

Trust building for collaborative win-win customer solutions  
(RACE for 2030 CRC - E1) – Case Study Analysis

*Curtin University Report*

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<b>Lead Chief Investigator</b>	Associate Professor Heap-Yih (John) Chong
<b>Co-Chief Investigator</b>	Dr Roberto Minunno
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## 1. Introduction

RACEfor2030 Opportunity Assessment E1: Trust building for collaborative win-win customer solutions seeks to explore customer goals and expectations for the energy sector. Furthermore, the Assessment investigates a broad spectrum of benefits of trust for both operators and customers, as well as tools for trust-building. Finally, the Assessment researches key insights, gaps and research opportunities that arise from an analysis of case studies and the literature.

### 1.1. Key customer

The focus of this research is customers' trust in the energy sector. Therefore, it is important to first differentiate between usual customers and those who are willing to adopt something, whether that is new technology, green power, and community energy. These key customers are early adopters, and represent a small portion of customers in some cases they are single digit numbers (i.e., 7% adopt green power versus 20% for non-adopters (Tabi, Hille, & Wüstenhagen, 2014)). Adopters place more trust in science (Tabi et al., 2014), this trust in companies and science could transfer to certain energy propositions such as the need to reduce carbon emissions due to climate change. However, a prominent portion of customer are non-adopters, and this group is difficult to change. To improve the participation, co-design and design led innovation is seen as the best method of engaging customers and better understanding their perspectives. Effective examples of participation, feedback and customer understanding within the energy sector can be seen via several case study examples available on: <https://www.theenergycharter.com.au/shared-learning-platform/>. Finally, social rewards can increase attitudinal participation and loyalty in the energy sector, although it has been proven that monetary rewards are effective mainly in improving the provision of customer feedback (see Gamma, 2016). However, energy needs and engagement with the energy sector changes based on life stage, with those in early adulthood experiencing 'bill shock', or being confused during their first interactions with retailers. Mature consumers compromise comfort to save money, seeking to limit energy usage (Energy Consumers Australia, 2020). Therefore, it is advised that energy operators willing to steer their clientele towards energy peak cut should expect better results when targeting older demographics (Przepiorka and Horne 2020).

### 1.2. RACE objectives

The Opportunity Assessment is aligned with RACEfor2030's objective of supporting operators in the energy sector in delivering secure and affordable energy in the Australian context. Relatedly, RACE's purpose is to promote innovation towards minimising greenhouse gas emissions and improve quality of life for all Australians.

## 2. Method

A case study method and a literature review were selected to address the focus of the Assessment. The mixed methodology unfolded in three main steps. First, some case studies mainly in Western Australia (refer to the details in Section 3) were nominated based on their relevance with the project aim and scope. Second, industry reports on the energy sector and security of the electricity market were investigated, particularly for the Finkel's report. This investigation informed an analytical approach employed to evaluate the literature and reports on the selected case studies. Third, some literature and reports were collected from search engines such as Scopus and Google Scholar. The keywords used to search literature and reports were the name of the case study and authors known for working around energy and trust, as well as keywords such as trust, energy operators, energy sector.

## 3. Case studies and key examples

Two main case studies were used in this analysis: WGV and ReNEW Nexus. WGV is a precinct in Fremantle, Western Australia, which includes five apartment buildings. Each apartment building was designed as a micro-grid system, as the buildings are completed with solar panels and a communal battery. The dwellers can purchase energy from the centralised battery and would pay less energy if they consume less (Breadsell et al. 2019, Breadsell and Morrison 2020). Therefore, the dwellers can be prosumers in the microgrid. ReNEW Nexus is a virtual power plant in operation in Fremantle, which connects owners of solar panels that can then share their surplus of energy among each other (Hansen et al. 2020).

Across the final report of this assessment, several minor examples were provided. These examples are reported here for reference.

### *3.1. Case example of trust conceptualisation*

Trust is a belief and a relationship between two parties. From the customer perspective, it is based on an expectation or belief from the perceived value, customer satisfaction and customer loyalty. Customers who trust the brand/business tend to choose the same brand/business in their repeat purchases or services. For example, most of the residents (70%) in the WGV case study chose to live there because of its low-carbon features.

