EXPLORATORY RESEARCH FOR STAND ALONE POWER SYSTEMS (SAPS)

Prepared for Essential Energy

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WOOLCOTT RESEARCH & ENGAGEMENT

essential energy

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THE ISSUE

Essential Energy has identified around 1,200 SAPS locations across NSW.

- They range from 1 to 100kwh per day of consumption
- The majority of sites are farming or rural small holdings
- Drivers for site identification include:
  - High vegetation costs
  - Long network segments
  - Network segments for Repex avoidance
  - Lower consumption levels suitable for solar generation

SAPS will predominantly supply only 1 customer.

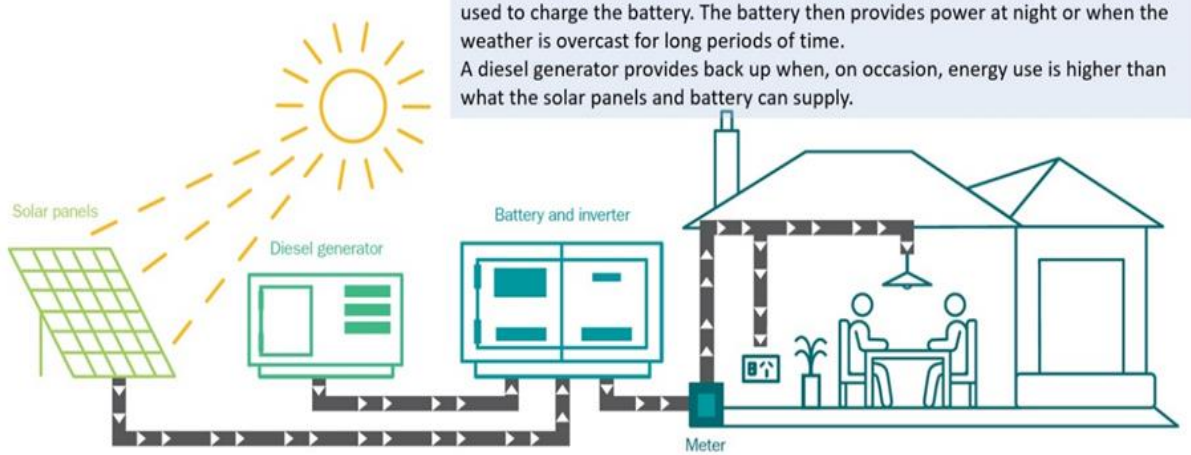
Their adoption will be entirely voluntary – the customer will choose whether or not they want one of these systems as opposed to being on the network.

- This new Power System is an alternative power source suited for people whose properties are currently connected by long powerlines, servicing a small number of properties.
- When the new Power System is installed and operational, the powerlines that supply the property are no longer needed to power the property. All new Power Systems will be installed and maintained by your electricity provider.

How these new Power Systems work

The solar panels generate electricity during daylight hours with any excess energy used to charge the battery. The battery then provides power at night or when the weather is overcast for long periods of time.

A diesel generator provides back up when, on occasion, energy use is higher than what the solar panels and battery can supply.



RESEARCH OBJECTIVES AND METHODOLOGY

The objectives of this research were:

1. To identify the threshold customers would be comfortable with, regarding the size of SAPS.
2. To ascertain what should happen if a new customer wants to join a multiple customer SAPS.

This engagement included n=8 in-depth interviews with people who had been identified as potential SAPS customers by Essential Energy and had expressed an interest in the concept.

A list was supplied by Essential Energy.

These people had also taken part in the previous research about SAPS conducted in 2022.

MAIN FINDINGS

TYPES OF PROPERTIES OWNED BY PARTICIPANTS

Most of those interviewed had multiple properties either on the same site or on different sites and it wasn't always clear which site was the one 'suitable' for a SAPS.

They were mainly farms so as well as the main residences, they often included shearing sheds, machinery sheds, cool rooms, workshops, pumps for bores etc.

