# SAVE (Solent Achieving Value from Efficiency)

| Project Number | SSET206 |
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| DNO | Southern Electric Power Distribution Ltd |
| Reporting Period | June 2018 – June 2019 |
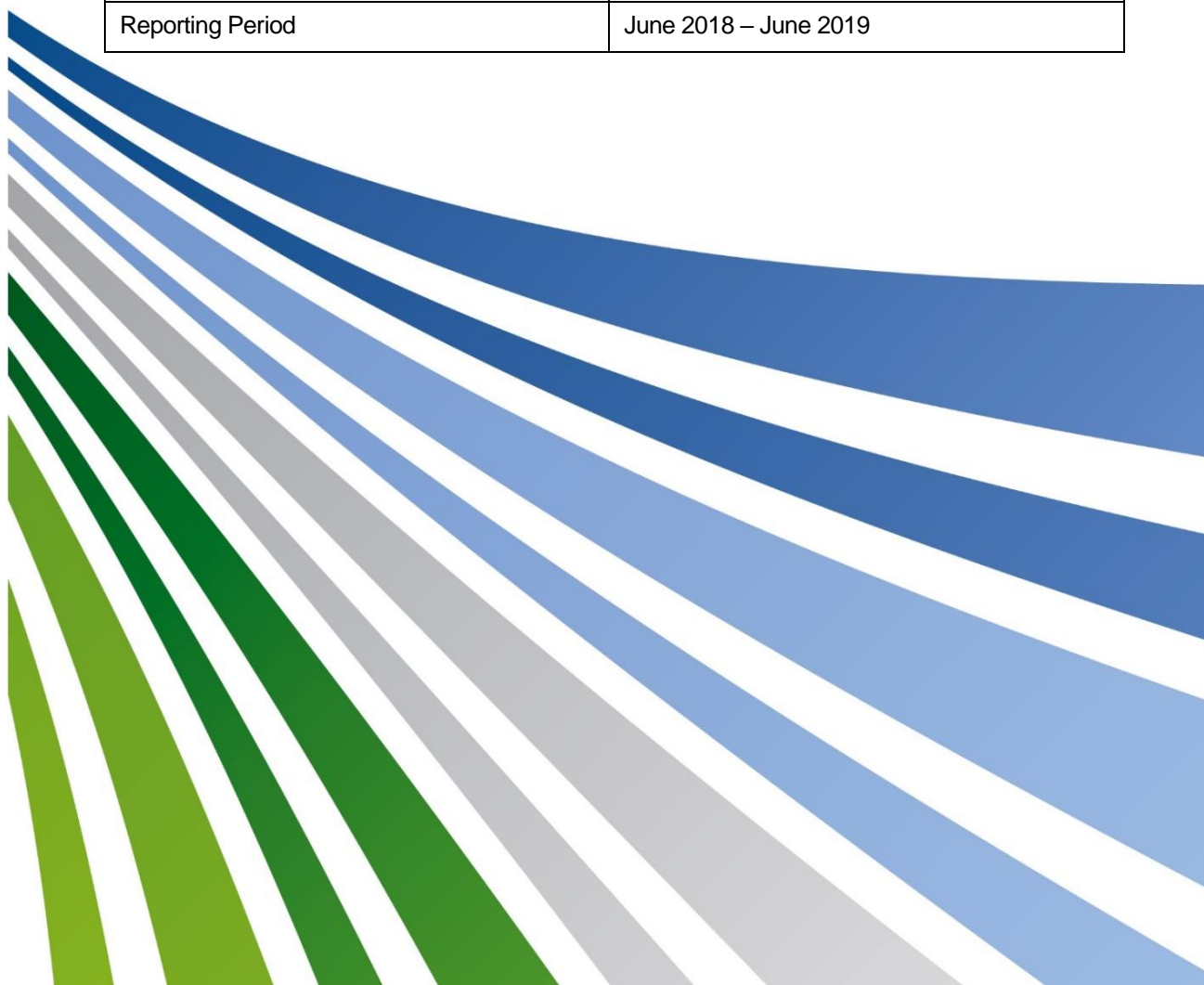
*Scottish and Southern Electricity Networks (SSEN) is the new trading name of Scottish and Southern Energy Power Distribution (SSEPD), the parent company of Southern Electricity Power Distribution (SEPD), Scottish Hydro Electricity Power Distribution (SHEPD) and Scottish Hydro Electricity Transmission. SEPD remains the contracted delivery body for this LCNF Project.*

| Document Owner(s) | Project/Organisation Role |
|---|---|
| Charlie Edwards | SAVE Project Manager |

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| 0.1 | 19/5/19 | Charlie Edwards | Initial draft for review |
| 0.2 | 28/5/19 | Charlie Edwards | Management Review |
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# 1   Executive Summary

The SAVE (Solent Achieving Value from Efficiency) project is a £10.3m project which is primarily funded by Ofgem's Low Carbon Networks (LCN) Fund, aiming to assess the use of energy efficiency measures as an alternative to traditional reinforcement. The Project involves a cross-section of domestic customers which are representative of much of the UK. Organisations collaborating as partners with Scottish and Southern Electricity Networks (SSEN) to manage and deliver the Project include the University of Southampton (UoS), Future Solent, Neighbourhood Economics Ltd (NEL) and DNV GL. The Project involves approximately 8,000 customers across 4 methods of intervention: deploying LED lighting; using media campaigns linked to the electrical consumption of individual households; adding a financial incentive to these campaigns, (methods 1-3); and using community energy coaches (method 4).

The end of the last reporting period highlighted the completion of the projects 2nd trial period (methods 1-3 and 3rd trial period for method 4) in addition to initial analytical findings. Throughout SAVE, communication and attrition challenges have been actively managed through project communications and BMG field teams. Despite forecasted communications dropping as low as 2500 customers with online Loops by the start of trial period 3 (TP3), the project managed to replenish this to 3100 communicating Loop devices (through a combination of engaging existing customers to fix communication issues and recruitment of new trial participants) by the start of trial period 3.

One SDRC has been published since last reporting; SDRC 8.8 Community Energy Coaching Trials, which marked the completion of this engagement method and highlighted key lessons for future community engagement, including: a need for simple and visual energy literacy, identification of 'stackable' social impacts through joint stakeholder collaboration in the rollout of energy efficiency and low energy cooking as an engagement tool. An extensive list and overview is provided in SDRC 8.8. At point of current reporting SSEN is completing 6 final SDRC's and 3 business as usual (BaU) deployment reports which will provide an extensive summary across the project work packages.

The last 12 months on SAVE focused initially on preparation for SAVE's final trial period, Trial Period 3 (TP3) in which the project looked to introduce its dynamic pricing trials, termed: 'peak banded pricing'. These trials looked to test the difference between an 'opt-in' methodology and an 'opt-out' approach to engagement. Opt-in trials registered a 38% participation rate whilst opt-out, as hypothesised, achieved a higher 98% participation rate. Results of these trials reported a 17W load reduction across the opt-in group (this includes all customers in the 1000 customer trial group) and 44W for the opt-out group. SAVE also ran a series of BaU designed event days across TP3, of which

the most successful, ran as a co-branded event with energy saving trust, achieved a 2.9% load-reduction.

Model development has been a central focus for project partners University of Southampton (responsible for SAVE's Customer Model) and project suppliers EA Tech (responsible for SAVE's Network and Pricing Model) over the past 12 months. With interim reporting on these models and the projects rescoping of the pricing model these software packages have required close communication between project partners/suppliers and carefully staged delivery. In March 2019 the project saw its first delivery of a functioning Network Model, however numerous integration bugs have required the close attention of SAVE's project team with new software iterations being delivered in bi-weekly sprints. The most crucial of these have now been addressed and integration between the models is working. This fully functioning flow between each piece of software, termed the Network Investment Tool will be discussed in full detail in June 2019's published SDRC's (8.5/8.6 -Customer, Network and Pricing Model and 8.2 - Network Investment Tool) and is the focal point of SAVE's final dissemination exercises.

Since TP3 closed at the end of December 2018, closedown activities, including: decommission, final analysis, reporting and dissemination have been a focal point for the project team. At time of reporting decommission has been completed with 2332 assets removed from customer properties and 875 assets with ownership transferred to customers. SAVE also ran a closedown event in Westminster on 6/6/19 with a politically focused follow-up at the Houses of Parliament sponsored by the Shadow Energy Minister, Alan Whitehead.

The SAVE project teams focus beyond this report will be the closedown of project finances which the project proudly forecast to come in under budget. This is achieved through efficiencies in the projects decommission process, 'piggy-backing' on wider dissemination opportunities and internal resourcing efficiencies. An overview of this and the projects summarised outputs will be available in the projects closedown report due September 2019. Wider focus will also be applied to enacting the strategies for BaU rollout laid out by SAVE; some work to this extent has already been started through SSEN's Social Constrained Managed Zones (SCMZ's[1]).

## 1.1 Risks

*Ofgem guidance: The risks section reports on any major risks and/or issues that the DNO encountered, including any risks which had not been previously identified in the Project Direction. The DNO should include a short summary of the risk and how it affects (or might affect) delivering the Project as described in the full submission. When relevant, the DNO should group these key risks under the following headings:*

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[1] SCMZ's look at opening flexibility markets up to SME and local organisations as those who potentially have best visibility of cross funding streams that could be stacked with flexibility service rollout i.e. energy efficiency.

Project risk management is considered in detail in section 4 of this report; a high level summary is shown below:

| Risk Description | Further details and impact | Controls |
|---|---|---|
| Final Reporting | Subject to a large amount of dependencies and short timescales means the impact of delays are significant to ability to deliver reports to time and quality | Close communication and rigorous engagement plans. Partners with international arms are able to stack resource as a contingency. Project team can stack internal reviews to provide project slack. If need be for SDRC 8.2 project could initially run the Network Investment Tool (NIT) manually to give results and start write up with automation coming later |
| Network Investment Tool | Creating customer categories which can accurately represent the impact of different interventions in addition to accommodating factors which affect how different households use their energy. Limitations of spatial microsimulation modelling (linking consumption with household characteristics available in Census): related to modelling scale, SAVE sample size and weighting methodology. In some cases this is causing rarity of customer types in certain categories. Large uncertainties in determining customer categories due to limited intervention effects also making this challenging. | UoS development of customer types has highlighted limitations due to sample size and considered in reporting recommendations for customer types. Showing a range of different case studies to highlight where SAVE interventions will/won't work. Try to manage high uncertainty by modelling feeders with high no's of customers. By testing early on feeders with high no's of customers to manage/identify uncertainty in desktop studies. If need be project team will collapse categories further to increase project sample in each category and hence statistical confidence. |
| | If the Network Model does not correctly estimate the impact of the interventions either due to: A) Calculation errors, B) The way that the data is processed i.e. picking up data from the wrong fields or outputting it in the wrong fields, and/or C) Due to the sequencing of computational tasks leading to an incorrect assessment of the impact of the interventions. | Testing being carried out in sprints by project team and supported through commercial expertise of consultants TNEI to ensure accurate results. |
| | How the Community Energy Coaching (CEC) trials feed robust information into the Network Model (NM). Issue is current factors influencing profiles are subject to error and do not align with customer profiles. | It is intended this would be done in same 'customer profile' manor as Customer Model. New customer profiles have been scoped and created by project analyst. Given granularity of analysis it is hypothesised that whist this will provide a methodology it will be recommended this trial is not run in the model in BaU due to highly variable and uncertain input data. |

## 1.2 Learning Outcomes

Learning outcomes are considered in detail in Section 6 of this report.

