

NATIONAL GRID ELECTRICITY DISTRIBUTION

ON BOUNDARY ENHANCED LCT INTEGRATING SERVICE CABINET: OBELISC

PROJECT LAUNCH

13 MARCH 2025



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INTRODUCTION

On 13 March 2025, National Grid Electricity Distribution (NGED) held an online stakeholder workshop to mark the project launch of its On Boundary Enhanced LCT Integrating Service Cabinet, otherwise known as OBELISC. The purpose of the event was to understand key stakeholders' thoughts on the project's concept; to identify any perceived barriers to its delivery; to capture initial design requirements from stakeholders; and to inform stakeholders about the next phases of the project. A further outcome was to identify interested stakeholders to form a steering review panel, which will act as a feedback mechanism for the duration of the project.

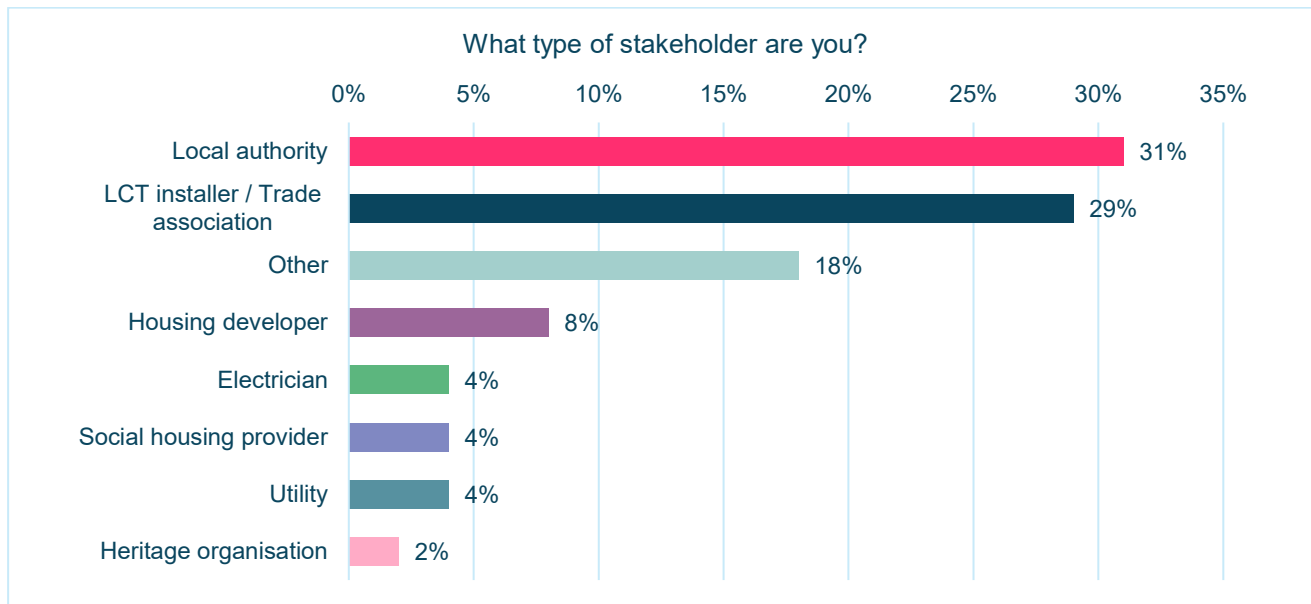
The workshop was hosted online, using Zoom. Each session consisted of a short presentation given by a NGED representative or a member of the wider project team, followed by discussions in virtual breakout rooms. The final session was followed by a Q&A. In addition, stakeholders were asked to vote in a series of online polls, using Slido.

NGED instructed EQ Communications, a specialist stakeholder engagement consultancy, to independently facilitate the event and take notes of the comments made by stakeholders. This document summarises the feedback received. Every effort has been made to faithfully record all of the comments. To encourage candour and open debate, comments have not been ascribed to individuals.

EXECUTIVE SUMMARY

Participants

- A total of 49 stakeholders participated in the workshop, representing 46 organisations.
- The most widely represented stakeholder group was local authorities, at 31%, closely followed by LCT installers and trade associations, at 29%.



Overarching Purpose

During the first session, stakeholders were introduced to Project OBELISC – an innovation project designed to develop a new three-phase meter cabinet, which may improve customers' ability to connect Low Carbon Technologies (LCTs) to the grid.

- Stakeholders were asked to vote on the extent to which they agreed with the statement: "There is a problem to be solved by a solution such as Project OBELISC." An average of 3.78 / 5 agreed with this statement, with 73% either agreeing or strongly agreeing, demonstrating overall recognition that there is a problem to address. Local authorities endorsed above the average, at 3.83, but for LCT installers and trade associations, it fell to 3.23.
- This split in responses was echoed in the discussions, with stakeholders representing LCT installers and trade associations generally more sceptical about the need for OBELISC, voicing concerns about cost as well as safety.
- Local authorities were more positive about OBELISC and saw the potential benefits in terms of boosting capacity and driving decarbonisation. However, concerns were raised regarding visual amenity, policy and planning, and liability.
- When stakeholders were asked how they felt about the statement: "OBELISC has the potential to rapidly increase the take-up of LCTs such as heat pumps and EV chargers," the response was more

mented, gaining an average score of 2.81. For LCT installers, this average sank to 2.31, but for local authorities, it rose to 3.09.

Design Requirements

Stakeholders were walked through the importance of getting OBELISC's design requirements correct from the start. Correctly identifying the needs and wants of end users and installers, along with continued stakeholder engagement, was critical to ensuring the successful deployment of OBELISC.

- Stakeholders were clear that resilience and future proofing needed to be embedded in the cabinet design. Ensuring easy upgrades and end-of-life recyclability were key design stipulations.
- A proper analysis of OBELISC's resilience to climate change was also a key consideration, taking into account flood and fire risk, rising projected temperatures, and extreme weather events.
- Stakeholders raised concerns about the cabinet switchgear degrading more rapidly as a result of being placed outside, along with questions about securing the cabinets from vandalism, theft and accidents.
- Stakeholders were invited to contribute to a word cloud by listing any concerns they had about the cabinet at this stage. There were many different answers, although there was one strong point of consensus: the word 'aesthetic'.

Steering Review Panel and Next Steps

Stakeholders were informed of the project team's intention to create a Steering Review Panel to provide feedback throughout the duration of project OBELISC and then invited to vote on a number of polling questions.

- Attendees were asked if they felt anyone was missing from a list of proposed stakeholder groups to include in the engagement and feedback process. Two people responded with 'fire service', and there were single votes for groups like warranty providers, IDNOs, insurance providers, the police and industry skills bodies.
- Stakeholders were asked, on a scale of 1 to 10, how supportive they were of the project approach. The proposition scored an average of 7.16 / 10, demonstrating overall support for the approach proposed. For local authorities, this rose to 7.56, and for LCT installers and trade associations, it fell to 6.08, in line with the split on previous questions.
- Stakeholders were then asked if they had any final thoughts on Project OBELISC. Responses were wide-ranging, with some still feeling that the need case was not yet clear enough and others feeling more positive, but pointing out the scale of communications piece that would need to accompany it to achieve public buy-in.

METHODOLOGY

This section outlines the methodology used to generate and record feedback from stakeholders during the online workshop.

Alongside launching the project, the purpose of the workshop was to capture initial feedback from stakeholders to help inform its development. The feedback the event was looking to capture was as follows:

- To understand initial thoughts on the project concept;
- To identify any perceived barriers to delivery of concerns about the project at an early stage;
- To capture any initial design requirements; and
- To identify potential members for a steering review panel.

The target list of stakeholders was produced from NGED's existing stakeholder database, supplemented by some desk research for underrepresented categories. In total, 1,247 stakeholders were invited to attend the online workshop, with 93 registering in advance and 49 attending on the day. The following number of stakeholders were invited from the categories below:

Stakeholder type	Invited	Attended
Customer organisations	2	0
Consultant	0	1
Domestic battery installers	38	1
Domestic PV installers	69	6
DNO	0	1
Electricians (trade bodies)	6	5
EV chargepoint installers	67	2
Heat pump installers	41	3
Heritage organisations	19	0
Housing developers	239	4
Local authorities - net zero officers	90	8
Local authorities - planning officers	496	14
Smart meter installers	11	0
Social housing providers	169	4
TOTAL	1,247	49

At the workshop, facilitated discussions took place in five breakout rooms, each with c. 10 stakeholders of different types to ensure diverse representation in each of the discussions. Stakeholders were joined by an

independent facilitator to help guide the conversation and an independent scribe to take notes. Feedback was anonymised, although it was recorded by stakeholder type to help with analysis. A representative from the Project OBELISC team (NGED, Frazer-Nash or Lucy Electric) was also present in each breakout room to answer any technical questions.