They were located all across NSW with some on the QLD border.

Some of the smaller properties were not really lived in, or only lived in occasionally.

"My brother and I are in partnership. We have 3 properties, 3 sites. 14,000 acres in the 3 properties. They are a bit of a distance apart."

We have 2 properties - 1 is not that remote but the other is. The remote one has a Telstra tower after it, this one here is not remote but we are the end of a line."

"There are 7 different premises that use power at the farm. It is all on one property but been bought at different times, on different lines."

"Our power usage can be big – we have three residences and two workshops."

"Our consumption is over a number of different meters. We don't draw on one central account, we have a dozen different accounts with residences which are also servicing water pump systems. Some are master sub systems."

CURRENT ELECTRICITY SUPPLY

Most felt that their electricity supply was quite reliable currently.

However, they did expect a slightly lower level of reliability than in other less rural areas.

One participant in particular felt that his reliability was quite poor and he had recently purchased generators as a back-up for blackouts, particularly as there was a perception that blackouts had increased in length, leading to greater impacts.

Another felt that the existing supply wasn't up to his needs and had plans in place with Essential Energy to augment the network.

Some had already installed solar or were considering installing solar to cut costs.

"Our blackouts used to be brief, 2 hours. Now the standard blackout time is about 6 hours."

"We regularly have blackouts and planned outages that we have to work around and normally they are leading into the summer which is a big time for us with shearing. So it's really inconvenient and you have to get contractors, make alternative arrangements."

"The transformers are giving us enough power for a resident, not the types of workshops and businesses that agriculture has become. It's not a little family farm anymore, they have disappeared. We have limited access to 3 phase power which is hard for us."

INTEREST IN SAPS – POSITIVES

Most were still interested in the idea of SAPS, albeit they wanted to discuss the details further. The primary reasons given were to save money and increase reliability.

"For me it is about the reliability of power really rather than gaining extra capacity. That is why we bought the generators."

"I think the reality is that poles and wires are really expensive and if we can reduce them and improve reliability that would be good."

"The attraction of SAPS in rural areas is that where we are here, we can get impacted by a storm 10kms away because it hits the one line."

"I would certainly be very interested in the solar side of it. I hadn't considered the complete standalone at this stage but it would be worth looking into I suppose. The main reason for interest would be to lessen the cost of bills."

"It would be worth going to a SAPS if the power is cheaper."

With the increased reliance on renewable energy on the network in the future, there was some concern that there may be more power shortages and they would be 'switched off' first during those times as they are at the end of a line. This made SAPS more appealing.

One participant also mentioned that removing the powerlines would be beneficial as they are a hazard to the large machinery he has to move around the farm.

INTEREST IN SAPS – CONCERNS AND QUESTIONS

However, there were some questions and concerns too, e.g. who is liable if there is a bushfire, who owns the land the SAPS is on, who will do the maintenance, what will the quality of the system be like (good quality equipment, not cheap 'stuff'), will it supply phase 3 power?

Some of the main questions were about the financial aspects – who would pay for it and would it save them money?

