-peak rates for energy consumption or generation at different times of the day, are considered fairer than a single, flat rate because customers are charged for how and when they use the network. Those who use the network more at peak times, when network costs are higher, are charged more than customers who use the network less at peak times. Over the long-term, cost-reflective tariffs can incentivise behaviours that can reduce costs and increase efficiency, thereby reducing costs for all customers.

As the energy industry transitions, there is a growing focus on tariff reform, customer vulnerability and technology. Our literature review and stakeholder interviews, which included key market bodies, market participants, customer advocates and academics in Australian and overseas, have sought to best identify current understanding, concerns and knowledge gaps. The review summarises useful evidence regarding barriers, motivators, at-risk groups and knowledge gaps. We believe there are significant opportunities to leverage key behavioural science principles to encourage and support the best adoption of cost-reflective tariffs by customers.

Endeavour Energy's charges make up about 30% of a typical electricity bill. Accordingly, we acknowledge that retailers and other market participants, who are the primary owner of customer relationships when it comes to customer bills, remain the primary stakeholders in this reform. However, we will continue to lead and work closely with retailers and other market participants in order to design tariffs and communications that best support our customers.

We warmly thank those who willingly shared their insights and experience in this knowledge review and are pleased to publicly share it in order to advance understanding and focus in this area, in the long-term interests of all our customers. We are committed to using this research in our ongoing engagement with and support for our customers.

Implications of this knowledge review: Energy sector

The findings of this review have potential implications for the sector as a whole and specifically for Endeavour Energy. The implications we see for the sector as a whole are:

- **What is the role of networks, retailers, government and regulators?:** Stakeholders acknowledge that there's only so much a distributor like Endeavour Energy can do to accelerate the transition to TOU pricing by sending price signals to retailers. They understand that retailers retain the prerogative to decide whether to introduce cost-reflective tariffs and the extent to which the distributor's tariffs are passed through to customers. Some stakeholders are concerned retailers may not implement these tariffs unless there is a critical mass of customers on TOU tariffs or a regulatory requirement to do so. Retailers may have limited incentives to implement TOU tariffs, which could cause confusion for their customers or affect their competitive position in the market. As a result, some stakeholders suggest regulatory requirements may be needed to ensure retailers pass on TOU tariffs in a timely and consistent manner.
- **Link with existing AER and Energy Charter work:** The AER review reinforces the importance of many objectives and issues raised in the AER's 'Towards energy equity'/Gamechanger plan, particularly in relation to Objective 2 which is to "reduce complexity and enhance accessibility for energy consumers". This relates to information on how retailers' energy plans are set out, how information on bills is presented, the need for greater commonality in the language used to describe energy plans, and education channels and materials to assist energy consumer literacy. Similarly, there is scope to collaborate across Energy Charter signatories to drive better outcomes for customers through a Better Together program.
- **Consistency is critical:** The review suggests that consistency in TOU tariff windows (across days and times of year) will be important in building customer understanding and adoption of new, sustained behaviours. SEC Newgate also notes that a lack of consistency in how retailers apply TOU tariffs may affect the prices offered to customers, which may make it more difficult for customers to compare and understand different retailer offers.
- **Content of communications:** The review sets out the nature of communications - both messaging and type of content - that would best meet customers' needs. It should open with the rationale or need for TOU pricing, followed by information on the potential benefits (monetary and prosocial), and illustrate prescriptive behavioural actions for people 'like them'. To ensure success, it is critical that communications are simple, though more detailed information should be available for those who want it, tailored to a range of specific situations. A 'one size fits all' approach is unlikely to be effective.
- **Credible communications source(s):** To build comfort with the move to TOU tariffs, the review identifies the importance of having one or more highly credible and trusted sources to lead communications on the introduction of TOU pricing, with consistent messaging and reinforcement from other key stakeholders and players in the energy supply chain.
- **Put communications in context:** Communications on TOU pricing need to be anchored in the issues customers care most about. Currently, these issues are savings on electricity bills and, for many, how they can reduce their carbon impact. We see customers who engage in this topic having flow-on questions related to energy-efficiency as well as solar, battery and home energy management systems. This comes back to a core industry issue - who is responsible for delivering an overarching narrative to customers about what will happen with energy markets in the years ahead and how they can best position themselves for this change?

Implications of this knowledge review: Energy sector

- **Areas that require further research:** The knowledge review identifies areas where further research would be most valuable. Recommended areas for further research include:
 - How different customers are currently responding to TOU tariffs in Australia specifically and what factors affect this – and *why* some people respond to TOU tariff signals and some don't;
 - What targeted initiatives will help the groups who are either at risk of being, or will be, adversely affected by TOU tariffs – in particular, we note a gap in understanding the impact on and needs of Life Support customers;
 - Keeping simplicity in mind, what is the 'right' type and amount of information or incentives that people need to be able to change their behaviour;
 - Which specific terminology customers prefer in this space - noting that a consistent industry approach to language will facilitate understanding;
 - The most effective messaging to explain the introduction of TOU / solar export tariffs, the rationale, and what you can do (e.g. testing different versions of specific collateral that frame messages around monetary impacts and prosocial benefits in different ways);
 - Who are the best (most trusted) sources to provide information on TOU tariffs, and how this should be provided (including to different customer groups);
 - The effectiveness of live feedback loops on promoting understanding and facilitating behaviour change;
 - How effective two-step (transitional) pricing as part of a transitional education period would be in helping customers to adjust their usage behaviour (as compared to no transitional pricing during the transitional education period).

Note: This review has focused specifically on *non-technological* barriers and motivators to customer acceptance of and response to TOU tariffs, and in particular on ways to build customer comfort and facilitate behaviour change. This is of course only one aspect of reducing peak demand, and other solutions may well be required in conjunction: for example, CSIRO's 2015 report on *Australian Consumers' Likely Response to Cost-Reflective Electricity Pricing* [3] concludes that "cost-reflective pricing will be more successful the less it relies on consumers... responding to changing price signals" (page 46); and that "tariff reform [needs to be] accompanied by systemic technological changes, especially around automation of usage" (page 49). Automation is another very important area for the energy sector to consider.

Implications of this knowledge review: Endeavour Energy

We see the implications of the knowledge review for Endeavour Energy as follows:

- **Further clarity around Customer Panel perspectives:** The review provides clear insights that explain why the Endeavour Energy Customer Panel developed a preference for an 'opt-in' or limited mandate approach despite initially supporting the introduction of cost-reflective (e.g. TOU) network tariffs in principle. These are set out in the 'Barriers' section of this report.
- **Timing of peak period:** The review reinforces the importance of a consistent peak period throughout the year, supporting Endeavour Energy's proposal for 4-8pm on weekdays.
- **Having a transition period:** While there is no evidence that a transitional price will aid in triggering behaviour change, it does appear to meet what stakeholders feel are social licence obligations in terms of giving customers time to understand the change and how they can respond, including time to equip themselves (or be equipped) with things that will help e.g. technology (including potentially automation), or energy-efficient measures to reduce the need for heating and cooling.
- **Seasonal variations in pricing:** Noting that customers may transition to (or be transitioned onto) TOU tariffs at any time of year, SEC Newgate feels it will be important (extrapolating from certain findings from the review and behaviour change principles) that the price differential outside the summer peak is still different enough to send a clear pricing signal to customers, given that they are most likely to change behaviours at the outset rather than further on.
- **Implications for Endeavour Energy communications in the short and longer term:** The review suggests that communications on TOU tariffs should be simple, consistent, provide a clear 'behavioural prescription' and come from a highly credible source. SEC Newgate's view is that, at this point in time, Endeavour Energy should provide information on its website and in customer call centre training materials. The knowledge review does provide guidance on the nature of messaging that will be most effective at this point, while noting that more work needs to be done in this area. In the longer-term, once an industry-wide approach is agreed, Endeavour Energy may seek to play a more significant role in communications with its customers on this issue. Both now and in the longer-term, Endeavour will need to be mindful of ensuring information suits its specific customer base: for example the high proportion of customers from culturally and linguistically diverse backgrounds, high summer temperatures in Western Sydney, and the low energy-efficiency of some housing stock.



Background, Objectives & Methodology

Background & Objectives

Background

The issue of cost-reflective tariffs arose in the context of engagement around Endeavour Energy's regulatory proposal for the 2024-29 period.

Deliberative consultation with Endeavour Energy's Customer Panel in 2022 showed strong in-principle support for the introduction of cost-reflective network tariffs (both Time of Use and Solar Export) but after being presented with more detail and options many indicated they would prefer an 'opt-in' approach, or mandated approach only for newly connecting customers, rather than a mandated approach for all. By contrast, many stakeholders preferred a mandated approach.

The Customer Panel's preference for opt-in appeared to be the result of multiple factors including a values-based preference for choice, uncertainty about their and other customers' ability to change their consumption behaviour to save money, and a lack of confidence that most customers would be better off. Several felt that such tariffs would be more equitable, but that if they were to be mandated there would need to be a strong focus on education, with time allowed for transition and support for customers experiencing vulnerability and those who could not change their usage patterns. In relation to solar export tariffs, many noted that solar customers had done the right thing by investing in technology and had made investment decisions based on certain financial assumptions which would now likely change, as feed-in tariffs had done in the past. See Endeavour Energy's [Customer Panel Report](https://yoursay.endeavourenergy.com.au/your-power-your-say-your-future/news_feed/see-where-the-customer-panel-landed-on-the-key-issues) [a] for more detail.

Note that when Endeavour Energy talks about a mandated approach to introducing TOU tariffs it is referring to network costs. It is up to retailers to decide whether or how to pass these on to customers.

In considering what might be driving customers' opinions and how to best approach the introduction of cost-reflective tariffs, Endeavour Energy felt it would be prudent to start by looking at what is already known in this space in Australia and other similar markets.

[a] https://yoursay.endeavourenergy.com.au/your-power-your-say-your-future/news_feed/see-where-the-customer-panel-landed-on-the-key-issues

Objectives

The key objective of this review was to examine publicly available literature on customer behaviour around Time of Use (TOU) tariffs and the best way to prepare customers for their introduction. It also sought to identify knowledge gaps that require further exploration.

The findings will be used to fine-tune Endeavour Energy's approach to tariff design as well as customer, stakeholder and industry engagement on this issue. It's also intended to contribute to industry knowledge in this area.

The report is structured around four key questions:

- **Assuming TOU tariffs are mandated from a network perspective, what are the non-technological barriers that will need to be overcome to encourage customers to change the timing of their energy consumption? What motivations can be leveraged?**
- **Which customers will be more and less able to respond?**
- **How do we best prepare people for the mandatory introduction of TOU tariffs?**
 - Is it better to introduce cost-reflective tariffs via a transition period, or all in one go?
 - What types of messages, information and resources will help people change behaviour?
- **What are the knowledge gaps that require further exploration?**

Methodology

We took three main approaches to gathering information:

1. **Desktop literature review.** A desktop review of **24** publicly available customer research documents was undertaken to explore existing knowledge about consumer responses to cost-reflective tariffs (in particular TOU tariffs). Customer research from Australia and overseas (primarily the UK, Ireland, and California), from the energy sector were of key focus, though we were open to including reports from sectors such as telecommunications, transport and water if deemed highly relevant. We reviewed reports published from 2014 onwards (i.e. the past and current pricing periods), though we note that some sources used earlier documents in their own reviews. The full list of documents can be found on pages 49-50, identified by the search terms to the left, or in stakeholder interviews. Reference numbers in [] in the report text indicate the sources for specific information.
2. **Stakeholder interviews.** We originally planned to interview a handful of key stakeholders as part of efforts to identify appropriate documents to review or to seek additional information on the effectiveness of collateral. However, many stakeholders suggested that others may also have relevant insights (including current work) and should also be included, so this element of the review expanded to encompass the views of **20** stakeholders. This included energy sector representatives, customer advocates, behaviour change experts, economists and academics. Interviews were conducted on a non-attributable basis. The full list of stakeholders interviewed can be found on page 56.
- **Summary of existing information and resources available.** We reviewed 15 resources (9 Australian, 5 UK, 1 USA) created to help people understand and shift towards TOU tariffs and looked for any evidence of their effectiveness. The collateral comes from comparison sites, energy companies (retailers, networks, gentailers), energy-saving websites, and customer and business advice websites (e.g. SolarQuotes, Bionic UK). We note that we were only able to look at websites rather than information sheets retailers may have sent to their customers, for example, or retailer apps. See page 57 for the specific websites we looked at.

Search terms

The following search terms were used to source documents on consumer responses to cost-reflective tariffs (in conjunction with the keywords 'consumers', 'attitudes', 'preferences', 'responses'):

- Cost-reflective pricing / tariffs
- Time of use tariffs / pricing /
- Off peak pricing
- Tariffs
- Energy tariff
- Electricity tariff
- Demand tariff/pricing
- Seasonal tariff/pricing
- Solar tariff
- Solar export tariff
- Sun Tax

These were searched through a general web search, as well as on specific websites (Ofgem, ARENA, ECA, CSIRO, BIT, NSW BIU, QUT, Menlo Energy Economics, PowerCo, Environment NSW).

Methodology (cont'd)

The inclusion of behavioural insights in this report

Fundamentally, transitioning consumers to the use of cost-reflective tariffs requires a population-level shift in energy-related behaviours. The inclusion of behavioural insights is thus critical for a deeper understanding of how people process information, make decisions and form habits.

