2018

Consultation on the Interim Solution for Domestic Managed Electric Vehicle Charging

protecting local electricity network assets in the absence of market-led solutions

Results

Version 1.0

HELPING ELECTRICITY NETWORKS FACILITATE ELECTRIC VEHICLE UPTAKE

DELIVERED BY EA TECHNOLOGY ON BEHALF OF ALL GB DISTRIBUTION NETWORK OPERATORS, AND LED BY SCOTTISH AND SOUTHERN ELECTRICITY NETWORKS

Scottish & Southern Electricity Networks

ea technology

Contents

1 Context

1.1 Introduction to the Smart EV project

The Smart EV project is funded by Scottish and Southern Energy Networks (SSEN) through its Network Innovation Allowance and delivered by EA Technology. It is a follow-on project to My Electric Avenue. The evidence from My Electric Avenue showed that electric vehicles (EVs) will cause an impact on the local electricity network, requiring significant investment by Distribution Network Operators (DNOs). My Electric Avenue also demonstrated that demand side response solutions can work, and can work sympathetically with the network, EVs and people.

SSEN, through the Smart EV project and specifically the Consultation on the Interim Solution for Domestic Managed Electric Vehicle Charging (the Consultation), sought views on a proposal to implement managed charging technology at customers' premises where the network has faulted, or where network monitoring and analysis shows that there is a high risk of fault due to the number of EVs charging in a local area. Reassuringly, studies done through the Smart EV project have shown that managed charging is likely to have little or no impact on an EV driver's ability to drive to where they need to go the next day. This is not intended to impede demand-side response offerings from a flexible energy market – the interim solution would only come into play if the market is unable to deliver.

As a secondary objective, the Consultation also sought views on a longer-term option using smart meters to control EV charging rates.

1.2 The Challenge of Electric Vehicles

Electric vehicles (EVs) are set to play an important role in improving our air quality, with both UK Government and Scottish Government stating that by 2040 and 2032 respectively, all new cars and vans must be zero emission. The Office for Low Emission Vehicles and the Department for Transport predict that there could be over 10 million EVs on UK roads by 2030. Our local electricity networks will need to evolve and change to cope with the growing trend towards electrification of both transport and heat. These changes will include traditional upgrading of networks, but also a new and increasingly viable range of smart and market-based solutions.

The majority of our local electricity networks were designed and built before the growth of EVs could have been predicted. Many do not have sufficient spare capacity to charge large numbers of EVs at our homes. DNOs are taking a range of measures to ensure that their networks are reliable. On average a typical EV being charged at home is equivalent to the additional demand of an entire house. Smart technology interventions can readily manage this additional demand to support clusters, or groups, of EVs on residential streets.

2 Aims of this Summary Report

This document sets out a summary of the responses received to the Consultation in support of the Smart EV Project; this work should achieve the following outcomes:

- Provision of clear steer to SSEN to inform a procurement specification for an interim solution for managed EV charging
- An indication as to whether a longer-term solution should be pursued for the management of EVs, using the smart meter infrastructure
- Informing policy on the standardisation of smart charging moving forward.

3 Smart EV Consultation

The Consultation opened on 23 March 2018 and closed at midnight on 30 April 2018. Several stakeholders requested extensions to this deadline. All responses were received no later than 8 May 2018. The Consultation asked for views on an interim solution for managed electric vehicle (EV) charging, and also sought views on a longer-term solution using smart meters. In particular, we encouraged and welcomed stakeholder views from those with an interest in low carbon energy relating to any of the following sectors:

- Automotive OEMs
- Consumer bodies
- Distribution Network Operators (DNOs)
- Electricity suppliers
- Electric Vehicle Supply Equipment (EVSE) supply chain
- Household smart technology providers

For the purposes of this summary report, and driven by the submissions received, stakeholder responses are collated under the following groups:

- Automotive
- Consultant
- Consumer body
- Charge point supply chain
- Distribution Network Operator
- Energy governance services
- Energy market participants
- Energy supplier
- Government and NGOs
- Other

'Other' encompasses responses from a local council, an academic, an energy storage manufacturer, and two renewable energy bodies. The consumer body, Citizens Advice, has given its permission for its response to be made public, and as such is cited by name throughout this document.

The Consultation was based on 14 questions split into two focus areas; the interim solution for managed electric vehicle charging, and the possible longer-term solution using smart meters. The two focus areas and component questions are restated below. The responses have been statistically analysed and the key response themes drawn from each respective stakeholder group under each focus area. The analysis is then summarised on an overall response basis.

Questions on the interim solution for managed electric vehicle charging

1. Do you agree that the interim solution, deployed within the use cases and governance arrangements described, would be in customers' best interest?
2. Do you believe that the market (i.e. technical readiness of potential manufacturers / suppliers of the interim solution) is mature enough to supply the interim solution within the next two years at roughly the costs outlined?
3. The use case of the interim solution has two key requirements:

i. Rapid deployment in any street (within a day)

ii. Available to deploy at required volumes (i.e. a reasonable proportion of households on a given street) within the next 2 years

Are you aware of any demand-side response market-led solutions/services that could be provided to DNOs that could viably and economically meet these criteria at a local level that we may have overlooked or discounted prematurely?

4. Do you believe that the interim solution is technically feasible to provide a robust method to manage demands on local networks?
5. Do you agree that DNOs should be able to deploy the interim solution, or a variant of it, as described in the use cases in section 2.1?
6. Do you agree that the interim solution should be optional, even in emergency situations, i.e. that the customer should give consent to its use?
7. Do you believe there should be any additional safeguards for customers, other than those cited in section 2.2? Do you have any comments on the governance arrangements outlined?
8. Do you believe that customers should be compensated for the installation and/or operation of an interim managed charging solution? If so, please comment on how you believe the compensation could be applied, for example, whether the compensation should be a one-off "inconvenience" sum or perhaps more directly related to the amount of charge management applied.
9. Do you have any comments on proposals to test for market-based solutions as described in section 2.2.1?

   Would you like to offer any general feedback on the interim solution?

Questions on the possible longer-term solution using smart meters

10. Do you believe that the energy industry should make steps to implement the smart meter solution in the best long-term interest of energy consumers?
11. Do you have any comments of the technical feasibility of the described longer-term solution using smart meter infrastructure?
12. It is considered that there could be significant benefits to using smart meter infrastructure (e.g. enhanced security, use of existing communication facilities, robust governance), however, there may be implications around fostering innovation and promoting other market-led alternatives. Do you believe the benefits of using smart meter infrastructure for managing EV charging outweigh any potential drawbacks?

    Would you like to offer any general feedback on the possible longer-term solution?

4 Consultation Responses

4.1 Responses Received

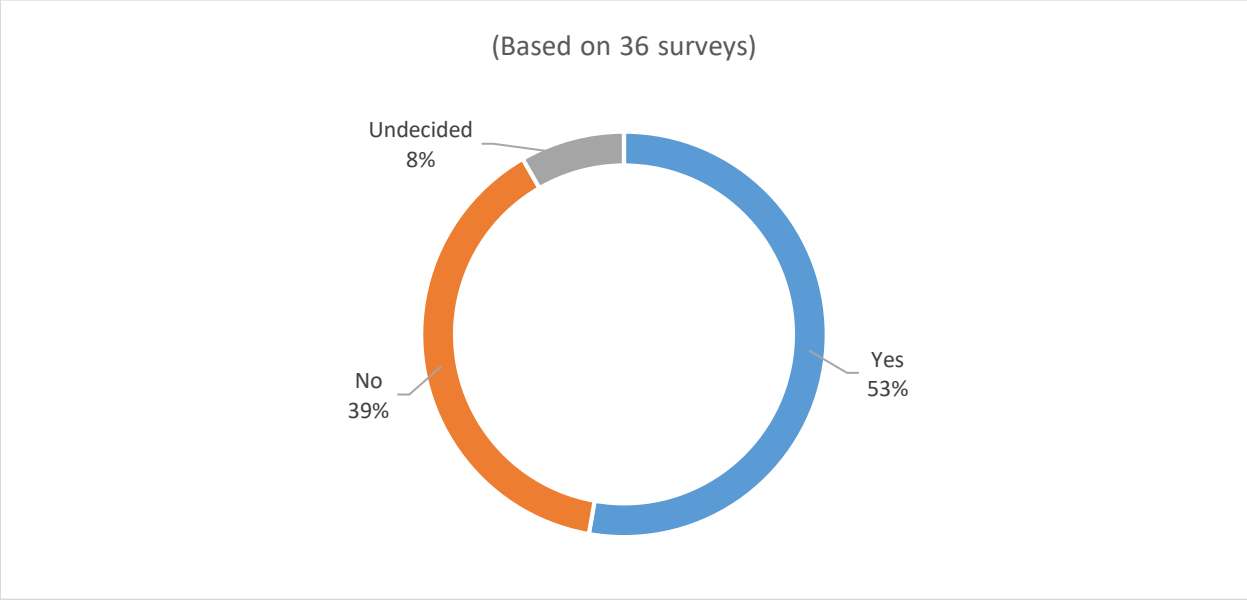
We received 42 responses to the Smart EV consultation from a range of stakeholders:

Stakeholder group	**No. of responses received**
Automotive	2
Charge point supply chain	9
Consultant	4
Consumer body	1
Distribution Network Operator	4
Energy governance services	5
Energy market participants	5
Energy supplier	5
Local government and NGOs	2
Other	5
Total	**42**

4.2 Interim solution – analysis of responses

4.2.1 Is the interim solution in customers' best interests?

Question 1: Do you agree that the interim solution, deployed within the use cases and governance arrangements described, would be in customers' best interest?



36 respondents offered a clear answer to Question 1; 53% of those who responded agreeing that the interim MEVC is in customers' best interests, with 39% disagreeing.

Taking a more granular view by stakeholder group, there is overwhelming support for the interim MEVC being in customers' best interests from both the DNOs and energy governance service stakeholder groups, at 100%. The local council and NGO that responded are also in favour.

Four DNOs responded to the consultation and three were in full support of the proposed interim solution. One DNO was not in full support of the interim solution, highlighting concerns about the use of smart meters for managed charging (despite the interim solution not using smart meters), issues where customers may have more than one EV and concern over how this solution fits in with the electrification of heat.

The main reasons given by DNOs for supporting the proposal were:

- It is critical to facilitate EVs on local networks
- There are concerns over the effectiveness of tariffs for local constraints
- This is a cost effective, reasonable measure that is equitable for all electricity customers (including non-EV drivers, vulnerable customers and those in fuel poverty)
- The solution acts for the common good and will lower the overall disruption level for customers

DNO

"…customers will be less disrupted than by the alternative which would lead to power outages."