There has been one SDRC completed within this reporting period and six in progress, lessons learned have been captured both within these reports and through ad-hoc/process related means. Key learning includes:

- During the weeks we observe the greatest load reduction, DNO led LED lighting installs can result in an averaged 47W per household reduction in peak demand (6-9% of household peak demand). Scaled across every home in the UK this could save more electricity at peak than the UK's current largest nuclear power plant (1.3GW).
- Future SAVE-like schemes may be able to maximise their value by:
  o Partnering with organisations such as local councils, charities or aggregators that can either:
    ▪ Contribute additional funding sources, or
    ▪ Quantify benefits that DNOs are currently not incentivised upon, such as carbon savings or energy savings.
  o Encouraging measures that are also eligible for funding from other Government schemes. In this case, SAVE funding may be able to act as 'gap-funding' to enable projects to move forward that may not be cost effective with Government funding alone.
- Messaging, if too frequent, may lead to fatigue and can result in higher than average energy consumption.
- Price signals work when sufficiently high, however these results are unlikely to be sustainable long-term. Price signals are also more effective across a pre-set population when run as an opt-out trial rather than in an opt-in trial, because of high participation rates.
- Field teams at BMG have been unable to train new staff due to commitments elsewhere, as a result a video was recorded which could be used as training materials for any new resource.
- Software should be delivered in short sprints from the start of design (bi-weekly) with details of conversations recorded in a central cloud platform to ensure all working on the product have visibility of decisions made.

**Approach to learning capture**

The approach to learning capture is focussed on capturing both structured learning in the forms of SDRC reports, and unstructured learning via lessons learned reviews and ad-hoc recording of insights. This aims to capture results drawn out from data analysis and reviews of activities, and also extract tacit knowledge that may not typically be captured in formal documents.

**Summary of Headline Dissemination Activities**

- UKPN- Energy Wise Closedown- Presentation on SAVE to industry
- LCNI conference 2018- presentation on SAVE price signal trials
- Two presentations to SSEN extended leadership teams around BaU rollout of SAVE energy efficiency trials and 'nudge' techniques
- Series of meetings with BEIS following 'call for evidence' around energy efficiency to discuss SAVE learning, value of energy efficiency to the DNO and integration into flexibility markets.
- Parliamentary event in House of Parliament displaying SSEN innovations in exhibition format
- SAVE project team on expert panel of Green alliance community energy 2.0 report launch event
- SAVE project team presentation to Ofgem at 'lunch and learn' event
- SAVE project supplier workshop to discuss future of ECO (LED trials link) and charging (price signals and 'cores' work) with National Energy Action.
- Project partners DNV GL and UoS present project outcomes at the International Conference on Renewable Energy (ICREN) held at UNESCO in Paris
- SAVE presented at Network Conference and wins Networks 'Stakeholder Engagement Initiative of the Year
- SAVE project closedown event in Westminster

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## 2 Project manager's report

The last 12 months on SAVE have seen the project both plan and complete its final trial period (TP3) and enact closedown procedures including: decommission, final analysis, final reporting and project dissemination.

At point of last reporting, the project team highlighted preliminary results from trial period 2 (TP2). This report will give a fuller update to TP2 results before discussing how this fed into the final design of TP3. Following project discussions and meetings with Ofgem, SSEN and DNV GL adopted a slightly different structure in TP3 than in previous trial periods. With the success of LED rollout in TP2, 76% of the 1000 customers in the LED trial group (TG2) had accepted installation of bulbs in their homes. With just 24% of customers remaining to engage, the project team hypothesised learning and replicability of engaging these hard-to-reach customers was prohibitive. As a result, and with support of industry consultation, the project re-designed the price signal trials in TP3 to facilitate a dynamic pricing strategy across two trial groups. This allowed for trial of both 'opt-in' and 'opt-out' methodologies to measure the impact of dynamic pricing.

In preparation for TP3, the project carefully managed usual attrition challenges through the support of project suppliers BMG, as discussed in section 2.2. The report then goes on to discuss the operation of TP3 and the results produced through the University of Southampton's (UoS's) analysis. We then describe progress on the projects three models: Customer Model, Network Model and Pricing Model which together make up the 'Network Investment Tool' before finishing with an overview of the closedown activities mentioned above.

Given the closure of the community energy coaching (CEC) trials in June 2018 this 12 monthly report does not discuss these trials in detail. Neighbourhood Economics (NEL), project partner and leads of the CEC trials have kept close ties to the project outputs completing a number of interviews with Citizens Advice Scotland to feed into policy proposals and providing input to closedown reporting/dissemination activities (events and website development). NEL also completed SAVE's final focus group (as planned in SDRC 3.2), revisiting their communities one year after trial interaction was completed, a full summary of this can be found in appendix 3.

### 2.1 Trial Period 2 results

#### 2.1.1 LED Outcomes

At point of last reporting the project was able to report some signs of significant shifts in demand resulting from the LED trials in TP2. Since then UoS have developed their analytical techniques to better understand the impact on both peak demand (kW) and overall consumption (kWh) of SAVE's trials. A full summary of these results is available in SDRC 8.3 'LED Trial Report'.

The maximum observed change in energy consumption during the peak period was 47 Watts per household. These results are statistically significant at the 90% confidence level. Scaling these results across the whole of SSEN's patch could result in a peak load reduction of 174 MW, or 1.3 GW across the whole of the UK; enough to turn off the UK's current largest nuclear power plant. Results of this analysis are shown in Figure 1 Impact of DNO led LED trials below[2]
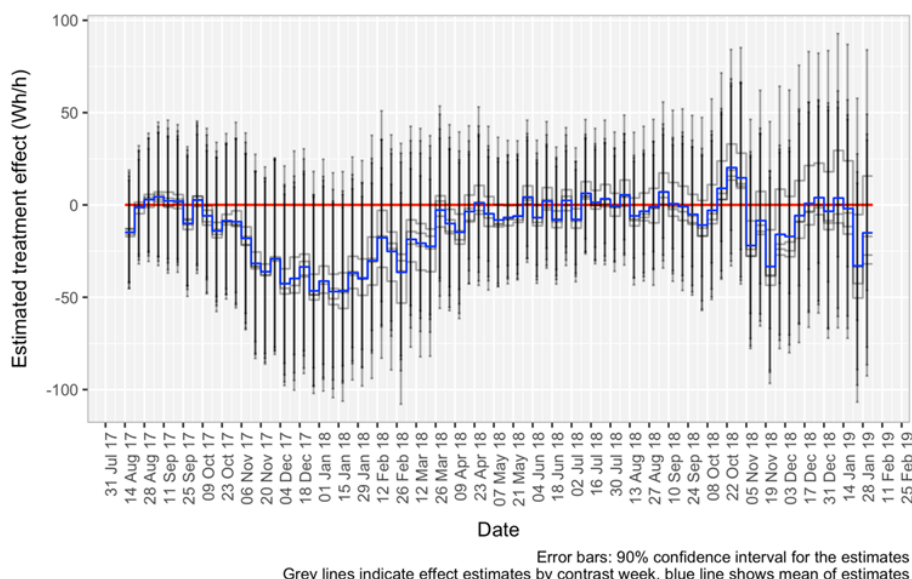


**Figure 1 Impact of DNO led LED trials**

Average annual savings per household from the LED trials (which installed an average of 7 bulbs across 76% of homes) were calculated as 90kWh or £15.82 per year. By this calculation the SAVE projects rollout is saving 97 MWh resulting in a saving of 37,181 kg of $CO_2$ annually.

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[2] Grey faded lines indicate how results vary when 'contrast' weeks used for the baseline of difference-in-difference analysis are varied. Difference-in-difference analysis is used to manage differences in trial group baseline consumption as compared to the control and is explained in full in section 4.3.3. of SDRC 8.3.

### 2.1.2 Data informed and Price Signal Trials

Building on learning from SAVE's initial trial period (TP1), TP2 saw a new approach to messaging, decreasing the quantity of information sent to trial participants and providing messages in more accessible and visual formats. Examples of this are given in the last annual report and include notebooks, sticky notes and stationary containing an energy efficiency message. Likewise, TP2 looked to increase the number and variety of events tested to better understand participants abilities to respond as duration (hours) and longevity (days) of events were altered. For price signal trials, this also included varying incentive levels and formats. As an example, the project tested if 'lotteries' were a more effective means of offering price incentives, since people tend to over-estimate the direct impact of small probabilities. . In total four events were held with parameters summarised in Table 1 below:

**Table 1 TP2 load reduction events**

| Event | Reduction target | Date | Time active | Delivery method | Prize (TG3 only) |
|---|---|---|---|---|---|
| 1 | 10% | Monday to Friday w/c 20 November 2017 | 16:00-20:00 | Postcard | Raffle draw for one of 20 £100 Restaurant Choice gift cards |
| 2 | 10% | Monday to Friday w/c 29 January 2018 | 16:00-20:00 | Email and Loop | Raffle draw for one of 20 £100 Restaurant Choice gift cards |
| 3 | 20% | Tuesday and Wednesday 6-7 March 2018 | 16:00-20:00 | Email and Loop | Raffle draw for a £1,000 Sainsbury's gift card |
| 4 | 10% | Tuesday 20 March 2018 | 17:00-19:00 | Email and Loop | £10 Costa Coffee gift card to all successful |

Figure 2 below illustrates how customers across both SAVE's 'data informed' (TG4) and 'data informed + price signals' (TG3) trial groups responded to both messaging (green shading) and event days (yellow shading) through TP2. No results show statistically significant load reduction.