There were two discussion sessions: (1) overall project concept and (2) design requirements. For each, there was a presentation beforehand from members of the project team that provided the information required for stakeholders to have informed conversations in the breakout rooms. The independent facilitators had a series of pre-designed questions to ask stakeholders during these sessions.

Stakeholders were also able to provide feedback through electronic voting software, Slido. They had the opportunity to provide quantitative feedback as well as qualitative feedback, expanding on the feedback given during the breakout discussions. There were three opportunities to provide feedback using the voting software: (1) overall project concept, (2) design requirements, (3) stakeholder steering review panel and next steps. The voting data was also anonymised, although it was recorded by stakeholder type to help with analysis.

SESSION ONE: OVERARCHING PURPOSE

Laurence Hunter, Innovation Engineer at NGED, introduced the first session of the day. He outlined the projected growth in three-phase retrofit, particularly for larger properties, and showed how the current technology used for upgrades created barriers to net zero due to increased costs and reduced customer acceptance.

Introducing Project OBELISC, Laurence explained that the intention was to develop a novel, cost-effective solution for three-phase upgrades by developing a new type of meter cabinet installed near the boundary edge of domestic properties to serve as the three-phase domestic connection point. He made it clear to stakeholders that any successful design must integrate with each property's existing single-phase connection, reduce disruption, be aesthetically pleasing and balance load on the LV network. He also noted the cost would be paid by the individual customer looking to upgrade – and savings would also be passed onto those individuals and not the DNO.

To finish, Laurence introduced the project team: Frazer-Nash, Lucy Electric, Proteus, Cubis Systems and EQ Communications, and emphasised that the project was at stage zero, which is the initiation and buy-in stage. He then invited stakeholders for their initial feedback and to vote on some polling questions.

INITIAL THOUGHTS ON THE CONCEPT

Stakeholders were asked to what extent they agreed with the statement: "There is a problem to be solved by a solution such as Project OBELISC." An average of 3.78 / 5 agreed that there was a problem to be solved, and OBELISC might be the answer, with 73% either agreeing or strongly agreeing with this statement. For local authorities, the average agreement rose to 3.83, but for LCT installers and trade associations, it fell to 3.23.

This divergence of opinion by stakeholder type was also reflected in the discussion. Stakeholders representing LCT installers and trade associations pushed back on the need for three-phase, arguing that the case for it had been overstated by NGED. Asserting that it was possible to run multiple LCTs on single-phase, these stakeholders questioned the purpose of OBELISC. They expressed concern that the only beneficiary of the project would be NGED, who would reap the benefits of reduced upgrade costs. They pointed out that for LCT installers and electricians, costs could increase with changes to wiring standards, and other potential system and asset incompatibilities. For these stakeholders, it was clear that NGED and the wider project team had much more work to do to convince them of the collective benefits of OBELISC.

Stakeholders representing local authorities were generally more supportive of the concept but had policy-driven thoughts around issues such as planning permission, liability and aesthetics. They emphasised the importance of having public acceptability and the regularity with which certain technologies were refused by residents for aesthetic reasons. While these stakeholders could see the potential benefits for end users, they urged NGED to communicate clearly and effectively to get that public buy-in.

Others wondered about ownership and liability, and whether there would be a need to create policies and codes at a local authority level for OBELISC installations. It was asked whether the single-phase connection

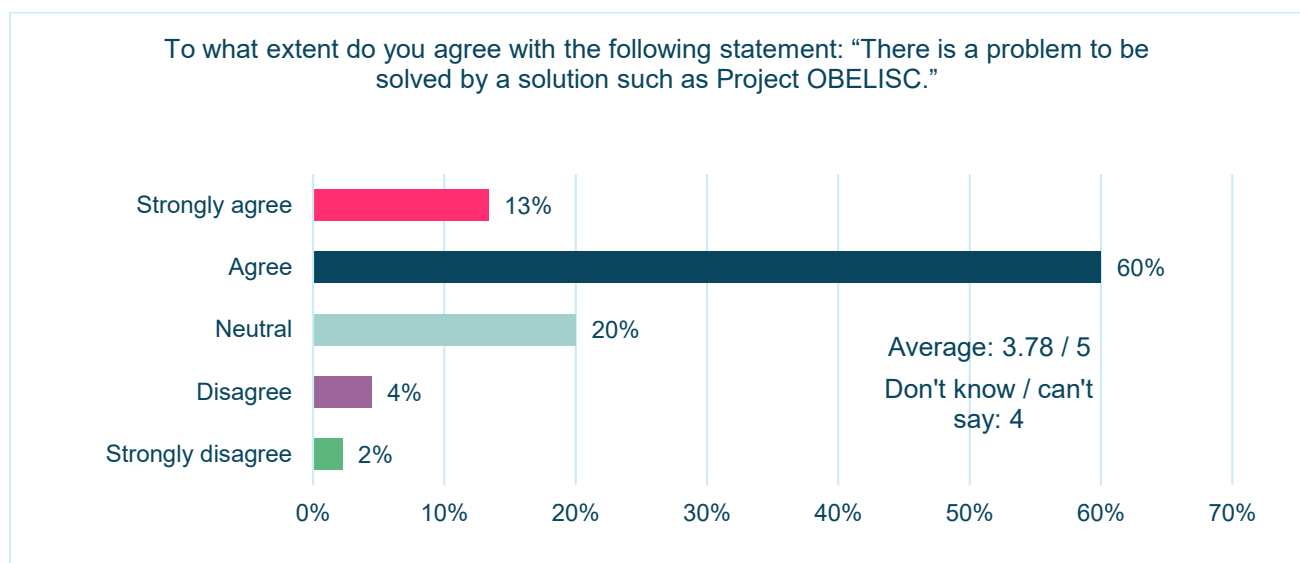
would stay within the ownership of the homeowner or be owned by the DNO. It was also asked where the costs and the liability resided, and it was suggested that NGED would need to develop a very clear policy framework for OBELISC as the project becomes a reality.

Do you have any initial thoughts on the project's concept?