For charging point supply chain respondents, 67% believe the interim solution is in customers' best interest, with 22% disagreeing and 11% undecided.

"… it is discriminatory against EV loads … the longer-term solution seems to offer a fairer solution that would be market led

Charge Point Representative

The core themes from the charge point supply chain industry are:

- There was unanimous support for the proposal from individual companies
- Of the two representative bodies for the charge point supply chain, one is not in support and one did not give a clear statement
- It was recognised that, over time, solutions that are more aligned to customers' interest are likely to be available
- One respondent felt that we should instead focus on a system that is intended to operate not just in emergencies but more frequently to help balance the energy system, in return for a "free" grid connection for their charger (similar to proposals in the Netherlands)

One representative body of the charge point supply chain cites two fundamental problems with the approach, in that it discriminates against EV loads and that charging control will likely be coarse (on/off rather than proportional). Instead, favour is given towards the longer term solution, citing that the timescales would be similar.

"…a logical and effective solution to a local problem… causes minimum inconvenience to customers."

Charge Point Manufacturer

Energy suppliers and energy market participants mostly disagree (80% and 75% respectively) that the interim MEVC solution would be in customers' best interests. 50% of the consultants' stakeholder group indicate that they do not think that the interim MEVC would be in customers' best interests, with 25% considering that it would be, and 25% undecided.

A representative body of the energy supply market offers cautious support for the interim MEVC solution, stating that:

"There may be a place for temporary emergency controls should a specific location within a local network be overloaded until longer-term market led solutions can be developed".

Energy Supply Representative

One energy supplier was less enthusiastic, stating that they "*fundamentally disagree that a solution that is not market based can be in customers' best interest*". They also believe "*that majority of EV charging in certain local network areas will be conducted outside of domestic premises (e.g. at communal charging points such as offices, supermarkets, etcetera)*".

One energy market participant feels that the proposed interim solution is:

"designed more in the DNOs best interests than the customers. Customers will benefit from avoiding localised electricity blackouts due to overloading, however this is the current expectation and service requirement for DNOs".

Energy Market Participant

Of the two respondents in the automotive category, one being a representative body for automotive OEMs and the other being an automotive OEM and manufacturer of electric vehicles, views differ significantly. The representative body agreed that the interim MEVC solution would be in customers' best interests, albeit with caveats around the need for "*a firm commitment to, and a timeline for, delivery of the long-term solution such that the short-term solution does not become the long-term solution*". The automotive OEM took the opposite view, with concerns that the solution could damage customer confidence in electric vehicles and impact on uptake. Furthermore, they believe that there are existing market-based solutions that could deliver the requisite level of smart or managed charging without needing to curtail customers when they need to charge.

Citizens Advice, representing the voice of the consumer, offers strong support for the interim MEVC solution as being in the best interests of the customer:

"Overall, it is in the best interest of electricity consumers to prevent a blackout if possible, which this solution tries to do. The alternative would be to let a fuse burn through and consumers wait for hours for it to be fixed. Without the

Citizens Advice

managed EV charging solution, the actions of a small number of EV owners could potentially put the reliable electricity supply of their neighbours at risk. Reducing the charge levels for vehicle owners temporarily appears an acceptable price to pay given it could prevent loss of supply for many, possibly vulnerable consumers".

Citizens Advice states that the interim MEVC solution would benefit electricity consumers, "*but only with their consent and in specific circumstances*".

4.2.1.1 Question 1: Other insight

Two key themes have emerged from the responses to Question 1, around the need to deploy the interim MEVC solution only in areas of high EV penetration, and queries around the need for a more up to date evidence base and trials regarding EV penetration and emerging clusters that require intervention to support both the distribution network and EV uptake.

High EV penetration areas:

"*It is worthwhile for the DNO to have more control over fitting control solutions where risk is high (e.g. very high penetration areas)"* – Energy Market Participant

"[the interim solution] *should be limited to only high-risk areas and has a clear sunsetting clause to ensure it does not impact long-term consumer-focused solutions*" – Energy Market Participant

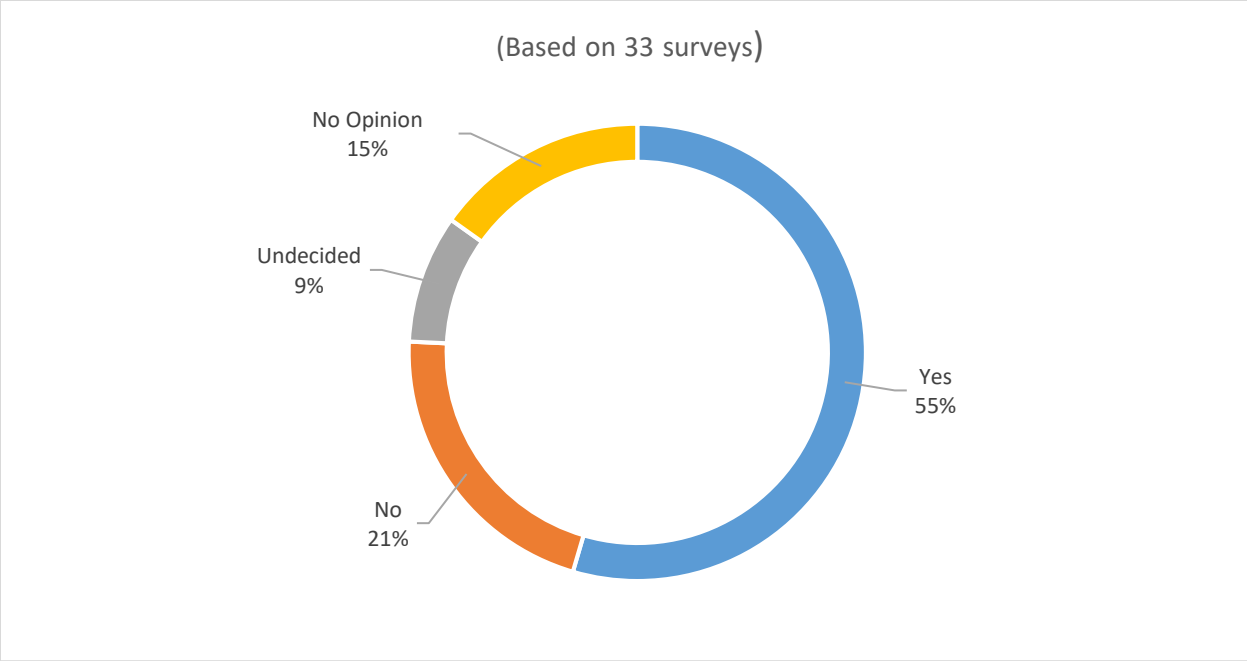
Evidence base / need for further trials:

"*More extensive and up-to-date evidence base, examining the impact of EV uptake on a range of distribution networks, needs to be developed*" – Energy Supplier

"*…interim solution could be tested in the real world under the umbrella of a trial*" – Energy Supplier

4.2.2 Availability of the interim solution

Question 2: Do you believe that the market (i.e. technical readiness of potential manufacturers / suppliers of the interim solution) is mature enough to supply the interim solution within the next two years at roughly the costs outlined?



Over half of the stakeholders that responded to Question 2 (33 respondents in total) agree that the interim MEVC solution could be supplied within the next two years, at roughly the costs outlined in the Consultation document. 21% disagreed, 15% gave no opinion, with 9% being undecided.

The Charging Point Supply Chain are in the best place to comment on maturity of a technical offering and 78% of respondents in this category agree that the market is mature enough to supply the interim MEVC solution.

"Yes the market is mature enough to supply an interim solution within the next two years. The costs are not too far from expected figures."

Charge Point Manufacturer

Of the four consultancies that responded, two agreed that the market is of sufficient maturity to supply the interim MEVC solution and at the costs outlined, albeit it was noted that there is uncertainty about the communication solution that will be used. The other two consultancies declined to answer, citing insufficient technical expertise.

67% of the DNOs responded 'yes' to Question 2, with the remaining 33% giving no opinion.

75% of both the Energy Market Participants and 'other' stakeholder groups believe that the market is ready, with 25% (one) of the energy market participant stakeholders not having a view. One respondent under the 'other' stakeholder group, a renewable energy forum, cites a timing issue in that smart charging technologies and time of use EV tariffs could be available within the timescales proposed, and therefore the interim MEVC would quickly be redundant.

Responses from the Energy Supply stakeholder group were balanced in that 40% consider that the market is ready to supply the solution within two years, with 40% disagreeing and 20% uncertain. This group raises concerns around the level of uncertainty on costs, with one energy supply entity saying that the

costs may be underestimated and may miss certain customer service elements, such as installation, responding to questions, or handling issues.

Purported lack of evidence to establish when and where EVs will become an issue for Low Voltage distribution networks is raised again in the responses under Question 2, with one respondent from the energy supply group stating that they "*do not know of any statistics that quantify network capacity at a local area level that would enable quantification of the issue and consequently a business case for any potential solution*".

4.2.2.1 Question 2: Other insight

From responses to this question, other insight was gained on timeframes and costs:

Timeframes:

"… but… similarly smart chargers and TOUTs can be available in time too" - Other

One energy supplier predicts that Automated and Electric Vehicles Bill, that is due to mandate smart charging, could mean that the interim MEVC solution is likely to be redundant before its implementation.