Error bars: 90% confidence interval for the estimates
Grey lines indicate effect estimates by contrast week, blue line shows mean of estimates
Green shaded bars indicate communications to participating housheolds
Orange shaded bars indicate 'Challenge' weeks
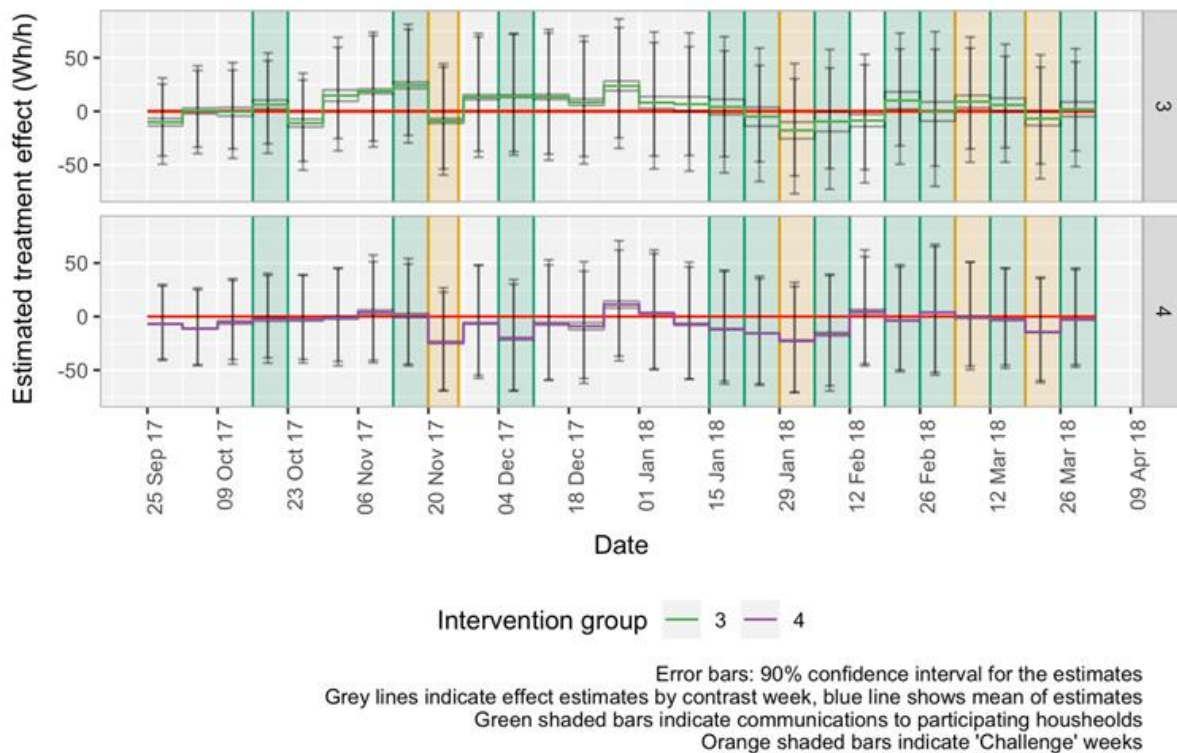
**Figure 2 TP2 Data and Price Signal Results estimated weekly average treatment effects during peak hours (16:00 to 20:00)**

Key learnings drawn from these trial results are listed below; a more definitive analysis is available in SDRC 8.4 and 8.7 'data informed and price signals report'.

- Customers often need some prompting to save energy; treatment effects are generally highest after an email or postcard that reminds them about the 'ask'.
- However, messaging, if too frequent, may lead to fatigue and can result in higher than average energy consumption.
- Postal communications are most effective when communicating one-off reduction 'asks'. However, these are also the most expensive and unlikely to be possible for unplanned peaks (due to longer lead times required).
- When running event days there appears to be no consistent differential impact through adding a price signal to data-informed engagement.

## 2.2 TP3 preparation and execution

In preparation for SAVE's final trial period, the project forecasted attrition/comms issues (as detailed in SAVE's June 18 PPR) if not addressed, could result in a project population of just 2500 project participants (or 625 per trial group) by the start of TP3, this is illustrated in Figure 3 below. This threatened to undermine the credibility of the projects statistically robust trials and chances of achieving statistical significance. To combat this the project team looked to address the decreasing sample through two main means; 1) re-engagement of offline customers and 2) recruitment of additional customers.
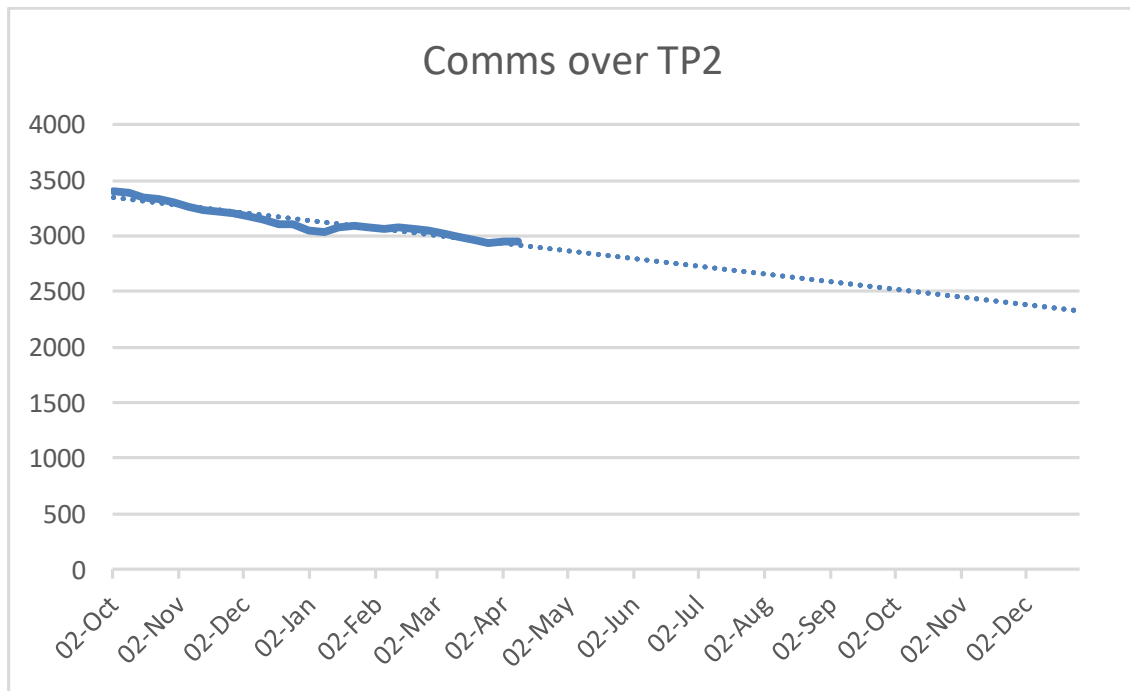
**Figure 3 Forecast of communicating Navetas Loop devices**

TP3's re-engagement campaign started in May 2018 and continued through until November 2018 at which point the marginal benefit of additional recruitment exceeded their marginal cost. Due to a lack of available BMG resourcing the project team looked to boost numbers through the support of alternate field contractors. This however proved somewhat challenging, due to the advanced stage of the project and short time-scales to recruit, few organisations could provide cost-effective quotes to help boost recruitment. When one organisation was procured to support in recruiting an extra 100 participants to the project, challenges in achieving the same rate of return as the BMG field teams became apparent and the depth of project knowledge that BMG as historic suppliers had acquired became apparent.

This provides several important learning points in such field trials: (1) where customer engagement is central to a long lasting project activity, field teams will build relationships and develop their approach to be most proficient and effective- for this reason it is crucial long-term contracts are established as a contingency for any unforeseen customer messaging that may be required; (2) having several organisations carry out the initial customer engagement on a project ensures that if one cannot provide resource contingency organisations are briefed and familiar with both the project and its customers to pick up activities as needed.

A full summary of the last reporting periods engagement and resulting participant numbers are given in Table 2.

**Table 2 Summer 2018 Fieldwork**

| Month | Comms fix | | Recruitment | Project Population (communicating within 30 days) |
| | Phone | Field | | |
| --- | --- | --- | --- | --- |
| May | 5 | 17 | 41 | 3121 |
| June | | 93 | 104 | 3219 |
| July | | | 8 | 3128 |
| August | | | 1 | 3065 |
| September | | | 116 | 3043 |
| October | 87 | 12 | | 3067 |
| November | | 294 | | 3119 |
| December | | | | 3116 |

### 2.2.1 Trial re-design overview

Following the re-design of TP3 discussed in SAVE's June 2018 quarterly report, the project analysed the output of a series of literature reviews, Ofgem discussion and industry consultation. DNV GL and SSEN used the results of this research to design 'peak banded trials' and progress them with two trial groups. What was formerly SAVE's price signal (TG3) and data informed (TG4) trial groups became the projects new dynamic pricing trial groups. Both these groups had received the same messaging prior to the initiation of TP3 on the project and hence were well structured to provide comparative results across TP3. The previous LED trial group (TG2) resultantly became a new data informed trial group following the decision at last reporting not to run another energy efficiency based trial following the success and level of penetration achieved through LED's in TP2. This group acted as an 'un-primed' population to test Business as Usual (BaU) ready messaging with customers.

### 2.2.2 Peak banded trials

SAVE placed two trial groups into its dynamic pricing trials to test the difference between 'opt-in' and 'opt-out' participants in response to a dynamic price signals. The project acknowledged most LCNI projects prior to it had very much been a self-selecting 'opt-in' population. As a result and to test a more likely real-world application of these pricing structures, SAVE, supported by industry made the decision that a comparison between these two mediums of engagement was key to fully understand the application of such a method and inform policy recommendations surrounding future dynamic tariffs.

The project had also determined it would be valuable to test the price sensitivity of customers in response to dynamic price incentives. These results could then feed directly into SAVE's incentive module within the Network Investment Tool (allowing the DNO to build elasticity curves for customers to determine the optimal payment price for a given intervention). To incorporate this without introducing bias, DNV GL designed the trials with two levels of incentives. During the first 6 weeks of

TP3, customers would be paid 10p per hour at peak (up to a maximum of £20) they could keep consumption below their target. Then, at week 6, DNV GL sent notifications to inform participants that for the remainder of the trial (week 7 – week 12) the incentive level would be increased to 30p per hour at peak (up to a maximum of £50 across the trial lifespan).

In early June, SAVE randomly selected TG3 to become the opt-in group and the customer base were sent a booklet which introduced the banded pricing trials (how it worked, payment available and peak hours it was applicable). An example of this booklet is shown in Figure 4 below. The booklet, delivered by post, was followed up with an email and notification through the Navetas Loop portal. The booklet came with a pre-paid return postcard that interested customers could use to opt-in to the trial. In July, phone calls were made directly to customers to encourage opt-in.