Some customers are more predisposed to trust than others. Particularly, organisations are more likely to be trusted if they demonstrate competence, responsibility, openness and authenticity. On the other hand, the opposite of trust is distrust, which can be demonstrated via customers' lack of confidence and negative expectations.

### *3.2. Case example of trust journey map*

The customer journey of trust in the energy sector is like a typical life transition after finishing high school with options to travel or continue study, then work full time and have a family and a busy everyday life. In which, consumers are not paying for energy and have minimal awareness and/or engagement at the first stage of the energy journey. Then, the next stage is to think about energy providers and bills suddenly. The increased energy usage for children's comfort was a barrier to energy management. When the time goes by and consumers are wiser to search for options in saving money. Yet, at the end of journey (downsizing/retirement), this stage has less income and consumers are required to reduce the costs as much as possible, for example, only increase the use of energy when family members come to visit or stay (ECA Household Findings, 2019). Overall, this journey shows meaningful messages to different needs of consumers throughout the transitioning periods, which corresponding means/strategies should be developed to cater their needs at the right timing.

### *3.3. Case example of measuring trust*

A good case example for measuring trust can be referred to the Queensland Household Energy Survey (QHES, 2019) report, which it had captured over 4500 people who participated last year in the tenth year of the survey. The results show Queenslanders are continuing to adopt more energy efficient behaviours, with the biggest shift coming from the technology, not from individually motivated changes. The installation of rooftop solar PV is behind the shift. Below are the four main questions to measure trust and most of Queenslanders agreed with them, i.e., (a) these energy suppliers provide my household with a reliable energy supply, (b) if faced with a problem, I would trust these energy suppliers to do the right thing, (c) these energy suppliers give me a sense of security about my electricity supply, and (d) these energy suppliers are working to make electricity more affordable. Nevertheless, the findings also show that electricity affordability is still a challenge to energy suppliers in Queensland. Electricity bills are also the top household cost concerns among regional Queensland households.

### *3.4. Case example of a dataset of proxy indicators of trust*

The evidence of trust can be referred to ECA's annual measure to the energy industry. This can be tracked from the energy market that is working in their interests, satisfaction with value for money, bill stress levels and so on. Besides, retailers have very limited capacity to influence prices, but people treat them as though they set the prices. This misunderstanding is a source of distrust.

### *3.5. Case study: British gas – bill redesign*

British Gas is a good case example for achieving customer expectation and aspiration. The customer-focused approach was to redesign the bill from “demand for money” to a way of “saving money”, which made the bill simpler. It put the customers' needs as the heart of this redesign.

As a result, the customers' satisfaction has increased for the new bills as compared to the old bills. Moreover, the query calls have been reduced significantly. The new bills have also cut off unnecessary jargon. Overall, this reform has been well received in the EU and has been recognised as a “Best Practice” in bill design.

### *3.6. Case example of drivers of distrust or trust*

According to the Australian Energy Regulator (AER)'s annual State of the Energy Market Report in 2018, only 39 per cent of consumers trust the electricity retail market, while just 25 per cent feel that it works in their interests. The figures suggest that the energy market is now trusted less than telephone, internet, insurance, water and even banking services. The report finds that the record low levels of trust are largely driven by high power prices and a lack of transparency in the market, particularly from the billing perspective. Moreover, numerous instances of poor retailers' conducts are the key contributor to low levels of customer satisfaction and trust in energy retail.

One of the solutions to improve trust in the energy sector can be referred to the Energy Charter, which is a world-first initiative bringing together all parts of the electricity supply chain to provide more affordable and reliable energy to customers. This new charter has five main principles, namely, improving culture to put the customer first; improving energy affordability; improving sustainability; improving the customer experience and providing more support for vulnerable customers.

## *4. Analysis of benefits of trust for the energy sector*

### *4.1. Benefits for operators and customers*

Greenwashing is a common concern among customers, and in the energy sector, brand loyalty can alleviate the lack of trust that greenwashing has caused to energy operators that are willing to invest in green solutions (Guo, R. et al. 2017). In this context, high-trust in the socio-policy and technical systems is needed to support unpopular actions devoted to decrease the environmental impact of the energy sector, such as increased carbon prices (Rafaty 2018).