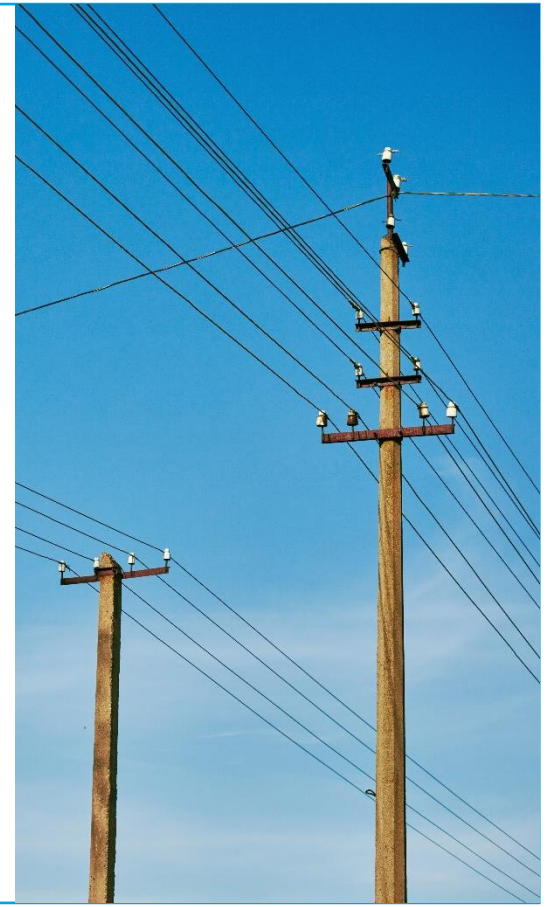
"What is the incentive for me? I can see the incentive for them – to save costs. But what is the cost advantage to me? Why wouldn't I just get a solar system and battery myself and then get the feed-in tariff?"

For those who do not experience poor reliability now, a key concern was whether the SAPS would be reliable, as they didn't want it to create problems that they currently don't have.

"How reliable the power is will be the biggest concern for people changing over. If it is not costing the landholder anything then people would be more likely to change over."

There was also some concern about not being able to export excess electricity to gain feed-in tariffs and 'cutting themselves off' from participating in the future energy market.

"Everyone is saying that we are going to end up with a renewable energy-based system and potentially have the coordinated management of rooftop solar within communities, but once you go down that SAPS system and cut the wire you can't feed in."



INTEREST IN SAPS FOR RURAL/REMOTE PROPERTIES

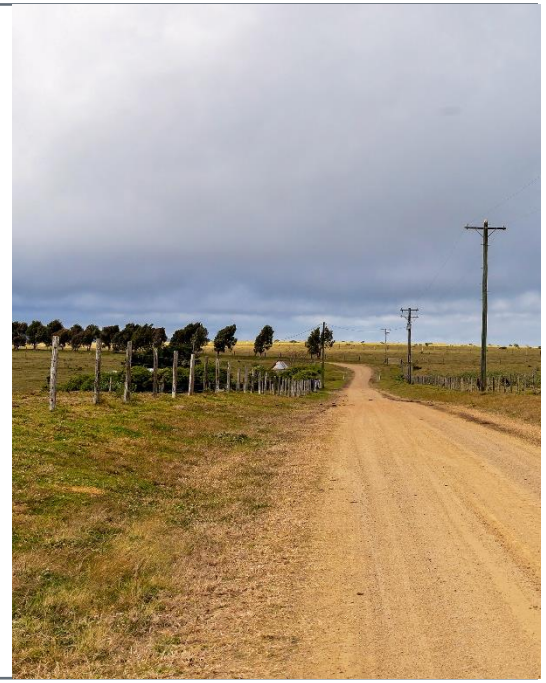
There was an assumption that the properties that were not inhabited frequently may not be suitable for a SAPS, as it may be too costly to put them out there.

Some also felt that the 'excess' solar generated would be wasted if it wasn't used or fed back to the network in those remote properties.