We see that there are three types of behaviours that could be shifted to reduce peak demand: (a) changes in the times at which people consume energy, (b) adoption of solar and batteries and (c) making improvements to the energy-efficiency of properties. We have focused particularly on the first point in this response, but also referenced the other two.

In writing this report, we drew upon the expertise of SEC Newgate's Behavioural Insights Group to ensure behavioural insights and principles were fully considered and incorporated into the findings.

Our focus has been primarily on the drivers/enablers of change, and the efficacy of communications materials, rather than on trials being conducted by network companies.

When it came to the collateral review, we were unable to find any evidence (i.e. data) regarding their effectiveness in terms of building comfort and helping consumers shift their usage. As such, our Behavioural Insights Group conducted a behavioural audit to review how current collateral (see information to left and in Appendix) is addressing the customer barriers, motivators and needs identified in this report. A behavioural audit is the evaluation of research collateral with a behavioural science lens (i.e. against our knowledge base on human decision-making and behaviour), with the aim of identifying strengths and opportunities for improvement.

Benefits and limitations of this review

This knowledge review incorporates findings from 24 documents published in the past eight years (along with a list of other documents identified by stakeholders or uncovered in our search which we were not able to review at this time). We have been fortunate to be able to combine this with findings from interviews with 20 stakeholders, enabling us to include some of the most recent industry thinking, experience and work.

As with any knowledge review, this report is not without its limitations:

- The insights are limited to the evidence that was publicly available at the time. The report does not include unpublished evidence or evidence behind a paywall. We are also aware that some organisations are currently planning - or conducting - further research in this space. Furthermore, we did not conduct a systematic literature review (following an explicit pre-defined search protocol); rather the evidence reviewed largely emerged from a rapid search of documents available on current search engines or specific websites (see Appendix for search terms and documents) or provided by stakeholders in response to the call for evidence.
- The documents that we have examined largely consisted of consumer research reports and results of trials that have not undergone academic peer review. Another limitation is thus that only a relatively small number of the documents would be considered evidence of the highest quality.
- There are limitations to the extent to which evidence collected on the behaviour of consumers during trials is likely to generalise to a real-world scenario once regulatory reforms have taken place.
- The vast majority of the literature has looked at the impacts of an opt-in or opt-out approach to cost-reflective tariffs, and there is limited information on a mandated-move scenario. See point 3 on the next page for more on this.
- The populations that were studied in the included literature may not reflect the experiences of all types of consumers - for example, those experiencing the most vulnerability.

Caveat: sometimes conclusions drawn from the literature have been made by the authors of this report; these should not be taken as the views of the authors of the source material.

Three foundational points

The purpose of this review is to discuss the customer barriers and motivations to TOU tariffs, and how to assist them during a transition to such tariffs. However, in discussing our review with stakeholders, three other foundational questions about TOU tariffs were raised, and we feel it is important to note these and provide a response to upfront, as they may impact how the information within the review is received. Noting that the answers to these questions were not in the scope of the review, we have provided what we understand to be some of the industry thinking on the topics.

1. Do customers actually respond to TOU tariffs (i.e. change their energy usage)?

Various studies show that customers do change their energy usage in response to TOU tariffs. For example, the literature review *Applying Behavioural Insights to Forward-Looking Charging Reform* by Ofgem's Behavioural Insights Unit [18] looked at four different studies (2010-2016) from the US and UK and concluded that the evidence shows consumers do adjust their electricity consumption patterns in response to TOU-style tariffs (with the vast majority of studies relying on consumers shifting "manually" rather than relying on automation to do so). It also noted that there are large, but mostly unexplained, variations in responsiveness to TOU tariffs across consumers; that some customers will not respond to TOU tariffs at all, some will respond a little, and some will respond a lot. The report goes on to note that a key concern is whether these differences in responsiveness could be due to socio-economic variables, but that the evidence so far for this is slim.

2. Are TOU tariffs fair and equitable?

As the [AEMC \[a\]](#) notes, consumers use energy in different ways based on individual lifestyles. Cost-reflective pricing reflects this diversity and the costs of different patterns of consumption, charging consumers in a way that more accurately reflects individual usage.

Cost-reflective pricing is considered fairer because customers are charged based on how and when they use the network. These tariffs also allow customers to make more informed decisions about their electricity usage. However, further research is needed on the extent to which different customers are able and willing to change their consumption patterns in response to price signals.

3. What is the evidence for mandated approaches to TOU tariffs (vs opt-in vs opt-out)?

Endeavour Energy's Regulatory Proposal for the 2024 - 2029 period currently proposes a mandated network tariff for small customers with a smart meter, but how that is passed on is ultimately a matter for retailers. The literature review has uncovered very little specific evidence about how customers will respond to mandatory TOU tariffs (if these are passed on by the retailers), other than a reference by Ofgem [18, page 16] to a mandatory tariff in Italy, but it does show evidence that opt-out methods are much more successful at shifting load at a cumulative level than opt-in because people tend to remain with the default option (see also [12] from the Energy Institute at Haas).

It seems reasonable to assume that a mandated tariff would be closer in effect to opt-out than to opt-in; that the identified barriers and motivators to TOU tariffs will largely still hold true. However, it is possible that there may be some backlash due to what people see as government intrusion or imposition, particularly from customers who absolutely cannot shift their usage or are unable to invest in initiatives that would help them reduce their peak demand. Messaging around fairness of customers paying according to their impact on the grid is likely to be critical here.



Findings

Assuming TOU tariffs are mandated from a network perspective, what are the non-technological barriers that will need to be overcome to encourage customers to change the timing of their energy consumption? What motivations can be leveraged?

Key barriers and motivators identified

Numerous studies exist which discuss the barriers to uptake of TOU tariffs and to behaviour change, and customers' general preference for flat-rate tariffs. These findings are consistent and appear to be well-accepted. This section of the report gives more detail on each of the motivators and barriers listed below. Enablers of behaviour change have also been identified. We note that these barriers and motivators will only come into effect if the tariff is passed on to customers by the retailers.

Motivators

1. Monetary savings and a sense of control
2. Prosocial values (environment, community, health)
3. Social proof during times of change

Enablers of behaviour change

1. Real-time (or close to real-time) feedback loops
2. Equipment such as timers and smart appliances

Barriers

1. Preference for predictability and certainty in bills
2. Concerns about ease of behaviour change
3. Awareness of, attitudes to and affordability of devices which may help
4. Lack of understanding of (and trust in) the energy sector
5. Complex tariff designs

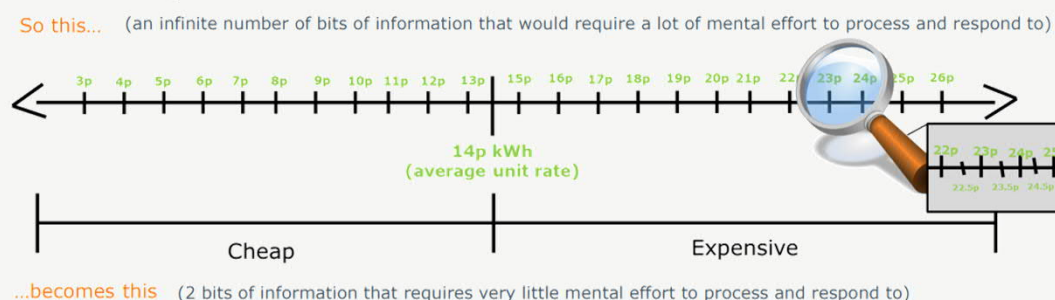
Barriers may relate to **ability** to shift or to **willingness** to shift usage. The findings on barriers and motivations appear to lend themselves well to application of the COM-B behavioural model, and we have included an example of this at the end of this section, as we feel it may help to frame industry thinking on the issue. It is also important to note that the reports we have examined tend to look at (or assume) an opt-in or opt-out approach to TOU tariffs. In a mandated move, it is possible that some of these barriers may be heightened, or new barriers created.

Motivations to be leveraged

1. Monetary savings and a sense of control

If there are savings to be made as compared to current bills (or if higher bills can be avoided), this is naturally a key motivator for behaviour change. As one behaviour change specialist noted in our stakeholder interviews, customers have a transactional mindset: **"I am moving something, and I want something in return"**.

Interestingly, the literature shows **a non-linear relationship between price and demand**, likely due to customers' use of mental shortcuts to process information. When marginal price changes involve many different bits of information, customers appear to **categorise this information into two broader classifications of 'cheap' and 'expensive'** to help them cope with information overload (see illustrated example) [18, page 12].



People also have reference-dependent preferences and measure wealth or utility in terms of deviations from a specific reference point (in this case the average unit rate on a flat-rate tariff). Using this reference point, anything below that unit rate is considered 'cheap' and anything above is considered 'expensive'. The size of a price signal therefore makes little difference to behavioural responses as anything that is an increase is just considered 'expensive' [18].

The way that monetary savings, or potential savings, are communicated to consumers is also an important factor in how much people will change their behaviour. Fundamentally, the above evidence suggests the focus should be on communicating which times of day are 'cheap' vs 'expensive'; we discuss additional motivating messaging further on in this review (pages 32-43).

We note that **TOU tariffs also provide some customers, namely those who are engaged and/or energy- or money-conscious, with an appealing sense of control** over their ability to be able to impact their own bills [5].

Motivations to be leveraged

2. Prosocial values

It's critical to note that **saving money often isn't a sufficient sole motivator for change**. When it comes to energy-related behaviour, people are motivated to change for many reasons.

Insights from behavioural demand response trials suggest that **behaviour change may be more likely when financial rewards are combined with messaging that appeals to altruistic or community values** (such as 'help the grid', 'cut down on waste', or 'join the club'). Notably, 'help the grid' had a higher impact during a period of relatively high blackouts, and lower impact during months there was greater supply reliability. As mentioned in the RACE for 2030 report [21], one trial by AGL's Managed by You Program found that participants considered the monetary value of rewards insignificant and did not view it as a primary motivation for participating. Similarly, an earlier study in Western Australia found that while consumers' primary motivation for choosing a TOU tariff is to save money, most attribute their behaviour change to the overall benefit to the community in reducing peak demand [24].

There appears to be **little specific research on the effectiveness of messages around the fairness and equity** of cost-reflective pricing, but this is something that was mentioned by several stakeholders and could be tested in further work in this space. We note that some perceive TOU tariffs as "unfair" (e.g. people feeling that some people can't change their usage patterns and will be penalised for it) [24], and therefore educational messaging on fairness and equity may help to overcome that.

Behavioural demand response trials mentioned in the RACE for 2030 report have also found that **environment and health-based framing are more effective at motivating greater and more persistent reductions in electricity use compared to cost-saving information**, noting that this was when messaging was combined with real-time data feedback [21 [i]. ECA [5] also notes that, other than the potential for monetary savings, the other key benefit seen in a TOU tariff was that it encourages more mindful or conscious use of consumption (i.e. is more environmentally friendly). A study from Ireland found environmental messaging (combined with messaging on monetary savings) was particularly motivating for younger people [1].

Research on attitudes towards the AEMC's proposed solar reforms (which included the introduction of a solar export tariff) found that the main reasons consumers felt positively towards proposed reforms were to do with the environmental benefits of supporting the growth of solar, that it is a fair approach balancing the needs of solar and non-solar customers, and that it benefits Australia's future and will incentivise batteries [16].

Overall, the **evidence shows that framing TOU tariffs in a prosocial way can encourage sustained behaviour change**; linking desired behaviours to personal and social values is more likely to encourage the adoption of new behaviours *and performance of these over time*.

Motivations to be leveraged

3. Social proof during times of change

Behavioural science research has consistently shown that **in situations of high uncertainty, people tend to trust the power of the 'crowd'** and gain comfort from behaving in line with others. This is understood as the principle of 'social proof', which reflects the human tendency to look at peers for guidance on how to behave [i].

This point was raised during discussions with some stakeholders, and although the literature we reviewed does not explicitly name this as a motivator, it does touch on other times when comparisons to peers have been helpfully made to encourage change. SEC Newgate believes that **seeing evidence that 'other people are doing this, and doing it successfully' - and more specifically 'people like you' - will be a motivating factor** in encouraging people to respond to a TOU tariff.

We also note that a small qualitative study by Hall and colleagues (2016) [13] found that consumers in Melbourne were more accepting of TOU tariffs than those in Brisbane and Sydney (noting these results are indicative only) and hypothesised that this might be due to the greater prevalence of smart meters there.

As other areas move further along in their smart meter adoption journey, and therefore in their ability to take up TOU tariffs, they get closer to reaching the critical mass required for a behaviour to become a prevailing social norm.

[ii] Cialdini, R. B. (2006). Influence: the psychology of persuasion, revised edition. New York: William Morrow.

Enablers of behaviour change

1. Real-time (or close to real-time) feedback loops

Consumers want information that verifies the impacts of their behaviour and the pricing structures on the bills. They also ask for information that will help them to understand their own usage. However **the exact amount and type of the information that will assist here appears to unclear; there is a balance that will need to be struck between helping and overwhelming**, and this balance will be different for different people. In addition, some may want initial feedback before they move to 'set and forget mode' whereas others may want something more continuous.