For operators in the energy sector, improving their clients' trust translates into several benefits. That is mainly a result of fluid relationships with their clients. That is because customers that trust their operators tend to be more relaxed about the complex operations that energy producers and retailers undertake. Also, trust between the energy operators and consumers decreased tensions in transactions and communications. When customers perceive that the technology is understood and is employed is working properly, they experience a tension-free relationship (Ransan-Cooper et al. 2020). Conversely, if the system in place is obscure to the customer or is lagging, customers experience friction with their operators. Finally, a frictionless relationship means that more customers will be driven by customers' satisfaction and word of mouth (Wilkinson et al. 2020).

When it comes to the economy of trust, it has been proved that the expectation that the provided energy is can deliver cheaper energy can increase the demand in that operator by 25%. This figure is related to the cost of energy only, not its provenance, being renewable or non-renewable resources (Wilkinson et al. 2020). At the same time, trust for the energy operator allows cheaper operations because benefit the client because it decreases the need for substitutes for trust, like legal remedies and close monitoring performance (Jones 2015). Relatedly, trust decreases anxiety and enables customers to feel secure delegating micro-management to the operators (Jones 2015).

Another benefit of trust in the energy operator is the willingness to be part of test and trials. Indeed, customers that trust their energy operator can be involved in trials of emerging technologies and applications (such as smart-meters, or peak management tools), providing a testbed for such technologies (Krishnamurti 2012, Ricci et al. 2010). These customers can help development and implementation of such technologies by providing feedback and concerns (Heiskanen and Matschoss, 2016). Such technologies can be enabled through blockchain, which, if explained well to the customers, further enhances their trust in the energy sector (Monroe J. 2020). Moreover, customers that trust their energy provider are more likely to engage in the development of applications in tandem with the operators. The ability of testing apps and management strategies is key for innovators in the energy sector (Heiskanen, Matschoss 2016). One noticeable technology that is largely missing in some energy contextes is the smart meter, which helps consumers and operators to increase transparency and operate the grid more efficiently. On the flip side, customers need to perceive the expertise of their operators. Otherwise, when individuals are not knowledgeable enough to make informed decisions, trust towards their energy operator decreases the perceived risk in, for example, grid stability and energy supplier reliability (Moyer and Song 2017).

#### *4.2. Benefits aligned with RACE's objectives*

Trust in the energy sector is beneficial towards RACE's objective analysed in Section 1.2. Conversely, distrust impacts willingness to participate in new energy innovations such as load control, with marketing communications or a 'trust-restoring message' needed to improve perceptions and willingness to participate in new energy programs (Stenner, 2017). It results that, once trusted, energy retailers have the faculty to influence their customers' behaviour. An example was recorded in Finkel's report (see Finkel et al. 2017, case study in box 6.2), in which the NSW retailer Mojo planned a strategy to limit the energy consumption during the most critical peak-hours (4-6 PM). In that period, the entire electricity grid was at risk of rolling blackout, due to the energy drainage attributed to air conditioning. Therefore Mojo, a company trusted by their clients, could persuade them to reduce their energy consumption during peak-hours for a small economic incentive (between AU\$25 and AU\$140). Figure 1 highlights the dramatic effect that this initiative had on the profile of the energy consumption for the tested day.