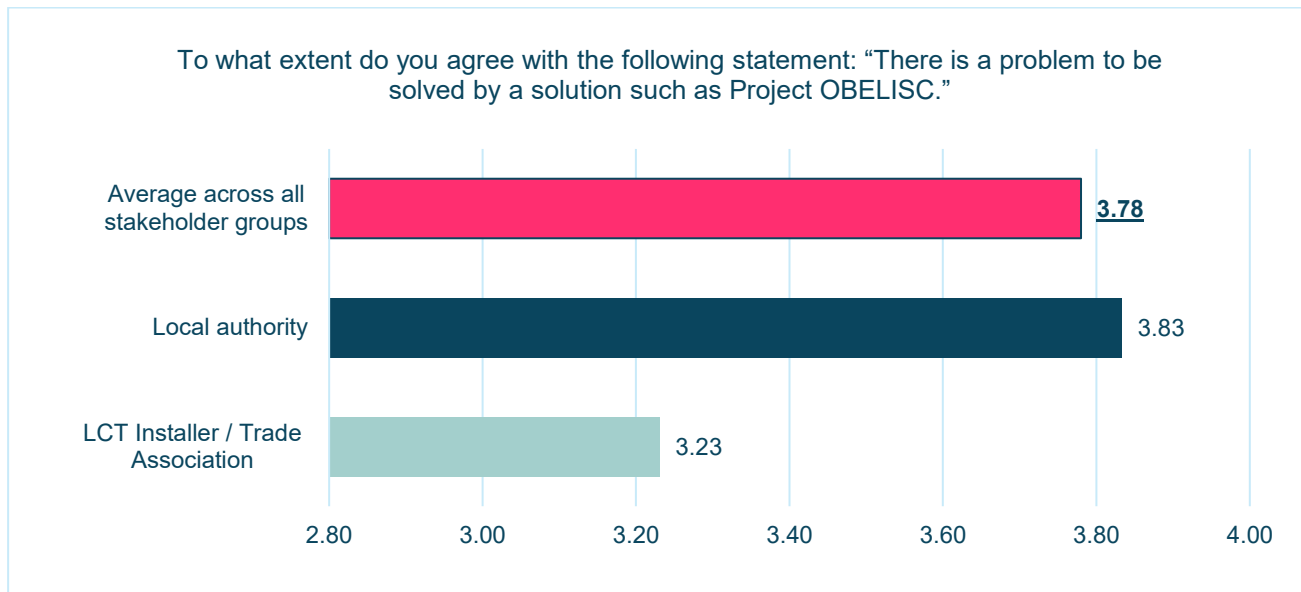
- “The assumption that a heat pump will add 8 KW to the load of a home on a single-phase connection jumped out to me, as we find that it’s often more like 3 KW. However, it tends to vary case by case. More broadly, it’s good to see that NGED is exploring solutions for these kinds of issues, but I want to know more about how the project will be rolled out and what the cost implications will be. I’m also worried about potential major disruption for homeowners in installing them.” LCT installer / Trade association
- “I wanted to ask if you’ve asked planning departments or planning consultants. When we’ve had planning applications refused, it’s because we’re not keeping up the aesthetic appeal of the area. So, cutting them into terraced properties, you’re not going to fall foul of that. And what about residents’ opinions on design?” Local authority
- “It sounds like an interesting product. What’s the issue with liabilities with residents? What if someone drives into it, who’s liable? Retrofit is expensive, so we need to do it right. Also, will this be raised in LAEPs, and will they engage with National Grid? In Notts County, Derbyshire, ours are being rolled out in phases. Is this something that needs to be picked up in LAEPs, and if not, I request that it is.” Local authority
- “General question, why? Why not increase the size of the cabinets already in existence? Is there any reason why this is the approach, of putting an external containment box?” Electrician
- “In my own home, I have a heat pump and an EV charging point on a single-phase supply and have smart controls to make sure that I don’t go over the tipping point. In my professional work, there have not been many occasions where we have not been able to install the equipment with a single-phase supply.” LCT installer / Trade association
- “There are potential positives here from a customer perspective, as you won’t have to have your drive dug up and you can save money. However, a good communications campaign will be critical for getting public buy-in, as they need to know exactly how they will benefit from them.” Social housing provider
- “The presentation brought lots of questions to mind: do we need to create policies and codes at a local authority level for developers for these cabinets? Does the single-phase connection stay within the ownership of the homeowner, or is the three-phase connection owned by the energy company? Where do the costs and the liability fall?” Local authority
- “I think it’s a good idea. The thing I find as the biggest challenge is that single-phase supply didn’t really work. Overseas, especially Denmark and Finland, most properties come as standard with 3-phase. I like the idea but would like to know more about the design of it. If it’s going to be a cabinet stood outside someone’s house, would it be an eyesore? Could it be on the street instead?” LCT installer / Trade association

- “There’s a push for three-phase where it’s not actually needed. People think they need larger supply than they actually need. I see that National Grid say this will be less cost for the customer, but I actually believe it’s a quick, cheap and easy win for National Grid to stick an ugly cabinet on your lawn and be done with it. The local DNO are going to win with reduced costs, but ongoing costs for us will be significant because we’ll have to allow for our wiring standard to be sized accordingly. We’ve got concerns with switchgear being placed outside in these cabinets that form a corrosion with multiple LV supplies. At the moment DNOs do not allow that. This would be subject to planning regulations as well, and most councils do not like outside cabinets. If you haven’t got a front garden, what are you going to do? We see this as an ugly box, a cheap win for DNOs and an added expense for the homeowner, who will be heavily reliant on an electrical contractor to finish the job.” Electrician
- “I work for a company that installs solar PV. Even if we were to have the OBELISC cabinet at the front of the property, it wouldn’t actually work for the equipment that we install. It would have to be on the same phase as the solar. It wouldn’t benefit our company. It would be more cost to us than it would be to National Grid, and actually it’s not really worth it for smaller companies like us.” LCT installer / Trade association

Electronic Voting: To what extent do you agree with the following statement: “There is a problem to be solved by a solution such as Project OBELISC.”



Stakeholder Analysis: Comparison between groups



OPPORTUNITIES PRESENTED BY PROJECT OBELISC

Stakeholders were asked how they felt about the statement: "OBELISC has the potential to rapidly increase the take-up of LTCs such as heat pumps and EV chargers." Overall, the statement received an average score of 2.81, but when analysing by stakeholder type, the same divisions were identified. For LCT installers, this average sank to 2.31, but for local authorities, it rose to 3.09. Again, this highlighted that NGED will need to work with its stakeholders across the spectrum to ensure consensus and buy-in on the opportunities presented by OBELISC.

In the discussions, stakeholders were of the view that the main opportunities presented by OBELISC lay in the potential to ramp up capacity for end users and connect more LTCs. They were also enthusiastic about the potential of OBELISC to change the conversation around retrofitting and future proofing. It was commented that any improvements to this process, be they financial or procedural, could unlock a good deal of untapped potential, and ultimately hasten the progress of net zero.

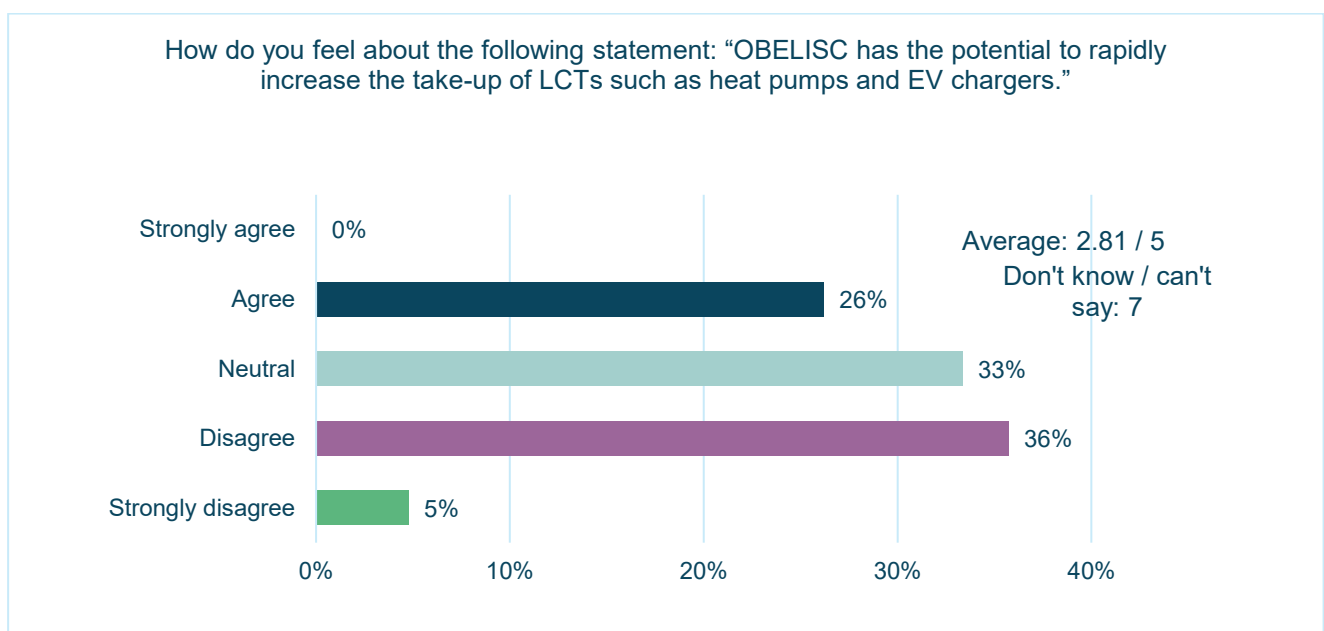
What opportunities do you think this project presents?