Several studies (and stakeholders) emphasise **the importance of being able to receive real-time (or close to real-time) feedback in driving behaviour change**. A continuous feedback loop of energy use has been found to be more effective at achieving demand response and positive user feedback compared to historical feedback, with a strong preference for access to an app or portal that shows real time usage translated into dollars [15; 20; 21]*.

We know that apps and portals may be out-of-reach for some customers, either due to affordability or to digital literacy [i]. As noted, there is a view that real-time is the 'gold standard' in driving change, and as close to real-time as possible is the next best thing – but as far as we are aware, there is no current evidence around a particular 'cut-off' in terms of frequency of feedback at which point responsiveness drops away. For example, **it seems likely that a monthly bill would be more effective than a quarterly bill in encouraging change**, but we are not aware of any specific studies which prove or disprove this.

On this latter point, ECA [5] notes that focus group participants expressed a preference for smaller and more frequent bills (e.g. monthly) in any case, as this aligns more with their cashflow, and because they feel smaller, consistent payments would allow for better planning and management, reducing the 'bill shock' of larger, less frequent bills.

2. Equipment such as timers and smart appliances

There is a wealth of assistive technology available, such as timers and smart appliances, which may help to remove physical and psychological barriers that may stand in the way of behaviour change. Making the desired behaviour easier to perform through the use of automation will likely help customers develop new habits and sustain them over time. However please see page 21 for a discussion of some barriers around these technologies.

[i] <https://www.abc.net.au/news/2022-10-16/australia-digital-divide-millions-cannot-access-internet/101498042>

*When considering HEMS, it is worth drawing attention to RACE for 2030 which notes that "HEMS do not necessarily reduce energy consumption, as the convenience they provide can also lead to increased energy use in pursuit of greater comfort, such as by pre-cooling the house on the way home." This point relates to total energy consumption rather than peak/off-peak.

Barriers to uptake and behaviour change

1. Preference for predictability and consistency

Research shows that consumers tend to prefer predictability and consistency when it comes to bills, as opposed to the potential for unspecified cost savings. **Several behavioural science principles have been applied to explain behaviour change resistance when it comes to adopting new tariffs.**

- Studies have provided extensive evidence of '**loss aversion**', whereby people weigh losses more heavily than equal-sized gains, under-value the chance of large gains (such as potential savings) in favour of smaller secure gains, and find uncertain losses particularly discouraging [3; 14]. This preference for smaller-but-certain rewards now likely influences how consumers view TOU tariffs. If customers are only receiving electricity bills every three months, the lag-time and uncertainty of savings may not be enough to motivate behaviour change, especially if those behaviours are viewed as negatively impacting lifestyles (a 'loss').
- People exhibit **status quo bias**, which describes how we tend to resist change and favour the default setting [3; 14]. This is supported by findings from studies that show that most customers are unlikely to change their pricing arrangements with their retailer even when shown they would be financially better off [8].
- Thirdly, people have a tendency to be **risk-averse**, and therefore may not prefer cost-reflective tariffs as they introduce more uncertainty about bills initially [14].

All these mechanisms would suggest a tendency for customers not to opt-in to cost-reflective tariffs, despite potential benefits – and also some reasons they may instinctively resist a mandated approach.

Focus group discussions conducted with business and household participants by the ECA in April 2022 [5] found that customers pay particular attention to their electricity bill, due to it being one of their largest bills and having significant variations in cost, and that **many find it difficult to estimate bills accurately and plan for this in their budget**. Generally speaking, the impact of a higher-than-expected bill causes customers who are more financially secure to examine the reasons for this higher bill and look for future solutions, but for the less financially-secure it causes a high degree of stress and the need to make sacrifices in other areas.

Related to this, some stakeholders interviewed discussed the challenges of "getting the timing right" when it comes to tariff reform, noting that the current situation with steeply rising 'cost of living' may pose a particular challenge; people are anxious about their bills, and the introduction of an unfamiliar tariff with uncertain implications for them may exacerbate this anxiety. In our experience, customers tend to look at the total bill - not the network component; as such, mandating network TOU tariffs on top of high wholesale prices is likely to elicit a different reaction than if it happened when wholesale prices were falling.

Barriers to uptake and behaviour change

2. Concerns about ease of behaviour change

Discussions with industry stakeholders suggest a strong current focus on the question of whether or not people will be able to change their behaviour to take advantage of (and not be penalised by) TOU pricing – and how customers experiencing vulnerability in particular can be protected in this proposed tariff change.

As ECA [5] notes, TOU tariffs tend to appeal to customers where they already reflect their current behavioural patterns around energy use. Ofgem/PwC [19] notes people's uncertainty around if/how they can save is reinforced due to expectation that off-peak periods are at times customers are typically less likely to be using energy.

Some research shows that when considering TOU tariffs, customers focus first on how changing usage behaviours will impact their lifestyle (comfort and convenience) rather than on any potential reduction to their bills [24]. We note that the sacrifice in lifestyle is something which can feel more certain ("I will have to lose or change something"), whereas the resultant cost savings are less certain.

Heating, cooling and entertainment were consistently identified as the energy uses that would be hard or impossible to move to a different time [6; 21[i]; 24]; the need for heating or cooling is of course weather-dependent and people are concerned that they may have to use these appliances during the peak or suffer significant discomfort. In the ECA's 2022 behaviour survey [6], 57% indicated it would be quite or very difficult to switch usage of cooling, and 60% usage of heating.

Conversely, people saw it would be easier to change the times at which they use their washing machines, dishwashers and dryers [6; 24]. More generally, people also note the need to do tasks such as cooking at convenient times, and the fact that they are not home at off-peak times, as other barriers to behaviour change [15;21]. As a result, they expect that load shifting will result in a loss of comfort, convenience, and safety (with the safety element relating in particular to heating and cooling) [21].

There is a clear role for information to educate people on how to change their behaviours (if they wish to), especially around heating and cooling - or how to otherwise mitigate the effects of peak pricing e.g. via energy efficiency measures that will require less energy consumption. It is also clear that **there needs to be sustained habitual change in order for consumers (and the grid) to reap the benefits of TOU pricing**, and the steps needed to assist people in making initial and sustained changes will vary based on a number of factors (e.g. interest and acceptance of the tariff, financial and personal situations).

[1] Buchanan, K., Banks, N., Preston, I., & Russo, R. (2016). *The British public's perception of the UK smart metering initiative: Threats and opportunities*. Energy Policy, vol, 91.

Barriers to uptake and behaviour change

3. Awareness of, attitudes to and affordability of devices which may help

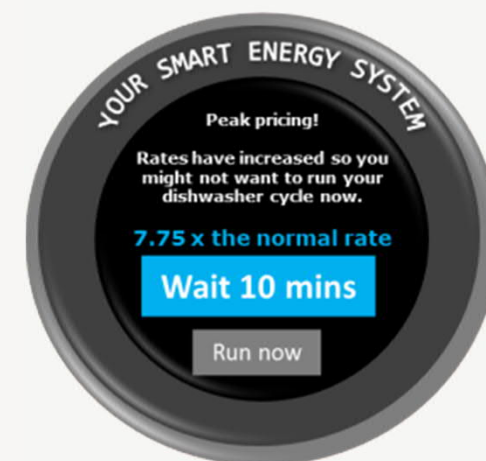
Noting the concerns about ease of behaviour change, it is important to note that there are various types of technology that can help - but there are also some barriers here. While our review focusses on non-technological barriers to TOU tariffs, we feel it is worth briefly noting some of the barriers to technology seen in the literature review, as these may affect acceptance of the tariff as a whole.

ECA [5] notes that low-income consumers feel "restricted" in their access to significant changes like solar and insulation which would enable them to reduce consumption, and that devices such as timers and smart appliances are not top-of-mind. We also note that automatic timers are more prevalent on more expensive appliances and so a potential barrier to low-income consumers and renters, for example.

Attitudes towards technology that supports/automates behaviour change, such as home energy management systems (HEMS) and smart/automated appliances can also be negative amongst some. While cost is a key concern, there are also fears of a loss of control if appliances are fully automated [7, 19], and concerns about data security and privacy with automating household loads/smart appliances [21 [ii;iii;iv]].

The provision of a manual override capacity is recognised as important to mitigate such concerns over a loss of control, and the absence of this could potentially act as a barrier to user acceptance of such technologies [7; 21 [v]]. It is suggested that issuing messaging such as "are you sure you want to override? It is X times the normal rate" (see illustrative example [18 - page 19]) could potentially decrease people's likelihood of overriding automation during peak periods, however no research on the effectiveness of this has been conducted [18].

Concerns with data privacy relate to the potential for household behavioural patterns (such as occupancy status, religious practices, etc.) to be identifiable from smart meter data, for energy data to be exploited by utilities, and that smart technologies requiring internet connection may lack secure authentication protocols that might compromise household privacy [21].



[ii] Fell, M. J., Shipworth, D., Huebner, G. M., & Elwell, C.A. (2014). *Exploring perceived control in domestic electricity demand-side response*. Technology Analysis & Strategic Management, vol. 26

[iii] Balta-Ozkan, N., Davidson, R., Bicket, M., & Whitmarsh, L. (2013). *Social barriers to the adoption of smart homes*. Energy Policy, vol. 63

[iv] Buchanan, K., Banks, N., Preston, I., & Russo, R. (2016). *The British public's perception of the UK smart metering initiative: Threats and opportunities*. Energy Policy, vol, 91.

[v] Parkhill, K., Demski, C., Butler, C., Spence, A., & Pidgeon, N. (2013). *Transforming the UK Energy System: Public Values, Attitudes and Acceptability: Synthesis Report*. UK Energy Research Centre.

Barriers to uptake and behaviour change

4. Lack of understanding of the energy sector...

Insufficient understanding of the energy market (bills, pricing, plans; also the features and benefits of smart meters), along with a sense of mistrust in energy providers, are found to be barriers to energy-related behaviour change [7; 15; 21].

The general evidence suggests many consumers lack the confidence, knowledge and skills required to ensure TOU tariffs will work for them (e.g. how to read a smart meter or how to change their energy-related behaviours accordingly). Many perceive the available information about cost-reflective tariffs to be difficult to understand and unhelpful in navigating the energy market [21].

Behavioural science research demonstrates that **as information becomes more complex, people tend to adopt simpler decision rules, potentially making worse decisions as a result of cognitive/choice overload** [e.g. 14, 22]. An example given during one of the stakeholder interviews is of a consumer experiencing vulnerability assuming that turning off appliances is always better and turning off their fridge to save money, without realising that the energy required to power it back up will negate any cost savings.

Furthermore, **consumers are not always able to accurately predict their own information needs**. For example, Ofgem [18] found that while consumers stated a desire to see energy data visualisations broken down by appliances, the reality was that they struggled to interpret the visualisations, making them ultimately unhelpful in enhancing understanding of which of their appliances used more energy. Energy Queensland Group's Tariff Reform Working Group (whose papers are published on the Talking Energy website) felt that people don't need to know everything about their bills, but obtaining insights into real people's lives and scenarios is important to help them understand what the impacts to their lifestyles are [23*].

... leading to (or exacerbating) a lack of trust

The lack of confidence consumers feel in their ability to navigate the energy system fuels a sense of suspicion that the system is deliberately confusing, eroding trust in energy providers [21[vi]].

We might assume the already-noted discomfort with the idea of providers having control (remotely) over household appliance use will be exacerbated by these low levels of trust. One stakeholder noted concern about how difficult it might be to contest an incorrect reading from a smart meter.

We also note that a mandated move to TOU tariffs may exacerbate the trust issue, especially if the rationale is not well understood; in such cases people can assume the motivation is profit. One stakeholder noted that in their experience customers often don't realise that energy costs more at different times of day, but they do understand it if it is explained to them – thus there is a need for education around that to bring people along more willingly.

The challenge is working out the most effective way to communicate the smallest amount of information that results in the required energy literacy. Much of this comes down to providing targeted and personalised messages and providing the right information at the right time.

*From Tariff Reform Working Group - Workshop 7 Discussion Summary

[vi] Mayol, A., & Staropoli, C. (2021). *Giving consumers too many choices: a false good idea? A lab experiment on water and electricity tariffs*. European Journal of Law and Economics, vol. 51

Barriers to uptake and behaviour change

5. Complex tariff design

The extent to which consumers will adjust their consumption habits depends on the design of the tariff [18]. In general, research shows that more basic tariffs yield larger responses. The authors note that "it is impossible to prove it is the simplicity of the tariff rather than differences in price that account for the difference in adoption rates"; however it would make sense to assume that behaviour change is affected by the complexity (or simplicity) of the tariff design.

This is because **people have a limited mental bandwidth** [18]; **it is important not to underestimate what complex means, and to be aware of how quickly comprehension can drop off**. For example, as the ECA [5] notes, some customers find it too complicated to have to monitor the time each day, and be mindful of their usage accordingly; they may not even remember the time of the peak (and another layer of complexity is added if there is more than one peak time per day, or if peak charging only happens seasonally). The Opower website [a] notes that "Customers on time-of-use (TOU) rate plans do not know the hours that are most expensive, and do not know where to find basic rate plan information" (though does not cite evidence for this).