Additional costs:

"…additional costs would accrue throughout the process, including: the costs of work to educate customers and gain their consent; the costs of retraining or recruiting within DNOs; the costs associated with delivering the physical solution to the homes of customers in a timely manner, and; the costs of supporting IT and customer service capabilities" – Energy Supplier

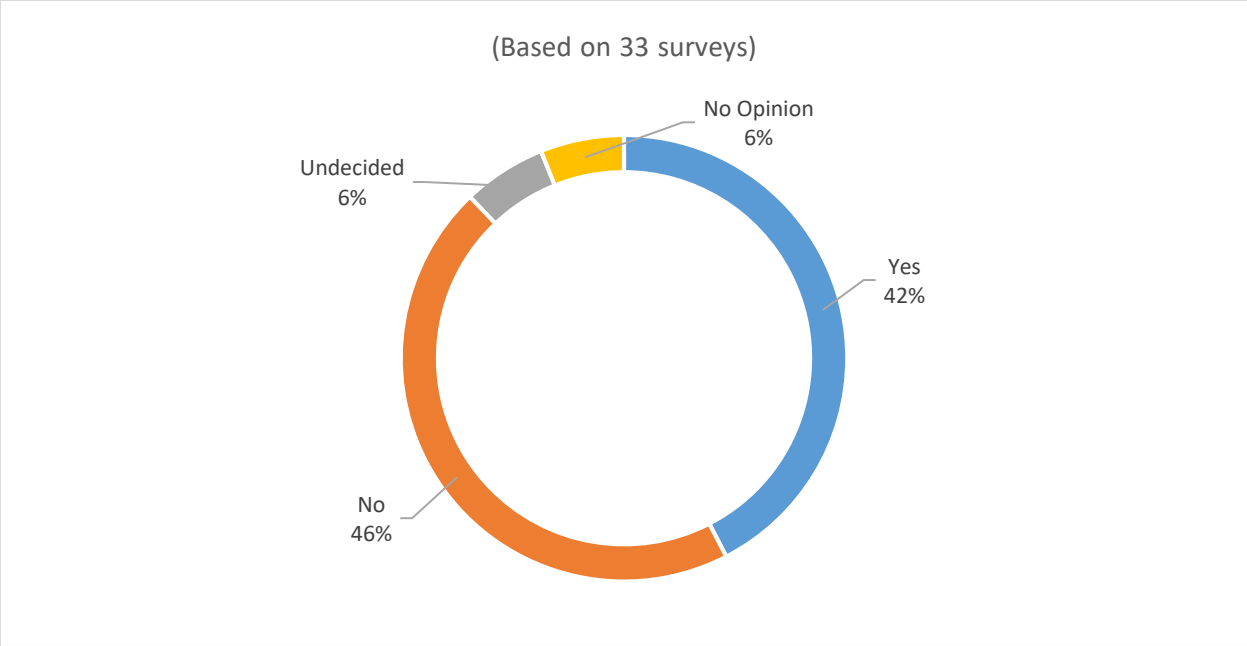
"…it's unclear if labour costs are included (which could easily double this price)" – Energy Market Participant

4.2.3 Potential availability of other solutions

Question 3: The use case of the interim solution has two key requirements:

i. Rapid deployment in any street (within a day)
ii. Available to deploy at required volumes (i.e. a reasonable proportion of households on a given street) within the next 2 years

Are you aware of any demand-side response market-led solutions/services that could be provided to DNOs that could viably and economically meet these criteria at a local level that we may have overlooked or discounted prematurely?



Opinion is divided as to whether there are other market-led solutions that will be available, as per the two key requirements. 46% of respondents believe that there are not, and 42% suggest otherwise. Citizens Advice, the energy governance services and local government / NGO declined to respond to this question.

The two respondents from the automotive sector are disparate in their views, with one declaring limited knowledge of current or imminent market-led solutions, and the other noting vehicle-to-grid as a potential solution.

The Consultant stakeholder group responded that they are not aware of any market-led solutions that have been overlooked or discounted prematurely.

Responses coming in from the charging point supply chain are mixed, with 45% stating no market-led solutions currently, 33% stating that there are, and 22% being undecided.

67% of DNO respondents are not aware of other suitable market-led solutions, with one DNO suggesting that there could be in the future.

One charge point supply chain representative suggested that more analysis should be put into whether the functionality within the vehicle could be leveraged with financial incentives.

Three of the four energy market participant respondents believe that there are current or developing market-led solutions that could meet the requirements. One respondent cites fast-ramping gas and storage as being well positioned to allow the best deployment of EV charging to help manage the system without requiring expensive network reinforcement. Another respondent suggests that residential charging technology providers have such solutions, along with aggregators and suppliers, and recommends that "*a single back-office for all supplier solutions can and should be used – so there isn't vendor lock-in*", such as its own back-office service offering.

One energy market participant states that *"market-driven solutions would be difficult to deploy at these timescales, as DNOs have shown no evidence (beyond early stage, limited pilots) of preparedness to purchase such services and therefore no existing solutions have been developed*".

On balance the majority (60%) of the energy supplier contingent believes there could be market-led services that meet the requirements, with 40% of the opposite view. One supplier is confident that it *"could not only fulfil the requested criteria but could offer a number of additional benefits such as being able to aggregate multiple asset types where the interim solution is purely focused on electric vehicles"*. One of the suppliers that does not believe that such market-led services are either available or imminent, states that it does *"not have specific details of DSR market led solution services that could be provided now, given that there isn't yet a current need for this type of support and therefore a commercial proposition is not yet available"*.

One energy supplier believes that there is potential to move straight to a market-led model, albeit no detail is offered on what this model could be. Another view from an energy supplier respondent is that it is *"incumbent on DNOs as aspirational neutral market facilitators, to test the viability of these solutions working both in isolation and together, in order to find the best solution from the customers' perspective"*.

From the 'Other' category, one of the renewable energy bodies suggests that smart charging and time of use tariffs could already provide the answer.

4.2.3.1 Question 3: Key insight

The main themes from the responses to this question are:

Communicating to the market

"If the DNOs were to use this interim solution, via the sunsetting clause, to clearly signal their willingness to purchase such services, that could help the market develop" – Energy Market Participant

"A market tender ahead of fault for specifically identified areas would allow for an organisation to be ready to deploy before a fault emerges and would be the most effective way to identify solutions that meet a DNOs specific requirements" – Energy Supplier

"Whatever the cost of the interim solution, it should be made clear to market actors what value is available where to encourage participation by solution providers who can resolve the constraint" – Energy Supplier

Timeframes

"By the time periods set out for the Smart EV project, the market may address the problem ahead of need" – Energy Supplier

"When considering the lead-time to implement the interim solution versus the pace of market developments, we believe the timescales start to dovetail and it would be in customers' best interests to move straight to a long-term market-led model" – Energy Supplier

"...believes industry could develop such a solution in faster timescales than the interim solution were the requirements communicated in a tendering process" – Energy Supplier

Flexibility markets

"[existing platforms] could be adapted and used to procure flexibility solutions relevant to addressing any potential issues caused by local concentrations of electric vehicles, as well as procuring flexibility from electric vehicles themselves across the network" – Energy Supplier

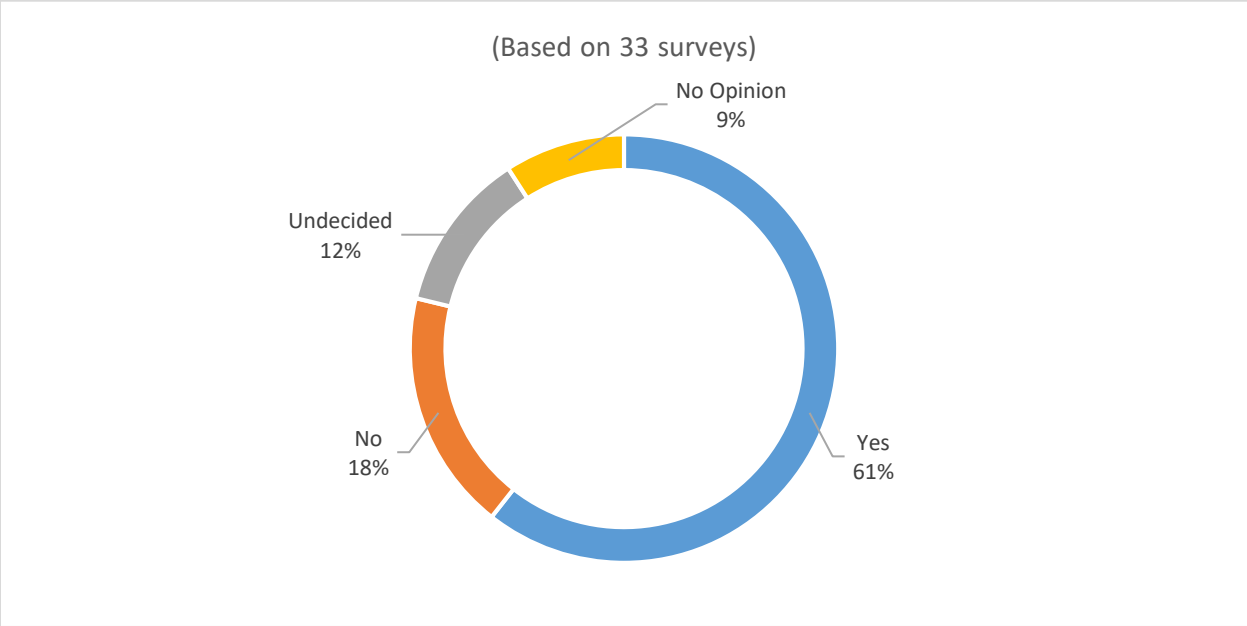
Vehicle to grid technology

"[V2G trials] which offer additional functionality over smart chargers" – Energy Supplier

"[V2G could] obviate the need for the MEVC solution" – Energy Supplier

4.2.4 Technical feasibility

Question 4: Do you believe that the interim solution is technically feasible to provide a robust method to manage demands on local networks?



61% of stakeholders responding to the Consultation agree that the interim MEVC solution is technically feasible such that it could provide a robust method of managing EV demand on local electricity networks. Of the 33 respondents, 18% do not think that it is technically feasible, with 12% being undecided and 9% not offering an opinion.

One of the automotive sector respondents thinks that the solution is technically feasible, albeit is concerned that customers could then switch to using Mode 2 (i.e. a three-pin plug) to charge, which has safety implications. The other automotive respondent does not offer an opinion.

The four Consultant responses received are all in agreement that the solution is technically feasible, albeit one cautions that the challenge of customer consent ought not be underestimated. The same consultant urges that:

"consideration should be given to how installation of DNO controllers between charging equipment and the domestic power supply could impact servicing and maintenance of charging points and any electrical inspections in the properties."

Citizens Advice agrees that the solution is technically feasible, although it caveats its response with a recommendation to ensure that it is also socially acceptable, suggesting that DNOs should conduct wider trials to understand social acceptance, including needing to monitor the extent to which the interim MEVC is rejected and why. The consumer body also determines that there is a need to understand how customers view their EV versus other electrical appliances.

Based on nine surveys returned from the charge point supply chain, 67% consider the solution to be technically feasible, with the remaining 33% determining that it is not.

The reasons given by some of the charge point supply chain for the solution not being technically feasible are mostly around the feasibility of "breaking into" existing wiring and the challenges of a having a robust communications service between both the substation and the back-office, and the back-office and the home.

All four DNOs respondents consider the solution to be technically feasible and fit for purpose on their networks. The main reasons cited were the experience on a range of project which have controlled load on their networks, such as WPDs "Connect and Manage" project.

Based on four responses, half of the energy market participants stakeholders accept the solution as being technically feasible, with one taking the opposite view and the fourth respondent being undecided or of no opinion. The dissenting view states that:

"We do not believe it is technically feasible for DNOs to prepare this level of monitoring, communications, and control in the timeframe it will likely be necessary. We do believe third parties that specialize in demand response and behind the meter applications can provide such a method."