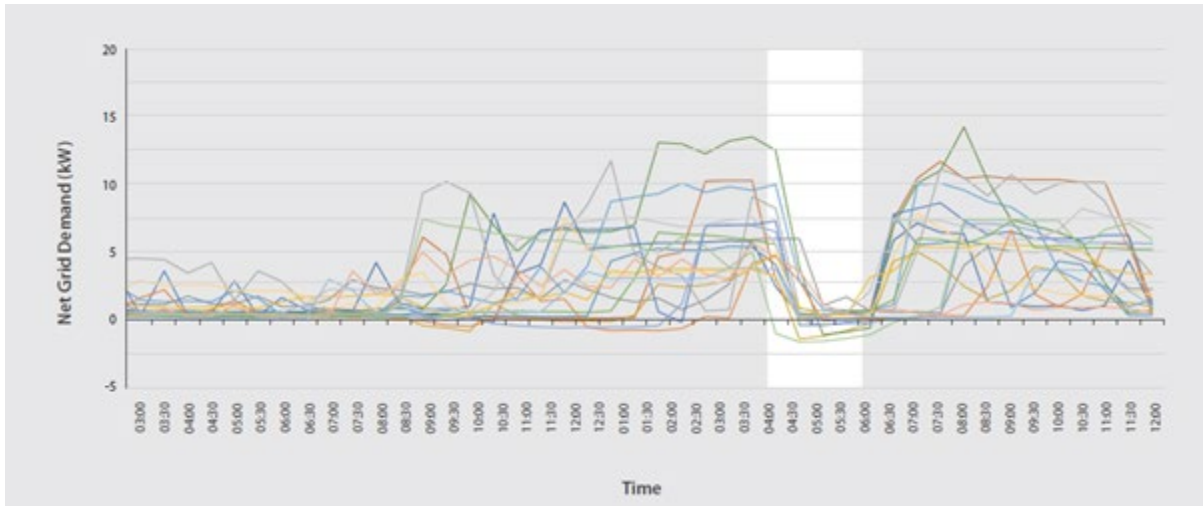


Figure 1 – Profile of the energy consumption (Net Grid Demand) during the tested day and peak-hour. Source: (Finkel et al. 2017)

Similarly, customers with smart-meters and the ability to read real-time data on their energy consumption, and those who also trust the energy operator, have shown that they are willing to compromise their comfort by decreasing their consumption during peak-hour by up to 38% (Shann et al. 2017). These technologies should be explained to the community through workshops. When implementing strategies and technologies towards renewable energy, energy operators are advised to run workshops to inform the community on the details and amounts of energy generated from solar PVs and on consequential cut of carbon emissions. Additionally, the operators must make clear the economic benefit to consumers that results from the adoption of solar energy to avoid confusion among the customers. In the RENEW Nexus trial it resulted that, although it was clear that using solar energy would have been beneficial for the environment, customers remained unsure about their personal economic benefit (Hansen et al. 2020).

Expectation in certain market sectors, such as the energy and low-carbon living, and trust in these sectors enable to generate more demand and interest from the community. It has been observed that 70% of the residents at WGV chose to live there because of its low-carbon features (Breadsell et al. 2019). Trust in the energy sector and its operation can, ultimately, lead to a shift in consumer behaviour. Such shift has been observed in the WGV case study where the users, aware of the environmental benefits of living in a precinct which fosters shared solar energy (Breadsell et al. 2019, Breadsell and Morrison 2020). Residents in the WGV precinct (which features solar panels in each dwelling) shifted their practices around clothes washing and drying, preferring to run these machines during the day. As a result, trusting the energy providers and their reliability when it comes to low-carbon practices influences customers to make eco-friendly decisions (Breadsell and Morrison 2020).

In the niche but fast evolving market of peer-to-peer energy sharing, a lesson learnt from the WGV and RENEW Nexus case studies is that users should be maintained informed of the complex energy sharing system. Energy distributors and retailers should, therefore, organize workshops and educational material for the community, to ensure that the final users understand how the system works and are therefore in charge of it. To corroborate this concept, it has been observed that users, once empowered with a complete understanding of the technology they were entitled to use, decided to manually change the distribution of their energy within their peers (Loveday et al. 2021).

It results that, improved trust in the energy sector allows (aligned with RACE objectives):

- To test new strategies to decrease peak hour consumption, and



- To transform users' behaviour towards a more sustainable one, albeit fostered by economic incentives.

#### *4.3. Link between COVID-19 and trust*

COVID-19 and a state of emergency affect the relationship between customer and energy operators. That is mainly because of economic concerns. It has been observed that a third of households and half of small businesses are concerned about their ability to pay for electricity bills, as their economies are endangered during the pandemic. In this context, 64% consumers are unsure whether they received sufficient information from their energy providers on how to decrease their consumption and bills (Energy Consumer Sentiment Survey December 2020).

### 5. Best and worst practices from non-energy industries

Some examples from the banking industry and other large businesses can provide insights on best and worst practices from industries operating in sectors unrelated to the energy sector.