Given the behavioural barriers identified in this report, we believe the evidence suggests that:

- It will be better for the peak time to remain consistent all year round, as it then allows the behaviour to become a habit. This is much less cognitively taxing than if the desired behaviour keeps changing.
- Ideally all retailers in the same geographic area would use the same pricing windows to minimise confusion. As a general rule, the more consistent the price structures used by retailers are, the easier it will be for customers to understand (though we also note the need for competition may override this).
- It seems likely that most customers' responses to the tariff will be disproportionately influenced by the impact of the first few months they are on it. This will be more difficult if the monetary savings fluctuate throughout the year (for example if there were to be a summer peak price, a winter peak price, and a 'rest of year' price). From a behavioural response perspective it may be advantageous to shift people to the tariff during a period where the benefits of the behaviour (in this case the cost differential) is greatest, to motivate them to make the behaviour a habit.

[a] <https://www.oracle.com/industries/utilities/products/opower-demand-flexibility/#rc30p2>

Applying a behavioural model

In considering the barriers and motivators to behaviour change, SEC Newgate notes that the COM-B model is a relevant and useful framework through which to look at the current evidence base. This model is based on the idea that a behaviour happens when people have the **capability, opportunity** and **motivation** to do it. The motivators and barriers identified through this research can be categorised using this model to help understand how to increase the likelihood of long-term behaviour change. In a simple way, it helps to show that there is no one single factor that will effect change, but rather a combination of factors and a need for interventions tailored to specific groups.

<p>Capability</p> <p><i>Whether an individual has the knowledge, skills and abilities to engage in a behaviour. Two broad categories (1) psychological and (2) physical.</i></p> <p>Consumers feel they do not have sufficient understanding of energy/bill structures to take action.</p> <p>Consumers feel that some appliances will need to be used at peak times, e.g. for heating and cooling, or that they will not be able to use them at off peak times (e.g. due to not being at home).</p>	<p>Opportunity</p> <p><i>External factors that make execution of a behavior possible. Opportunity also includes two categories: (1) environmental and (2) social.</i></p> <p>The opportunity to change behaviour is impacted by differences in factors including home ownerships status, control over energy-related decisions and the ability to afford assistive smart technologies/systems.</p>	<p>Motivation</p> <p><i>Internal processes that energise and direct behaviour, including (1) automatic responses (emotions, desires,, etc.) and (2) reflective processes (plans, beliefs, etc.)</i></p> <p>Reflective motivation - people are not confident that they can perform the behaviour correctly (i.e., use their appliances at off peak times), and this also requires the creation of new habits to replace old ones.</p> <p>Automatic motivation - people generally have negative emotional reactions (resistance) to change</p>
<p>Factors increasing perceived psychological capability:</p> <ul style="list-style-type: none"> • Understanding information provided by energy suppliers and about energy consumption • Having the digital skills required to use energy apps <p>Factors increasing perceived physical capability:</p> <ul style="list-style-type: none"> • Ability to install assistive technology(home-owner, living in a house, more financial resources, etc.) 	<p>Factors increasing environmental opportunity:</p> <ul style="list-style-type: none"> • Having technological appliances / systems to aid load shifting • Lifestyle/stage changes (e.g. moving homes) <p>Factors increasing social opportunity:</p> <ul style="list-style-type: none"> • Positive experiences from friends and family 	<p>Factors increasing reflective motivation:</p> <ul style="list-style-type: none"> • Having a prosocial attitude and wanting to do the right thing (e.g. for the community or environment) • Awareness that switching can save money • Awareness of ease of behaviour change • Trust in suppliers <p>Factors increasing automatic motivation:</p> <ul style="list-style-type: none"> • Positive experience of switching in other markets/contexts • Immediate rewards or incentives

The model above includes factors that have been identified through this research review (in black) and others from SEC Newgate's own view (in blue).

**Which customer groups are thought
to be more and less able to respond?**

Considering those most at risk

There is a high degree of concern within the industry about those who are unable or less able to respond to TOU pricing.

It's important to note first of all that **being unable or less able to respond does not necessarily mean being negatively impacted by TOU pricing; but it is nonetheless important to understand who these people are, how they might be impacted, and how they can be supported.** These groups are listed on the following page.

We'd like to note upfront that:

- there are many overlapping socio-demographic factors at play here (e.g. renters are more likely to also be lower income, for example) and that the reasons for each person's more limited ability (or inability) to respond may be multi-faceted. In addition, we must acknowledge that not everyone within each of these categories is the same, and that in every case some individuals will be more able and willing to shift their behaviour than others.
- customers who experience vulnerability aren't a distinct group; people may move in and out of vulnerability throughout their lifetime. The RACE for 2030 report [21] points out that "vulnerability... [affects] a large proportion of Australians at some point in their lives because of illness, loss, natural disaster, bereavement or other life events".

While **at-risk customer groups can be identified now and pre-emptively targeted** (noting that many stakeholders stress the need for tailored communication rather than a one-size-fits-all approach), **there is also a strong argument for ongoing monitoring post-TOU tariff introduction, to understand who is being impacted - followed by targeted research to understand why this is and how to help them.** We note in particular the comment by RACE for 2030 [21] that it is important to consider how certain household members may be endangered as a result of shifting load to reduce energy bills. This concern was also raised by a stakeholder who noted their experience of customers experiencing vulnerability (particular those who are elderly or with a medical condition) compromising their health for cost saving, choosing not to use heating or cooling even when it was necessary.

Reasons why customers may be less able to respond

Numerous customer groups have been identified as less likely to respond to TOU tariffs (and therefore potentially at greater risk of being negatively impacted), based either on research conducted to date or the experiences of stakeholders interviewed.

Overall, **the principal reasons we identified during the review process for being less able to respond are:**

- **Inability to shift behaviour** (e.g. due to medical needs or not being at home in off-peak times; the RACE for 2030 [21] report also notes that apartment dwellers may have reduced ability to shift load due to smaller water tanks);
- **More limited awareness of how to shift behaviour** (e.g. due to lower education, or lack of access to technologies such as Home Energy Management Systems (HEMS) [23*; 21];
- **Limited/no capacity to make changes to the home** (e.g. renters, who typically need a landlord's permission and/or financial investment);
- **Lack of access to technology** such as monitoring devices or appliances with timers (e.g. low-income households). This includes the fact that **some current tools rely on users having internet access and speaking English** [21]. It is widely accepted in the literature and by stakeholders that those without financial and technological means, many of whom are customers experiencing vulnerability, will be unable to access the same benefits and potential to react to complex pricing. One report also noted the looming problem of an energy cost divide based on income and home ownership, created by access to technology driven solutions [4].

In 2017, QUT/CitySmart [20] created a segmentation of Australian households based on several factors including how they gather information (passive or active) and make decisions (top-down or shared), which summarises the specific barriers to and potential value propositions for TOU tariffs. This gives a little more insight into the different barriers affecting different people: for example, behaviours that involve too much effort and/or that need to be monitored, and solutions that don't consider 'all of us', are barriers to the uptake of TOU tariffs for the 'Flock of Geese' segment.

While solar and batteries are not facilitators of behaviour change (in terms of people moving energy use off-peak), they can facilitate people needing to draw less on the grid at peak times, and so are relevant to discuss here. We note that low-income customers (as well as people in apartments and renters) may also be less able to access solar/batteries which might save them money during peak times. This is also true of energy-efficiency measures such as insulation.

*From Tariff Reform Working Group - Workshop 3 Discussion Summary

Customer groups more and less able to respond*

Less able to respond (in no specific order):

- Low-income households
- Those with low education
- Single parents
- Larger households
- The elderly
- Households with disabled persons in the home, or persons with a chronic illness, especially those reliant on energy (e.g. Life Support customers**, with doctor-issued medical equipment such as a dialysis machine)
- Aboriginal and Torres Strait Islander people***
- Culturally and Linguistically Diverse (CALD) groups****
- Renters
- Apartment or townhouse dwellers
- Those living in public housing (stakeholder interview)

***We must credit the RACE for 2030 CRC report [21] for providing a lot of information on this. Unless otherwise noted with a citation number, all points on this page are from that report.**

**NB Life Support customers in particular were noted by one stakeholder as a group that it is very important to single out for consideration; they may be small in number but their risk of being disproportionately impacted is high given their expected inability to shift load.

***One stakeholder noted a potential knowledge gap in terms of any particular cultural issues re TOU energy

****Reports refer to non-English speaking; stakeholder interviews also made mention of those with limited English or English as a second language, and potentially differing cultural experiences with or attitudes to energy

More able to respond

- Having higher education [i]
- People who are home during the day
- Using more electricity [i]
- Home owners (*not explicitly stated in reports, but noted as opposed to renters who are identified as having greater difficulty*)
- EV owners [19]

Business customers

- Among businesses, those high energy users who do not keep standard (i.e. 9-5) business hours, such as hospitality and health care, were identified as needing more support to take up TOU pricing. A report from Business NSW [17] found that more than half of surveyed businesses felt they would not be able to take actions to change their usage for any value of incentive (while 9% of businesses believed it would be easy to shift electricity use, and 39% are unsure or said it would depend the price/value of the incentive payment). The report does not include data on which business types fall into each category though some hypotheses can be drawn.
- In addition, business consumers have more positive attitudes towards smart appliances and technology and are more interested in automating energy usage, have higher levels of technology adoption, and are more likely to be gaining more value from using them [15].

[i] Currie, G. T. (2020). *ToU Tariff Effect on Domestic Electricity Patterns- Australian Case Study*. Technology and Economics of Smart Grids and Sustainable Energy, vol. 5

How do we best prepare people for the mandatory introduction of cost-reflective tariffs? Is it better to introduce cost-reflective tariffs via a transition period, or all in one go?

Overall support for transitional pricing was mixed

What might a transitional arrangement look like?

Year 1 - A smart meter is installed and the household has access to their usage data. They will remain on their current tariff unless they choose to move.

Year 2 - The household moves to a transitional TOU tariff, which has peak and off-peak charging but with a smaller differential than the full TOU tariff.

Year 3 - The household moves to the full TOU tariff.

The literature review yielded little information regarding the benefits or drawbacks to customers of if the TOU tariff is introduced by the retailer via a transition period, and views received via stakeholder interviews were mixed. There are two lenses through which this might be considered - what will be most effective in changing behaviour? And, what is the fair and right thing to do?

Reasons given for opposition to transition period

- Some stakeholders note that retailers may not want to pass on an interim tariff, especially if the price differentials (between peak and off-peak) are small, so it would serve no practical purpose
- Some stakeholders note that if this tariff has the potential to benefit most people and provide savings then there should be no real need to ease them into it

Reasons given for support for transition period

- It will allow people time to adjust, while minimising penalties - in fact to an extent this could be considered as a social licence issue:
 - Time to understand the shift to TOU and the benefits of changing behaviour (or drawbacks of not doing so)
 - Time to look at their own data and consider how they might adjust;
- It would give customers time to make investments in energy-saving appliances or energy efficiency, particularly around heating and cooling (though noting that their ability to make effective changes will also be dependent on education and cost)
- It was also noted that this will allow time for government policy changes that may help people to benefit (notably in terms of solar installation or energy-efficiency policy around rental properties)

We are aware that the ECA's recent qualitative research [5] shows that many general customers preferred **network charges to be passed on at the same rate year on year, rather than gradually increasing, viewing small increases as more manageable than a large change (although small business and customers experiencing financial vulnerability preferred to 'rip the band-aid off', as they felt seeing costs gradually ramp up would be anxiety-provoking; they would rather a one-off big change if costs over the following years are more predictable). However, this is a different question to that of tariff reform, and it is not clear that the findings can be extrapolated to TOU tariffs, especially since the latter includes a behaviour change element and potential investments in energy-saving or smart devices.*

Important considerations if a transitional approach is taken

We note that the intention of a transitional price (as described in Year 2 on the previous page) is not necessarily to drive a change in behaviour, but rather to assist with educating people on TOU pricing. Nonetheless there are some points to bear in mind when thinking about how the transitional approach will affect customers.

1. Some of the points listed on the previous page in support of the transitional approach will only apply if the retailer passes on the transitional pricing, and/or if the household is aware of the change in tariff structure and that a further change is coming. We note that retailers may be reluctant to pass on the pricing if they feel that it will cause complexity or confusion for customers, or pushback from them – or due to practical reasons from their own side such as implications for their IT systems – and that there may be a need for further discussion with them on this issue.
2. Given the already-noted need for simplicity in tariff structures, it will also be important (as noted by stakeholders) that it is only the actual pricing which changes through the transition, and not the times of the peak (i.e. not shifting the peak time year on year, or during the year). While we note that shifting the times might be inherently more cost-reflective, there is also a need to strike the right balance that avoids customer confusion and decreases engagement.
3. It will depend on the exact amount of the transitional price signal (i.e. the difference between peak and off-peak) as to whether it is significant enough to motivate change in Year 2 (noting again that this is not necessarily the desired intention).
4. There is no public evidence uncovered in this review as to whether two pricing signals (transitional in Year 2 and full in Year 3) will have the same effect on behaviour change, or a different effect, from one single signal. Looking at the evidence from Ofgem [18] as described on page 15 – that the size of a price signal makes little difference to behavioural responses – we could hypothesise that if there were a response to the initial (transitional) price signal (assuming that the increments are significant enough, as noted in point 3 above), we would not also expect a second significant response upon the move to full TOU pricing. But we cannot say based on available evidence whether this will stimulate more or less response overall.

How do we best prepare people for the mandatory introduction of cost-reflective tariffs? What types of messages, information and resources will help people change behaviour?