On a more positive note, one energy market participant notes that the:

"interim solution will provide a means of testing acceptance of and requirements for market-based solutions, and to flag development of the market. Therefore, it is important that the design of communications and research/data gathering aspects of the solution is as rigorously {sic} as the technical solution".

Five energy supplier stakeholders responded to this question, with 60% being undecided, 20% agreeing that the solution is technically feasible, and 20% declaring it not to be. The dissenting party suggests that *"the need for customer consent and override button (both essential) would impact on robustness of such as system".*

Other reasons cited for its purported lack of robustness are that it may fail to identify all the causes of local faults and unfairly penalise EV-owners, it will rapidly be superseded by cheaper, market-led technology, it is likely to be neither the most effective nor the most cost-efficient solution for consumers, even in the shorter term, and finally, that it risks undermining the commercial development of other local flexibility tools and home demand response, as well as delaying a longer-term solution to EV smart charging.

An additional and ostensibly strongly held view form the supply side, is that " *As a result of the deliberately simple nature of the interim solution, customers subjected to it will receive no/less compensation for their participation. As a firm advocate for the right of domestic consumers to share in the financial benefits of the smart power revolution, [the respondent] feels that such an arrangement goes contrary to the principles sought by key stakeholders such as Ofgem".* It should be noted that compensation to customers is addressed in Question 8; there is nothing to say at this stage that customers will not be compensated. The results of the Consultation will help to inform the approach on this front.

Timescales are questioned by energy suppliers, with one theorising it to be *"unlikely network operators would be able to deploy charger controls (and set up an operational back office) before 2020 - critically after the Electric and Autonomous Vehicle Bill mandate on smart charging specification is due to come into force in Spring/Summer 2019".*

A query is also raised as to a network operator's legal right to operate 'behind the meter' assets.

Of the 'Other' respondents, three affirmed that the technology is feasible, with one stating that it is not a robust method to managed EVs on local networks. One renewable energy representative body, although considering that that the solution is technically feasible, purports that *"the better way to manage demand is through smart charging and EV tariffs".*

4.2.4.1 Question 4: Key insight

The following insight was also gained from the responses:

A means to inform the market

"[the] interim solution will provide a means of testing acceptance of and requirements for market-based solutions, and to flag development of the market. Therefore, it is important that the design of communications and research/data gathering aspects of the solution is as rigorously as the technical solution" – Energy Market Participant

"[there are a] number of practical and commercial questions which are best discovered through agile development and feedback from real users" – Energy Market Participant

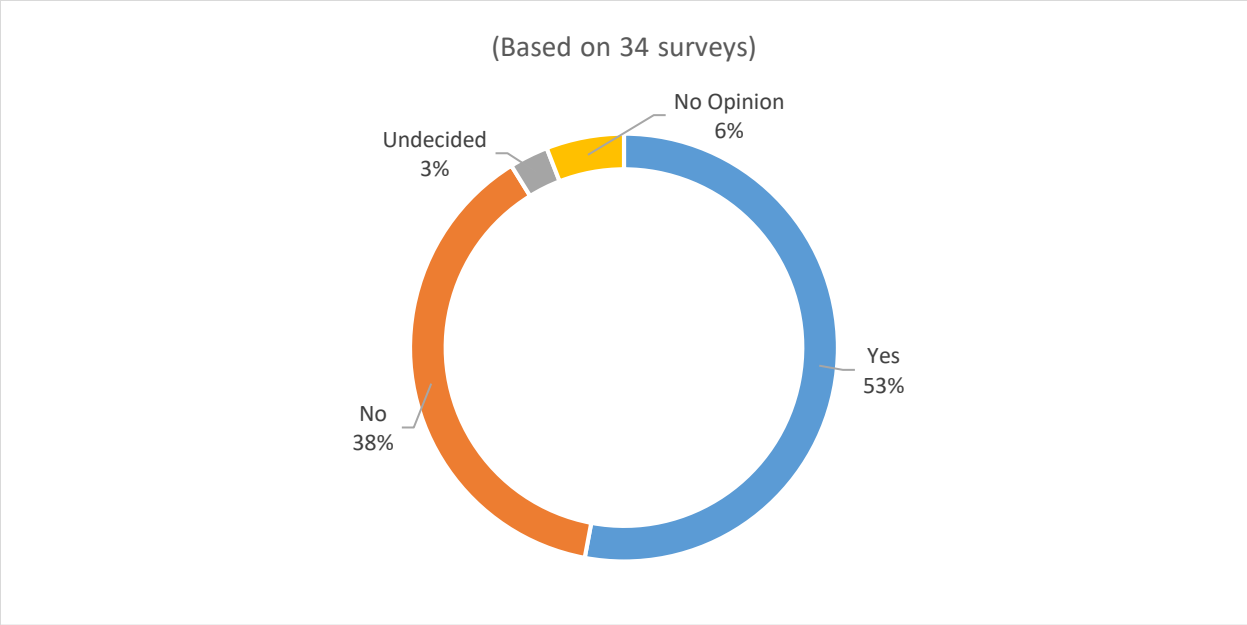
Customer engagement

"challenges around how the interim solution is rolled out and how customer engagement is managed" – Energy Supplier

"DNOs are not customer facing entities and there is no detail included as to how the DNOs would practically manage this solution with their customers" – Energy Supplier

4.2.5 Should a DNO be able to deploy the interim solution, as per the use cases?

Question 5: Do you agree that DNOs should be able to deploy the interim solution, or a variant of it, as described in the use cases in section 2.1?



A majority of 53% of those stakeholders who responded to this question believe that DNOs ought to be able to deploy the interim solution as per the proposed use case, whilst 38% disagree.

The two responses from the automotive sector offering opposing views, with the industry body stating that it is:

Automotive Representative

"Not in anyone's interests to trigger a local power cut".

The automotive OEM respondent is of the opinion that not only would it undermine confidence in EVs, but that the *"interim solution is not warranted due to uptake rates, scope for market-based solutions and availability of technical offerings"*.

Of the Consultants that responded, one of the four agreed, albeit with the caveat: *"so long as this proves to be an economic solution compared to current alternatives, and, as indeed indicated in the consultation, only until viable and economic market-based solutions from domestic aggregators emerge"*. One Consultant questioned whether DNO licences allow deployment under the use cases, whilst the final two respondents under this stakeholder group, although they responded 'no', are seemingly not wholly opposed to the solution, but rather would seek reassurance that *"Before installing these types of solutions they must look to the market to deliver competitive solution"*.

One Consultant deems the fault use case to be *"undesirable and much more significant effort is required to minimise the occurrence of such cases"*. It also feels that *"Provision of this interim solution, if implemented, should be considered in the broader ecosystem of other possible smart services and how they interact"*.

On a more positive note, the same respondent acknowledges that if:

"mass LV reinforcement is required this solution could aid the process of prioritisation of such reinforcements as we believe that the network companies would find such mass upgrading of LV networks challenging in respect of the availability of skilled resources and manufacture of equipment".

Consultant

Citizens Advice agrees that the DNO should be able to deploy the interim solution as per the use cases, however as an *"emergency measure only and temporary to avoid reduced supply levels becoming the 'new normal'"*.

An overwhelming 78% of respondents in the charge point supply chain group responded in the affirmative to this question, whilst 22% were not supportive of DNOs deploying the interim solution under the use cases set out in the Consultation.

One respondent from the charge pot supply chain agreed that the DNO should be permitted a safety net despite a strong preference for market-led solutions:

"However, we are hopeful that its deployment will be made largely unnecessary by broader smart charging initiatives, particularly the formation of an incentive led smart charging marketplace."

Charge point manufacturer

Perhaps not surprisingly, all of the responding DNOs are in favour of DNOs deploying the solution under the use cases.

Half of the Energy Market Participant stakeholder group declared in favour of DNOs deploying the solution, as long as the market had been tested first, and as long as there is clear timescales for usage and a sunsetting clause. One was against DNOs deploying the interim MEVC solution, instead asserting that any solution around managing domestic EV charging should be supplier-led, in order to maintain existing and ostensibly trusted communication channels. Furthermore this respondent likens the management of EV charging by DNOs to energy storage, in that managed EV charging by DNOs should also be prohibited, in line with Ofgem's intention to insert a new Condition into the Generation Licence prohibiting DNOs from carrying out any generation activities.

Although the energy supply representative body that responded is tentatively in favour, albeit with caveats that there should be "case-by-case assessment of where there is a need and whether deploying the interim MEVC solution is the most effective use of network funds" and that the solution be rolled out under the auspices of a trial, the majority (80%) of the Energy Supply stakeholder group are against DNO deployment of the interim solution under the specified use cases.

"…it would be in customers' best interests to move to a long-term market-led solution. We feel the proposed use case could lead DNOs to prematurely blame EVs for local faults."

Energy supplier

Other reasons from Energy Suppliers include *"we do not believe it has a positive business case"*, and a *"belief that the proposed implementation of the MECV could restrict or prevent customers from benefiting in future from utilising their inherent flexibility associated with how and when they choose to charge their EV"*.

The NGO consultee agreed that DNOs should be able to deploy the interim solution, although it gave no specific reasoning for this.

In the 'Other' stakeholder group, one renewable energy forum declared against DNOs being able to deploy the interim solution, however gave no further comment.