Subsequently in August 2018[3] SAVE ran an opt-out methodology with TG4. A similar booklet to that sent to TG3 was sent out to participants, this time informing customers they had been enrolled onto the trial[4] and gave them a telephone number they could call to opt-out. As before the booklet was sent out by post and followed up by email and Loop portal notification.
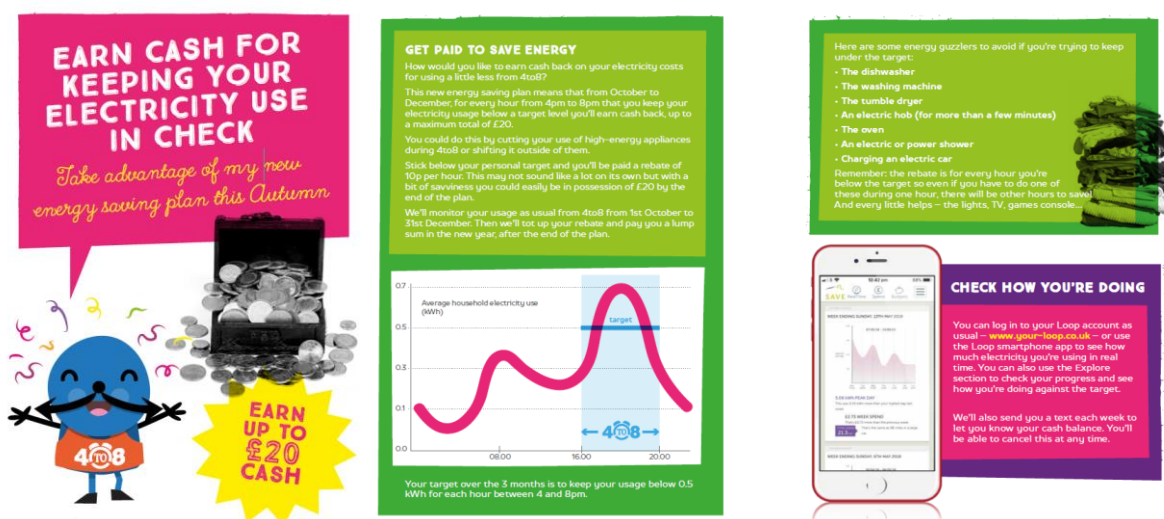


**Figure 4 TP3 Dynamic Pricing Material**

Following this engagement, the SAVE project recorded an opt-in rate of 38% of customers, mean whilst opt-out customers were just 2% of TG4.

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[3] Opt-out was purposefully kept until a later date to allow the project to analyse the response to opt-in trials and determine that a further opt-out trial was still the best variable to test for the remaining trial group.
[4] It is important to note these trials were incentive only to model a DNO led approach as opposed a supplier based tariff.

In the build-up to the start of TP3 the SAVE project team also worked to produce a short video (see Figure 5) aiding in explaining the trial and to act as a nudge to participants' memories of what was required of them when the trial was initiated.

The video focussed on three points and was structured so that it could easily be 'cut' and the first two points could be re-used in a BAU scenario. These three scenes include:

- An explanation of why the network sometimes experiences stress between 16:00 and 20:00.
- Why running appliances outside of this period can help ease the pressure. The video stated specific appliances to avoid using during the peak period, such as the washing machine, dishwasher, tumble dryer, the oven and charging an electric car.
- An introduction to peak banded pricing and explanation of how the SAVE project would pay participants for every hour they are able to keep their consumption below their customised target. The video also showed participants how to use Loop to check their energy consumption.



**Figure 5 Dynamic Pricing Video[5]**

Participants were also pointed towards their loop portal which would allow them to track their usage and ensure they were below their target consumption at peak time. This is illustrated in Figure 6 below:

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[5] Video can be viewed at: https://www.youtube.com/watch?v=1CQFrdmHsYc&t=
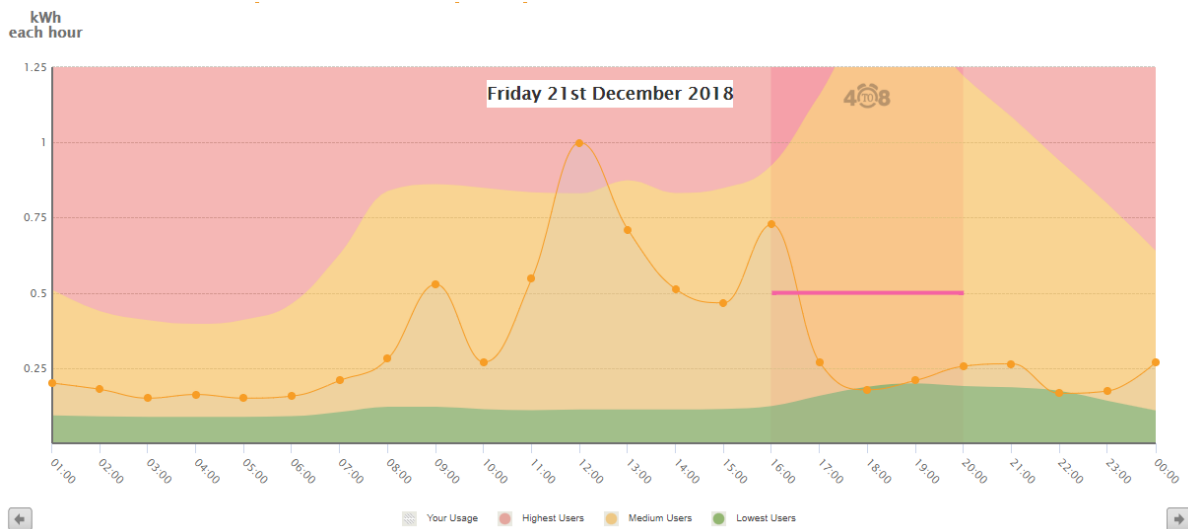
**Figure 6 Loop Portal used for Dynamic Pricing Trials**

The project's peak banded trials started as planned on 1<sup>st</sup> October 2018; participant data was collated weekly through the Navetas Loop Portal and input into a spreadsheet to calculate their weekly balance. DNV GL sent participants weekly text messages with a balance update and to keep them engaged and help track the benefits of shifting consumption. At the end of December, the trial closed as planned with payment to customers made via cheque throughout January.

The results of the trials are displayed in Figure 7 below. It should be noted this graph shows the entire trial group whether people opted-in or not. These results therefore show estimated per customer impact if each trial methodology were rolled-out at scale.
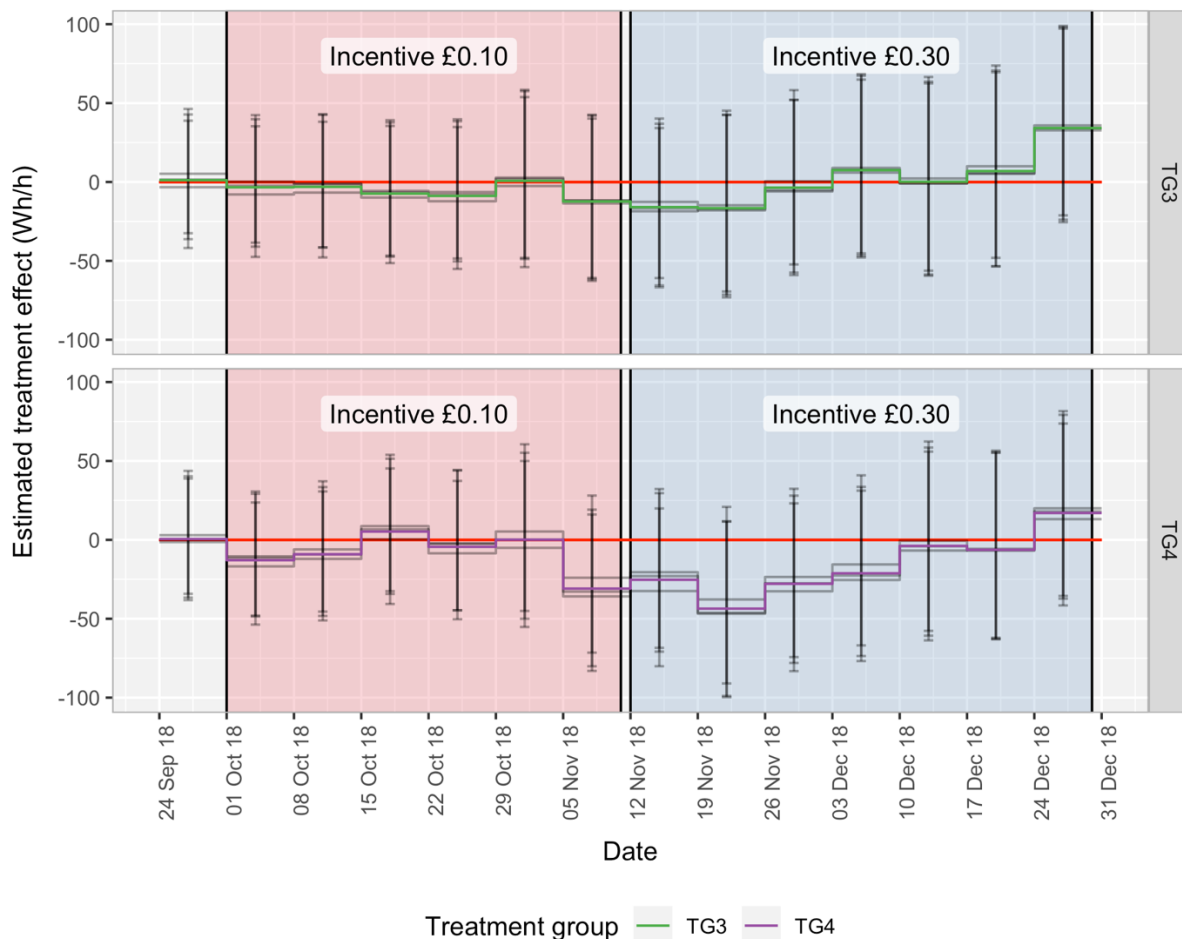
Error bars: 90% confidence interval for the estimates
Grey lines indicate effect estimates by contrast week, coloured lines show mean of estimates

**Figure 7 Results of TP3 Dynamic Pricing Trials: estimated weekly average treatment effect during peak hours (16:00 to 20:00)**

The maximum estimated load reduction for both treatment groups was observed during the week commencing 19 November 2018 – the second week of the high incentive period – with mean effect sizes as follows:

- TG3 maximum -17 Wh/h
- TG4 maximum -44 Wh/h

Following trial closure and prior to decommission, project supplier BMG, carried out a feedback survey with participants. Building on Low Carbon London's customer survey this looked to understand peoples' perception of the trials, ability to respond and behavioural changes (both during the trial and enduring). Results of this will be available in final reporting.

### 2.2.3    Event based trials

The LED trials did not extend past the second trial period (TP2), which allowed SAVE to test something new in TP3 with what was previously known as the LED group (TG2). The SAVE project sought to explore the impact of 'event days' if run as stand-alone messages and not as part of a larger education and engagement campaign, as had been done in TP1 and TP2. This is seen as a possible BAU approach as it would be relatively low cost and quickly deployable.

TG2 received notifications of 'event days' through post, email and text message formats, and were asked to reduce their consumption for short periods of time, they were however not given a specific reduction target as the approach did not include follow-up messaging (which would be required to inform participants if they succeeded). They did not receive any additional information concerning the peak period, DNOs or energy efficient strategies.

The events are shown below in Table 3.