Information provision is critical

This section sets out key insights from the literature and the outcomes of a behavioural audit of existing communications resources (see page 9 for an explanation of this) about what builds customer comfort with TOU tariffs. Where relevant we also note stakeholder perspectives on areas they feel should be explored further.

Overall analysis suggests:

- The **education provided to customers about TOU tariffs will directly impact the level of support for these tariffs and willingness to change behaviour** [see 24].
- There are **significant opportunities to improve existing approaches to future communications** by leveraging several key behavioural science principles to encourage the adoption of cost-reflective tariffs.
- **But this does not mean that the more information we provide, the greater the acceptance and change in usage will be** [3] due to the risk of cognitive overload - as such particular focus needs to be given to the specific content and wording of the information (as well as consideration of other tools beyond education - see orange box on page 5).

In terms of current collateral, our behavioural audit found that while resources differ in how they present the information, there is a lot of similarity in the content presented. Resources range from simple to detailed webpages that contain factsheets, videos and/or visual charts explaining cost-reflective pricing and the different pricing periods. The various plans available to consumers are sometimes included. Information for solar consumers, EV owners and business consumers are limited. None of the resources reviewed appeared to have anything specifically aimed at customer groups experiencing vulnerability.

Framing will be critical - customers have many other questions about energy

- Endeavour Energy's [Customer Panel Report \[a\]](https://yoursay.endeavourenergy.com.au/your-power-your-say-your-future/news_feed/see-where-the-customer-panel-landed-on-the-key-issues) shows energy customers are keen to know what they can do to reduce their electricity bills, and for most, also their emissions. Many have questions on various topics including how they can get subsidised access to solar panels and battery systems or access to community batteries, or in learning more about home energy management systems or selling energy back into the grid. They don't particularly want to learn about the electricity supply chain and the role different organisations like networks and retailers play. In this context customers will place considerable value on access to information they can trust that answers questions like these.

[a] https://yoursay.endeavourenergy.com.au/your-power-your-say-your-future/news_feed/see-where-the-customer-panel-landed-on-the-key-issues

Ten guidance points on collateral

Keep language simple to convey meaning without complexity

Alongside a simple summary, provide access to more detailed, tailored information to meet the needs of different customers

Provide a clear rationale for change

Normalise change in timing of energy consumption and explain that 'people like you' are benefiting

Provide behavioural prescription - be very clear on what specific behaviours are effective

Use 'prosocial' message framing

Emphasise losses rather than gains

The importance of trusted independent information sources

Solar customers will need targeted communications too

Energy efficiency information will be another highly beneficial tool for consumers seeking to reduce peak costs

Ten guidance points on collateral

1. Keep language simple to convey meaning without complexity

- As a general rule, behavioural science recommends simplicity in all communication by using straightforward and jargon-free language, as people are averse to complexity [i].
- Key messages about the introduction of cost-reflective pricing should be short and simple. A large amount of context puts cognitive strain on the reader and primes them to 'switch off,' which may mean they skim and miss important information.
- Stakeholders also emphasised the importance of language used by the industry; terms such as 'tariffs', 'network tariffs', 'retail price', 'pricing' and 'pricing structures' need to be clearly defined and used in consistent ways.
- Research shows CALD consumers prefer receiving communications in their first language [10; 11].

2. Alongside a simple summary, provide access to more detailed, tailored information to meet the needs of different customers

- Customers prefer to receive tailored information, advice and solutions that are relevant to them personally [21 [ii]].
- The diversity or heterogeneity of customers is mentioned in various literature (e.g. ECA [5]) and emphasised by stakeholders. While key messages need to be clear and simple, it is important to find a balance between information and energy literacy, and ensure that extra detail is available for those segments who are motivated to know and/or do more.
- Stakeholders interviewed also emphasised the need for tailored communications for groups identified as at risk of (or known to be experiencing) negative impact.
- Looking at existing collateral, we note that Wattever's [a] use of a drop-down menu for state-based information represents a good example of simplifying information. Unlike other resources which present information for all states at once, a drop-down menu avoids overwhelming consumers and ensures they only need to interact with relevant information.

[i] Alter, A. L., & Oppenheimer, D. M. (2006). *Predicting short-term stock fluctuations by using processing fluency*. PNAS, vol. 103.

[ii] ECA & Forethought. (2019). *Future Energy Vision Consumer Expectations Research - Household Findings Report*.

[a] <https://wattever.com.au/time-of-use-periods-electricity-network/>

Ten guidance points on collateral (cont'd)

3. Provide a clear rationale for change

- Research shows that people accept change more readily when there is a clear and credible rationale that they understand and it helps build trust and reduce scepticism [iii].
- Few of the resources reviewed provide a clear reason why TOU tariffs exist, but one that did was prepared by [Essential Energy \[b\]](#).

4. Normalise change in timing of energy consumption and explain that 'people like you' are benefiting

- There is evidence that consumers respond to messages that normalise new behaviours such as shifting the time of energy consumption, leveraging social norms and we note that this is not currently utilised by most resources. One exception is [Canstar Blue \[c\]](#). Posing the question 'Are you one of many Australians who [...]' and attaching this to ideal behaviours (using the dishwasher late at night, washing clothes on weekends) challenges the idea that people aren't already doing this behaviour, and normalises switching to off-peak periods.
- Stakeholders representing customers facing vulnerability also noted the importance of those people being able to see themselves in the examples to give confidence that it can work for people like them (e.g. a case study of a person with a disability giving an explainer from a person with a disability's point of view).

5. Provide behavioural prescription - be very clear on what specific behaviours are effective

- Various studies show that consumers are interested in receiving more information about simple behaviour changes that can help them significantly reduce their energy consumption and save money with time-of-use pricing [15], with a clear link between behaviour and its impact on bills [21[i]]. This needs to include behaviours and investments that will work for different lifestyles and incomes, and messages targeted at solar owners.
- Stakeholders cite a lot of confusion and misperception about what actions are more or less effective or expensive, leading people to make the wrong choices. A stakeholder who represents customers facing vulnerability spoke about a client they had who would turn their fridge off to reduce electricity usage, not realising that it took more energy to cool it back down again once it was turned on. Clear and accurate information is needed to help consumers make the right choices (including, critically, in the transitional phase), to upskill them to do the right things in the right way.
- This sort of information was lacking in most of the collateral we reviewed and appears to be an opportunity.

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[iv] ECA & Forethought. (2019). *Future Energy Vision Consumer Expectations Research - Household Findings Report*.

[b] <https://www.essentialenergy.com.au/at-home/time-of-use>

[c] <https://www.canstarblue.com.au/electricity/time-of-use-tariff/>

Ten guidance points on collateral (cont'd)

6. Use 'prosocial' message framing

- As noted, there is strong evidence of the effectiveness of messaging that promotes environmental, community, health benefits in addition to potential financial benefits. Some stakeholders suggest it will be important to frame the introduction of cost-reflective pricing as about fairness.
- One resource that has incorporated this is [Synergy \[d\]](#), which uses language such as 'your electricity decisions count' and 'you can also help to support a more stable electricity system' to build a sense of shared responsibility.

7. Emphasise losses rather than gains

- As people feel losses more than equal-sized gains, making losses more salient is likely to encourage action as people are more motivated to avoid losses than to gain something. It is therefore more effective to use loss framing messages that emphasise financial losses as a result of using electricity during peak periods (such as "You are currently losing \$XX per month by using your dishwasher during peak periods") as opposed to messages that emphasise financial gains from using electricity during off-peak periods [v].

8. The importance of trusted independent information sources

- Trust serves as an important decision-making heuristic for people, especially when presented with complex information. This means that people make a judgement of how trustworthy the source of information is, as a shortcut to make quick decisions. It is therefore important to ensure messages stem from a source perceived as credible, competent, accountable and acting in good faith [14].
- While stakeholders noted the importance of both the network and retailer's role in educating consumers and providing information, many also identified need for a trusted independent source to deliver recommendations and advice, and (if relevant) aid comparisons of service packages (e.g. CSIRO [13], IPART [13], AER).

[d] <https://www.synergy.net.au/Blog/2022/09/What-is-time-of-use-electricity-tariff>

[v] Bager, S., & Mundaca, L. (2017). *Making 'Smart Meters' smarter? Insights from a behavioural economics pilot field experiment in Copenhagen, Denmark*. Energy Research & social Science, vol. 28.

Ten guidance points on collateral (cont'd)

9. Solar customers will need targeted communications too

- It will be important to clearly communicate the rationale for introduction of solar export tariffs (and for the broader industry to communicate removal of rebates and subsidies if relevant) to those people who invested in solar. Stakeholder interviews conducted for this review, and Endeavour Energy's Customer Panel members [e], noted that households and businesses invested in solar based on specific assumptions that financial incentives and policy settings would remain fixed and/or because it was "the right thing to do" - and as such may feel blindsided or resentful about the changes. As noted on page 16, the environmental benefits of supporting the growth of solar, that it is a fair approach balancing the needs of solar and non-solar customers, and that it benefits Australia's future and will incentivise batteries were all considered reasons to feel positive about the tariff [16].
- Solar owners will also need prescriptive information on what they can do now... for example, will batteries now become better value as an investment or should they move their solar panels to a west-facing position?

10. Energy efficiency information will be another highly beneficial tool for consumers seeking to reduce peak costs

- As noted, many customers' key concern with TOU pricing relates to the feasibility (and health/comfort) impacts of shifting heating and cooling usage outside of the peak - and this can be a particular challenge if one's property is highly energy-inefficient. Improving energy-efficiency in the home is likely to enable people to maintain comfortable temperatures during peak pricing periods without needing to use as much electricity.
- SEC Newgate's latest Mood of the Nation research conducted in November 2022 also shows that improving the energy efficiency of homes and businesses tops the list of energy-related actions that Australians support
- Any information provided would need to take into account different types of housing stock, renters vs owners, and different budgets - and could include information about any current government schemes to facilitate access to energy-efficient upgrades.

[e] https://yoursay.endeavourenergy.com.au/your-power-your-say-your-future/news_feed/see-where-the-customer-panel-landed-on-the-key-issues

A behavioural experiment on TOU collateral

In 2019, the Commission for Regulation of Utilities (Ireland) mandated 'Time-Of-Use Primers – that is, one-page information sheets sent by energy providers to all households with a smart meter, which explain what (static) TOU tariffs are, how they work, and their potential benefits for the consumer. The goal of this initiative was to enhance consumer understanding and encourage engagement with the tariffs.

In a study conducted by Barjakova and colleagues [1], a set of 8 different primers were tested looking to understand the impact on the framing of benefits, format of content and impact of visual tools to aid comprehension and adoption.

The results suggested that:

- Monetary benefits were the primary benefit communicated that customers recalled, but those who were first primed with environmental benefits had a higher positive sentiment (creating a complimentary effect between the two).
- Younger participants became more positive about TOU tariffs when the environmental benefits were emphasised and more inclined to opt for a TOU tariff over other tariffs.
- Visual display of a 24-hour clock for explaining tariffs actually lowered comprehension of tariffs, whereas a plain table with key times and definitions had the strongest recall and comprehension.
- These findings were subsequently supported by Belton & Lunn [2] who identified that visualisations of the hourly breakdown of tariffs had a negative impact on the ability of customers understand tariffs key attributes, when compared to a standard definition table.

We note that this study offered consumers the ability to opt-in to a TOU tariff, with options to choose from; however there are still some applicable findings to anyone seeking to communicate about TOU tariffs. **But more importantly, we feel this indicates the opportunity for the energy sector to conduct a similar study here tailored to its own specific market and tariff structure (we note that such trials may already be taking place at a commercial level with findings not publicly available).**

Figure 1. Benefits experimental manipulations.

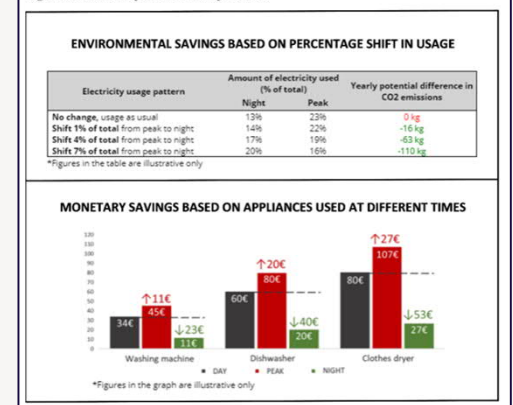
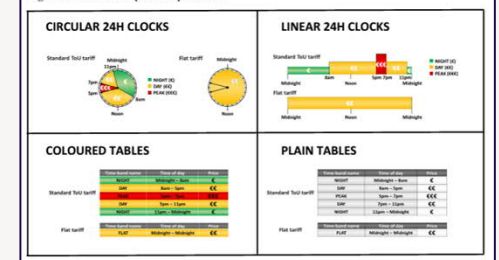


Figure 2. Tariff example manipulations.



Resources to leverage - SMUD

One specific resource that appears likely to be effective is the [Sacramento Municipal Utility District's \[a\]](https://www.smud.org/en/Rate-Information/Time-of-Day-rates/Time-of-Day-5-8pm-Rate) (SMUD) time-of-day (TOD) webpage, and we have featured it here since it may not be familiar to Australian audiences.