4.2.5.1 Question 5: Other insight

Other insight gained from the responses was:

Evidence base / further trials

"MEVC should therefore be rolled out under the umbrella of a trial with findings being shared between all DNOs and market participants on a regular basis" – Energy Supplier

"...need more assessments to define a more up to date probability of overload from the expected increase in EV ownership" – Energy Supplier

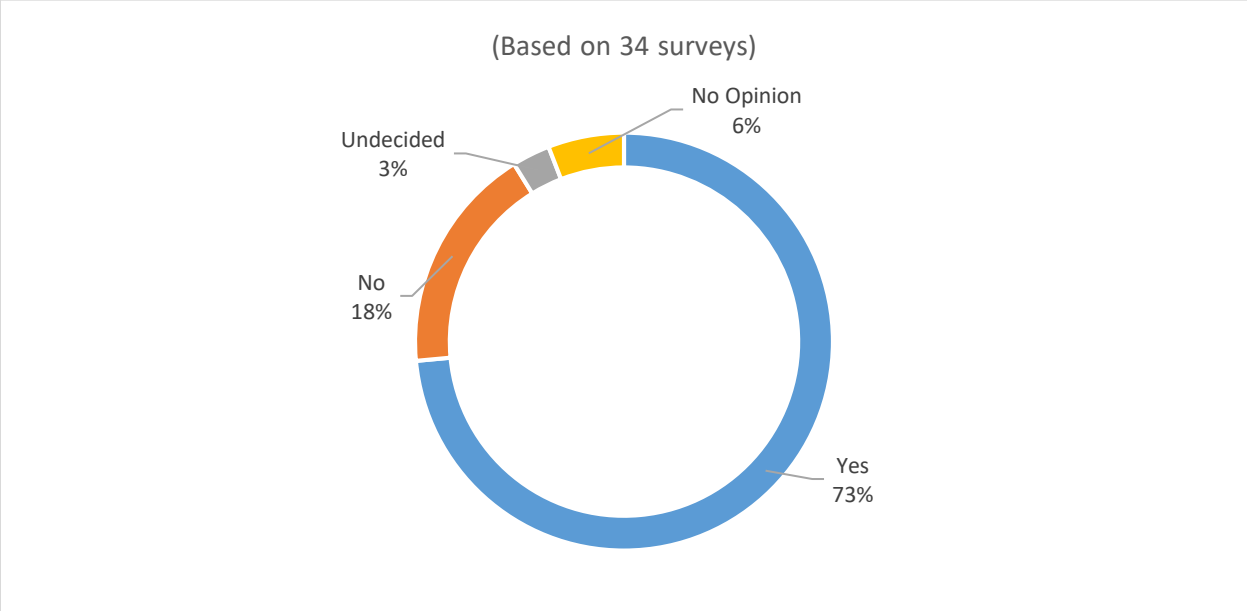
"customer behaviour relevant to EV charging needs to be understood, and robust testing of market solutions is required to establish their suitability for local network management" – Energy Supplier

Flexibility markets

"Allowing network companies to implement solutions such as the one currently proposed risks compromising efforts to establish flexibility markets and could result in instances where potential procured flexibility is not utilised because the network company is able to directly control the asset itself" – Energy Market Participant

4.2.6 Customer consent

Question 6: Do you agree that the interim solution should be optional, even in emergency situations, i.e. that the customer should give consent to its use?



A significant majority of 73% of all respondents to this question are in favour of customer consent being required, with 18% not in favour. The remaining 9% are either undecided or did not give an opinion.

The stance taken by the automotive representative body and the one respondent automotive OEM differs. The representative body does not consider that the interim solution should be optional because it is a *"Choice between stop charging or power cut. Compulsory seems unattractive, however, unreasonable to allow freedom which exposes everyone to a power cut"*. This is caveated with the assertion that it *"needs to be associated with a genuine emergency case i.e. needed to keep power"*. The automotive OEM considers that consent should be required, although does not give reasons.

Of the four Consultants' responses to this question, one declared that the interim MEVC solution should not be optional, in the interests of protecting the grid: "As regards activation of the interim solution in case of an (anticipated) emergency, the DNO should be able to take whatever action necessary to safeguard the integrity of the distribution grid – through the interim MEVC solution or otherwise", however it considered appropriate for a "(pricing) mechanism to reflect the underlying cost of interruption to consumers, the interim MEVC solution will not deliver an economically efficient outcome". The clear steer from this respondent was that the interim MEVC solution should only be activated once all market-led options have been explored.

The majority of the Consultants' group deemed it appropriate for the interim solution to be optional and therefore customer consent required, with one noting that:

"this solution can only be appropriate and acceptable on a voluntary basis with informed customer consent, and importantly customers should be paid for the service".

Consultant

The consumer body Citizens Advice is wholeheartedly in favour of it being optional and for customer consent to be required, suggesting that *"Forced installations could erode consumers' trust in their DNO to provide reliable electricity supply, and in EVs as a viable form of transport"*, and furthermore that DNOs will need access to property which in itself needs customer consent.

Respondents from the charge point supply chain are largely in favour of the interim solution being optional and for customer consent to be required, with 78% in favour; 11% taking the opposite view and 11% being undecided.

Of the DNO respondents, 67% do not consider that the solution should be optional. The main reasons given were the emergency nature of the system, for instance, the prospect that consent is not granted which could jeopardise their neighbours supply.

75% of the Energy Market Participant respondents stated that the solution must be optional, with one determining that:

"There should always be an option to opt out of managed charging. A price signal can inform the customer of the seriousness of the situation: if it is an emergency, it should be prohibitively expensive to charge at that time, but if a customer is willing to pay for that charge (in the event of their own emergency) they should be allowed to do so".

Energy Market Participant

Another noted that making it compulsory and without consent could have *"long-term negative impacts on the uptake of future advanced demand management services"*. The question of withdrawal comes up as well, with one stakeholder recommending that customers should have the option to withdraw consent.

Responses from Energy Suppliers are unequivocal, with all respondents from this stakeholder group agreeing that the solution should be optional, even in emergency situations, and that consent should be sought from customers.

The local council respondent considers that the solution should be optional and that customer consent should be sought. The NGO did not give a steer on this question; nor did the Energy Governance Services respondents.

Three of the four respondents under the 'Other' stakeholder category are in favour of the interim MEVC being optional and of customer consent being a prerequisite to deployment.

4.2.6.1 Question 6: Other insight

The issue of informed consent is raised, with a strong steer toward ensuring that customers have adequate information in advance so that they can make a decision based on knowledge and understanding of what managed charging through the interim MEVC solution entails.

Informed consent

"Consent should be sought suitably in advance of the interim solution being installed, rather than seeking consent for installation on the spot. This will give the customer sufficient time to read any relevant literature and make an informed decision" – Energy Supplier

"essential that the system is optional and that the customer gives its informed consent to both the installation of the smart controller and its ongoing use" – Energy Supplier

Withdrawal of consent

"...option to rescind consent should be implemented" – Energy Supplier

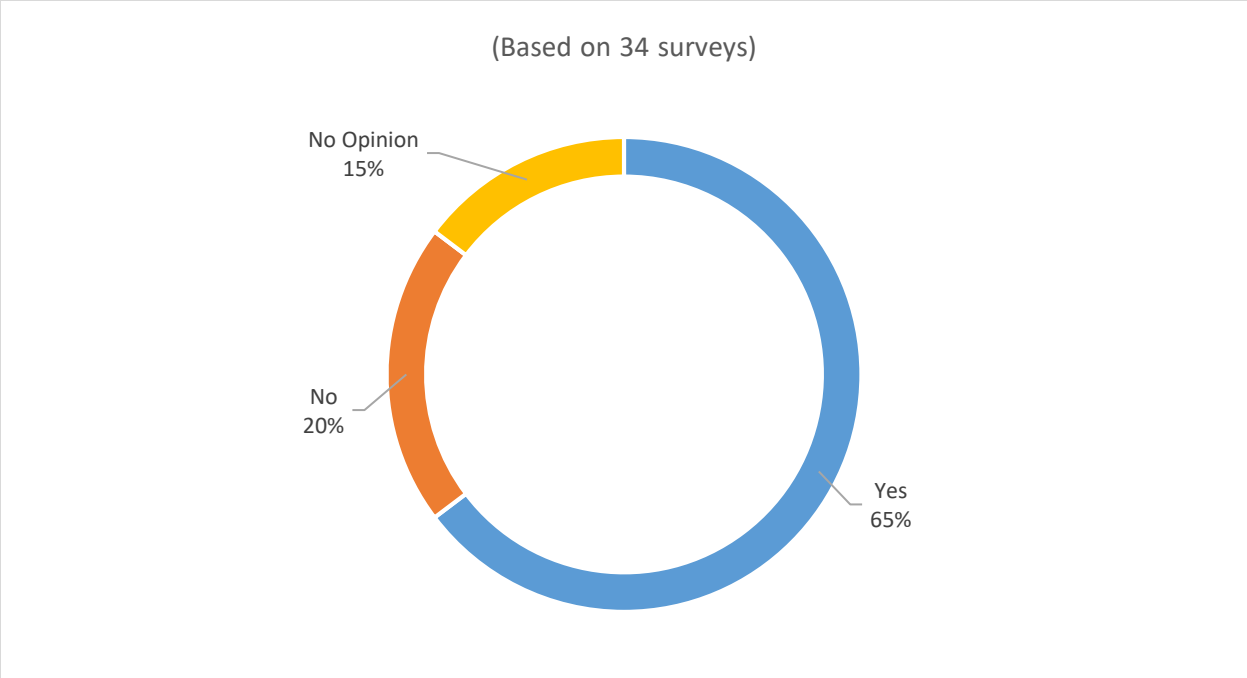
"Customers should have the right to withdraw their consent" – Energy Market Participant

Market-led

"Notwithstanding market-based solutions, DNOs (or DSOs) should retain the capability to curtail load in emergency situations, but only after market-based solutions have been exhausted, and curtailment should not focus on EV charging exclusively, but on all relevant load" - Consultant

4.2.7 Safeguards and governance arrangements

Question 7: Do you believe there should be any additional safeguards for customers, other than those cited in section 2.2? Do you have any comments on the governance arrangements outlined?



65% of all respondents to the Consultation consider that there should be additional safeguards for customers, and / or offer views on the proposed governance arrangements.

Both automotive sector respondents are of the view that additional safeguards should be implemented, such as a firm commitment from the DNO to reinforce in a reasonable timescale, furthermore that if limits are breached then the DNO should be required to reinforce much faster. There is also concern that the arrangements outlined could still entail significant disruption if the charge management falls when consumers were depending on the ability to charge.

Half of the Consultants responding to this question felt that there should be additional safeguards, with one taking the opposite view, stating that they *"do not agree with the need for such prescriptive governance arrangements as each local situation is likely to be different and they may be impractical to guarantee",* going on to note that *"any smart charging system should operate on the principles of attributing (financial) value for greater flexibility offered up by the customer to manage their charging process. This would encourage greater flexibility and still enables each individual's specific charging requirements to be safeguarded"*.

Additional safeguards suggested are around insurance in case damage is done to a customer's property during installation, and the potential right of the customer to withdraw consent.

Citizens Advice consider that additional safeguards should be considered around vulnerable customers and associated priority services, i.e. how does the definition of 'vulnerable' change once a householder relies solely on electricity for its means of transport; information, and notes that *"the Smart EV customer messaging strategy[1] is a good starting point";* that more modelling is required, and finally that *"Any quality assurance processes, guidelines and protections for domestic and SME consumers should be in place before managed EV charging is deployed"*.

[1] See the Smart EV Customer Messaging Strategy: https://www.eatechnology.com/projects/smart-ev/

Over half (56%) of the Charge Point Supply Chain respondents are of the view that additional safeguards should be taken into account, with over one third (33%) comfortable with the safeguards and governance proposals as set out in the Consultation.