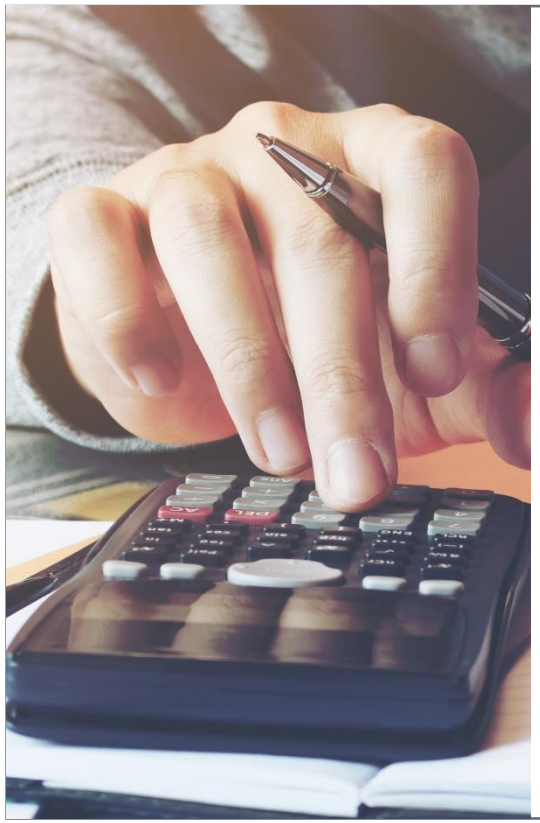
"It's not occupied all the time, it's a lifestyle place for family and friends. With that, if we were to put on solar, it doesn't use a lot of power so we would want to sell back. With a standalone system, it would just fill up – it's well exposed to the west, it's got a large roof, sheds etc. If I was to set up a solar system there, I would want to sell it back."

"I'm not sure if the one on the Queensland border would be suitable. Nobody lives there but we need power there. We put solar up there years ago."

"We are only out there once every 2 weeks. There is a pump for a paddock, fridge freezer but everything else is turned off."



CURRENT USAGE



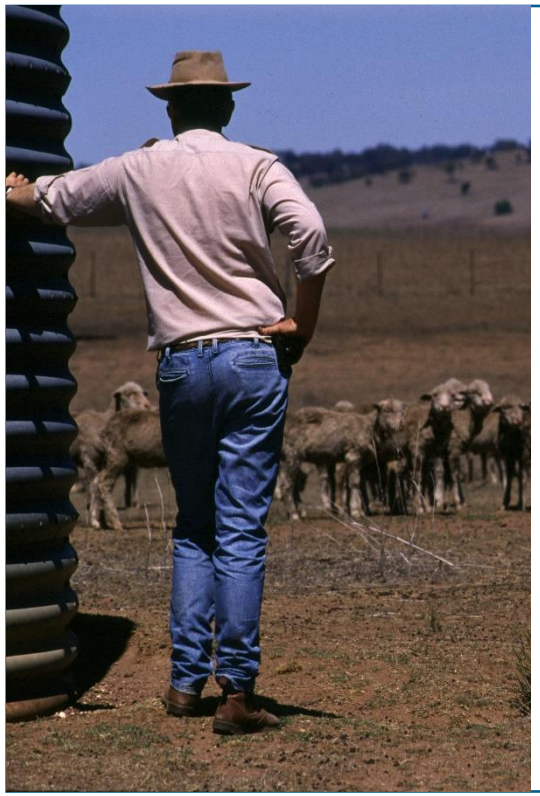
None of the participants were aware of their current usage. With multiple premises, and with solar on some, it was hard for them to work it out.

Most thought they would be larger users and as a very rough guide the following were provided as estimates:

- **Three mentioned about 16,000 kWh a year**
- **One said 11,000kWh**
- **One said 18,500kWh**
- **One said 20,000 kWh**
- **One said 30,000kWh**

Some also had seasonal differences in their usage which made it hard to calculate, e.g. shearing sheds.

EXPECTED FUTURE USAGE



None of those interviewed had plans that would mean a substantial increase in their electricity usage in the future.

Businesses did not have any plans to expand or purchase electric vehicles/machinery now.

"The business is about as big as it is going to get. Can't get much bigger."

Even at a personal level most did not have plans to get electric vehicles or have more people living in the household in the foreseeable future.

In fact some were quite negative about electric vehicles as they didn't think they would suit their needs and could even be risky on a farm.