- "If it's solving a capacity issue, that's great. We have connection issues in the Forest of Dean. I can also see how this would work on a large, detached house, but other housing types are different. It might also facilitate on-street car charging. We also have conservation areas. This means there's a concern if the cabinet degrades over time." Local authority
- "The key is retrofitting and planning ahead. If we can work with builders and planners going forward, that will be crucial. It will be another thing we just accept on streets in 40 years' time." Local authority
- "I represent a local energy markets alliance. I'm torn because the deployment of a three-phase solution is a good idea, but easier in new developments than existing ones. This seems to just reduce the cost for the DNO, not the customer. NGED has considered standardising three-phase

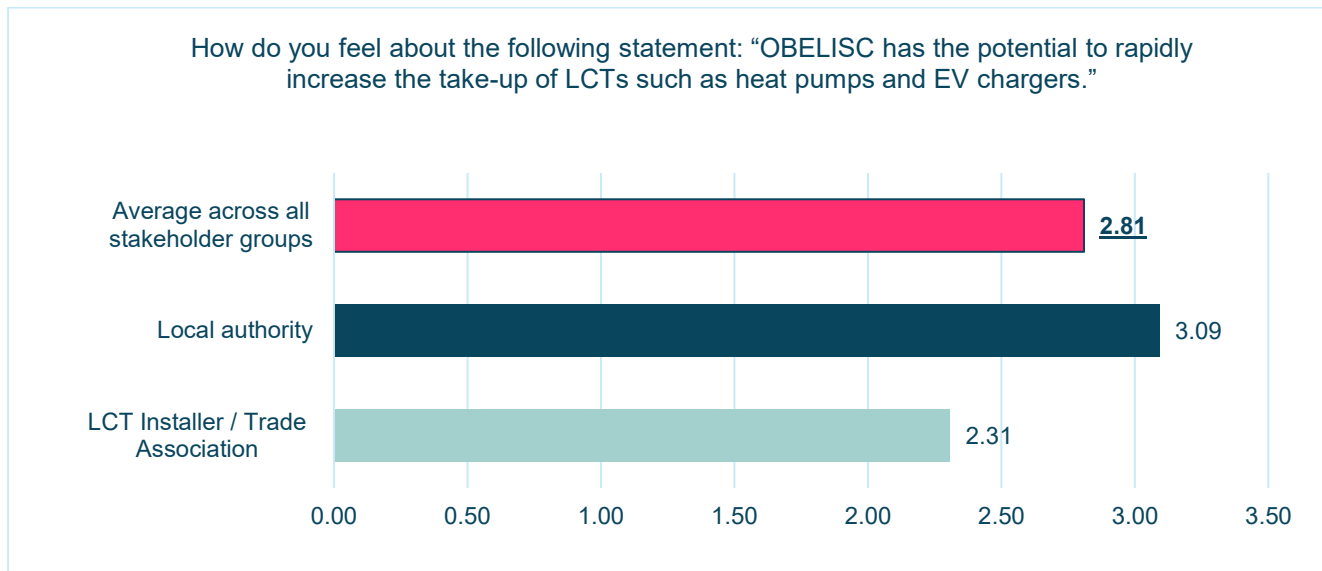
solutions for LCT, but this hasn't happened. There is work needed to turn this into a mutually beneficial solution for DNO and consumer." Other

- "Over 10% of our housing is social housing, which would be key to this discussion. They are also doing lots of retrofit. We're working with social housing providers to drive retrofit opportunities further, so this could be factored into their thinking." Local authority
- "There is a huge opportunity around future proofing. How we're designing new buildings, how that's actually being factored into this design process, because the regulations are changing. But there's also the new Zero Carbon Building Standard, which applies to all types of buildings. It could be very relevant to the discussions here. Also, there's about 29 million homes that need to be retrofitted, so there's a huge challenge around skills but a huge opportunity for skills development. In terms of the product solution, for me that still needs to be unpacked a lot more." Utility
- "There's a real opportunity here for people to increase their energy capacity to meet both environmental and financial targets. At the moment, many small projects are restricted to single-phase supplies because the upgrade to three-phase is prohibitively expensive. If we can make that cost more manageable, it could unlock a huge amount of potential." LCT installer/Trade association

Electronic Voting: How do you feel about the following statement: "OBELISC has the potential to rapidly increase the take-up of LCTs such as heat pumps and EV chargers."



Stakeholder Analysis: Comparison between groups



MAJOR BARRIERS TO DELIVERY

For some stakeholders, potential barriers to delivery were practical and safety related. Those representing electricians asked if NGED could guarantee that any new power supply would come from the same source, if earthing issues that could create shock risk had been properly considered, and if equipment from multiple supplies should be accessible to one another. Other stakeholders, particularly those representing LCT installers, pointed out that if the cabinet was to function as an external meter point, NGED would have to ensure its security and safety while also allowing accessibility for its owners.

For stakeholders representing local authorities and housing developers, the perceived barriers were to do with visual impact, space and public acceptability. Those representing social housing providers cited their clients' refusal of solar panels for aesthetic reasons and felt that many would be more concerned with the disruption caused by installation than by the decarbonisation benefits. Improving communications to these customers and 'sweetening the deal' was seen by these stakeholders to be critical to the success of OBELISC. For others, cost was seen as a major barrier. It was pointed out that many households are unable to afford the costs of upgrades to LCTs, or the power needed to supply them. Some stakeholders cautioned against a 'one size fits all' image of housing stock when thinking about the project. They reminded the team that not every property has a front garden and a paved driveway. It was pointed out that consideration will have to be made for rural and terraced properties, and other housing types.

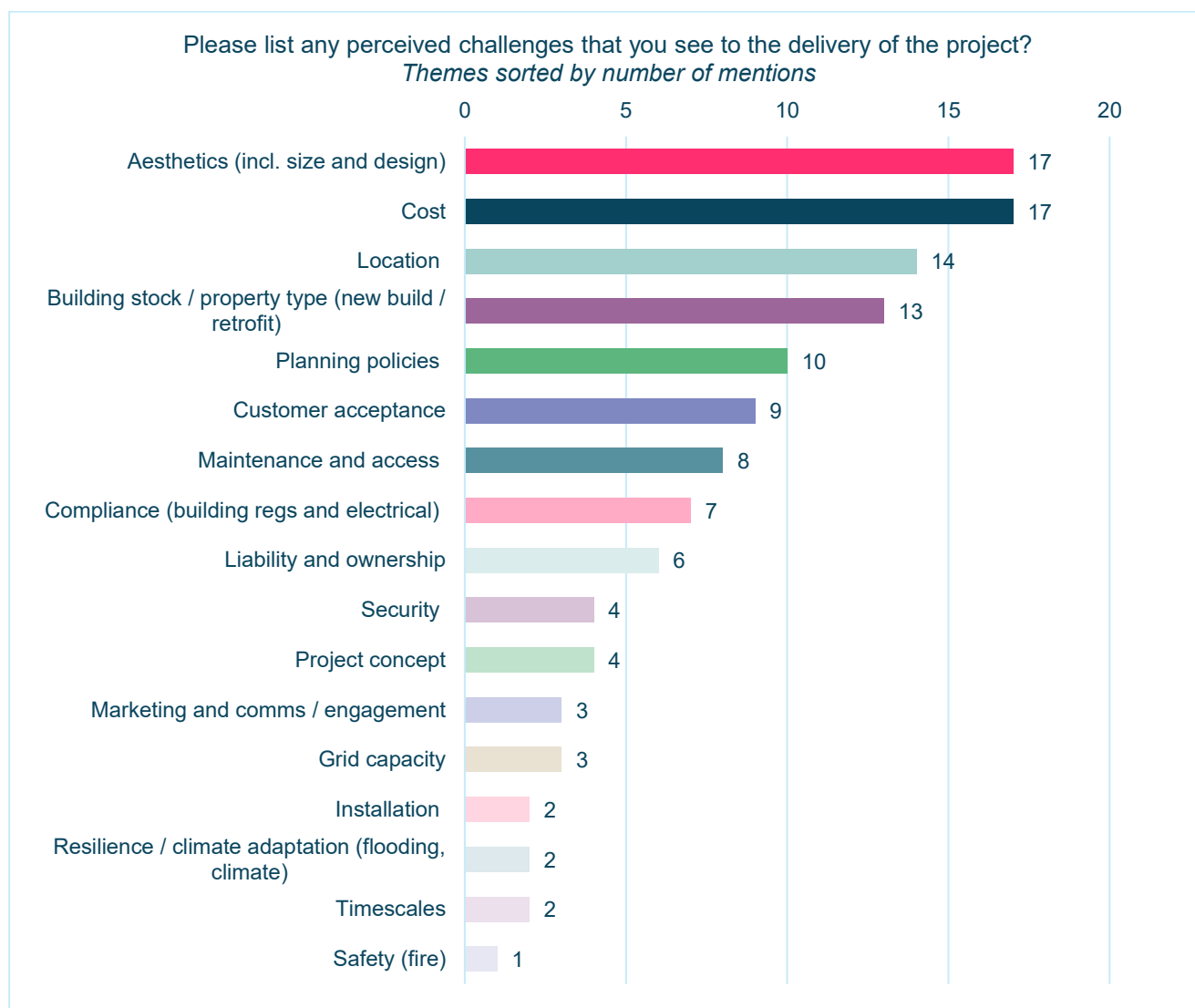
At the end of the discussions, stakeholders were asked to contribute to a word cloud by listing any perceived challenges they saw to the delivery of OBELISC. There was only one point of convergence, which was 'customer acceptance'. The huge diversity of opinion was perhaps due to the fact that OBELISC is such a new proposal, with stakeholders getting to grips with it in real time, before overlapping points of consensus had time to emerge.