**Table 3 TP3 Event Day Structure and Results**

| Event | Date | Time active | Delivery method | Message | Change in Load[6] |
|-------|------|-------------|-----------------|---------|-------------------|
| 1 | 10 October 2018 | 16:00-20:00 | Text message | Notification asked participants to use less electricity as the network was under extra pressure. | +2.1% |
| 2 | Monday to Friday w/c 29 October 2018 | 16:00-20:00 | Email and Loop | Notification asked participants to use less energy as the evenings are darker and colder (sent out after Daylight Savings Time ended). | -2.2% |
| 3 | Monday to Friday w/c 19 November 2018 | 16:00-20:00 | Postcard | Notification was co-branded with the Energy Savings Trust. | -2.9% |
| 4 | 13 December 2018 | 16:00-20:00 | Text | Notification asked participants to reduce their consumption because the electricity network was under pressure due to weather. | +1.1% |

A full summary of these events and their impact is available in SDRC 8.4 and 8.7.

## 2.3 SAVE Models and the Network Investment Tool

SAVE's Network Investment Tool (NIT) as previously communicated is built of three main models, the Customer Model (developed by UoS), the network model and the pricing model (both developed by EA Tech). Figure 8, below gives a visual overview of how these models interact and the data they process. SDRC 8.2 gives a full overview of the Network Investment Tool and the outputs it provides.

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[6] A negative value denotes load reduction, while a positive value denotes an increase in load.
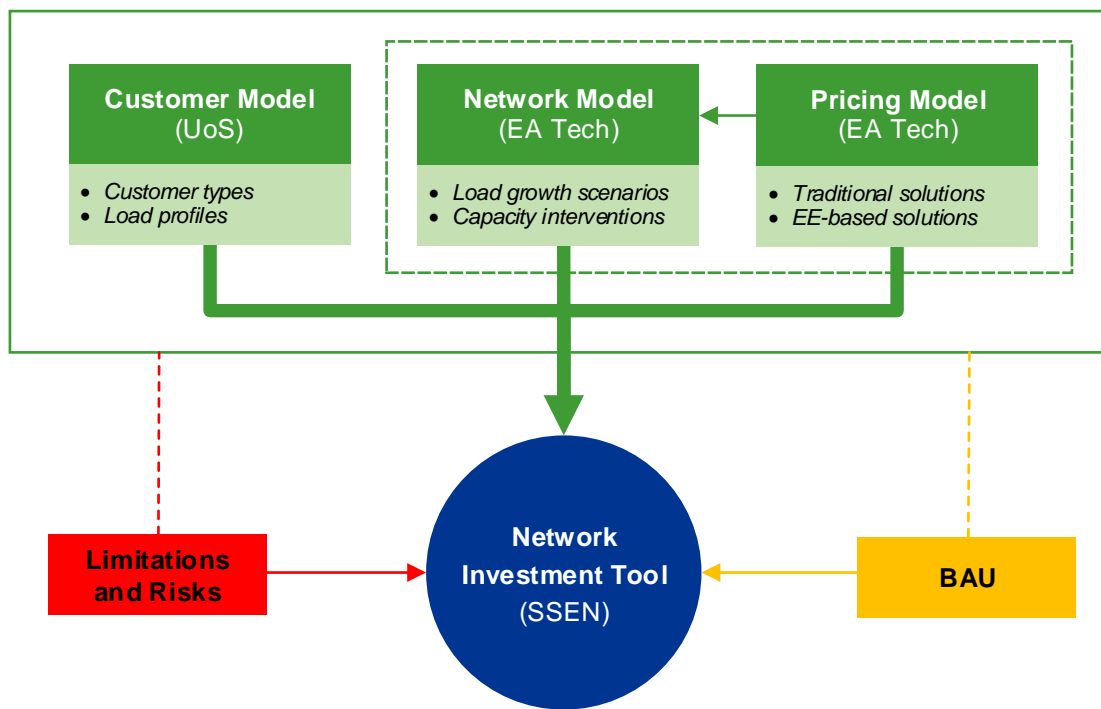
**Figure 8 Network Investment Tool Data Flows**

At point of last reporting the project team highlighted two key challenges the team were working on through the integration of the Customer Model profiles which are scaled at output area (OA) level (typically 100 households), using census data, being linked to SSEN's network, as displayed within the Network Model, which flows across OA's. The first of these challenges highlighted that by grouping customers into a number of categories and applying category-level profiles at OA scale some 'customer type' profiles would be based on very small numbers of SAVE sample households. This increased the risk of 'unusual' (outlier) sample household consumption patterns impacting forecasted load on feeders/substations. The second challenge was how the project reconciled the previously specified outputs of the Customer Model with the nodal approach to mapping customers of the Network Model.

**Resolution 1-** Throughout the second half of 2018, SSEN's SAVE project team worked closely with the University of Southampton to detail 'customer demographics' which could best represent the differences between households whilst ensuring any results/load-profiles derived from these customer demographics were representative of the group and not based on household counts that were so small that a single outlier household could substantially skew results. This was provided by the development of a customer typology that maximised the number of sample households per category, aligned with area-based statistics of household characteristics, and which could therefore be used to allocate customers of different types to OAs (and simulated networks) in the correct census-derived proportions (see Resolution 2). A full summary of this and wider Customer Model developments can be read in SDRC 2.3 and SDRC 8.5/8.6.

**Resolution 2**- SAVE's project team has implemented a new interface between the Network Model and the Customer Model termed the census interface. This interface replaced the functionality of the

spatial microsimulation module previously developed within the Customer Model (for details see SDRC 2.2). In the first half of this reporting period the engineer used postcode data from the office for national statistics (ONS) census information and linked it to postcodes supplied by each substation through SSEN's GIS systems. This is described in full in SDRC 8.5/8.6.

Whilst these issues were resolved, SSEN continued to work closely with EA Tech via weekly calls and monthly face-to-face meetings to develop the Network Model and the Pricing Model (SDRC 7.3 and 8.5). This was focused initially on confirming functional specifications (though in reality as complexities materialised this was required to be a living document), then more visual wireframes before delivery of each model iteration.

In February 2019 (to coincide with final trial analysis output from the Customer Model), EA Tech delivered their first working draft of the network and pricing model to SSEN for user testing. Initial user testing found numerous bugs with the model which were swiftly recorded in a central interface, these bugs were then ranked in urgency and importance to create an evolving work-plan with EA Tech to move the model forwards. Across this period and throughout March and April the Network and Pricing Models were delivered in bi-weekly 'sprints' to keep visibility of the models and allow cross-over between SSEN's testing and EA Tech's development.

In parallel to the user testing and development of the Network Model, UoS worked closely with SSEN to deliver further additional development of the Customer Model in response to additional input requirements and to enable the full functionality of the NIT. This included the development of 'intervention impact profiles' to allow the simulation of SAVE interventions outside of the periods during which the field trials had been conducted.

Knowing the complexity of software delivery, the project team built significant slack into the Network Investment Tools completion, which by the start of May 2019 had been fully used up. The project has subsequently requested that SAVE's closedown report, originally communicated to be submitted June 2019 is not submitted until 3 months after project completion. SSEN believes this is inline with LCNI governance which states: "The DNO must submit its Close-Down Report to Ofgem within three Calendar Months of the Project completion date set out in the Project Direction" and has discussed the matter with the SAVE project officer at Ofgem.

This not only gave the project three weeks of dependency time back for delivery of the NIT and it's related SDRC's ensuring quality is optimised to ease BaU rollout, but also allows for project finances to be accurately reported in to Ofgem in the final closedown report as it allows time for any final payments to be processed.

In transitioning the Network Investment Tool into business as usual, SAVE has sought support from a network planner with a deep understanding of current industry and SSEN planning and policy standards to test the Network Investment Tools outputs against existing tools. The network planner will also work to pick apart elements of the tool which are likely to provide most value and integrate

with future, DSO centric, planning roles. This resources final responsibility will be to provide training and briefing to the wider planning department, both in SSEN and across DNO's on the tools functionality.

The SAVE project contacted DNO's to offer a series of roadshows across May to support their integration of the NIT and SAVE's wider learning outcomes. Interest was received from three of the five DNO's, however in discussion with each DNO it was agreed that these parties were best first off attending SAVE's closedown event and then registering interest in the specific elements of SAVE of most interest to them, allowing for a tailored event. The NIT is intended to be at the centre of this engagement and will offer the same planners training as provided internally to SSEN staff at these roadshows.

## 2.4    Closedown Activities

Throughout winter 2018 the SAVE Project team worked with partners to develop a robust strategy for project closedown ensuring: 1) final deliverables could be delivered to time and quality with reports reflective of these findings; 2) project decommission and customer communications could progress efficiently and timeously; and, 3) a robust dissemination strategy was enacted.

In terms of project deliverables, this included full reviews of the projects work packages and risk registers to ensure the direction of project progress and a new project Gantt to align deliverables- this was discussed monthly at Project Partner Review Board (PPRB meetings) between December 2018 and June 2019. To support final reporting, a deliverable master spreadsheet was created to support partner tracking and provide visibility of dependencies to all.

The future of SAVE's household monitor assets was deliberated closely between the SAVE project team and its partners. SAVE saw significant value in offering customers an opportunity to retain assets should they wish to, this would allow customers to both continue benefiting from the Navetas Loop device and would forego the cost of decommission, bringing down project spend and hence allow any budget saved to be returned to Ofgem.

This process required in depth commercial discussions with project supplier Navetas, in order to reach a reasonable price to transfer customers to a BaU server (if the customer wished) and to roll them onto a 'normal' software package[7]. The UoS proposed leaving devices in-situ for further research and looked to understand how this could be financed and accessed for future projects. Whilst UoS were not able to find funding to retain the SAVE population and give customers the option to participate in a future project, SSEN worked closely with GDPR and legal teams to ensure that

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[7] Customers who received an ASUS router (to provide SIM based internet) were treated with a slightly modified approach noting they would only gain from retaining loop through connecting it to their own internet as the project could not pay for the ongoing SIM costs attached to these post project.

where customers accepted, details could be passed to UoS who could retain a database of customers with the 'loop' device should future funding be accessible.

In order to further minimise the costs of decommissioning, the SAVE project team recognised the cheapest initial way to communicate with customers was via letter. At the end of January[8] 2019 (28/1/19) the project sent their first communication letter to 50% of the SAVE customer base (TG3 and TG4) providing three options: (1) acknowledge retention of the loop device by signing an included consent slip and sending this back to the project in a pre-paid envelope; (2) return the loop device (with pictures and safety notes to remind customers what and how) in a pre-paid jiffy bag[9]; (3) a phone number to call for those not comfortable removing loop or requiring more information.

Two weeks later on 15/2/19 this was followed up with a second letter reminding customers of their options, providing a new pre-paid return letter and jiffy bag and this time noting, if SSEN had no response they would attempt to remove the loop via phone calls and 2 field visits per household. If customers did not want a phone call or field visit they were offered a means of opting out. The following week phone calls were made to all remaining customers and field visits began once all customers had been called at least once (25/2/19). Upon each unsuccessful visit the BMG field teams would leave a calling card with the ability to re-arrange a field visit.

At the end of February (25/2/19), the second half of the treatment group were rolled onto the same programme[10]. Decommission was completed by BMG and Navetas by 20th May 2019.

SAVE's substation monitors were removed in line with SSEN policies and procedures ensuring appropriate RAM's and safety auditing in January 2019.