#### *5.1. Through the Fire - Banking Industry recovery after crisis*

If we examine the banking industry in Australia during and immediately after the 'Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry' we can see evidence of damaged SLO. If an entity needs to repair its SLO, it is likely that the entity has failed to meet stakeholder expectations, and/or it has not been responsive to changing societal norms (Hurst, Johnston and Lane, 2020). For example, Commonwealth Bank of Australia's (CBA) broker relations and accreditation process was found to have conflicts of interest where brokers were not seen as acting in the best interest of borrowers (Commonwealth of Australia, 2018). CBA's chief executive Ian Narew was quoted as saying that the "the use of loan size linked with upfront and trailing commissions for third parties can lead to poor customer outcomes" (The Australian, 2018). This breakdown in SLO occurred for multiple banks as revelations of misconduct were aired in the royal commission's public hearings. Since this crisis, the banking sector has managed to recover its SLO through a variety of repair tactics. "Communication and engagement are crucial factors in determining the outcome of any repair strategies, where the entity needs to 'walk the talk', and thus show, tell, and deliver" (Hurst, Johnston and Lane, 2020, p. 6). For instance, CBA focused on delivering a more consumer-oriented value proposition. They now offer consumer-adapted investment learning programs, Bill Sense which predicts bill size giving consumers more control, Green Loan which helps eligible customers switch to solar and make their homes more energy efficient (CommBank, 2021)."

#### *5.2. Through some of the largest companies in US*

The companies who built their business model exclusively on customer-centric focus such as Amazon, Apple, Zappos, Netflix, and USAA, have set the benchmarks for markets across all trade sectors. Key to this business model is personalized and world-class service that allows them to take control over their bills, usage, and new programs to reduce energy usage and costs. Furthermore, safety and reliability in energy provision have been considered basics from the customers' point of view. A customer-centric mindset is the core element to drive a deeper and richer customer experience. Customers now are more critical about reduced energy usage and costs and want highly functional, easy-to-use digital platforms to interact with (Bansal, Burden, & Swartout, 2020). Although some US energy providers have invested in enhanced customer experience, they still are not par with these companies when comparing with the overall customer satisfaction and ease of use via enhanced digital customer experience.

### 6. Tools for trust-building in the energy sector



Customers are seeking digital empathy, transparency, and a bidirectional information flow, ensuring that the customer experience is personalised and provides greater added value than just receiving energy (Pinar et al., 2017).

According to National Electricity Market (NEM), getting back to basics in terms of increased security, future reliability, rewarding consumers, and lower emissions could influence building trust as they are the pillars of (a) orderly transition, (b) better system planning and (c) stronger governance (Finkel et al, 2017). Although governments have made commitments to strengthen these pillars via several objectives such as lower emissions future, the pathway is not so clear on how to get there. For example, although consumers have been long acknowledged as at the heart of the transition, not much attention has been paid to how we can best reward consumers for demand management and the power they generate through Distributed Energy Resources (DER). Finkel et al, (2017) further assert that how trust could be rebuilt using DER combined with improved energy efficiency toward reduced electricity bills (Wilkinson et al. 2020).

To build trust in the energy sector, consumers are seeking clarity and transparency from energy retailers. Two typical answers of surveyed Australians quoted (Energy Consumers Australia, 2020):

- “If energy companies were a little more open and transparent with the people - it would be easier to make a decision on who I'm going to use for power to save more money. Energy companies are making it harder for people to make a decision” – 62, Mature, South Australia
- “Retailers need to make sure they are honest and upfront. They need to be transparent with prices and stop bullsh\*\*ting people. The Telco's have had to be more transparent, and it has made for a better Telco experience for everyone. Energy providers need to follow suit so that people can compare apples with apples.” - 31, Early Adulthood, NSW

In these directions, data analysis and monitoring can build trust in the energy provider, and similarly, poor monitoring and data processing might create a lack of confidence, thereby endangering trust between customer and retailer. Participants in the RENEW Nexus case study, for example, were able to monitor their energy consumption and generation. This feature of the case study increased trust in the system. However, the technical system and data analysis were not working as the customer expected, resulting in a conflict with the energy operator (Hansen et al. 2020). Data must be displayed in a comprehensive and user-friendly manner, as customers might have distrust towards computer interfaces, when data is hard to understand (Pink et al 2018). Moreover, energy related information should be displayed using simple tables to facilitate the reading. Unsurprisingly, customers with lower energy literacy would understand the provided information less (Canfield et al. 2017). Therefore, allowing consumers to visualize their data on energy consumption and production might improve their trust in the provider (and overall energy system, in the case of an off-grid system). It results that a useful tool to increase trust is data visualization. Such a tool must be handled carefully, as it can backfire when it fails, generating concerns on private information leakage and overall unreliability and usefulness. Aligned with these notions, the Green Button initiative developed in the US provides a service to electricity users helping them to visualize their electricity consumption (Finkel et al. 2017).