Do you perceive there to be any major barriers to delivery?

- “Single-phase supply, the new supply will have to be added outside. Is there a guarantee that the supply is from the same source? What about earthing issues which could create shock risk. Should equipment from multiple supplies be accessible to one another? Switchgear has been a challenge in industry. Compliance, for example.” Electrician
- “I work in planning policy, so I have similar questions about design plans. Would installing one of these things require planning permission or not? Have options been considered for people that can’t accommodate this infrastructure within or outside of their homes?” Local authority
- “Limited space and cluttering concerns would be a potential major barrier. Many people already have lots of things outside their homes. Would they be willing to have another?” Social housing provider
- “Costs could be a big problem here. You’re looking at paying £16,000 for installing a heat pump and doing all of the investigatory work. At a time when we’re trying to reduce the costs for our housing association residents, this could be a barrier.” Social housing provider
- “There could be a problem around acceptability among housing association residents, as they have refused solar panels in the past, as they were thought to be ugly. In addition, you have the particular issue of disruption caused by installing these cabinets and people having far greater concerns in their day-to-day lives than decarbonised electricity. Therefore, communications around the benefits will be critical. You need to find a way to sweeten the deal for them and make them care. This should be targeted at vulnerable customers to ensure that no one is left behind.” Social housing provider
- “I have a practical question. If this is going to be an external meter point, how are we going to deal with security and safety, while making sure that homeowners have access when necessary?” LCT installer/Trade association
- “A big issue could be the visual impact. Could the equipment be buried underground rather than having a visible box outside every home?” Local authority
- “There’s an assumption that every home has a driveway or front garden, but that’s not representative of the houses we mostly work with. Many houses, especially terraces, have no front access, and in rural areas, some homes don’t have pavements at all. How would the system work in those situations?” Local authority

Electronic Voting: Please list any perceived challenges that you see to the delivery of the project.

The graph below groups the challenges raised by key words to give an indication of which were the main challenges perceived by stakeholders.



The following table sets out the challenges raised in full.

Customer acceptance
Heat Networks Zones
I don't get feedback from industry that this is a problem
Restrictive deeds/covenants about affecting external appearance of property!
New build & retrofit solutions different
Maximum demand is not understood, 18.4kW is a significant supply capacity. The costs are being moved from the DNO to the homeowner, where the majority of cost will be the LV installation post meter.

Multiple LV supplies - G94 is not released as yet. Outside switchgear Planning issues The cabinet isn't looking great.
Planning policies that are being prepared now would need to be flexible enough to allow for innovative solutions such as being proposed by OBELISC Engagement with communities Property owner buy-in Who owns the remaining existing single-phase line?
Cost - these will rise due to increase in materials needed. Pressure on installer - to make install look good from front of property G100 compliance - pressure on this as a lot of installs need solid cable installation and monitoring happens at source.
Possible earthing issues as we will have multiple supplies which may introduce a difference in voltage potential. Aesthetics Challenges will then fall with electrical installer to get wiring system up to the property in some cases
Additional cabling in gardens / grounds
Cost, stress on the ring main cable as more demand is placed on it, as more connection points are taken from it.
Balancing load
DNO avoiding the issue
Height of unit
Maintenance requirements?
Buy-in from customers Planning Location Education for buy-in Advertising Integration to overall decarbonisation strategies
Ease of adding more connections - PV, energy storage, multiple EV chargers etc.
I don't want a box on my front garden. Electricians don't want to dig trenches and drives. Maximum demand seems to have been ignored. Access to the unit to those with malice intent seems to be a problem.
No concrete please...

Visual appearance. Security. Disruption as existing ev charger would have to be rerouted, plus any future heat pump cable. Flood risk.
Timescales for fitting within our programmes of works
Compliance with future building safety reforms and regulations
Location and size of the cabinet What load is anticipated for each property. Ducting requirements Appearance
It's a DNO-centric solution
Not registered for new build?
Acceptance from people that don't want to see street cabs
Cost, ownership of unit, multiple consumer units, one per phase?
The look of the unit (can it go in the ground) Cable cost for EV/heat pump will cost more to customer
Approvals, application, cost, location, customer's approval, disruption
Positioning of enclosure and requirements to get three-phase cabling back to required position
Space requirements
- Practical application - Not a one size fits all resolution - Property specific
The cost of installation... limited spaces for the installations, look, ease to get installed
Culture of UK homeowners, intransigence to change or not understanding how to implement green energy solutions etc.
Distance of property from boundary
Flood risk
This appears to shift some cost for a three-phase upgrade away from the DNO and onto the customer at a potentially higher cost.
Additional cost of unit will impact on development viability
- Timescales from National Grid - Phase imbalancing - Communication cables still need to be trenched - Doesn't work for solar responsive EV - Planning - Aesthetics
Design and visual impacts

Planning challenges
Liability and ownership between stakeholders
Cost
Marketing and customer engagement
Convincing people additional cost is justifiable
Terraced housing, planning permission was mentioned earlier & available space/land on each property
Limited space at front of properties; planning; design of unit.
Design / aesthetics (e.g. conservation areas / planning)
Applicability to UK housing stock (terraced)
Multiple occupancy buildings
Costs across entire social housing stock
Local authority requirement
Acceptance from customer of the boundary box on their property
End cost to customer as more works on them
Space / location for equipment
Planning
Planning restrictions, liability issues
Planning issues
Costs
Design
Liabilities
Technical issues
Terraced houses, mixed ownership, no drives, where is the boundary line. Security issues - vandalism, stealing energy?! Nimbyism in terms of aesthetics
Load balancing, How does it affect future DNO applications for LCTs.
Security, aesthetics
Positioning and locating the unit will be a problem.
Lack of grid capacity. Lack of garden space.
Cost - who bears the cost of installation?
Planning requirements
Access to social housing tenants' homes
Location of the OBELISC solution

Property suitability
Community issues
Costs
Property type
Silo approach
Cost
Financial advantage to customer
Visual appeal

SESSION TWO: DESIGN REQUIREMENTS

The second session of the day was introduced by Iain McDonald (Senior Engineer at Frazer-Nash Consultancy), who demonstrated the importance of getting OBELISC's design requirements correct from the outset. He explained that correctly identifying the needs and wants of end customers, installers, and other key stakeholders was critical to ensuring the successful deployment of OBELISC. Alongside this, continued stakeholder engagement throughout the design lifecycle would minimise the risks associated with the project.

To begin this process, Iain then invited stakeholders to share their initial feedback on OBELISC's use cases and design requirements.

INTERACTION WITH THE CABINET

When thinking about how they would interact with the cabinet, stakeholders had many more questions than settled responses, and this was perhaps due to the novelty of the concept. Those representing electricians wanted to know if and how access to the cabinet could be limited to installers. They were clear that the only people who should have access to the cabinet would be skilled installers, and they had safety concerns. They wanted to know the maximum amps of each phase and pointed out that circuit protection in the form of consumer switchgear would be needed if taking supply straight from the cabinet to other devices, prohibited under current regulations. The question of having a consumer unit in the cabinet as well as in the domestic residence came up as a key concern. These stakeholders also wanted to know how they would access their own cabling from the cabinets. Would they have to go below ground, and in this case, how would they get cabling to them without trenching the whole route?

Those representing the domestic customer perspective were more muted in the discussions, although those representing social housing providers cited that many of their residents were not 'tech savvy' and therefore extremely unlikely to want to interact with the cabinet in any form.

As a potential user how would you interact with the cabinet? What would stop you from doing that?