From a dissemination perspective, throughout the projects life-span the team has worked to ensure knowledge has been shared across industry forums and fed into ENA DSO discussions. Moving into the final 6 months of the project as SAVE collated its final learning and 'project story', these efforts were ramped up through a series of internal sessions, DNO roadshows, a workshop with suppliers, a lunch and learn with Ofgem, and meetings with BEIS to inform the future of energy efficiency; all culminating in the projects two-part closedown event in Westminster.

In March 2019 SAVE was also awarded winner of the Networks Award Stakeholder Engagement Initiative of the Year. A full summary of all these events will be included in the projects closedown report.

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[8] The project gave 1 month for data to catch-up on any offline loops. The loop device can store data for up to 30 days, at this point if a clamp still hasn't communicated old data will start to be overwritten.
[9] Navetas would then dispose of all Loops in line with WEEE regulation. Unfortunately these could not be re-used by the supplier due to being outdated models no longer sold by the supplier.
[10] This was done in two halves to allow an extra month of data from TP1 and TP2 customers for longitudinal analysis required for the UoS to estimate long-term effects on LED trials.

# 3   Consistency with full submission

*Ofgem guidance: The DNO should confirm that the Project is being undertaken in accordance with the full submission. Any areas where the Project is diverging or where the DNO anticipates that the Project might not be in line with the full submission should be clearly identified. The DNO should also include, where appropriate, references to key risks identified under "Risk Management".*

The SAVE project is being conducted in accordance with the full submission.  To ensure all commitments from this submission are completed in a timely and efficient manner, the project has developed a comprehensive structure with clear linkages to the text of the full submission. The project has linked this with its wider work breakdown structure (WBS) assigning ownership and providing clarity to all key project contributors.

The project has discussed with Ofgem, pushing back the delivery of the projects closedown report from that originally stated in the project bid document. SAVE's project bid suggests this is due in June 2019 the same time as project closure. In order to ensure the closedown report accounts accurate final project finances, and to ensure the NIT is delivered so to maximise the tool/ elements of the tools adoption across DNO's, the project has requested it be treated in line with other LCNI/NIC projects and Ofgem governance[11]; this permits the closedown report to be submitted up to three months after project completion (30th June 2019).

Ofgem's project officer for SAVE has agreed this is acceptable.

The project has not made any change requests in this reporting period and has no plans to do so in the remainder of the project.

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[11] Ofgem governance notes: "The Network Licensee must submit its Close Down Report to Ofgem within three Calendar Months of the Project end date set out in the Project Direction" (Electricity Networks innovations Competition Governance Document v.3.0, June 2017)

# 4   Risk management

The Project risk register is a live document designed to identify actual and potential barriers to the satisfactory progress of the SAVE project.  The register is used to target resources and to develop control measures and mitigations.  The SAVE risk register is a single log of risks as identified by SSEN, University of Southampton, DNV GL, Future Solent and Neighbourhood Economics.  The register is reviewed at the monthly Project Partner Review Boards and is reported to the SSEN Project Steering Group.

Risks are assessed against their likelihood and impact, where the impact considers the effect on cost, schedule, reputation, learning, the environment and people.  Risks are scored before (inherent) and after (residual) the application of controls. Risks which are closed are removed from the live register, with any learning captured through the Learning Moments and Project Trials described in section 7.

Increased focus is placed on risks with amber or red residual scores and also on all risks with a red inherent score (to ensure there is no over-reliance on the controls and mitigation measures).  At present there are 4 risks that fall into this category.  The project has listed these risks and amber rated risks below in Figure 9 as well as how the project is managing them.

**Figure 9 Risk Register**

| Risk ref # | Confidential to Partner | Source | Owner | Phase | WBS Category | Status | Risk Description | Inherent Impact – Cost | Schedule | Reputation | Learning | Environment | People | Likelihood | Risk Control/Mitigation Actions | Residual Impact – Cost | Schedule | Reputation | Learning | Environment | People | Likelihood | Inherent Score | Inherent Contingency Cost (wk's) | Inherent Contingency Delay (wks) | Residual Score | Mapping Ref | Residual Contingency Cost (wk's) | Residual Contingency Delay (wks) | Risk Review Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| wp1-13 | | SEPD | SEPD | | | Active | Final Reporting in June 2019 subject to a large amount of dependencies hampering quality of reports | 2 | 3 | 3 | 4 | 1 | 1 | 4 | Largely managed to date. Project may need to manually run model for initial results for SDRC 8.2 with model automation coming later | 1 | 2 | 2 | 3 | 1 | 1 | 3 | 16 | 7.0 | 0.7 | 9 | 33 | 0.2 | 0.0 | 09/05/2019 |
| wp2-13 | | SEPD | UoS | | | Active | Creating customer categories which can accurately represent the impact of different interventions in addition to accomodating factors which affect how different households use their energy. Limitations of spatial microsimulation modelling (linking consumption with household characteristics available in Census): related to modelling scale, SAVE sample size and weighting methodology. In some cases this is causing rarity of customer types in certain categories. Large uncertainties in determining customer categories due to limited intervention effects also making this challenging | 2 | 4 | 2 | 4 | 1 | 1 | 4 | UoS development of customer types has highlighted limitations due to sample size and taken into account in reporting recommendations for customer types. Showing a range of different case studies to highlight where SAVE interventions will/won't work. Try to manage high uncertainty by modelling feeders with high no's of customers. By testing early on feeders with high no's of customers to manage/identify uncertainty in desktop studies | 2 | 3 | 2 | 3 | 1 | 1 | 3 | 16 | 7.0 | 0.9 | 9 | 33 | 0.7 | 0.1 | 09/05/2019 |
| WP3-7 | | SEPD | EA Tech | | | Active | The network model does not correctly estimate the impact of the interventions either due to A) Calculation errors. B) The way that the data is processed i.e. picking up data from the wrong fields or outputting it in the wrong fields, and/or C) Due to the sequencing of computational tasks leading to an incorrect assessment of the impact of the interventions. Pricing Model/Optionality/main unproven systems | 2 | 3 | 2 | 2 | 1 | 1 | 4 | Testing being carrie dout in sprints by project team and supported through commercial expertise of consultants TNEI to ensure accurate results | 2 | 1 | 2 | 3 | 1 | 1 | 3 | 12 | 0.7 | 0.1 | 6 | 33 | 0.7 | 0.0 | 09/05/2019 |
| WP3-23 | | SEPD | SEPD | | | Active | How the CEC trials feed robust information into NM. Issue is current factors influencing profiles are subject to error and do not align with customer profiles | | | | | | | | It is intended this would be done in same 'customer profile' manor as Customer Model. New customer profiles being scoped. CE needs to clarify what data will be put into model for Paul on this. Talk with MF and DM | | | | | | | | 12 | 7.0 | 0.7 | 8 | 24 | 7.0 | 0.4 | 09/05/2019 |

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## 5 Successful delivery reward criteria (SDRC)

The SAVE project has identified six Successful Delivery Reward Criteria (SDRC) left for delivery to Ofgem, highlighted in Table 4 below. Each of these has a defined criteria, evidence requirement and a target date for completion.  The following table lists the individual SDRC components in chronological order and details the Project's progress towards their achievement for those due to be completed by project closedown (June 2019).

| | Completed (SDRC met) | | Emerging issue, remains on target | | SDRC completed late |
|---|---|---|---|---|---|
| | On target | | Unresolved issue, off target | | Not completed and late |

**Table 4 SDRC Delivery**

| SDRC | Due | Description | Status |
|---|---|---|---|
| SDRC 3.1 | 28/02/2014 | Create Customer Engagement Plan | Complete – submitted to Ofgem on 28/02/2014 |
| SDRC 8.9 | 19/06/2014 | 6 monthly Project Progress Report | Complete - and due to be submitted every 6 months until end of the Project |
| SDRC 1 | 30/06/2014 | Produce report on learning from UK and international energy efficiency projects and the impact on the design and implementation of the SAVE project | Complete – submitted to Ofgem 30/06/2014 |
| SDRC 8.9 | 19/12/2014 | 6 monthly Project Progress Report | Complete - and due to be submitted every 6 months until end of the Project |
| SDRC 2.1 | 31/12/2014 | Create initial customer model | Complete – submitted to Ofgem 31/12/14 |
| SDRC 7.1 | 31/12/2014 | Create initial network model and parameters for tool | Complete – submitted to Ofgem 31/12/14 |
| SDRC 8.9 | 19/06/2015 | 6 monthly Project Progress Report | Complete - and due to be submitted every 6 months until end of the Project |
| SDRC 5 | 30/06/2015 | Identify control and sample groups | Complete – submitted to Ofgem 30/06/15 |
| SDRC 6 | 30/06/2015 | Install 80% of clip-ammeter | Complete – submitted to Ofgem 30/06/15 |
| SDRC 8.9 | 19/12/2015 | 6 monthly Project Progress Report | Complete - and due to be submitted every 6 months until end of the Project |
| SDRC 8.9 | 19/06/2016 | 6 monthly Project Progress Report | Complete - and due to be submitted every 6 months until end of the Project |
| SDRC 8.9 | 19/12/2016 | 6 monthly Project Progress Report | Complete - and due to be submitted every 6 months until end of the Project |
| SDRC 8.9 | 19/6/2017 | 6 monthly Project Progress Report | Complete - and due to be submitted every 6 months until end of the Project |
| SDRC 4 | 30/06/2017 | Create commercial energy efficiency measures | Complete – submitted to Ofgem 25/1/18 |
| SDRC 2.2 | 31/12/17 | Revise Customer Model | Complete – submitted to Ofgem 28/12/17 |

| SDRC 7.2 | 31/12/17 | Revise Model and Tool | Complete – submitted to Ofgem 28/12/17 |
|---|---|---|---|
| SDRC 3.2 | 31/01/2018 | Hold meetings to share progress, experiences and next steps with customers involved in trials on a six monthly basis | Complete – submitted to Ofgem 25/1/18 |
| SDRC 8.9 | 19/06/2018 | 12 monthly Project Progress Report | Complete – submitted to Ofgem 13/6/18 |
| SDRC 8.8 | 30/06/2019 | Produce community coaching trial report | Complete – submitted to Ofgem 28/6/18 |
| SDRC 8.3 | 30/06/2019 | Produce LED trial report | Report finalisation - On track for submission to Ofgem |
| SDRC 2.3 | 30/06/2019 | Finalise customer model | Report finalisation - On track for submission to Ofgem |
| SDRC 7.3 and 8.5 | 30/06/2019 | 'Finalise network Model' and 'Produce network pricing model report' | Report finalisation - On track for submission to Ofgem |
| SDRC 8.2 | 30/06/2019 | Produce network investment tool key outcomes report | Report being written - On track for submission to Ofgem |
| SDRC 8.6 and 8.5 | 30/06/2019 | 'Produce customer and network modelling report' and 'Produce network pricing model report' | Report being written - On track for submission to Ofgem |
| SDRC 8.4 and 8.7 | 30/06/2019 | 'Produce data-informed engagement trial report' and 'Produce DNO price signals direct to customers trial report' | Report finalisation - On track for submission to Ofgem |

The following table lists the remaining SDRCs in chronological order:

| SDRC | Due | Description |
|---|---|---|
| SDRC 8.1 | 30/9/2019 | Produce project closure report |

Table 4 above details that SAVE has combined several SDRC's to produce a more coherent message to Ofgem and readers of the SDRC. The reasons for combining these SDRC's are given below:

SDRC 7.3 and 8.5- Network and Pricing Model - Given the efficiency found through creating the network and pricing model in a single piece of software to smooth transition between the two models; these software interfaces interact closely and tell a more coherent user journey linked together. This report will tell a story of the build and isolated use case of each of these models.