"We will never go to electric vehicles. There would be nothing worse than having to charge a vehicle half way to Cobar [going between their properties that are 5 hours from each other]. Also do you know how hot the underneath of an electric vehicle gets? That can lead to fires in paddocks."

"I don't think so, not out here. I'm not a big believer in any of that [electric vehicles]."

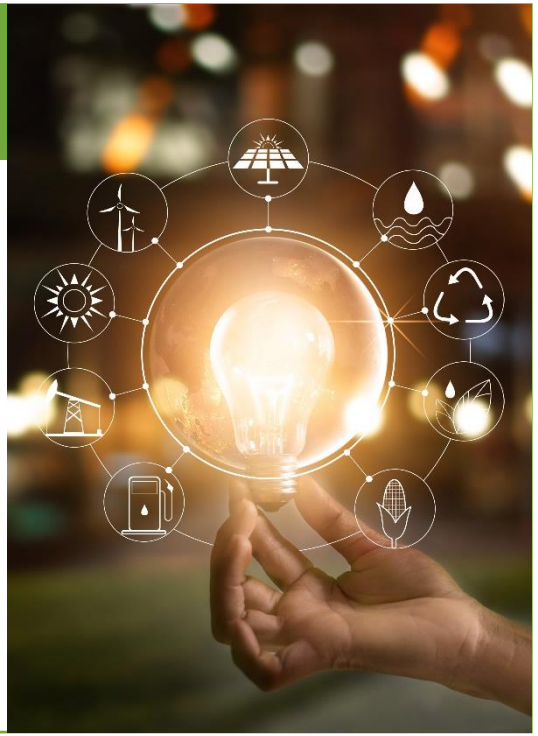
FUTURE USAGE

However, there was an assumption that everything would be moving to being powered by electricity in the future and that this would impact their plans and their usage at some point.

"The trends with electrification means it will go up, with electric vehicles and things. I would have no idea how much it will go up. My wife gets the bill and pays it so I would have no idea. We have two cars so if we were to get electric vehicles in the future then I would think at least 1.5 times the current usage. That is a technical question for people who understand electricity."

"I have no plans to increase the power I'm using but that is not to say it won't be forever. As we start to move toward more automation in agriculture some of this is going to be driven by electricity."

"Those automation issues are going to increase use in the future, for example robotic spraying."



THRESHOLD LEVEL

When asked what size system they would be comfortable with unprompted, most suggested that their current usage plus about 20-30% would be an acceptable threshold.

There was an assumption that the size of system for each customer would be reviewed by Essential Energy on a set basis, e.g. every 3-5 years, and that they would be upgraded if needed (within reason).

Therefore, when asked if they thought a 100% threshold was acceptable they agreed it was, although some actually thought it was excessive.

However, they found it hard to predict how much they might need in the longer-term future with the predicted increase in electrification.

"I think doubling needs is good in the early days. As time goes on people will know more."

"That's the way we do it in the bush – we do things in double. We don't mind paying a bit extra to provide a bit of safety."

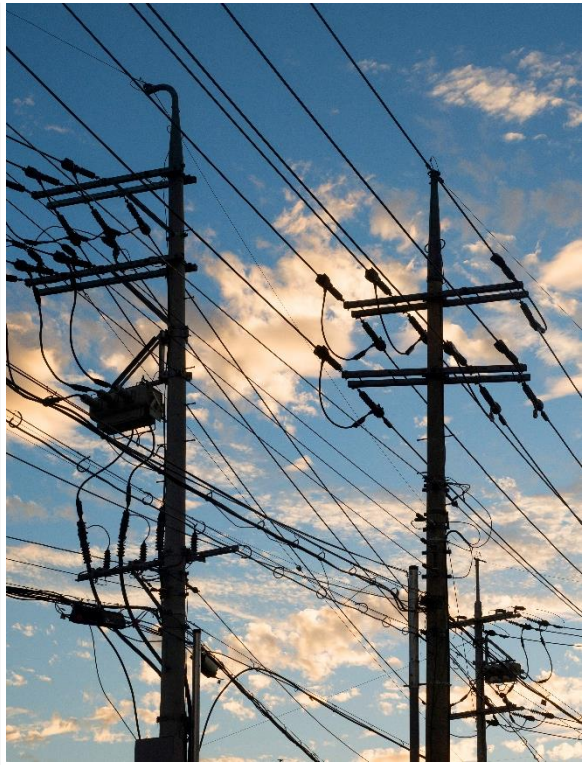
"I would think that I would get a system that had the capacity to be easily upgraded. You start out with a battery that can give you 5 hours of electricity but if you actually need 10 then they will come back and put an extra 5 on. I would think they would have to upgrade. It would have to be compatible with expansion."