- "The design will meet the IET requirements, what did the presenter mean by that? Do the IET set standards for products? Who and how do we limit access to the box, in terms of installers? Consumer units, which are generally quite feasible to install, have been maliciously accessed. Could the design limit that? A box can be seen walking past, as opposed to the meter cabinet on the side of my house." Electrician
- "Some of our housing residents are less tech savvy and don't have an appetite to use this newer technology, preferring to stick to what they know. As a result, they really don't want it in their homes." Social housing provider
- "The only people interacting with the cabinet would be someone skilled and instructed, which won't be the user. It will only be accessed by electrical contractors. The end user only needs to look at it aesthetically." Electrician

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- “Two questions. Would the supply be 60 amps per phase? That may cause an issue. Additionally, would the cabinet have space for consumer switch gear? If you’re taking supply straight from there to other devices, then circuit protection would be needed. Under current regulations, you’re not allowed to put consumer switch gear into the meter box. There is the potential to add a third compartment.” LCT installer/Trade association
 - “I assume the idea is that us as installers will be fixing our own cabling out of these boxes? So, what are the knockouts of this, and access below ground, how do we get cabling to them without trenching the whole route?” Electrician
 - “In your mind, would this have a consumer unit inside the box, as well as a consumer unit inside the house? Also, in reality, some installers don’t use cats and gennies. Would this have safety connotations, running cables across drives and gardens, lacking training?” Electrician

CABINET REQUIREMENTS

Stakeholders urged NGED and the wider project team to embed resilience and future proofing in any cabinet design. Ensuring the cabinet could be easily upgraded in the future was a key consideration, as was integrated lifecycle management. Stakeholders reminded NGED that the recycling and disposal of the cabinets needed to be intrinsic to the design at the beginning, so working with recyclable and sustainable materials as far as possible was also important.

Another critical requirement was the resilience of the cabinet in the face of climate change. Describing the cabinet as ‘a big metal box full of electrical components’, stakeholders wanted to know if the cabinets presented an elevated fire risk. They also stated that projected rising temperatures needed to be factored into resilience testing, as well as flood risk analysis.

On a more local level, stakeholders wanted NGED and the project team to ensure the cabinets were installed where the risk of driving or crashing into them was minimised. They wanted the placement of the cabinets to consider pushchairs, wheelchairs and the visually impaired. Could the cabinets find a common visual language with other utility cabinets? Could they benefit from being placed close to one another? How could the design of the OBELISC cabinet itself work to minimise disruption?

Stakeholders also wanted to ensure the cabinet would have flexibility of location, asking if they could be placed on a wall, or underground. For many, the key design concept was that the cabinet be as visually unobtrusive as possible, seen to be particularly important when thinking about historic and listed buildings.

Do you have any requirements for the cabinet that we should consider at this stage?

- “We always think about resilience and future developments. Don’t just consider the present but the future too. Design the cabinet in a way that it can be easily upgraded in the future. Some people won’t want it, aesthetically. Put it in a place where you can’t drive or crash into it. You should also consider pushchairs and blind people. Think of other utility providers and the benefit of these

cabinets being close to theirs. How can we minimise the disruption to the city and to residents?"

Local authority

- "In terms of climate change, increased temperature or extreme weather events, it feels like this box needs to be Fort Knox. Is there a fire risk? Are projected temperatures being considered? Or are tests based on the now? Rising temperatures need to be factored in. This is a big metal box full of electrical components. Have worst-case temperature projections been considered?" Local authority
- "Flexibility of location is important to consider too. Do they have to go on the ground? Could they be placed on a wall instead?" Local authority
- "I would want the cabinet to be as inconspicuous as possible and not visibly obtrusive in areas with historic buildings." Local authority
- "Could some of the cabinets go in the ground if local authorities were to allow it? Would that be too complicated? I realise that this could cause problems with access for maintenance and ease of movement on the pavement." Local authority
- "Regarding IoT, keyless remote access management could be a valid solution. This gives asset management to the asset owner." Manufacturer
- "You mentioned the fact about integrated lifecycle management, and there's been a lot of talk about the technicalities of these boxes. But there's going to be millions of them around the country, and I think recycling and disposal needs to be considered from the beginning. End of life is very important." Local authority
- "Consumers are in different positions, so maybe you need a series of different solutions. There are those who have a drive, those who don't, those who live in a house, a flat, and different housing situations will require different approaches." Local authority

CONCERNS ABOUT THE CABINET

Stakeholders representing LCT installers, trade associations, electricians and manufacturers had concerns about the impact resistance of the cabinet. They were also sceptical about the longevity of the switchgear and components inside the cabinets, which would be much more exposed to extremes of temperature than equipment placed inside the house. Security, vandalism and flood risk were also key concerns. Stakeholders cited incidents of supply being stolen and rerouted to serve cannabis farms and wanted to ensure that the cabinets were as secure as possible from this type of risk.

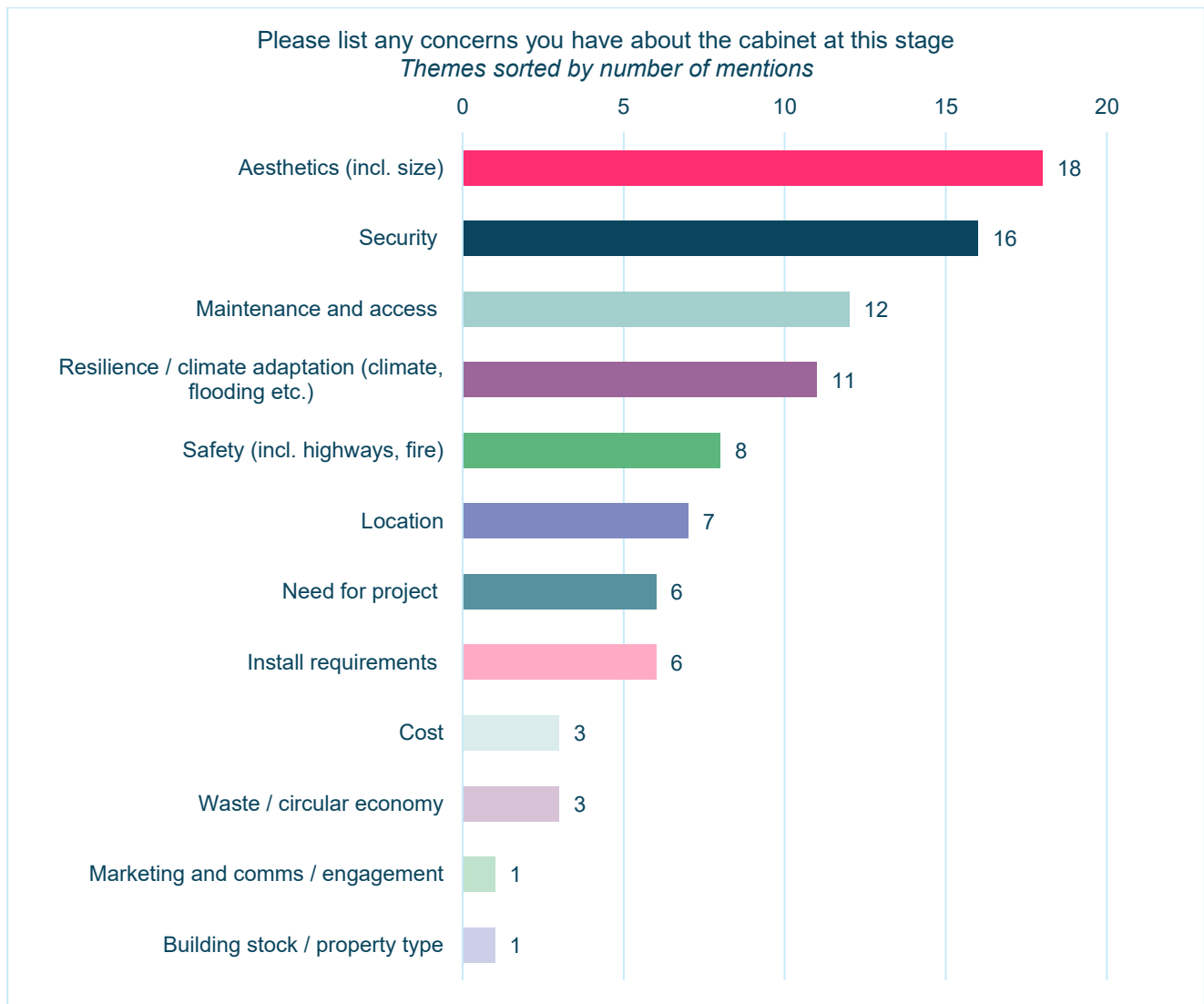
At the end of the discussions, stakeholders were invited to contribute to a word cloud by listing any concerns they had about the cabinet at this stage. As with the previous word cloud, there was only one point of convergence, in this case the word 'aesthetic'. What did emerge, however, was a rich and diverse set of questions and considerations for NGED and the wider project team to consider.