SDRC 8.5 and 8.6 - Customer and Network and Pricing Model - This report was designed to show the interaction between SAVE's models and how data flows between them when used for different purposes. The project team felt it was just as important to include the pricing model in this and hence created a second part of the pricing model SDRC (8.5) linked in with SDRC 8.6.

SDRC 8.4 and 8.7- Data Informed Engagement Trial and Price Signals Direct to customers report – The data informed and price signal trials both followed identical philosophies in TP1 and TP2, as outlined in the project bid document, to understand what and if price signals had an additional impact to data alone. To best draw this comparison and understand trial design, these reports were deemed best combined.

In addition to the core reporting outlined above the project has delivered three business as usual (BaU) integration reports to support the delivery of SAVE's outputs into industry standards. This includes:

- A regulatory report published with DNV GL and Energy Saving Trust to understand any policy based barriers or opportunities that could affect the SAVE trials rollout in BaU.
- An operational report published with TNEI looking specifically at planning policies and procedures both across DNO's and within SSEN; to highlight an integration pathway for operation of the projects Network Investment Tool.
- A commercial report published with CAG consulting and University of Reading, as a sister report to their work conducted with Citizens Advice looking at new methods of charging, specifically the concept of 'core' consumption.

Each of these reports will be published prior to completion of the project.

## 6   Learning outcomes

*Ofgem guidance: The DNO should briefly describe the main learning outcomes from the reporting period. It should update Ofgem on how it has disseminated the learning it generated as part of the Project over the last six months*

The learning objectives for the Project are:

- to gain insight into the drivers of energy efficient behaviour for specific types of customers
- to identify the most effective channels to engage with different types of customers
- to gauge the effectiveness of different measures in eliciting energy efficient behaviour with customers
- to determine the merits of DNOs interacting with customers on energy efficiency measures as opposed to suppliers or other parties

These will be answered as a result of carrying out the following project objectives:

- Create hypotheses of anticipated effect of energy efficiency measures (via commercial, technical and engagement methods)
- Monitor effect of energy efficiency measures on consumption across range of customers
- Analyse effect and attempt to improve in second iteration
- Evaluate cost efficiency of each measure
- Produce customer model revealing customer receptiveness to measures
- Produce network model revealing modelled network impact from measures
- Produce a network investment tool for DNOs
- Produce recommendations for regulatory and incentives model that DNOs may adopt via RIIO

At the start of each of SAVE's closedown SDRCs (all those submitted in June 2019) clear reference is made to the specific learning outcomes identified within said work-package.

## 6.1 Learning Outcomes

There are six SDRC's being worked on or completed within this reporting period. In addition to this, the project has completed its third and final trial phase with close-out activities well under way. Alongside this, the project has delivered a series of models which have been integrated into a functioning Network Investment Tool. This section will report key learning from each SDRC in Table 5 below. Further captured learning outcomes are bulleted in section 6.2. 'learning moments'

**Table 5 Learning capture**

| SDRC Report | Learning Captured |
|---|---|
| SDRC 8.3 LED trial report | • As expected, free bulbs and installation was very popular and will likely be well received by a majority of customers if offered. In addition to popularity, this approach is preferable to others as: <br>     o Direct installation and removal of old bulbs can help ensure the effects of efficient lighting is seen by the network. <br>     o Direct installation and removal of old bulbs can limit the number of bulbs stored or sold second-hand. This was an especially common issue in other projects where efficient bulbs were handed out at events or sent through the post. Many people will view the efficient bulb as a replacement for when an old bulb fails. <br> • A DNO may want to investigate installing more LED bulbs per house and/or other forms of energy efficiency as energy reductions were not statistically significant in many weeks of the observation period. White goods are a major energy user in most domestic properties and would be a reasonable area to consider. <br> • If offering discounted bulbs, marketing should target a very large audience as take up will likely be low. <br> • Thought should be given to ways to maximise participation if offering bulbs at a discount, such as: <br>     o Making the sales website as easy to navigate as possible. <br>     o Clearly stating the price per bulb for easy comparisons to other retailers. <br>     o Partnering with well-known and trusted retailers. <br>     o It may also be worth exploring other (non-online) sales options. <br> • Not all household types respond equally: <br>     o Treatment effects are larger in single person households (effects decrease as number of occupants increases). <br>     o Treatment effects are larger in large homes (effects decrease as house size decreases). <br>     o Treatment effects are larger in households with retired occupants and increases as the age of the occupant increases. <br>     o If DNOs are looking to maximise impact, it may be worth targeting these types of households. This could be done by partnering with local organisations, for example those that regularly work with older |

| | citizens. However, it should be noted that the differences between these groups had very large uncertainties. Future research should be done to more robustly determine where LED installations will have the greatest impact. <br> • Future SAVE-like schemes may be able to maximise their value by: <br>    o Partnering with organisations such as local councils, charities or aggregators that can either: <br>       ▪ Contribute additional funding sources, or <br>       ▪ Claim benefits that DNOs cannot, such as carbon savings or energy savings. <br>    o Encouraging measures that are also eligible for funding from other Government schemes. In this case, SAVE funding may be able to act as 'gap-funding' to enable projects to move forward that may not be cost effective with Government funding alone. |
|---|---|
| SDRC 8.4 and 8.7 Data informed and Price Signals Report | • Customers often need some prompting to save energy; treatment effects are generally highest after an email or postcard that reminds them about the 'ask'. <br> • However, messaging, if too frequent, may lead to fatigue and can result in higher than average energy consumption. <br> • Postal communications are most effective when communicating one-off reduction 'asks'. However, these are also more expensive and unlikely to be possible for unplanned peaks (due to longer lead times required). <br> • If deploying an opt-in banded price trial or TOU scheme, marketing should target a large audience as take-up will likely be less than 40%. <br> • Those that opt-in to a banded price trial or TOU scheme may be less motivated by money than the general population. They also may result in self-selection bias, as households are unlikely to join the TOU scheme if they cannot or will not adjust their consumption. <br> • Price signals work when sufficiently high, however these results are unlikely to be sustainable long-term. Price signals are also more effective in an opt-out trial that includes a wider range of customers than in an opt-in trial. |

## 6.2   Learning Moments

The following 'Learning Moments' have been recorded during this reporting period:

- Field teams at BMG have been unable to train new staff due to commitments elsewhere, as a result a video was recorded which could be used as training materials for any new resource. It is recommended this is done at the start of the project, to ensure if field team turnover is high training material is always available.
- For price signal trials the project didn't specify in the materials whether or not they'd get the rebate if they opted out, in hindsight this would ensure clarity to customers.
- It would be good practice that in any customer recruitment exercises, teams have customers spell their name. Especially if the project intends on issuing cheque payments whereby incorrectly spelt names will cause issues/inability to pay.

- Software should be delivered in short sprints from the start of design (bi-weekly) with details of conversations recorded in a central cloud platform to ensure all working on the product have visibility of decisions made.
- Towards the second year of LED trials the effect of the initiative seems to largely disappear and become erratic. Further investigation shows how a small number of outliers can greatly influence treatment effect estimation.

## 6.3 Dissemination Activities

The table below shows the main dissemination activities which have been completed in this period:

**Table 6 Dissemination Activities**

| Leading Partner | Date(s) | Description |
|---|---|---|
| SSEN | 22/5/18 | ALEO Spring Meeting- Presentation on energy storage and value that DNO led EE could bring to local councils |
| SSEM | 13/6/18 | Meeting With Citizens Advice- Overview of SAVE Project learning and scope for 'stacking' with third parties |
| SSEN | 13/6/18 | Meeting with Energy Saving Trust- Overview of SAVE and understanding of wider industry EE progress |
| SSEN | 12/7/18 | UKPN- Energy Wise Project Closedown- Presentation on SAVE to industry |
| UoS | 10/7/18 | PRESAG annual meeting- UoS exhibited its work on SAVE |
| UoS | 1/8/18 | New Zealand Energy Network Association 'Network Transformation Roadmap' (NTR) Project- teleconference trying to re-imagine local distribution in a zero-carbon future led by Ben Anderson |
| SSEN | 19/7/18 | Discuss EE initiative with Thames Water-To share findings of SAVEs LED trials and discuss wider EE rollout |
| SSEN | 25/7/18 | Discuss energy efficiency initiative with SGN-To share findings of SAVEs LED trials and discuss wider EE |
| SSEN | 16/7/18 | Meeting with GenGame (NPG ACE partners)- update on ACE following closedown. Discussed potential to integrate GenGame with Loop. |
| SSEN | 16/7/18 | Meeting with UCL-Overview of dynamic pricing trials, UCL shared some work done with Citizens Advice and literature on price elasticities |
| SSEN | 1/8/18 | Meeting with Carbon Trust-Understand means of scaling, additional finance and moving to SME sector |
| SSEN | 17/8/18 | SSEN internal Extended Leadership Team SAVE EE trials overview- Get buy-in to roll-out BaU |
| SSEN | 21/8/18 | Presentation to SSEN Customer Relationship Manager in north- Get buy-in to roll-out BaU |
| SSEN | 30/8/18 | Presentation to local LV planners on how SAVE EE trials could be rolled-out- Get buy-in to roll-out BaU |
| UoS | 1/7/18 | TWITTER campaign using SAVE data to estimate Electricity consumption in the UK during matches in 2018 World Cup. |
| UoS | 6/8/18 | Presentation to BRANZ (Building Research NZ) |

| UoS | 10/8/18 | Department of Economics Seminar, University of Otago |
|---|---|---|
| SSEN | 13/9/18 | Discussion with PAMIS-Share SAVE learning with wider communities/stakeholders |
| SSEN | 31/10/19 | BEIS workshop on Energy Efficiency following their call to evidence-Provide government evidence of barriers and opportunities to EE. |
| SSEN | 5/11/19 | Parliamentary event in HoP displaying SSEN innovations in exhibition format |
| UoS | 11/19 | Teleconference with Policy Advisors, Ministry of Business, Innovation and Employment, NZ to discuss evidence of effectiveness of price and other incentives for customer demand response in the UK |
| SSEN | 6/2/19 | SSEN Presentation at UoR 'DeepRed' project closedown event- To engage industry, update on SAVE and share learning |
| SSEN | 26/2/19 | Green alliance community energy 2.0 panel session- Panel discussion with audience of 50+ asking Q and A's on community energy, surrounding policy and future charging. SSEN relayed SAVE learning and feed-in to BaU through SCMZ |
| SSEN | 26/2/19 | Green alliance community energy 2.0 report |
| UoS | 15/3/19 | 'We Got The Power'-working paper based on SAVE reporting of statistical analysis |
| SSEN | 11/4/19 | Ofgem Lunch and Learn-Presentation with DSO technical Authority and Head of Network Trading- 25 min presentation on SAVE with 20 mins for Q and A SAVE received well with interest in data availability |
| SSEN | 8/5/19 | SAVE Supplier Workshop- Led by National Energy Action with presentations from BEIS, SSEN, NEA, DNV GL and Citizens Advice |
| SSEN | 26/3/19 | SAVE Network Awards 'Stakeholder Engagement Initiative of the Year' Winner |
| SSEN | 26/3/19 | SAVE presented at Networks Conference and how it could be translated to SCMZ |
| UoS, DNV GL | 26/4/19 | Presentation of two papers (one from UoS and one from DNV GL) at International Conference on Renewable Energy (ICREN) 2019 conference, UNESCO, Paris, 24 - 26 April 2019 |
| SSEN | 22/5/19 | SAVE Utility Week Conference- SAVE presented on in context of joint utility working and stacked benefits |
| SSEN | 6/6/19 | SAVE Project Closedown Event- 2 part event summarising all SAVE trials with follow-up in houses of parliament. To be reported in full in SAVE closedown report |