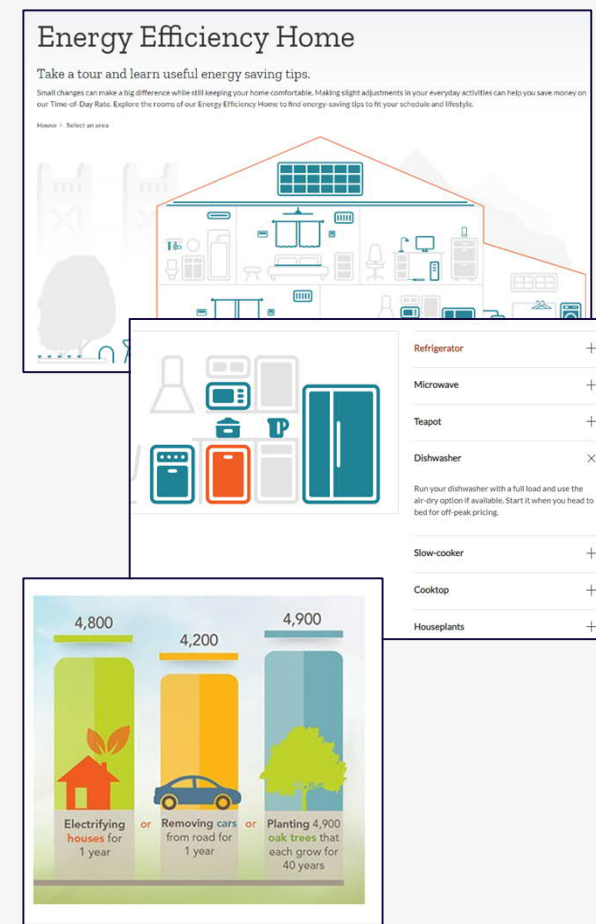
Communications are generally simple, brief and presented in a user-friendly manner, and the importance of time-of-day rates for the community and environment are noted (though briefly). There are external links to further information and useful tools, a [Cost Estimator \[b\]](https://www.smud.org/en/Rate-Information/Time-of-Day-rates/Time-of-Day-5-8pm-Rate/Time-of-Day-Cost-Estimator) and an [Energy Efficiency Home \[c\]](https://www.smud.org/en/Rate-Information/Time-of-Day-rates/Time-of-Day-5-8pm-Rate/Energy-Efficiency-Home). Both tools present information through 'rooms' (e.g. kitchen, laundry, etc.), which users can navigate through and select the appliances they are interested in receiving more information about.

The Cost Estimator allows users to calculate the estimated daily cost of household items across different time periods, which meets consumers' desire for a deeper understanding of the impact of specific appliances on energy bills and how behavioural changes translates to bill changes.

The Energy Efficiency Home provides general energy-saving tips. 'Easy, no-cost tips' (general energy-saving behaviours and TOD-specific behaviours) and 'TOD savings tips' are also provided on the main webpage. Making the desired behaviour simple is important when building and sustaining new habits, and providing multiple, simple ways of changing behaviour allows consumers to choose the behaviours that are relevant and suitable for them. Providing general energy-efficiency tips may also help to address perceptions that heating/cooling behaviours can't be shifted. Tips such as turning the thermostat up by 2 degrees or closing the blinds/windows during summer, for example, shows consumers that small modifications they can make to avoid having the appliances running at full blast during peak periods.

Case studies are also identified as an appealing resource to consumers. SMUD provides this through videos demonstrating how others (a family and an individual) have made TOD work for their lifestyle. Both case studies describe the changes they have made and the minimal impact on their lifestyle. Using examples of similar others appeals to similarity bias and utilises social proof, which may help address/correct the false beliefs consumers currently have about the impact of cost-reflective tariffs on their lifestyle.

SMUD also provides a statistic of the positive environmental impact of TOD pricing, accompanied by a simple visual chart, which appeals to prosocial and value-based motivations.



Resources to leverage - the Behavioural Insights Toolkit

One useful resource to consider when designing communications around cost-reflective tariffs is the [The Behavioural Insights Toolkit \[a\]](https://bitoolkit.userstcp.org/checklist.html), an online tool that applies behavioural insights to energy policy. This was developed by The Users TCP (run by the International Energy Agency) and The Behaviouralist to help policymakers, civil servants or professionals apply insights from behavioural science to demand-side energy policy; it was funded by organisations in Canada, Switzerland, Ireland, the UK and the Netherlands, and appears relevant for people working in this space across many markets. It is based on a literature review of academic papers and reports, consultations with behavioural policy experts, and extensive testing with policy practitioners.

This toolkit provides checklists with recommendations that can be applied to increase the likelihood that a policy or program will achieve its intended outcomes.

Most of the checklists are applicable to cost-reflective tariffs and would be important to consider. Based on the barriers to adopting cost-reflective tariffs identified, as well as limitations of current energy-related information and resources, we would like to draw particular attention to the following checklists for consideration when designing communications around cost-reflective tariffs:

- [Build and sustain new habits \[b\]](https://bitoolkit.userstcp.org/ck/c1-build-and-sustain-new-habits.html)
- [Increase public acceptance \[c\]](https://bitoolkit.userstcp.org/ck/c4-increase-public-acceptance.html)
- [Address knowledge and ability gaps \[d\]](https://bitoolkit.userstcp.org/ck/c8-address-knowledge-and-ability-gaps.html)
- [Communicate effectively \[e\]](https://bitoolkit.userstcp.org/ck/c5-communicate-effectively.html)

[a] <https://bitoolkit.userstcp.org/checklist.html>

[b] <https://bitoolkit.userstcp.org/ck/c1-build-and-sustain-new-habits.html>

[c] <https://bitoolkit.userstcp.org/ck/c4-increase-public-acceptance.html>

[d] <https://bitoolkit.userstcp.org/ck/c8-address-knowledge-and-ability-gaps.html>

[e] <https://bitoolkit.userstcp.org/ck/c5-communicate-effectively.html>



The image shows a screenshot of the 'Checklist browser' interface. The browser lists several checklists: 'Build and sustain new habits', 'Address knowledge and ability gaps', 'Use positive social influence', and 'Simplify administrative processes'. The 'Build and sustain new habits' checklist is selected and expanded, showing its title, a brief description, and a list of strategies: 'Remove infrastructural and financial barriers', 'Use timely prompts and reminders to trigger behaviours', 'Make the desired behaviour(s) simple', and 'Reward the new behaviour'. The 'Reward the new behaviour' strategy is highlighted with a black background and white text.

Checklist browser

Demand-side energy policies can fall short of achieving desired outcomes if they are not designed around realistic assumptions of human psychology and behaviour.

There are common behavioural pitfalls that demand-side energy policies or programmes face. The following checklists provide actionable insights and case studies to help you address these challenges and design behaviourally informed policies and programmes right from the start.

Build and sustain new habits

Existing habits often make it difficult for citizens to adopt a green technology, change their energy consumption patterns, or switch to a new mode of transport. Learn what your policy or programme can do to help citizens form new habits and sustain them over time.

Address knowledge and ability gaps

Sometimes, people might simply lack the knowledge, skill, or ability to engage in the desired behaviour. Explore behavioural techniques that can help you address such knowledge and ability gaps.

Use positive social influence

Citizens or businesses might not engage in the desired behaviour because they incorrectly believe that others do not do so either. Learn how to use positive social influence to improve compliance with your policy or programme.

Simplify administrative processes

Checklist: Build and Sustain New Habits

Existing habits often make it difficult for citizens to adopt a green technology, change their energy consumption patterns, or switch to a new mode of transport.

We provide a number of strategies below that you can use to help individuals form new habits and sustain them over time.

Remove infrastructural and financial barriers

Use timely prompts and reminders to trigger behaviours

Make the desired behaviour(s) simple

Reward the new behaviour

Reward individuals when they perform the desired behaviour to reinforce the habit and increase the chance that they will perform it again in the future. Rewards can take different forms, but the most common rewards are monetary incentives and social incentives.

Monetary incentives can be effective at encouraging people to first take up a new behaviour. Examples of monetary rewards include discount vouchers, lottery draws, and direct cash bonuses. However, effects of monetary incentives may not persist over time, especially if the rewards are discontinued.

General resources to assist with embedding behavioural insights into communications

The NSW Government's Behavioural Insights Unit has drafted a checklist on 'Using Behavioural Insights to Optimise Communications' which asks five key questions:

- Is there a clear call to action?
- Is the call to action salient and relevant?
- Is the campaign targeted to the relevant people?
- Are audiences receiving your message or campaign materials at the time or location where they're deciding or required to act?
- Is the sludge or 'hassle factor' to complete the desired behaviour as small as possible?

It also provides tools (the COM-B model and EAST framework) to assist in embedding behavioural insights and principles into communications, and identifies a number of resources which exist to assist organisations in driving behaviour change through communications. These include:

- [Behavioural approach to strategic communications \[a\]](#) (UK Government Communication Service)
- [Principles of behavioural change communications \[b\]](#) (UK Government Communication Service)
- [IN CASE framework \[c\]](#) (UK Government Communication Service)
- [MINDSPACE framework \[d\]](#) (UK Cabinet Office)
- [RESPONSE Checklist & playbook \[e\]](#) (London School of Economics)
- [INSPIRE framework \[f\]](#) (Monash University)
- [Principles for effective communications and behaviour change \[g\]](#) (World Health Organisation)

Thirdly, it provides tips on reducing sludge on various channels to improve customer experience, including:

- [Websites;](#)
- [Forms;](#)
- [Letters & emails;](#)
- [Text messages;](#)
- [Phone & face-to-face;](#)
- [Apps](#)

[a] <https://gcs.civilservice.gov.uk/publications/strategic-communications-a-behaviouralapproach/>

[b] <https://gcs.civilservice.gov.uk/publications/the-principles-of-behaviour-changecommunications/>

[c] <https://gcs.civilservice.gov.uk/publications/in-case-a-behavioural-approach-toanticipating-unintended-consequences>

[d] <https://www.bi.team/wp-content/uploads/2015/07/MINDSPACE.pdf>

[e] <https://www.local.gov.uk/sites/default/files/documents/Response%20Playbook%20Final.pdf>

[f] https://e-tarjome.com/storage/panel/fileuploads/2019-05-07/1557225623_E11068-etarjome.pdf

[g] <https://www.who.int/about/communications/actionable/behaviour-change>

[h] https://www.nsw.gov.au/sites/default/files/2022-08/BIA_Reducing_Sludge_on_Websites.pdf

[i] https://www.nsw.gov.au/sites/default/files/2022-08/BIA_Reducing_Sludge_in_Forms.pdf

[j] https://www.nsw.gov.au/sites/default/files/2022-08/BIA_Reducing_Sludge_in_Letters_Emails.pdf

[k] https://www.nsw.gov.au/sites/default/files/2022-08/BIA_Reducing_Sludge_in_Text_Messages.pdf

[l] https://www.nsw.gov.au/sites/default/files/2022-08/BIA_Reducing_Sludge_on_the_Phone_and_Face_to_Face.pdf

[m] https://www.nsw.gov.au/sites/default/files/2022-08/BIA_Reducing_Sludge_in_Apps.pdf

Innovative initiatives

Outside of standard TOU tariffs, other creative and innovative ways that incorporate different methods of encouraging behaviour change were also identified through this review.

Initiatives that reward or gamify desirable behaviour

Two particularly interesting initiatives take a 'carrot rather than stick' approach i.e. rewarding usage off-peak or the minimisation of usage on-peak, rather than penalising peak usage.

- Electric Kiwi in New Zealand provides an '**Hour of Power**' to its consumers, in which consumers can choose any hour during off-peak time slots where their energy use is free of charge. This has resulted in consumers saving 9.9% on their bills, and some people saving more than 30%.
- In Australia, Origin hosts one '**SpikeHour**' a week where its users are challenged to use as little energy as possible during that one peak hour. If consumers beat their forecast (based on previous average use), users earn points that can be redeemed as PayPal cash or gift cards.
- For more examples of various programs in Australia encouraging behaviour change during peak periods and the effectiveness of these, refer to pages 185-187; 198 of 'Rewarding flexible demand: Customer friendly cost reflective tariffs and incentives' [21].

Initiatives that leverage competition / comparison with peers

Highlighting how others behave draws consumers' attention to current social norms, which can increase the salience and attractiveness of adopting energy-efficient behaviour as a result of TOU tariffs.

- In California, an experiment conducted by Opower (prior to its acquisition by Oracle) reduced peak demand by 2-4% without financial rewards or penalties (mentioned in [18]). Instead, consumers received automated telephone calls one day before a peak event and asked to reduce their electricity use between a particular time period. During these calls, an element of competition was created between their house and houses of a similar type, e.g. 'You were the [xx]th most efficient on the last peak day. Move up the ranks by [...].' We note that this was not intended to drive sustained behaviour change, but it is nonetheless an interesting example of how the element of competition and comparison (social nudges) can play in encouraging peak demand reduction.

What are the knowledge gaps that require further exploration?