Do you have any concerns about the cabinet that we should consider at this stage?

- “Impact resistance. When we have a unit on the side of the wall, that’s one thing. But with three-phase, we need to see some technology that designs that centrally.” LCT installer / Trade association
- “Where things are placed, the highway authorities will need to be involved. Accessibility, you need to make sure you don’t cause hazards.” Local authority
- “First of all, we don’t know how big it’s going to be. Is it going to be in the way? What about safety if it’s damaged? I’m wondering about those kinds of things. Wherever you put this, is it going to be an obstruction? What if a delivery driver reverses into it? What are the risks to the supply and its safety?” Local authority
- “One thing that stuck out was a flooding risk. The comment about vandalism, intentional or accidental, is also valid. Until we know what that’s going to look like, it’s going to be difficult to know how the public will react.” Housing developer
- “We’ve seen lots of cannabis growth in our street. Some people will dig into the road to access the supply. Review how easy it is to open the boxes. If a box is opened and it’s not planned maintenance, you could have an alarm system that alerts someone of the intrusion.” Local authority
- “The security of the device at the boundary is important. Flood risk and vandalism risk must also be considered.” LCT installer / Trade association
- “Some people can break into meters and rob the electric supply, such as tapping off lampposts. If these cabinets are very accessible, that poses a risk. People will always find a way to circumvent a system.” Manufacturer
- “I’d like to see how that switchgear survives 25 years at the end of your drive, outside, where it is more exposed than if it were in your house. Temperature heat rise testing would have to be done.” Electrician
- “Being involved in the process is going to be good. I’m glad you’ve reached out. Until we get an idea of a prototype, it’s hard to make clear assessments. How this sits within the planning regime will be interesting. There are permitted development rights for utilities, which mostly don’t cause issues, but occasionally they do.” Local authority
- “The big issue in South Devon is the lack of capacity on all the substations. I’d be interested to know where this sits. The National Grid website shows red everywhere, indicating a lack of capacity. This project won’t help that situation, so I’d be interested to hear from National Grid.” Local authority

Electronic Voting: Please list any concerns you have about the cabinet at this stage.

The graph below groups the concerns raised by theme to give an indication of which were the key areas of concern for stakeholders.



Aesthetic
Building safety
Size Cost Space for consumers' equipment Security Impact rating Positioning, it may introduce touch potentials e.g. adjacent lamppost connected to a different earthing system
Cumulative street clutter Impacts on facades if built into new builds that are immediately on the street Could boxes be shared between properties? What about where power lines are in back gardens?

Would this be domestic only or commercial?
Surge protection
Cable would be required anyway
The size Natural disasters - flooding etc. Access Security Appeasing Cost
Continuing need to access, alter and add to connections
Why is a cabinet needed, is it more of a technology challenge to integrate into building
Length of cable to consumer units?
Where located in terms of the highway and how interrelates
Comms
Size Space for consumer equipment Conformities to other regulations Signals - 5G for smart metering Safety of installers, they do not typically cat and genny - this would be a new skill and product to buy and use
Circular economy, waste how recycled at end of use. Materials use
Flexibility of location
Security
Redundancy of existing single-phase cabinet
Size, if we have a small block of flats which need more than one cabinet on a plot
Standard connection methods to ensure quality safety is maintained
Size. Carbon footprint of construction. Recyclability at end of life
Vehicle collision
Size mainly
Spacing requirements (small front yard - need space for car parking instead) / restrictive covenant - need permission from other body first
Future proofing
Security and ease of access for theft of unmetered supplies
Security, safety (from flood risk), accessibility, aesthetics
Size and position, security
Size and positioning
Security, robustness, flooding

Size Weather and impact performance Location Aesthetics
Robustness and positioning of the cabinet
Could mean more consumer units, more maintenance, more joints, increased fire risk etc.
Climate adaption - storm events, wind damage etc. Temperature increased.
Safety, robustness, vandalism, appearance, flood resilience
Safety and security of the device to vandalism, theft, flood risk, security of supply
Size Realistic installation Cost Disturbance
Design, scale, visual impact
Height, size, material, access/security
Look of unit. Tamper proofing
Size, shape, appearance, material
Flooding
Do we need three-phase So do we need cabinets
Flooding Vandalism Insurance Obsolescence
Vandalism Customer access Not required
Cable access
Security - illegal tapping in
Size
The answer to a solution that doesn't exist.
In case of fire?
Access for malice
Customer accessing the cabinet

SESSION THREE: STEERING REVIEW PANEL AND NEXT STEPS

Stakeholders were apprised of the formation of a Steering Review Panel, tasked with providing feedback for the duration of the project, and were then invited to vote on a number of polling questions, using Slido.

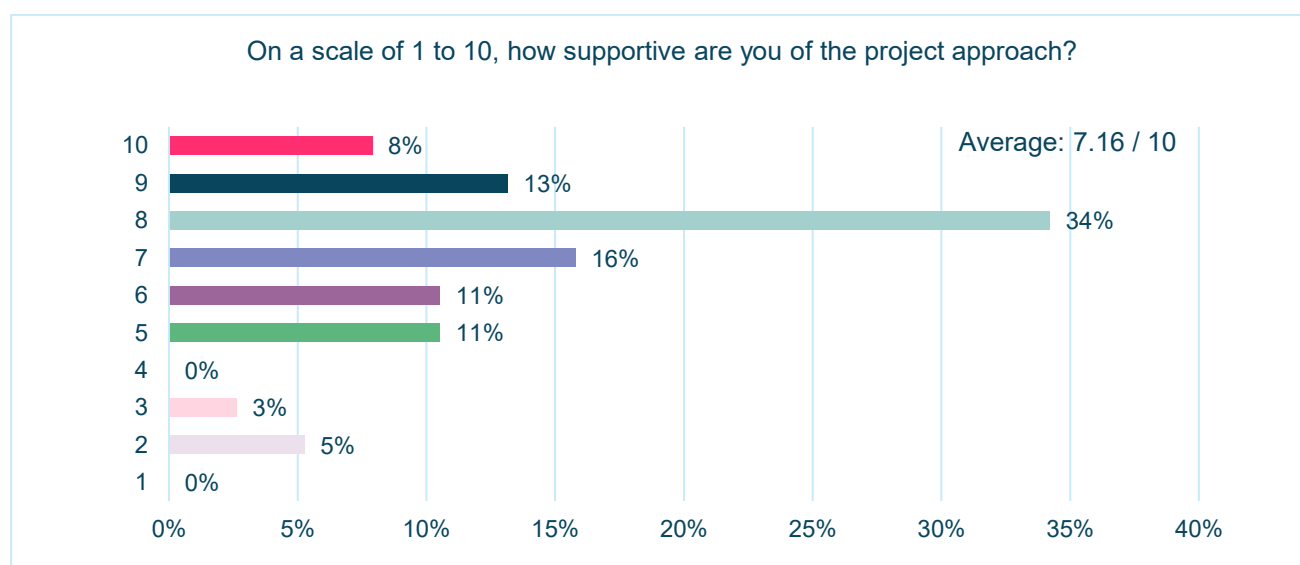
Electronic Voting: Are there any stakeholder groups that you feel are missing from our proposed list?

The following organisations were put forward as suggestions. Each organisation has only been included once, even if the suggestion was made several times.

Fire service
Manufacturing Technology Centre (MTC)
Government catapult
IET (Wiring Regulations Department)
Policymakers
National House Building Council
BEAMA
Electrical Safety First
Planning authorities (drafting new design/spacing policies for new build housing etc.)
Accessibility groups
Active Travel England
Home insurers
Manufacturers of consumer units
Warranty providers
Homes England
BSI national standards body
Planners
Police (in terms of antisocial behaviour)
Heritage building organisations
Highways authorities
Ofgem

TCPA
Historic England
Meter operator - EDF etc.
Research and academia
Housing associations
ICPs and IDNOs
Manufacturer trade bodies e.g. heat pumps or batteries
Product manufacturers
Electrician Contractors Association
SELECT (Scotland)
NICEIC
NAPIT

Electronic Voting: On a scale of 1 to 10, how supportive are you of the project approach?