Of the four Energy Market Participant stakeholders responding to this question, three offer additional safeguard considerations, including that of a sunsetting clause to establish a clear timeframe as to duration of the interim solution, as well as a *"clear transitional plan to a market-based approach"* to give consumers confidence that there is a long-term solution from which they will directly benefit.

60% of responses to this question from the Energy Suppliers identify additional safeguards to be desirable, with further comment on the governance arrangements; 20% consider the safeguards and governance to be suitable, whilst 20% give no opinion.

The representative body of the energy suppliers is broadly supportive of the proposed safeguards, stating that its members:

"welcome the fact that customer engagement is being considered so carefully as part of this consultation and that clear customer safeguards are being put forward to manage the customer relationship. Ensuring that managed charging has minimal impact on the customer experience will be important to avoid damaging the take up of electric vehicles".

Energy Supplier

One energy supplier agrees that:

"safeguards for customers proposed herein are suitable, and would welcome their application to a viable, economically efficient solution to network management. [The] governance arrangements noted in this section are principally sound, but that these are not based on a robust understanding of EV charging impacts to local networks, or of expected charging behaviours and are consequently subject to change".

Energy Supplier

Other safeguards put forward include a customer's ability to rescind consent, assurance of informed consent, what happens if there is damage to the charger, and removal of the control mechanism.

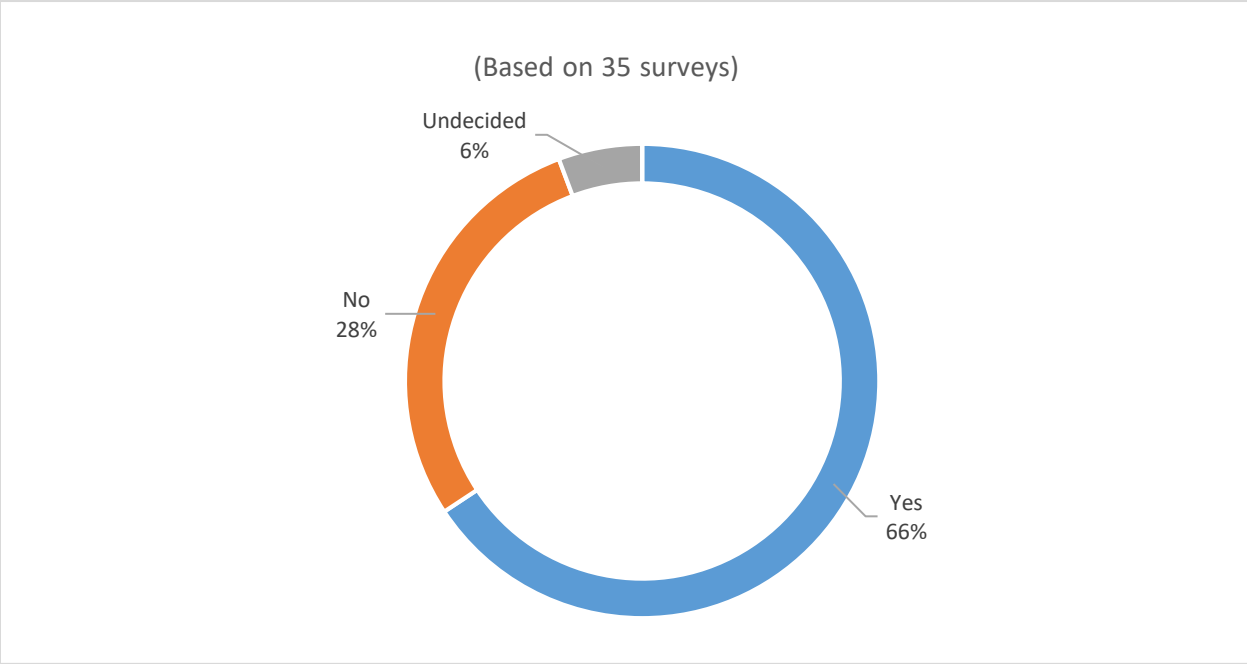
The issue of market-based testing in the governance is a key consideration for one respondent from the energy supply camp, who would seek *"to understand proposed governance mechanisms for regular market testing to ensure the benefits of a market solution could offer are not delayed any longer than absolutely necessary"*.

The local council respondent considers that *"Further evidence regarding the average length of time during which power is reduced or charging paused would give greater confidence. The governance states that the maximum period of paused charging during a 24-hour period is 2 hours. This is significantly higher than the 30 minutes referred to earlier in the text. A 2 hour pause in charging could be significant enough to inconvenience customers making their journeys the following day"*.

In the 'Other' category, half of the respondents believe that there should be further safeguards, and / or had comments on the proposed governance arrangements.

4.2.8 Compensation to customers

Question 8: Do you believe that customers should be compensated for the installation and/or operation of an interim managed charging solution? If so, please comment on how you believe the compensation could be applied, for example, whether the compensation should be a one-off "inconvenience" sum or perhaps more directly related to the amount of charge management applied.



A 66% majority considers that customers should be compensated in some form.

Both of the automotive sector respondents agreed that compensation should be due to the customer, with one stating that it *"should be directly related to service interruption… [and] should incentivise investment into strengthening the network to prevent permanent use".*

The Consultant stakeholder groups are also unanimous in their support of compensation, with one simply asserting that *"Customers are providing a service to the DNO (acting as a DSO) and should be compensated as such"*. The mechanism by which compensation could be payable is discussed, with proposals including a one-off payment on installation, followed by utilisation payments as the solution is deployed on each occasion. The importance of customer engagement is also raised, as a positive opportunity to inform and encourage support for a low carbon system.

Citizens Advice is less equivocal in its response, saying that there may be a case for compensation in the future, however more research should be done by DNOs to understand extent of compensation. It refers to The Guaranteed Standards of Performance (2015) that establishes what minimum service levels electricity consumers can expect from their DNO and what compensation is due if it fails to deliver.

Over half (56%) of the Charge Point Supply Chain stakeholders who responded to the Consultation are of the view that customers should be compensated for having their charging managed under the interim MEVC solution, with 44% taking the opposite view.

A charge point supply chain representative body argues that compensation suggests the solution is negative for the customer, whereas if it is seen as a customer-centric solution, no compensation should be necessary.

"Setting up compensation could add effort and cost, whereas focus should be on getting a solution that works and that causes minimal disruption to the customer."

CP Supply Chain Representative

Three quarters of the DNO respondents do not believe that customers should be compensated, with only one of the four in favour.

The Energy Market Participant stakeholders are 80-20 in favour of that compensation being paid to the customer, with one stakeholder noting that:

"managed charging activities with no compensation not only inconveniences owners, it in some ways limits their true ownership of their EV and has potential to hinder the development of the EV industry if conditions are put on ownership and usage of cars".

Energy Market Participant

Another Energy Market Participant notes that the current mechanism used in the Guaranteed Standards of Performance provides a good benchmark for how this could be practically administered, which echoes the thoughts of Citizens Advice. This cohort urges transition to a market-based solution, whilst at the same time noting that compensation is what a market-based solution would provide, which "*covers users being negatively impacted by having to arrange a time for the installation of the hardware and potential impacts to future charging*".

The question of compensation arose early on for one energy market participant, who feels that

The Energy Supplier group, with the exception of one respondent who is undecided, believes that compensation is appropriate. One states that *"customers should be rewarded for contributions to energy system resilience, including in relation to an interim MEVC solution".* The option of linking compensation to the amount of charge management applied is mooted, as well as the practice of lump sum payments which could be paid quarterly or bi-annually. If such payments are linked to periodic notifications that customers receive, this could act as a means of communicating the benefit of the interim MEVC solution and improve levels of engagement, and retention of those customers under management. Another respondent notes that *"Having to pay customers to opt-in to the programme would provide the DNOs with an incentive for investing to resolve the fault".*

The 'undecided' Energy Supplier has concerns relating to how the value of compensation would be assessed in relation to the inconvenience and loss of firm supply, and queries how the DNO would operate and manage the compensation payment framework in a way that is transparent, with clear customer redress if the process goes wrong.

The clear steer from both the local council and NGO respondents is that a compensation mechanism should be implemented, either as a one-off payment based on the amount of expected charge management with an amount to cover general inconvenience, along with a cap on the number of hours where charging can be curtailed in any month.

In the 'Other' category, half of respondents think that compensation should be paid.

4.2.8.1 Question 8: Other insight

Payment mechanism

"There should be an installation payment, like an option fee. There should then be a utilisation payment when the services are used. This sort of payment structure is in line with all ancillary services contracts and this is similar to those services" – Consultant

"The payment can be either a one-off payment or a recurring variable payment, or a combination of both. Key is that the pricing mechanism allows the DNO to discover the most economic intervention, avoiding unnecessarily interrupting customers where this is not economic" - Consultant

Customer engagement

"Promotion of the solution to customers will be critical. It should be presented as a positive opportunity to support a low carbon system, to efficiently and effectively manage a local network issue and to be financially rewarded for the contribution that is being made rather than as an inconvenience" – Consultant

Moving to a market-led solution

"This is a chance to push in the direction of market-based solutions, and for formation of markets around flexibility" – Energy Market Participant

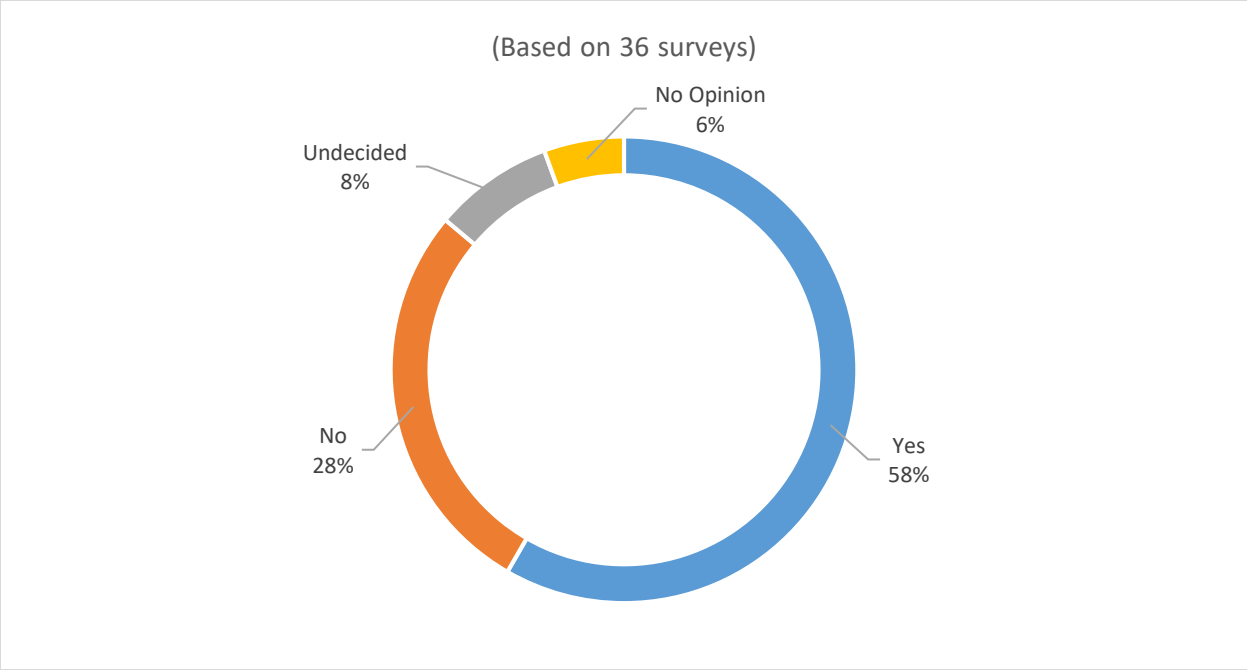
"To provide a fair and competitive solution to customers the market-based approach should be transitioned to asap" – Energy Market Participant