Knowledge gaps

Key Question	Finding	Gaps
Assuming TOU tariffs are mandated, what are the barriers that will need to be overcome to encourage customers to change the timing of their energy consumption? What motivations can be leveraged?	Good and consistent evidence of barriers and motivators	<ul style="list-style-type: none"> Some stakeholders noted a lack of research on how consumers are currently responding to TOU tariffs in Australia specifically and what factors affect this. Reports also note a lack of understanding as to <i>why</i> some people respond to TOU tariff signals and some don't in the real world. People say they want more information about their own specific energy use in order to be able to change their behaviour, but it is unclear how much and what kind of information they need. It's also unclear how well information on the energy consumption within a household, provided to consumers via an app or portal, is being understood in the current form(s) in which it is being presented (there is some evidence that people don't understand it – but we note this may vary by app), and there is a lack of evidence to show the extent to which these mechanisms are actually changing behaviour. Likewise, live feedback loops have been developed, but the effectiveness of them is unknown.
Which customer groups are thought to be more and less able to respond?	Good evidence – but less on how to help them	<ul style="list-style-type: none"> There is lack of evidence on what targeted initiatives will help the groups who are either at risk of being, or will be, adversely affected by TOU tariffs. This should include particular focus on Life Support customers and the steps that need to be taken to ameliorate the impact on them, as a potential safety issue. Ongoing testing/monitoring of consumer comprehension and decision-making post-tariff introduction will be useful to further inform targeted interventions.

Knowledge gaps (cont'd)

Key Question	Level of evidence	Gaps
Is it better to introduce cost-reflective tariffs via a transition period, or all in one go?	Very little evidence	<ul style="list-style-type: none"> The benefits of allowing people time to invest and understand TOU tariffs and the necessary behaviour changes make rational sense, but it is unclear how effective a two-step (transitional) pricing will be in changing behaviour vs no transitional pricing.
What types of messages, information and resources will help people change behaviour?	Some evidence	<ul style="list-style-type: none"> Inconsistent language confuses customers, but it is unclear which specific terminology is preferred when receiving information TOU tariffs (e.g. 'tariff', 'pricing', 'charges'). There is some evidence on the effectiveness of different messaging to explain the introduction of TOU tariffs, the rationale, and how to change - but not the specific hierarchy of importance and emphasis in this market. We know that prosocial messaging and emphasising losses (from usage during the peak) works, for example, but it is important to test more specific types of messaging and language to build an effective narrative, and for these to potentially be used across the industry for consistency. Testing the effectiveness of messages around fairness and equity should also be considered. This applies to introduction of TOU pricing and solar export tariffs. Consider behavioural experiments (such as A/B testing) on different types of collateral (cf. the primer study by ESRI mentioned on page 39, using collateral tailored to the NSW situation and audiences). It is not clear who are the best (most trusted) sources to provide information on TOU tariffs, and how this should be provided. This isn't a one-size-fits-all approach, as different groups trust different sources.

Other sectors to consider

- Demand management is an issue across a number of sectors, and many interesting initiatives have been developed. Stakeholders noted industries such as:
 - Rideshare (e.g. Uber pricing)
 - Flights
 - Public transport
 - Water e.g. Target 155, drought pricing
- This review has not been able to extensively cover all these areas
- While the energy sector can look for inspiration here, it is also important to note that some are looking to drive behaviour change on a one-off basis, while only water can be said to be seeking sustained behaviour change



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A number of the documents we reviewed have been consolidated analyses of other research, or have featured a consolidated analysis of existing findings as part of the background/context for their own studies. This reference list contains only the resources we actually reviewed, but we would also like to acknowledge and thank the authors of the original source material for their work where it may be indirectly referenced within this report. Where possible, citations in Roman numerals on the relevant pages of this report reference the original source material.

Document summaries: 2022 (Aus)

Title	Source	Aims & Method	Overarching takeout	Link
Consumer Pricing Preferences Report (2022)	ECA	<p>Aim: to understand how consumers are managing their energy bills and to gauge their interest and preferences in different types of retail electricity pricing structures (including TOU tariffs) that may provide them with more control over the size of their bills.</p> <p>Method: focus groups with three types of consumers (engaged, experiencing financial vulnerability, small business).</p>	<p>The benefits of TOU tariffs were seen by consumers as ability to reduce bills, and encouraging more mindful consumption, while downsides are complexity, and ability to change. Appeal was higher where the time allotment for peak/off-peak fitted with their current usage patterns.</p> <p>ECA stresses the need to accommodate diversity within the system.</p>	https://energyconsumersaustralia.com.au/wp-content/uploads/Final-Report-ECA-Tariff-and-bill-preferences_-Dec-2022_LG.pdf
DER Implementation plan - Customer Insights Collaboration Release 1 (2022)	Energy Security Board	<p>Aim: to leverage existing evidence, co-design customer insights with stakeholders, and generate insights that would support the ongoing development of reforms across the DER implementation Plan and Post-2025 reforms. Report obtained insights on barriers and enablers to customer reward for flexible DER and energy use.</p> <p>Method: Workshops with energy sector stakeholders and a review of latest research and trials undertaken for Release One.</p>	<p>We need to meet customers 'where they are at'. Stakeholders are aware of consumer diversity and the extent of the barriers and enablers among certain groups. Pricing signals are not demonstrably effective in motivating consumer actions in line with system interests. Incentives need to be paired with information, tools and support to help consumers respond.</p>	https://www.datocms-assets.com/32572/1658964111-esb-cic-knowledge-share-report-final_250722.pdf
Industry perspectives on electricity tariffs and retail pricing (2022)	ECA	<p>Aim: to get a better understanding of the 'state of play' of current, new and forthcoming retail prices and network tariffs. One of the objectives was to get a better understanding of any barriers to success or barriers to implementing desired price or tariff structures/bundles.</p> <p>Method: Conducted interviews with retailers and networks</p>	<p>Customers do not receive sufficient explanation for demand charge retail rates. There is an opportunity for networks and retailers to work together more (e.g. networks who default customers to cost-reflective tariffs providing a bill history so that retailers can assess the impact of default and alternative tariffs)</p>	https://energyconsumersaustralia.com.au/wp-content/uploads/Industry-Perspectives-on-Electricity-Tariffs-and-Retail-Pricing-Final-Report.pdf
Energy Consumer Behaviour Survey: Household Topline Results Oct 2022	ECA	<p>Aim: to provide Australia's richest picture of the attitudes and activity of residential and small business energy consumers - how they use power and associated energy technology, their attitudes to new technology, and how they see the future of energy for themselves and their communities</p> <p>Method: Online surveys, n=2384 household; n=515 small business</p>	<p>The majority of energy consumers do not think it is easy to switch behaviours to off-peak periods. Heating/cooling behaviours are particularly difficult to switch.</p>	https://ecss.energyconsumersaustralia.com.au/wp-content/uploads/2022/10/ECBS-W13a-Oct22-Household-Toplines.pdf
Tariff Reform Working Group - various documents (2022) <i>There are 16 documents at time of writing, reflecting stakeholder insights and views. Where relevant we've cited the specific document in a footnote.</i>	Talking Energy	<p>Aim: As part of Talking Energy's work in shaping network tariffs of the future and move to more cost-reflective network tariffs</p> <p>Method: Workshop discussions consisting of selected customer representatives</p>	<p>Important to educate consumers but find the right balance between simple vs complex information. Concern that those without financial means and/or technological systems/smart appliances (customers facing vulnerability) will not be able to change their usage behaviours.</p>	Tariff Reform Working Group Talking Energy

Document summaries: 2021-20 (Aus)

Title	Source	Aims & Method	Overarching takeout	Link
Energy Consumer Behaviour Survey - The Results (2021)	ECA	Aims and Method as per 2022 document - <i>Included for an additional piece of information that wasn't measured in the 2022 report - comfort with fully automated appliances</i>	Behavioural responses to tariffs depend on engagement/understanding of their energy plan/structure and being able to see results of actions in near real-time. It is also important to provide consumers with the option of overriding automated appliances.	https://energyconsumer.saustralia.com.au/news/energy-consumer-behaviour-survey-the-insights
AEMC Metering Review (2021)	AEMC	<p>Aim: to provide a robust evidence base of small customers' experiences and attitudes towards smart meters, including current use, issues and roadblocks involved.</p> <p>Method: 14 focus groups with residential and small business customers across the NEM, with and without a smart meter (n=101), and a 15-minute online quant survey with n=1948 residential and business customers across the NEM.</p>	<p>Uncertainty over ability to change behaviour and take advantage of a new tariff structure. People want more information on simple behaviour changes. Consumers want evidence that they can actually save money. Access to an app or portal that shows usage in real time translated into dollars is a particularly attractive appeal of smart meters.</p> <p>Business customers are more interested in, and feel positively towards, saving money on electricity by changing behaviour and using technology to automate energy usage.</p>	https://www.aemc.gov.au/sites/default/files/documents/newgate_research_full_research_report_-_metering_review.pdf
Community attitudes to rooftop solar and the AEMC's proposed reforms (2021)	ECA	<p>Aim: to understand contextual attitudes to energy, solar and the electricity network; awareness, knowledge and attitudes to the AEMC's proposed reforms; acceptability and preferences for various tariff options</p> <p>Method: 8 focus groups with Solar PV customers and considerers, and a quant survey with n=2012 participants who were electricity decision-makers for their household</p>	Prosocial reasons (environmental benefits, Australia's future, perception of a fair approach) are the main reasons consumers feel positive to the proposed reforms. Customers facing vulnerability less likely to feel positive about the reforms. Level of detail of tariff information has varying impacts; can either create more confusion/questions or calm the situation.	https://energyconsumer.saustralia.com.au/wp-content/uploads/Report-on-Community-Attitudes-to-Rooftop-Solar-and-the-AEMC-Proposed-Reforms..pdf
Rewarding flexible demand: Customer friendly cost reflective tariffs and incentives (2021)	Reliable Affordable Clean Energy for 2030 Cooperative Research Centre (RACE for 2030 CRC)	<p>Aim: to describe a pathway of research projects and industry development activities to increase flexibility of household electricity use and generation through cost-reflective incentives.</p> <p>Method: literature review of academic literature and industry reports.</p>	Poor understanding, trust and engagement with the energy market creates several barriers for the uptake of cost-reflective tariffs. Financial incentives are not sufficient to drive behaviour change; there are multiple motivations involved and these should be combined. Many feel that shifting appliance usage will be difficult, particularly heating/cooling.	https://issuu.com/racefor2030/docs/h4_oa_final_report_17.11.21
How people respond to complexity in public transport fares (2020)	Infrastructure Victoria	<p>Aim: to understand how people respond to complexity in public transport fares.</p> <p>Method: literature review, online experiment (n=2011) to test how public transport users respond to different levels of complexity in transport fares, and user consultation with public transport users.</p>	Comprehension declines as complexity increases, and people typically do not choose the best price when faced with more complex pricing structures. Most users could handle two elements in a fare, but three appeared to be a tipping point. Most users are 'intuitors' when it comes to decision-making and fare structures should therefore be designed to include the basic rules of thumb this group follows.	https://www.infrastructurevictoria.com.au/wp-content/uploads/2020/09/Transport-Fares-and-Complexity-SGS-and-BIT-Report.pdf

Document summaries: 2019-16 (Aus)

Title	Source	Aims & Method	Overarching takeout	Link
NSW Business Infrastructure Survey: Energy.(2019)	NSW Business Chamber (now Business NSW)	Aim: to gather evidence-based insight into emerging challenges faced by the business community in NSW with regards to energy Method: Quantitative survey with a range of businesses	9% of businesses said it would be easy to shift electricity use throughout the day, and over half said they would not be able to shift demand. 39% either didn't know or said it would depend on the size of the incentive.	N/A
Electricity Network Transformation Roadmap (2017)	Energy Networks Australia & CSIRO	Aim: to provide detailed milestones and actions to guide an efficient and timely transformation over the 2017-27 decade. Method: consolidates 19 reports summarising expert analyses, scenario analyses and quantitative modelling to 2050.	Suggests that most people will benefit from cost-reflective pricing (lower energy bills, less difference between those who are/can and those who aren't/cannot invest in DER).	https://www.energynetworks.com.au/resources/reports/entr-final-report/
Behavioural approaches to electricity pricing (2017)	QUT & CitySmart	Aim: to provide a robust evidence base of small customers' experiences and attitudes towards smart meters, including current use, issues and roadblocks involved. Method: 14 focus groups with residential and small business customers across the NEM, with and without a smart meter (n=101) and a 15-minute online quant survey with n=1948 residential and business customers across the NEM.	Uncertainty over ability to change behaviour and take advantage of a new tariff structure. Consumers want evidence that they can actually save money and information on simple behaviour changes. Access to an app or portal that shows usage in real time translated into dollars a particularly attractive appeal of smart meters. Business customers more interested in/feel positively towards changing behaviour and using technology to automate energy use.	N/A
Cost-reflective electricity pricing: Consumer preferences and Perceptions (2016)	Energy Policy (Journal)	Aim: to explore consumer interest and responses to the concept of cost-reflective pricing within the context of current understanding of electricity pricing structures and delivery mechanisms, perceptions of energy affordability, and attitudes towards energy security. Method: six focus groups with residential electricity consumers in Melbourne, Sydney and Brisbane (total n=53 participants).	Information to increase understanding is key - but people do not trust retailers to provide information about tariff structure changes, preferring independent sources. Greater support in Melbourne, mixed in Sydney, lowest in Brisbane.	https://www.sciencedirect.com/science/article/abs/pii/S0301421516302117?fr=RR-2&ref=pdf_download&rr=76f586420d7d5a7f
Time of use tariff insights (2016)	Western Power	Aim: to explore the level of support for TOU tariffs. Objectives included understanding current behaviour patterns, preferences in TOU tariff options, trade-offs customers are willing to make under a TOU tariff, and current thinking around smart meters and preferences in monitoring electricity usage. Method: Online survey (n=500) and 3 workshops (n=26).	Customers are most concerned about the impact on their lifestyle, preferring convenience over saving money. Cost-reflective tariffs are viewed as penalising those who feel they cannot change their behaviour without a noticeable impact on their lifestyle. Education is key in increasing support.	https://westernpower-website.azurewebsites.net/about/reports-publications/time-of-use-tariff-insights/