Stakeholder Analysis: Comparison between groups



Electronic Voting: Do you have any final thoughts on Project OBELISC?

Of the 24 comments left, a majority (15) were mixed or equivocal in their assessment of the project. Six were negative, and three were positive.

Technology will probably make this concept obsolete in 5 years
Only that I feel that there should be a cultural sea change nationally where homeowners in their millions have an expectation that new properties should be designed from the outset with OBELISC/EV/solar panels etc., and the planning PD rights allow for the adaptation of existing properties
Costs needs to be considered as if its extensive I don't see home owners buying into it
I see this as being one possible solution, but not a generic one. You need to have an agnostic approach to solutions, not a one size fits all
Selling this to the public will be key (if taken forward) as will cost
I think it is a great idea. However please do not use language like you are the silver bullet. It should be part of a toolbox, right technology for the right place/person. Having questions that asked us if it would 'rapidly' increase is probably why the high % of disagree. It will help, but it's not the silver bullet. Language helps engage people 😊 rather than put them off
Will this make it cheaper to move existing single-phase equipment in older properties? Would the homeowner adopt the existing single-phase? Probably too early to answer
Good concept. There are a few design options not just stand alone for retrofit. Lots of variables to consider
Needs to be discussed with all bodies, NICEIC, Fire, Homes etc.
I remain unconvinced that this will lower costs or encourage wider deployment of EV charging & heat pumps. It seems to simplify the cost/scope for the DNO but not the householder
Good idea, plenty to look at

Hope it's not the size of an obelisk
Could be useful, but we need to see how many homes will really need to go to 3ph. If we find ourselves needing such a product, it's good to be looking at it now
Will it allow more than 4kw of solar on dwellings as a norm
A project like this has merit. However, we believe it to be aimed at a very niche housing stock. We can see this benefitting housing estates, however not so much a solution for bespoke projects/houses
Sounds like it could be a great solution to some situations, very supportive to see it work
There is a need for the application but will require considerations from many parties to be a success
I think this could be a really good project if some aspects are changed. Parts of the project seem redundant but could be changed to be really beneficial
Needs to be entwined with improvements in grid capacity. Too many places cannot connect in rural areas
I think this is an inconvenient solution to a problem that does not exist for installers. Happy to contribute, but feel the cost implications are being pushed to homeowners
I do believe that something going forward does need to happen - it is whether this is the right idea?
An interesting idea but plenty to be looked at before can be rolled out
Good idea, let's get a design on paper!!
Pushing three-phase for customer pays, rather than DNO
Are there any considerations for properties with multiple households (i.e. flats)
I doubt this was 'end user' requirement, more like a DNO push

SESSION FOUR: Q&A

Laurence and Iain were joined by Richard Brady (Policy Engineer at NGED) and Zack North (Electrical Engineering Consultant at Frazer-Nash) for the Q&A. The questions posed and the answers received are detailed below.

Question

“Based on our breakout sessions, who's asked for this? Because I think we represent 27,000 operatives and over 3,000 member companies or electrical contractors, not once have we been asked for this sort of solution. So, I'm wondering who the user is.”

Answer

“I think, for us, it's come mainly from house builders who we've engaged with and also from the LCT installers that my colleagues have been engaging with. We know that other DNOs as well are very receptive to this kind of method to accelerate three-phase. We have a lot of requests coming in but the time to deliver and the cost to deliver are the kind of main things we're trying to overcome. So that's my answer. But Richard, if you're available, do you have anything to add?” NGED

“Yeah, thanks for the query. Yeah, it's really come from, well, A) the business has requested, when we were installing three-phase equipment, a better position to put it, but also from house builders and developers and LCT installers have requested something different. We get new house builders that are saying they're going to build a nice new house. They've got all sorts of EPC requirements to get thermal abilities to certain standards, and then we come along and cut a hole in a wall and stick a metre cover into it so that we can get our cable into it, so there's that side from new builds, and then there's sort of more rural development teams who are trying to convert properties into flats or multiple buildings, and then they've got the issue of trying to get their supply into somewhere, and I think it was brought up in the other questions around something regarding multiple users for flats or blocks of houses that could be facilitated, so that is one of the options. We want a sort of fully flexible modular unit that can either be added onto or expanded as needed. We put an initial stakeholder request out to local stakeholders and our local planning teams, and there was quite positive feedback from the housing developers about something different than a hole cut into the side of the house for the meter box.” NGED

Question

“Sorry, did we just discuss that for new build properties? I really don't understand that for the purpose of a new build property. Why couldn't we just put a three-phase supply in if that's been requested or required because there's heat pumps and EV chargers and an electric home and such. I don't really understand why we'd go and build a new property and then put one of these boxes at the bottom of the drive. I don't really see much of a difference with having a slightly larger cable and a slightly larger survey set. Most of the conversation was around retrofit.”

Answer

"Let's say we we've got liabilities of cable across properties and on driveways and things like that so we can get it near the boundary. That would be less liability for a DNO, which I suppose is a saving for a DNO, which ultimately is a saving for the customer, because it will get socialised onto the bill, but also the retrofit is where [?] has all been modified and changed and upgraded. Like you say, on our initial drawing the service head was in the middle of the property somewhere. Trying to get that cable back into that position is often the more difficult thing on a retrofit or upgrade of an existing supply." NGED

"And just to add on, in terms of new builds, it's seen as an alternative way in which we can provide a three-phase service cabinet. Obviously, customers would have the choice of whichever meets their needs most effectively. But from the engagement we have had so far, larger recessed three-phase cabinets are often seen as a burden by some of the developers we engage with. And so, this kind of responds to that concern over thermal efficiency within the outer wall of new build properties. But it's an option. It's an option that people can select from." NGED

Question

"On slide 10 of the first round, there was a comment about temperature rise and this being an issue. Is this in relation to temperature rise of terminals and equipment, or is this in relation to new builds and almost passive house standards? I would have thought if it was a passive house type thermally insulated building then you wouldn't have an external cabinet, you'd have a plant room designed into the building, and temperature rise wouldn't be an issue for that. I just wondered, was that a justification for putting these externally in a GRP enclosure?"

Answer

"Yeah, the temperature rise is an issue. So, there's been a study through the ENA around heat rise at the domestic cutout point, and there's been studies done around that and in radiation as well from the side of the house, so this is a sort of area that could be resolved." NGED

Question

"What are the potential savings for a customer?"

Answer

"We're targeting between 10 to 15% decrease in the unit cost of providing a three-phase retrofit. With that, a sort of cumulative net present saving of between 3 to 30 million pounds could be achieved, rolling that out across the network. And that is customer saving. That's not DNO savings. That's benefit to domestic customers wishing to upgrade. But because we haven't got a prototype yet, that's a targeted cost that we're working towards. And that's kind of the aim of the work is to try

and get costs as low as possible for customers. Yeah, it's likely to come in lower than the existing. Otherwise, there's no business case in issuing something that's more expensive.” NGED

APPENDIX 1: ATTENDEE LIST

A total of 49 stakeholders attended the workshop, representing 46 organisations. The organisations represented are shown below:

2020 SolarPV	High Peak Borough Council
Aira Home UK	IMS Heat Pumps
Alliance Homes	Mansfield District Council
Bellway Homes	Naked Solar
Birmingham City Council	Newland Homes
Bolsover District Council	North Northamptonshire Council
Boston Borough Council	North Somerset Council
ChargedEV	Rippon Homes
Coastal Housing Group	Robertson Developments Limited
Cornwall Council	Rutland County Council
Derbyshire County Council	Schneider Electric
Deta Electrical	Staffordshire County Council
Dorset Council	Staffordshire Moorlands Council
East Staffordshire Borough Council	Stoke-on-Trent City Council
Electrical Association	Stroud District Council
Empower Energy Ltd	SunGift Solar
Energy Storage Association	Swansea Council
Erewash Borough Council	Thermal Earth
EVC Solutions	Traxis Group
Forest of Dean District Council	Vale of Glamorgan Council
GivEnergy	West Devon Borough Council
Heat Pump Federation	West Midlands Combined Authority
Heatable	Westward Housing Group



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