"the most cost-effective solutions to manage EV charging will come about through developing robust, competitive market mechanisms. Developing this market requires price signals reflective of the value of flexibility which in turn necessitate EV owners being rewarded for their contributions" – Energy Supplier

4.3 Possible longer-term solution – analysis of responses

4.3.1 Should the energy industry implement the smart meter solution?

Question 10: Do you believe that the energy industry should make steps to implement the smart meter solution in the best long-term interest of energy consumers?



Over half of the stakeholders that responded to Question 10 (36 respondents in total) agree that the energy industry should make steps to implement the smart meter solution for the future benefit of energy consumers. 28% disagreed, 8% were undecided and 6% had no opinion.

One response was received from both the automotive sector and the Consumer Bodies to this question. Both representatives agree that the implementation of smart meter technology is in the interest of energy consumers in the long term. The automotive OEM has a view to utilise the smart meter to manage a range of 'smart' devices. The Consumer Body stated:

Consumer Body

"This solution could offer simplicity and cost-effectiveness, given the existing infrastructure and governance arrangements in place".

It should be noted that this organisation stressed that the smart meter enabled solution must provide a *"positive experience for consumers"* to avoid a significant proportion of the population opting out of the smart meter installation process.

There was a total of nine responses from the Charge Point Supply Chain stakeholders, six responses (67%) were in favour of the long-term solution using a smart meter infrastructure, while the other three (33%) were against the proposal. The overall benefits of energy consumption management within the domestic environment, managed by the smart meter system, were highlighted. The advantage of having the infrastructure and technology in place was also raised. One of the organisations are currently involved in rolling out second generation smart meters in Italy and are closing the full deployment in Spain, Romania and Latin America. The organisation stated:

Charge Point Supply Chain

"Optimum distribution grid management and open-data services for all the Electrical System actors can be achieved only through Advanced Metering Infrastructure deployment".

As mentioned previously, 33% of the Charge Point Supply Chain responses are not in agreement with this solution. This group suggests that domestic loads and EV charging loads could be managed separately:

"Since EVs represent an unusually high, continuous domestic load, managed charging through the charging points themselves represents an effective and targeted opportunity to mitigate grid impact from EV charging".

The suggestion was made that the smart meter could then be used to measure domestic loads and this data could be utilised to control the use of smart chargers externally:

"The information provided by the meters could implicitly limit charging by sending a signal to a central platform or hub, to protect the local grid connection, but should not actively control it".

Energy Supplier

Another argument presented was that the longer-term solution should be market-led. This would require any new device (some of which have already been developed) to have the functionality to curtail or increase their power consumption based on a signal from the grid. This would require the energy industry to ensure the signals have flexibility to be compatible with a range of different devices. Therefore, a standardised communication procedure would have to be clearly defined and implemented.

The overall opinion received from the Consultant stakeholders contrast the overall views of the previously mentioned stakeholders significantly, with 75% of the responses received stating they oppose the implementation of the smart meter solution. The issues of data protection and a possible lack of confidence in the Home Area Network were clearly highlighted:

"Customers have expressed considerable concern over data security in relation to smart meters".

"Customers will be worried that the DNO will interrupt them and say the freezer will not come back on and they will have lost a fortune in rotten food".

Consultants

The general conclusion from the consultancy-based stakeholders was that alternative methods need to be explored.

However, 67% of DNOs favoured the use of the smart meter infrastructure, stressing that the installation of EV charge points should be coupled with installation of SMETS2 meters. The DNOs also raised similar supporting points to those highlighted by other stakeholders, regarding the current existence of the infrastructure, the level of security of the system meeting requirements and the solution fitting in with the Smart Home Strategy. Arguments against the use of smart meters from DNOs were based on market-based solutions being in the best long-term interest of EV owners.

Every member of the Energy Governance Service group were in favour of the proposed smart meter solution (based on 3 surveys).

There was a range of opinions returned from the Energy Market Participants. One respondent was in support of the smart meter solution, another was against the proposal and one organisation had no opinion on this part of the Consultation. The reasoning behind the dismissal of the proposition from the one organisation was that the existing smart meters may be incapable of supporting devices used by self-consumers and prosumers.

Most of the Energy Suppliers (60%) were undecided on whether the long-term solution utilising smart meters would be in the consumers' best interests. They insist further research is required. The remaining

40% were against the energy industry pursuing this solution, as this would give DNOs direct control of the HAN:

"Giving DNOs the ability to directly modify household demand would undermine the market for flexibility and demand response".

Of the two stakeholders categorised under 'Government and NGOs', one organisation has presented reasoning for supporting the solution and the other gave no definitive opinion.

Every stakeholder grouped into the 'Other' category supports the smart meter solution (there were a total of 5 stakeholders in this group). It was noted that the possibility of managing renewable energy generation and EVs using smart meters could allow consumers to optimise their savings. Also highlighted were the future benefits to energy suppliers, aggregators and network operators.

4.3.1.1 Question 10: Key themes

One of the key themes that can be extracted from the responses is the possibility of using the smart meter to control a range of smart devices. It seems the industry has differing views on the possibility of using a smart meter device as a management tool. An Energy Market Participant did not believe that the smart meter would be able to cater to the needs of self-consumers and prosumers. However, stakeholders categorised under the 'Other' group explored the possibility of managing renewable energy generation and EV charging using smart meters. So, it seems there needs to be research conducted to determine if the smart meter is technically capable of managing a range of 'smart devices'.

Another key theme that emerged from the responses was that further research into market-based solutions should be pursued. This would require a standardised approach to the communication procedure between the new devices developed by the market and the grid, thus allowing the market to deliver competitive electricity bills to the consumers.

The final key theme that was uncovered was the understanding that the smart meter infrastructure has already been developed and is partially already in place, along with robust governance arrangements. Therefore, it has been suggested that it should be fully utilised to reduce unnecessary additional developmental costs and to avoid overcomplicating the solution. It should be noted however that it was stressed by multiple stakeholders that should this solution be implemented it is vital that the installation of an EV charge point should be coupled with the installation of an SMETS2 meter. Currently the rate of installation of EV charge points is greater than the installation rate of SMETS2 meters, which needs to be addressed.

Management across a range of smart devices

"The smart meter solution would allow the consumer to prioritise their energy needs for example disabling water heating to allow a car to charge thus facilitating travel to an evening appointment" – Automotive Sector

"Smart meters and HANs allow a higher level of oversight, optimisation, and automation through 'smart home' integration with connected devices" – Charge Point Supply Chain

"There is certainly a place for smart metering in the energy system moving forward as Time of Use rates and other mechanisms become viable in UK. However, as with other behind-the-meter technologies developing advanced functionalities such as solar PV, stationary storage, and bi-directional vehicles, the

half-hourly granularity of smart meters will prove insufficient to fully integrate behind-the-meter resources and enable self-consumers/prosumers to optimise their resources as part of the evolving DSO model" – Energy Market Participant

Further research

"The energy industry should make steps to examine the potential of a smart meter solution, but only as one of a range of potential solutions, to build up the evidence base and inform the development of effective market-based solutions that deliver at least cost" – Energy Supplier

"The use of smart meters is in effect a monopoly and it should be possible to use alternative solutions" – Consultant

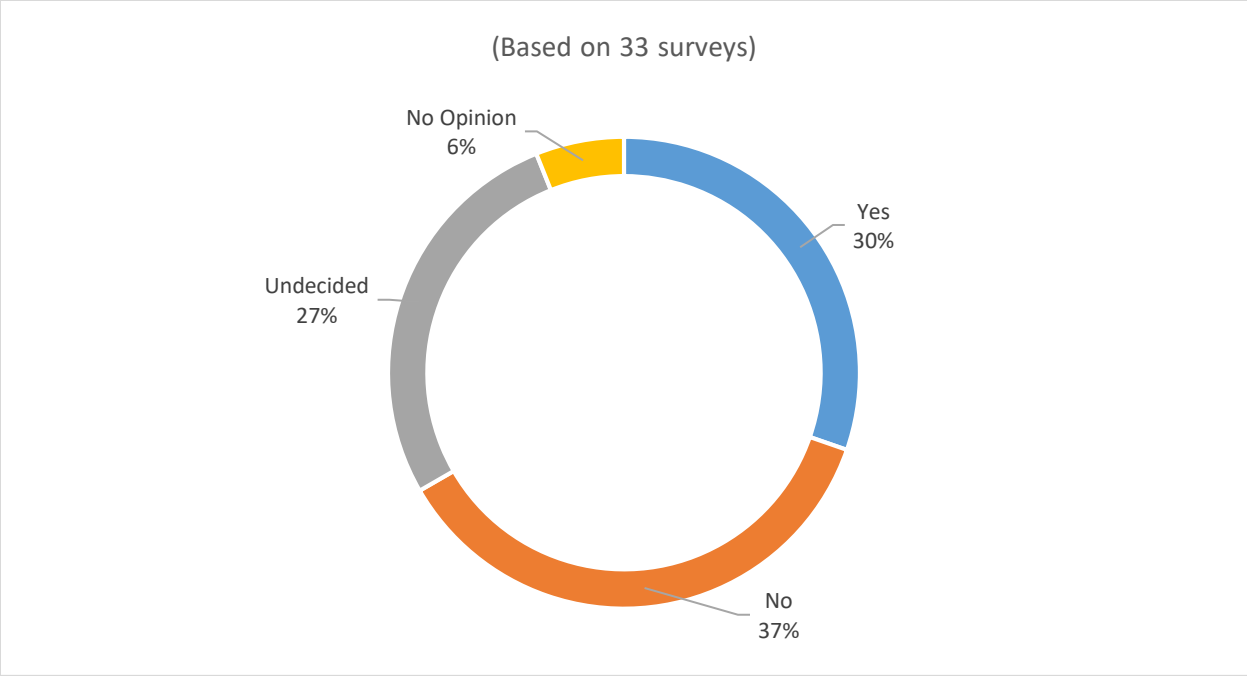
Benefit of existing infrastructure and governance

"Given SMETS2 meters already have these features embedded and the DCC provides a secure communications solution, this would provide the energy industry with a uniform and low-cost solution for all parties" – Charge Point Supply Chain

"All houses fitted with EV charge points should be fitted with a SMETS2 meter to allow us to monitor network stress (voltage) and ensure that a cut-out safety check is undertaken. These meters also offer auxiliary load switches which have the capability to manage charging, however, utilising this 'Smart Grid' option is currently challenging due to the lack of available disaggregated data which is needed to provide the visibility of load profiles" - DNO

4.3.2 Do the benefits of using smart meters for EV charging outweigh the drawbacks?

Question 12: It is considered that there could be significant benefits to using smart meter infrastructure (e.g. enhanced security, use of existing communication facilities, robust governance), however, there may be implications around fostering innovation and promoting other market-led alternatives. Do you believe the benefits of using smart meter infrastructure for managing EV charging outweigh any potential drawbacks?