"Don't just give everyone double not knowing if they will ever need that in the future. The upfront costs would be too high. Just give them the capacity to expand the system in the future if needed. But if you are stuck with it then you would want more 50-100%."

"I think so (comfortable with 100%), the bigger the better… make it bigger so they don't have to revisit it."

MOVING ONTO A SAPS

There was also a suggestion by some that there should be a 'trial period' where the customer would try living on the SAPS, and if it didn't work out they could still go back onto the network (i.e. the infrastructure remains for a period after the SAPS is installed).



"You can't just be cut off straightaway before you know if it is going to work for you. Perhaps only go off the network after a year. If it wasn't working go back onto the network."

"100% would make them feel comfortable and secure – there would be a certain fear about being disconnected from the system. We have all grown up with poles and wires, being able to use power when you want to. People might want smaller capacity in the future but at the beginning, that could help them."

UPSIZING THE SYSTEM

As mentioned, there was an assumption that Essential Energy would upsize the system for the customer if needed (within reason) at no cost.

However, this was on the assumption that the threshold was lower than 100%.

If an upgrade was required on top of a 100% threshold then there was more agreement that it would be fair for the customer to contribute.

In order to 'save' capacity, most did not think they could shift much of their usage to the middle of the day as some had equipment that needed to be run 24/7, e.g. cool rooms, or at certain times.

Solar customers had already moved as much usage as possible to when they are self-generating.

"You are essentially doing this to save Essential Energy poles and wires really. You would want a contribution from them, otherwise there is no driver. Why leave the status quo?"

"In some ways no I don't think that would be fair to have to pay more. That depends on whether or not they are charging you for electricity month by month. If you are not being charged and you are dealing with it all then it would be fair to have to pay more, but if not and you are still paying an electricity bill then not fair."

"If looking at 50% or 100% above what we use now then if we went above that then I would be quite happy for the customer to have to chip into that."

"If they put something at the start that wasn't fit for purpose, no but if they increase their usage then yes. If they make a big change, add a manufacturing plant or a big farm, yeah they should contribute."

ONGOING SUPPORT FOR SAPS CUSTOMERS

Participants stressed the importance of Essential Energy providing information and guidance once the SAPS was installed.

Helping customers to understand their energy use and advice on how a change in consumption might impact a SAPS performance were seen as particularly useful.

"It is really important for them to give advice. You need their expertise."

"Yes all of the above. That would be critical for the ongoing success. Where would the regular punter get the information from otherwise?"

"Definitely, you have to educate the people using it. Some would understand really easily but lots wouldn't. For example a 'how to' manual, what do you do in a brownout. Farming families want practical things."

"Yes there is a big role for Essential Energy in that, rather than having a 3rd party trying to get involved. Getting the information from multiple sources rather than the one is not easy for the customer. It would be easier for the customer if it is just from Essential Energy."

It was thought that the support and guidance would be particularly important at the beginning.

"Particularly at the start there needs to be a lot of support. I'm trying to get my head around it and I don't think I'm averse to new things. With that sort of system, it needs to be basic, without jargon all that."