## 7   Business case update

*Ofgem guidance: The DNO should note any developments or events which might affect the benefits to be gained from the Second Tier project. Where possible the DNO should quantify the changes these developments or events have made to the Project benefits compared to those outlined in the full submission proposal.*

SSEN's core purpose is to provide the energy people need in a reliable and sustainable way. The learning from the SAVE project will inform our strategy to deliver on this priority with the aim of supporting our core purpose.

Through these trials, SSEN hopes to quantify the most cost effective approach to having a measurable change in the operation of the distribution system and develop means of controlling demand reduction in order to be able to rely on the demand reduction to defer or avoid network reinforcement.

Drawing on previous research and project learning up until now the project expects to see reductions of between 5-10% in overall electrical consumption for the interventions being trialled, although this reduction and potential benefit to the networks is expected to vary depending on multiple variables.

Expected reductions achieved as a result of the interventions being trialled in the Project are shown below, these have been updated since full submission following learning from the projects analysis.

| | | | | |
|---|---|---|---|---|
| Average annual household consumption (kWhs per year) | 4,226 | 4,226 | 4,226 | 4,226 |
| *Measure* | *LEDs* | *Data informed engagement* | *DNO rebates* | *Community Coaching* |
| Average annual household lighting consumption (kWhs per year) | 634 | | | |
| Expected total reduction (%) | 8.0 | 10 | 12 | 10 |
| Expected annual reduction (kWhs per year) | 338 | 423 | 507 | 423 |
| Expected hourly reduction (kWhs) | 0.04 | 0.05 | 0.06 | 0.05 |
| Expected hourly reduction (Watts per hour) | 39 | 48 | 58 | 48 |
| Expected daily reduction (Watts per day) | 463 | 193 | 232 | 193 |

**Small LV Urban**

| | | | | |
|---|---|---|---|---|
| Reduction on LV cable with 150 customers (kW) | 6 | 7 | 9 | 7 |
| Rating of circuit (kW) | 200 | 200 | 200 | 200 |
| Headroom made available (%) | 2.89 | 3.62 | 4.34 | 3.62 |
| Equivalent number of 3kW heat pumps or EVs now able to connect (without diversity) | 2 | 2 | 3 | 2 |

The project team notes that as trial learning has progressed the significant additional value of trials has become increasingly apparent. Namely this includes value to third party stakeholders (BEIS, other utilities etc.), social benefits and carbon reductions. The project team notes this business case is inherently limited to those benefits that accrue solely in terms of network capacity released. SDRC 8.8 'produce community coaching report' further details how some of these benefits and how they might be accounted in future. A full updated business case will be supplied in SAVE's closedown report.

## 8   Progress against budget

*Ofgem guidance: The DNO should report on expenditure against each line in the Project Budget, detailing where it is against where it expected to be at this stage in the Project. The DNO should explain any projected variance against each line total in excess of 5 per cent.*

Project expenditure is within the budget defined in the Project Direction. The table below details expenditure against each line in the Project Budget and compares this with planned expenditure to date[12].

At point of last reporting the SAVE project's re-design of TP3 instigated a realignment of budget across project codes. This is reflected in the column 'budget' below.

Expenditure reported below is reflective as of 16th May 2019. This will be the projects preliminary budget update before final figures are published in the SAVE Closedown Report. As a result the project publishes it's forecasted cost at completion (FCAC) to provide visibility of total expected spend.

Currently the SAVE project is anticipating and underspend meaning money will be returned to customers. Precise amounts and amount to be returned to Ofgem will be detailed in SAVE's closedown report. This underspend is reflective of efficiencies the project team has sought out throughout SAVE's lifecycle. A full overview of this will be available in the SAVE Project Closedown Report. In line with final reporting governance the below comments reflect all items with forecasted spend variance in excess of 10%:

- Labour Spend (35% under or £597,000 under) – The SAVE Project team have worked to ensure resource procured onto the project is skilled to work across several work packages and cost-efficient. LEAN project management methodologies have minimised risk and implemented processes to allow PM time to focus across commercial and output orientated roles.
    - o   Keeping a close integrated project team has minimised time lost on disputes and ensured partners are able to deliver added value from their contracts to address project aims, objectives and success criteria.
- Payments to Users (37% under or £175,000) – This pot of money was allocated for incentive payments for trial surveys and in price signal trials. Lower than anticipated 'pass rates' to SAVE's early trials kept payments to users low. Following SAVE's learning from each trial period it became apparent that motivators outside of price acted as greater drivers for customers to change consumption. With the advice of behavioral experts 'Nudge' and other such techniques (i.e. lotteries) were determined more realistic and cost-effective techniques than simply increasing payment amounts.
    - o   This was further supported by the re-design of TP3 to test a dynamic price signal, in order to test a realistic payment rate lower customer payments were required than they would have been for further 'event'/Critical Peak Rebate (CPR) based initiatives.

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[12] Expenditure is compared with a dynamic assessment of project phasing which reflects the nature of specific contract payments and physical delivery milestones.  A comparison of expenditure with phased budget will often indicate a payment lag due to the nature of invoicing processes.

- o From a survey perspective whilst budget had been allocated for a survey with participants each year in the form of follow-up 'update surveys' and 'time-use diaries' achieving this with the full project sample was far more challenging (1609 completed in TP1 and 738 completed in TP3).
- Other (78% or £311,000)- The majority of spend for the projects 'other' category is allocated for dissemination activities. Through working closely with industry (namely the other DNO's and academia), SAVE has been able to largely 'piggy-back' on existing dissemination opportunities. Through managing the projects dissemination internally the project has also saved on contractor fees (this has in part come at the cost of travel and expenses, hence the re-allocation of 15k worth of budget from 'other' to 'travel and expenses' Table 7 below). Where the SAVE project has led events, the project team have worked to minimize costs to maximise value for money for customers through competitive tender exercises and utilizing project partner venues and contacts, one example of this was the low cost yet high impact of the projects closedown event in the Houses of Parliament. Evidence of the extent of the SAVE projects dissemination efforts are illustrated in Table 6 above.

**Table 7 SAVE Budget Expenditure**

| | Budget | Revised Budget | Expenditure ITD | Forecast Cost At Completion (FCAC) | Projected Variance (at project conclusion) | | |
|---|---|---|---|---|---|---|---|
| | | | | | (£K) | % | # |
| **LABOUR** | £1,678,320 | £1,678,320 | £1,020,898 | £1,081,000 | -597,320 | 64.4 | |
| **EQUIPMENT** | £1,037,000 | £1,037,000 | £1,020,213 | £1,020,000 | -17,000 | 98.4 | |
| **CONTRACTORS** | £5,208,200 | £5,208,200 | £4,358,600 | £4,686,000 | -522,000 | 90 | |
| **IT** | £586,850 | £586,850 | £599,226 | £600,000 | 13,150 | 102.2 | |
| **TRAVEL & EXPENSES** | £36,400 | £51,400 | £44,158 | £50,000 | -1,400 | 97.3 | |
| **PAYMENTS TO USERS** | £472,300 | £472,300 | £294,278 | £297,000 | -175,300 | 62.9 | |
| **DECOMMISSIONING** | £206,930 | £206,930 | £80,920 | £188,000 | -18,930 | 90.9 | |
| **OTHER** | £417,680 | £402,680 | £26,722 | £92,000 | -310,680 | 22 | |
| | | £9,643,680[13] | | £8,014,000 | -1,629.48 | 83.1 | |

Notes: The budget totals used are reflective of the new SAVE budget structure, detailed in Formal Change Request CR-2 and agreed by Ofgem in July 2016.

[13] It should be noted this value assumes a £334,750 interest rate, actual rates of interest look to have been lower than this. As a result figures may vary in final reporting when final interest payments have been accounted.

## 9   Bank account

Transaction details for the SAVE Project Bank account during this reporting period are listed in the Appendix.   This extract has been redacted to protect the financial details of transacting parties; the full, un-altered copy has been submitted in a confidential appendix to Ofgem.

A summary of the transactions to date are shown in the table below:

| Description | Totals (June 2018 – June 2019) |
|---|---|
| Payments out of account | £1,264,687.34 |
| Interest | £6,378.18 |
| **Balance** | **£1,911,068.28** |

## 10 Intellectual Property Rights (IPR)

No Relevant Foreground IPR has been generated or registered during the June 2018 – June 2019 reporting period.  No Relevant Foreground IPR is forecast to be registered in the next reporting period.

## 11 Other

No further details.

## 12  Accuracy assurance statement

This Project Progress Report has been prepared by the Project Manager and Project Engineer and reviewed by the DSO & Innovation Delivery Manager before final sign-off by the Head of Future Networks, and approval by the Distribution System Operations Director.

This report has been corroborated with the monthly minutes of the Project Steering Group[14] and the Project Partners Review Board to ensure the accuracy of details concerning project progress and learning achieved to date and into the future.  Financial details are drawn from the SSE group-wide financial management systems and the Project bank account.

| | | |
|---|---|---|
| Prepared by: | Charlie Edwards | SAVE Project Manager |
| Reviewed by: | Stewart Reid | Head of Asset Management & Innovation |
| Final sign off: | Andrew Roper | Distribution System Operations Director |

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[14] The Project Steering Board meets as part of an overall SSEN Innovation Steering Board

**Appendix 1 - Redacted copy of bank account transactions**


**Appendix 2– Open Day 9, Community Energy Coaching 1 year on**