As can be seen from the figure above, there are a range of differing opinions on whether the benefits of the utilisation of the smart meter infrastructure, for the charge management of EVs, outweigh the drawbacks. There have been 33 responses, 37% believed the potential drawbacks were more significant than the benefits associated with using the smart meter infrastructure. 30% of stakeholders had the opinion that the benefits outweighed the disadvantages, and the remaining 33% were either undecided or had no opinion.

The representative from the automotive industry is in favour of the use of smart meter infrastructure, with the caveat that *"there must be the opportunity to have other smart interfaces (such as OCPP to a CPMS) in the charge point".* The representative believes this would enable DNOs to avoid reinforcing the network and would allow for a competitive market place.

Similarly, the representative of the Consumer Bodies believes the benefits of the smart meter system outweigh the potential negative impacts. However, they are concerned about the possible impact the solution will have on consumer costs and the customer experience, insisting further investigations should take place in these areas.

In addition, one respondent from the Energy Governance Services strongly believes the benefits to be reaped are worth the associated risks:

"Utilising the capabilities of our smart meter network are key to building a smarter, more flexible energy system".

Energy Governance Representative

The Consultancy, Charge Point Supply Chain and Energy Market Participant groups were all in significant overall disagreement that the smart meter infrastructure should be used to manage EV charging.

75% of the responses from Consultancy organisations disagreed that the benefits outweigh the potential drawbacks. It was pointed out that smart meters have their place *"in providing accurate and reliable measurements"* and to *"measure (or verify) the exchange of services"*, however the smart meter should not be used as a platform. In addition, the potential increased security by using a range of new technologies was explored:

"If there are lots of alternative technology suppliers the risk to the country of a cyber-attack causing significant power issues would be reduced".

Consultant

One stakeholder from the Consultancy group is open to future investment in the smart meter infrastructure providing it is carefully developed and there is the opportunity for legislation to be altered if required.

56% of the responses received from Charge Point Supply Chain stakeholders did not concur with smart meter technology offering more benefits than disadvantages. They share a similar opinion to the consultants in that the smart meter has its place but should not be utilised as a management system. The reasoning behind the lack of confidence in the management capabilities of the smart meter is rooted in the potential inaccessibility of information.

22% of Charge Point Supply Chain stakeholders believe the benefits are substantial enough to outweigh the drawbacks. Reasons supporting these decisions were linked to the potential future financial benefits to the DSO, allowing them to reduce consumer costs. Furthermore, two-way communication technology is proven to be complex to implement, therefore alternative solutions would be difficult to develop:

"The roll out of smart meters has demonstrated the complexity and cost of developing a system that supports robust two-way communication, and there is little to suggest that replicating this with an alternative system specifically for EV charging would be any easier".

Charge Point Supply Chain

The remaining 22% of Charge Point Supply Chain stakeholders were undecided and called for further investigation.

The majority (67%) of Energy Market Participants believe the disadvantages associated with the management of EV charging using the smart meter infrastructure are not acceptable. One respondent had a lack of confidence in the ability of the smart meter infrastructure to be economically viable and stressed the importance of gearing towards market-based solutions. The remaining 33% of Energy Market Participants gave no opinion.

On the other hand, 67% of DNOs agreed that the benefits of the proposal carry more weighting than the drawbacks. They believe the existing security measures in place are ample and overcomplication and duplication of data should be avoided.

"The security of the communications medium, not duplicating a secure medium and the benefits of not overloading the system outweigh the issues mentioned".

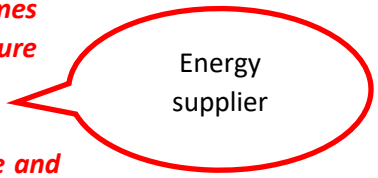
DNO

It should be noted that a DNO suggested, should the solution be taken forward, the installation of a smart meter should be mandated with all smart appliances. The remaining 33% did not believe the benefits were

substantial enough to warrant investment in the smart meter infrastructure and suggested that market-led solutions will prevail.

The majority (80%) of Energy Suppliers were undecided on the relative weightings of the advantages and disadvantages of the smart meter infrastructure proposal. They call for further investigations to be carried out before submitting a definitive response.

One stakeholder (making up 20% of the Energy Suppliers group) is against the use of the smart meter infrastructure to exclusively manage EV charging. They based their reasoning on past performance of market-led solutions ***"generally achieving better long-term outcomes for consumers, and* [the organisation] *would counter against any measure contrary to the development of these in the domestic demand side response sphere".*** Also ***"imposing such a solution now risks limiting future innovation in the field of electric vehicle charging infrastructure and other smart assets".***



Half of the stakeholders classified under the 'Other' group were undecided and have called for further investigations to be carried out. Whilst the other half were in favour of the approach, stating "[it is] *important that all the players (National Grid, energy suppliers, and DNOs) are allowed to work together on this".*

4.3.2.1 Question 12: Key themes

A key theme that has emerged from this research is that multiple stakeholders believe the smart meter has its place but should not be utilised as a management system. There is a lack of confidence in the management capabilities of the smart meter, rooted in the potential inaccessibility of information required.

There was a continued demand for market-led solutions to be made available to allow competitive rates to be issued to customers.

There is a general theme of uncertainty present across all stakeholder categories. Further investigation seems to be required to clearly present a cost-benefit analysis to make an informed decision, rather than taking potentially costly risks.

Lack of Management Capabilities

"Access to the charging stations through the smart meter infrastructure will be complex. Permission will be needed for 3rd parties to access information that potentially only the energy suppliers can (currently) access. Therefore before smart charging infrastructure is committed to the smart meter infrastructure there needs to be a clear set of policies around who can access what data and at what point" – Charge Point Supply Chain

"Benefits can be outweighed by the need for this platform to be able to communicate with controllable devices (the EV charger, the EV itself, smart devices etc.). It poses governance issues (the organisation that is responsible for the smart meter and the platform versus the 'app' and service provider). And there will be an inevitable technology lock-in (the hardware needs to be updated/replaced as 'apps' get more advanced, more smart devices are installed within the home and new services will be developed)" – Consultant

"We see smart meters as a tool for hubs and platforms to measure the situation, not to manage it. We see energy management systems, with solar panels and flexible loads (heat pumps, EVs, home batteries etc.) adopting a platform structure, with smart hubs in between. Such innovations will be hindered when all management is supposed to come from smart meters" – Charge Point Supply Chain

Market-Led Solutions

"This is a move away from deregulation and market-based solutions and will likely not be the most economically efficient way to address the evolving needs of the UK grid" - Energy Market Participant

"We fully expect market led solutions to come forward to manage the clustering problem, so that there will be choices for the industry on how to manage the network capacity problems associated with EV charging" - DNO

Cost Benefit Analysis

"A cost benefit analysis should be conducted to determine the balance of potential benefits versus impact" – Energy supplier

"The optimal solution needs to be investigated and defined further to clarify the impacts on the various stakeholders e.g. DNOs, DCC, EV charge point manufacturers, charge point operators, energy suppliers, etc., and compare that to alternative solutions" – Charge Point Supply Chain

"Further investigation needs to be undertaken to provide more evidence to allow us to determine the balance between any potential benefits of using smart meter infrastructure for managing EV charging and any potential drawbacks from so doing" - Energy Governance Services

5 Next steps

The consultation responses have provided some great insight into the acceptability of the interim solution and the required features of the overall system. Additionally there was a clear view from many stakeholders that Managed EV Charging using Smart Meter infrastructure should be investigated, to understand the technical approaches and any legal and governance implications.

The main activity that will now be conducted is as follows:

Procurement specification to formally engage with the market

A procurement specification will be produced which can be used to invite the market to provide the interim solution. This specification will initially be reviewed by SSEN, other DNOs and the Energy Networks Association (ENA) for consideration on publishing this as an ENA Engineering Recommendation or Technical Standard.

The specification will describe the technical features of the system only. Governance arrangements and the adoption method will be handled separately.

Smart Energy Code Modification Request (SECMP0046)

Through the delivery of this project, we have investigated how GB's Smart Meter (SM) infrastructure could be leveraged for the emergency management of EVs on residential networks. Some discussions between SSEN, EA Technology, BEIS and the DCC resulted in an initial understanding that SM infrastructure could be used (technically) to achieve the project aims, in a world where there is a prevalence of newer (i.e. SMETS2) SM's on the system.

In order to further investigate the technical options and to explore the implications on existing SM governance a Modification Request was submitted by SSEN to the Smart Energy Code Administrative Service (SECAS).

As part of the modification process, two Working Groups have been held to date (mid-August 2018) to explore the options in more detail.

SSEN and other DNOs intend to continue to engage in this process.

More information can be found at https://smartenergycodecompany.co.uk/modifications/

Market Engagement

It is recognised that both the EV and wider energy sector are moving rapidly and new products and services are emerging from a range of commercial entities.

SSEN will continue to engage with market players to keep a watching brief on new technologies and services and their appropriateness to be implemented under this use case.

Dissemination

The project team will continue to engage with the industry and will present the outputs of the project at leading industry events, such as the Low Carbon Vehicle (LCV) event and Low Carbon Network Innovation (LCNI) conference in September and October respectively.