MULTIPLE CUSTOMER THRESHOLD

Participants were asked what they thought would be fair in a scenario with multiple customers on the same SAPS, and then an additional customer wants to join.

They found this question quite hard to answer as it was felt that each situation would be different and would probably require consultation with the existing customers when someone new wants to join.

Most thought that the new customer should pay for the upgrades required for them to join the SAPS and the existing customers keep the thresholds agreed at the beginning.

"The new customer should pay the upgrade fee for the extra capacity, but any future upgrades should be shared."

"It is not really fair for the existing customers if the new person doesn't have to pay. The existing customers already had to pay to get onto the poles and wires in the first place. They have had the poles put onto their place all those years ago. For example, my parents had to pay exorbitant amounts to get the power to our place. The new customer hasn't had to pay anything yet. They should pay."

"Whatever is decided, it just shouldn't impact the existing customers."

MULTIPLE CUSTOMER THRESHOLD

It was assumed that the same model would apply for multiple use SAPS as for those on the network – if a customer needs additional supply/new supply then they approach Essential Energy and say what they need, then Essential Energy provides a quote to the customer if an upgrade to the network is needed.

"Each customer can request a certain amount and then there is a reserve amount. If you exceed that then you contribute to the upgrades in association with Essential Energy. That is how I think it works now but I might be wrong."

It was stressed that it should be very clear to the existing customers what the conditions are when they sign up, and that these conditions should remain for the lifetime of the SAPS (assuming they still want them).

"The existing customers should keep the threshold they signed up for."

"When you sign up you know what you are allowed but if you need more then you contribute to the upgrades."

Without much knowledge of the possible upgrade capacity required by joint use SAPS customers, most participants assumed that the threshold provided should be the same for multiple use as single use.

There were also questions and some confusion from participants about whether a multiple use SAPS is the same as a microgrid.

CONCLUSIONS

SUMMARY AND CONCLUSIONS

Most were still interested in the idea of SAPS, albeit they wanted to discuss the details further.

Financial aspects were top of mind, particularly in the current climate of rising energy costs and costs of living generally and they assumed that having a SAPS could save them money.

Reliability/having enough supply was a key driver for a minority.

There were no plans to increase usage in the short to medium term but it was hard for participants to predict their longer-term usage with the expected increase in electrification.

Expectations regarding the size of SAPS required for their needs were modest with most suggesting they would be comfortable with an extra 20-30% (unprompted).

However, there was an expectation by some that the size of system for each customer would be reviewed by Essential Energy at regular intervals after installation (probably during maintenance), to ensure it continues to meet their needs.

The research suggest that customers will be comfortable with a 100% threshold, however many thought that this was actually a lot more than they would require.

Any cost savings involved in moving to a SAPS would need to be clearly outlined to encourage take up.

The 'benefits' of feeding back into the network would need to be countered – both from an individual financial perspective and also a 'green energy' perspective.

A 100% threshold could be a good early step in order to encourage customers onto a SAPS but this threshold amount should be reviewed for future SAPS customers as more take up the concept.

Consideration should be given to whether the size of existing customers' SAPS could be reviewed over time and/or a trial period is feasible.

SUMMARY AND CONCLUSIONS

Information on helping customers to understand their energy use and advice on how a change in consumption might impact a SAPS performance were seen as particularly useful.

It is strongly recommended that Essential Energy provides information and guidance on energy use and SAPS performance after installation.

For multiple use SAPS with a new customer wanting to join, most thought that the new customer should pay for the upgrades required for them to join the SAPS and the existing customers keep the thresholds agreed at the beginning.

They believed that the process should be similar for SAPS customers as for those on the network.

Without much knowledge of the possible upgrade capacity required by joint use SAPS customers, participants assumed that the threshold should be the same for multiple use as single use.

There was support for the new customer covering the costs for any upgrades required to the SAPS, in order for existing customers to keep their threshold.

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Thresholds for SAPS customers

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