Document summaries: 2016-14 (Aus)

Title	Source	Aims & Method	Overarching takeout	Link
Experiences of energy consumption for CALD communities (2016)	ECC NSW	<p>Aim: to understand CALD consumers' and businesses experiences and concerns.</p> <p>Method: survey of 145 households in 10 different languages, 83 small businesses in 8 languages across Vic and NSW.</p>	CALD communities prefer communication in their first language. There is a perception that CALD residential and small business customers are not being engaged by the industry and are not being provided with information about how to reduce energy use.	N/A
Uptake and usage of cost-reflective electricity pricing: Insights from psychology and behavioural economics (2015)	Renewable and Sustainable Energy Reviews (Journal)	<p>Aim: to draw on evidence-based insights from the behavioural sciences to examine how the uptake and usage of cost-reflective pricing might be improved.</p> <p>Method: Combines empirical evidence with behavioural insights.</p>	Many cognitive biases and psychological anomalies are likely to influence customer responses to electricity pricing, including aversion to complexity/cognitive and choice overload, trust as a decision heuristic, status quo bias, loss aversion, risk aversion.	https://www.sciencedirect.com/science/article/pii/S1364032115015270
Australian consumers' likely response to cost-reflective electricity pricing (2015)	CSIRO	<p>Aim: to obtain a realistic and accurate picture of the likely response of Australian consumers to the introduction of cost-reflective pricing.</p> <p>Method: Nationwide randomised field experiment (n=1181). 6x3 factorial experiment (tariff type x risk scenario) with 18 different pricing plans in total (six types of tariffs, three different risk scenarios). Each participant randomly received one offer via a survey.</p>	Concludes that education and behaviour change focus alone will not drive the desired change and that automation will also be required	https://publications.csiro.au/rpr/download?pid=csiro:EP152667&dsid=DS2
Energy Smart Ethnic Small Businesses (2014)	ECC NSW	<p>Aim: to directly support small ethno-specific businesses in managing their energy use.</p> <p>Method: on-site assessment visits to 627 businesses in Sydney and 211 businesses in Melbourne across a range of business sectors and languages backgrounds. Provided businesses with assessment reports (outlining how to improve energy efficiency) and businesses completed three surveys (prior to assessment, when they received the report, and at a follow-up).</p>	Preference for communication in their own language, and half only preferred communications in their own language. There are significant knowledge gaps about ways to reduce electricity use in their businesses, with cost an important barrier to change (followed by time or staff resources to undertake the changes). Receiving knowledge through face-to-face methods (onsite expert assessment process) is preferred and also likely to increase recall of information.	N/A

Document summaries: International insights

Title	Source	Aims & Method	Overarching takeout	Link
Efficient ways of communicating time-of-use electricity tariffs in Ireland: Plain and simple (2021)	Economic and Social Research Institute (Ireland)	<p>Aim: to develop and pre-test different versions of the prototype TOU primer, using insights from behavioural science to create effective communication. To design communications to enhance consumers' comprehension of TOU tariffs and help them to make better decisions.</p> <p>Method: experiment with n=1300 consumers, who viewed a manipulated primer on TOU tariffs and completed a series of tasks.</p>	<p>Monetary benefits were the primary benefit communicated that customers recalled, but those who were first primed with environmental benefits had a higher positive sentiment (creating a complimentary effect between the two).</p> <p>Most customers chose a ToU tariff over other tariffs, even if this was not the cheapest tariff given their self-reported data. This may point to a potential overconfidence bias effect, indicating people expect their behaviour to change to fit in with the benefits of ToU tariffs.</p>	https://www.esri.ie/system/files/publications/WP704_0.pdf
Smart choices? An experimental study of smart meters and time-of-use tariffs in Ireland (2020)	Energy Policy (Ireland)	<p>Aim: to employ experimental behavioural science to investigate how consumers make tariff choices and how to optimise this, in the context of the Irish market where there are multiple options available to them</p> <p>Method: n=145 consumers were given information about smart meters and TOU tariffs, with their attitudes, comprehension and decisions measured through a sequence of experimental tasks</p>	Customers often chose simpler tariffs (e.g. flat rate, or static TOU tariff) rather than the dynamic ToU tariff, even if it wasn't in their best financial interest. This points to customers favouring easier to understand systems or systems that feel similar to their existing technology, and highlights a need to provide them with additional information that explains why adoption is in their best interests, rather than just providing information on how the tariff works.	https://www.esri.ie/system/files/publications/JA202015.pdf
Energy consumers' experiences and perceptions of smart 'Time of Use' tariffs (2020)	Ofgem (UK)	<p>Aim: to understand consumer experiences of and preferences for TOU tariffs among those currently enrolled, and the needs attitudes and preferences of those not enrolled, in order to inform future policy decision making</p> <p>Method: 38 in-depth interviews conducted with TOU and non-TOU tariff customers.</p>	Current TOU customers are typically highly engaged. Satisfaction is high among EV owners but non-owners feel less able to capitalise on off-peak periods. For non-users, appeal is mixed due to uncertainty around how they could save during off-peak periods - except for EV owners where main barrier was awareness. Appeal increased if tariffs are less complex, static, and framed in terms of rewards.	https://www.ofgem.gov.uk/publications/energy-consumers-experiences-and-perceptions-smart-time-use-tariffs
Default effects and follow-on behavior: Evidence from an electricity pricing program (2020)	Energy Institute at Haas (USA)	<p>Aim: to analyse the use of a default manipulation in time-varying electricity pricing and observe how the default manipulation impacts customers' subsequent electricity consumption.</p> <p>Method: analysed a large-scale randomised controlled trial where one group was given the option to opt-in to time-varying pricing while another group was defaulted into the program but allowed to opt-out.</p>	Default options have a demonstrated effect on decision-making in numerous areas. In this case only 20% opted into new pricing programs while 90% stayed on the default. The study also looked at follow-on behaviour and found that consumers do adjust consumption in response to time-varying prices even if they did not actively select them.	https://haas.berkeley.edu/wp-content/uploads/WP280.pdf
Applying behavioural insights to forward looking charging reform (2019)	Ofgem (UK)	<p>Aim: to answer 4 main research questions, including what small users need to help them be demand flexible and the factors that affect whether small users respond to price signals.</p> <p>Method: literature review.</p>	Evidence shows that consumers do adjust their electricity consumption patterns in response to TOU tariffs (with some caveats). There are large, but mostly unexplained, variations in responsiveness to TOU tariffs across consumers. Strategies to help consumers be demand-flexible include automation, simplicity in design and user experience, information about price and tips on how to respond.	https://www.ofgem.gov.uk/sites/default/files/docs/2019/12/behavioural_insights_and_forward_looking_charging_report_0.pdf

Stakeholders consulted in this review

Energy sector

- Australian Energy Regulator (AER) – Dale Johansen (Director, Network Pricing), Jordan Tasker (Director, Consumer Projects), Andrew Ley (Acting Director, Consumer Projects) & Matthew Katzen (Project Officer)
- Energy Networks Australia (ENA) – Lucy Moon (Head of Regulation)
- Energy Consumers Australia (ECA) – Brian Spak (Director, Energy System Transition) & Caroline Valente (Senior Policy Associate)
- Elisabeth Ross Consulting – Elisabeth Ross* (Director)
- The Customer Advocate – Mike Swanston* (Principal Consultant)
- Energy Queensland – Bob Telford (Network Pricing Manager)

Consumer representatives

- PIAC – Jan Kucic-Riker (Policy Officer, Energy and Water Consumers' Advocacy Program), Douglas McCloskey* (Program Director, Energy and Water Consumers' Advocacy Program) & Craig Memery (Senior Advisor, Energy)
- Business NSW – Simon Moore* (Policy Manager, Infrastructure)
- Tenants Union – Leo Patterson Ross (Chief Executive Officer)
- Wesley Mission – Vanessa Emery (Financial Counsellor)

Behavioural insights

- Ofgem Behavioural Insights Unit – Cameron Belton (Senior Behavioural Scientist)
- Behavioural Insights Team – Ravi Dutta-Powell (Senior Advisor)

Academia

- Frontier Economics – Deirdre Rose (Economist)
- University of Queensland – Neil Horrocks (Director of the Centre for Energy Data Innovation)

Additional thanks

We would like to thank Energy Charter industry working group members Louisa Frome from Horizon Power and Kenny Mizzi from Energy Queensland who shared their experience of tariff development and trials and directed us to valuable resources cited in this study.

We would also like to thank Iain Maitland* of the NSW Ethnic Communities Council.

**Asterisk indicates those who are current members of Endeavour Energy's Regulatory Reference Group*

Collateral reviewed*

Source	Jurisdiction	Link
Ausgrid	Aus	https://www.ausgrid.com.au/Your-energy-use/Meters/Time-of-use-pricing
Canstar Blue	Aus	https://www.canstarblue.com.au/electricity/time-of-use-tariff/
ActewAGL	Aus	https://www.actewagl.com.au/plans-and-connections/pricing-information/pricing-plans-for-home-smart-meters
Essential Energy	Aus	https://www.essentialenergy.com.au/at-home/time-of-use
Solar Quotes	Aus	https://www.solarquotes.com.au/blog/time-of-use-pricing/
myenergi	Aus	https://myenergi.com.au/time-of-use-tariffs/
wattever	Aus	https://wattever.com.au/time-of-use-periods-electricity-network/
Synergy	Aus	https://www.synergy.net.au/Blog/2022/09/What-is-time-of-use-electricity-tariff
The Green Age	UK	https://www.thegreenage.co.uk/tech/time-of-use-tariffs/
energy saving trust	UK	https://energysavingtrust.org.uk/time-use-tariffs-all-you-need-know/
Bionic	UK	https://bionic.co.uk/business-energy/guides/time-of-use-tariffs/
Gocompare	UK	https://www.gocompare.com/gas-and-electricity/guide/time-of-use-tariffs/
Smart Energy GB	UK	https://www.smartenergygb.org/smart-meter-benefits/benefits-for-you/time-of-use-tariffs-the-benefits
SMUD	USA	Time-of-Day (5-8 p.m.) Rate (smud.org)

**January 2023, noting websites may have changed since then*

Resources identified but not reviewed

NB We are aware that Italy and Spain are considered comparable markets and reports from there may also yield valuable learnings; our review focussed only on English-language sources.

Publicly available documents:

- Business NSW. (2022). *Unfinished Business – putting small business energy policy back on the table*. Business NSW. Retrieved from https://www.businessnsw.com/content/dam/nswbc/businessnsw/submissions/November_2022_ECA_Survey_Report_low-res.pdf
- Conway, L., & Prentice, D – Infrastructure Victoria. (2019). *How much do households respond to electricity prices? Evidence from Australia and abroad*. Infrastructure Victoria, Technical Paper No. 1/19. Retrieved from <https://www.infrastructurevictoria.com.au/wp-content/uploads/2019/09/Infrastructure-Victoria-technical-paper-How-much-do-households-respond-to-electricity-prices-September-2019.pdf>
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- Ofgem. (2019). *What works in increasing engagement in energy tariff choices*. Ofgem. Retrieved from <https://www.ofgem.gov.uk/publications/what-works-increasing-engagement-energy-tariff-choices>
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- The Brattle Group & University College London. (2017). *The Value of Time of Use Tariffs in Great Britain*. Citizens Advice. Retrieved from <https://www.citizensadvice.org.uk/cymraeg/amdanom-ni/our-work/policy/policy-research-topics/energy-policy-research-and-consultation-responses/energy-policy-research/the-value-of-time-of-use-tariffs-in-great-britain/>
- ThinkPlace. (2018). *Demand response – Customer Insights Report*. ARENA. Retrieved from <https://arena.gov.au/assets/2018/08/demand-response-consumer-insights-report.pdf>

Journal articles:

- Emodi, N. V., Dwyer, S., Nagrath, K., & Alabi, J. (2022). *Electromobility in Australia: Tariff Design Structure and Consumer Preferences for Mobile Distributed Energy Storage*. Sustainability 2022, vol. 14. Retrieved from https://mdpi-res.com/sustainability/sustainability-14-06631/article_deploy/sustainability-14-06631-v3.pdf?version=1654608186
- Mayol, A., & Staropoli, C. (2021). *Giving consumers too many choices: a false good idea? A lab experiment on water and electricity tariffs*. European Journal of Law and Economics, vol. 51. Retrieved from <https://link.springer.com/article/10.1007/s10657-021-09694-6>
- Nicolson, M. L., Fell, M. J., & Huebner, G. M. (2018). *Consumer demand for time of use electricity tariffs: A systematized review of the empirical evidence*. Renewable and Sustainable Energy Reviews, vol. 97. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1364032118306257>

Other people/organisations recommended for stakeholder interviews/consultations include:

Mark Byrne – Total Environment Centre; Asha Ramzan – Sydney Community Forum; Dr Perry Sioshanshi – Menlo Economics; Emma Bacon – Sweltering Cities



Thank You