When implementing renewable energy strategies and technologies, operators should inform their customers and provide them with environmental/economic saving. Such duality of information is a useful tool to build trust (Hansen et al. 2020).

## 7. Key insights

Some key insights can be drawn from the summarised benefits of trust (Table 1).

Table 1 - Benefits of trust: a customer value approach

Author/source	Stakeholder	Benefit of trust	Case studies	Customer value type - social benefit, functional benefit, altruistic benefit or emotional benefit?
Wilkinson, S., Hojckova, K., Eon, C., Morrison, G. M., & Sandén, B. (2020)	Residential, community and retailer	Increase the demand (new customers) by 25%, benefit for the retailer	RENeW Nexus	Functional benefit
Breadsell, J. K., Byrne, J. J., & Morrison, G. M. (2019)	Residential, community	70% of the residents at WGV chose to live there because of its low-carbon features	WGV	Environmental benefit
Breadsell, J. K., & Morrison, G. M. (2020).	Residential, community and retailer	Trusting the energy operators enables a shift towards low-carbon practices, influencing customers to make eco-friendly decisions.	WGV	Environmental benefit
Hansen, P., Morrison, G. M., Zaman, A., & Liu, X. (2020)	Residential, community, educators	Trust in educators and operators decreases customers' doubt when it comes to their personal economic benefit.	RENeW Nexus	Emotional
Ransan-Cooper, H., Lovell, H., Watson, P., Harwood, A., & Hann, V. (2020)	Residential	Decentralised energy generation and storage allows consumers to become prosumers. Trust enables the customers to feel positive emotions in response to these innovative technologies.	Trial on Bruny Island	Social, functional and environmental benefits
Finkel, A., Moses, K., Munro, C., Effeney, T., & O'Kane, M. (2017)	Policymaker, generator	Trust could be built using distributed energy resources combined with improved energy efficiency toward reduced electricity bills.	N/A	Functional benefits
Joshi, G. Y., Sheorey, P. A., & Gandhi, A. V. (2019)	Consumers	Low awareness and insufficient knowledge impact energy efficient investments	N/A	Functional
Strengers, Y., Nicholls, L., Glover, A., Arcari, P., & Martin, R. (2019)	Consumers	Collaboration between energy operators and other entities might help to build trust in the operator.	N/A	Social and functional benefits
Energy Consumer Sentiment Survey	Residential, community	<ul style="list-style-type: none"> <li>In comparison to younger consumers, older consumers can be steered towards more</li> </ul>	N/A	Emotional

(2020)		<p>sustainable trends, when they trust the energy operator.</p> <ul style="list-style-type: none"> <li>During a state of emergency such as the COVID-19 pandemic, trust can be enhanced by helping consumers to save in energy bills</li> </ul>		Emotional
Stenner, K., Frederiks, E. R., Hobman, E. V., & Cook, S. (2017)	Residential, retailer, network	To successfully deliver messages to consumers on improved management solutions (e.g., direct load control), the operator must be trusted.	N/A	Functional
Tabi, A., Hille, S. L., & Wüstenhagen, R. (2014)	Consumers	Trust in science and its applications in the energy sector helps towards adopting carbon emissions saving technologies	N/A	Altruistic
New, P. (2017)	Consumers	The language spoken in the energy sector is unappealing to customers, and to improve customers' trust, it needs to be switched towards a relationship terminology.	N/A	Social benefit
Pinar, H., Santos, R., Madrid, I., Velasco, C., Conde, J., Barrantes, M. E., Fernandez, J., & Roman, aCarolina. (2017)	Consumers and retailer	Consumers seek information in forums or social networks instead of contacting their energy retailer. This might highlight a lack of communication with the energy operators, a lack of trust and a need for digital empathy	N/A	Social benefit
Ndebele, T., Marsh, D., & Scarpa, R. (2019)	Consumers and retailer	Rewards programs, local ownership of suppliers, and length of call waiting times are factors that, beyond price, influence customers' choice or energy retailer	N/A	Functional benefit
Guo, R., Tao, L., Li, C. B., & Wang, T. (2017)	Consumers and retailer	Trust can alleviate the negative effect of greenwashing on trustworthy brands.	Chinese energy market	Functional benefit
Moyer, R. M., & Song, G. (2019)	Customers	When individuals are not knowledgeable enough to make informed decisions, trust towards their energy operator decreases the perceived risk in, for example, grid stability and energy supplier reliability.	N/A	Emotional benefit
Lwin, M. O., Wirtz, J., & Stanaland, A. J. S. (2016)	Customers	Privacy is one of clients' most valuable assets, and when privacy is at stakes, the clients will take extra measures to protect it - even when they trust the operators. However, trust can facilitate relationships with clients, when privacy and sensitive information are not involved.	N/A	Social benefit

- Trust enables a more efficient, smoother and more pleasant relationship with the energy operators.

- A benefit of trust is the ability to steer customers towards those practices that might be initially unwanted, but that also pay back in terms of reduced bills as well as decreased environmental issues.
- Trust can be used to test new technologies, apps and devices in the energy sector. Such feature is key when it comes to implement ground-breaking management (e.g., micro-grids), missing products (e.g., smart-meters), or strategies such as reduction of peak load.
- To keep up these trusted relationships, the energy operators should maintain the customers informed on needs, methods, outcomes and environmental benefits.
- Trusting the energy operators enables a shift towards low-carbon practices, influencing customers to make eco-friendly decisions.
- Indeed, customers that are especially aware of environmental issues, tend to trust their operators when they take action on climate change, however they also tend to demand a decreased cost of energy when renewable energy is employed. As a result, customers might be puzzled to discover that, in some instances, employing renewable energy does not translate into reduced costs.
- Therefore, educators are trusted to decrease customers' doubt when it comes to their personal economic benefit.
- In summary, trust can enhance customer satisfaction, value or feelings through:
  - Promoting new, user friendly technologies
  - Tackling climate change
  - Reward programs
  - Education on sustainable living

## 8. Emergent gaps and proposed research

In conclusion, three main research gaps can be identified on the benefit of trust for the energy sector:

- The present literature review did not identify studies that correlate large groups of customers divided in their segments and related interest on environmentally friendly practices.
  - Proposed research. Vertical studies on a wide sample of population to characterise how customers of different ages, social background and education level react when asked to embrace more environmentally friendly practices.
  - Contribution. Such study could provide strategies that could be formulated ad-hoc for different customer segments.
- Although case studies were analysed in this literature review, and they provided useful overview that addressed the questions of this OA, these case studies are still limited in size and tested technology. That is largely because case studies require practical and empirical test-beds, in which cutting-edge technology is tested in settings similar to living laboratories. Further, the inhabitants of the analysed case studies might be biased towards sustainable living and environmentally friendly practices. More comprehensive studies are required, where unbiased customers are prepared to share sensitive data regarding their home practices.
  - Proposed research. Empirical studies in which innovative technology is embedded in daily life of customers (either consumers or prosumers), recording their habits, their inclinations, and the way they interface with the technology studied. The number of customers should be large enough to create substantial statistics.
  - Contribution. This study can help energy operators to refine the proposed technology before it is launched into the market.
- There are some minor studies on the benefit of trust for the energy sector, however, they tend to be limited to the residential sector rather than the commercial sector. That might be due to the heterogeneity of the commercial sector, which adds complexity to the research boundary.
  - Proposed research. Surveys on how customers perceive their relationship with the energy operators, including gas and electricity. This research could employ surveys

and semi-structured interviews, and distinguish between different commercial venues, such as small and medium enterprises.

- Contribution. Such study would create valuable knowledge on how energy operators are seen by commercial customers. This result could help policy makers and energy operators create strategies and further roadmaps specifically for small and medium enterprises, improving the trust that these have for energy operators and investigate related benefits.

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