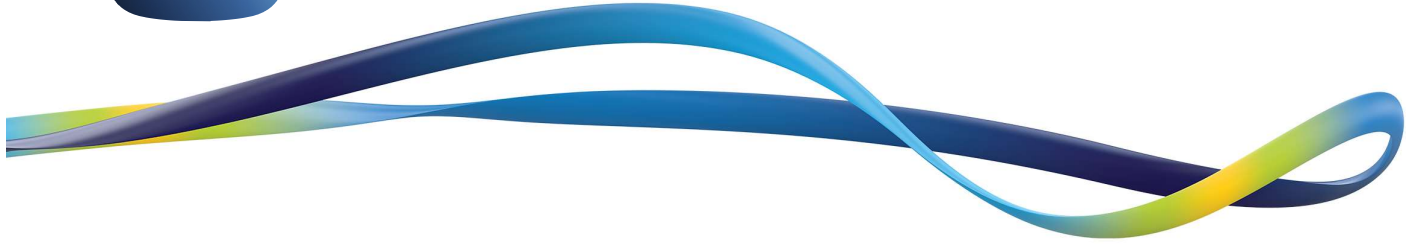




NETWORKS



# **THE DINGLE ELECTRIFICATION PROJECT: SHARING LEARNINGS FROM THE PEER-TO-PEER ENERGY TRADING OBJECTIVE**

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# 1 Introduction

## 1.1 Background

The Dingle Project is part of the ‘Future Customer’ roadmap in the [ESB Networks Innovation Strategy](#). ESB Networks’ vision for the future is to maximise the capacity of the existing network to support its customers’ changing energy requirements into the future. The original scope agreed for the Dingle Project included a trial of Peer-to-Peer (P2P) energy trading concepts.

This document outlines the activities undertaken by ESB Networks in furtherance of the P2P objective of the Dingle Project, the learnings garnered from these activities and proposed future steps to be undertaken to increase learnings on the potential impact of P2P energy on the operation of the distribution network.

## 1.2 Dingle Project Background

ESB Networks has a pivotal role to play in Ireland’s transition to a low carbon economy, powered by clean electricity. Electricity holds the key to a low carbon energy future. By removing carbon from electricity generation and electrifying heat and transport, Ireland can address a substantial portion of its carbon emissions.

Electricity customers will play a central role in the transition to an all-electric future. Only by understanding and responding to their needs and behaviours, will it be possible to create the energy system of the future. The deployment of new technologies in the Dingle peninsula will assist ESB Networks in understanding the development of a smart, resilient, low-carbon energy network of the future.

The Climate Action Plan envisages that by 2030, Ireland will have the following mix of technologies:

- 70% of all electricity needs from renewable energy sources – solar and wind;
- 950,000 EVs; and
- 600,000 Heat Pumps;

The 2020 Programme for Government with annual targets of 7% reductions in emissions between now and 2030 may further increase the renewable and electrification targets.

ESB Networks will need to develop the network to facilitate participation of customers in future flexibility services or markets. It is forecast that there will be 2,500MW of demand side response capability in its customers’ premises by 2030. This will require investment in new control systems and assets to allow future Demand Side Response (even at domestic level), to offer various flexibility services to the energy system in Ireland. Domestic and network level control technologies will be important in delivering a network with sufficient capacity and visibility to facilitate customer flexibility. The flexibility trial set out in the Dingle Project will demonstrate these technologies and provide ESB Networks with insights into the data and systems that it will need to meet the changing needs of its customers.

## 1.3 Dingle Project – Peer-to-Peer Objective

As mentioned, ESB Networks has a pivotal role to play in Ireland's transition to a low carbon economy, powered by clean electricity. The Climate Action Plan anticipates a steady increase in the number of citizens adopting electric transport, electric heating and distributed energy resources such as Solar PV out towards 2030.

It is envisaged that these electric transport, heating and renewable energy technologies will also enable customers to partake in new energy services where they can contribute to managing climate change by decarbonising Ireland's energy system. It is also expected that markets will evolve to enable customers to benefit commercially from their participation.

In this context, ESB Networks defines a prosumer as a customer who not only consumes energy but also produces energy or flexibility for the power system thus becoming an Active Energy Citizen and who understand that their actions have a direct impact on the power system.

ESB Networks does not envisage a situation where it has future responsibility for P2P trading as it expects this to be a market-led initiative and not within the scope of the DSO. However, its innovation consultations and stakeholder engagements clearly indicated that there was significant interest in the topic and diversity of views on how it might be achieved in Ireland. Additionally, it could be the case that modifications to ESB Networks' metering or operations might be required to facilitate P2P, in which case ESB Networks would require to have an active involvement in ensuring that the network configuration facilitated P2P where this was feasible and economic. In the absence of known requirements for what P2P might involve from a Networks perspective, ESB Networks looked to develop a trial of the concept in Dingle to both help it understand what it needs to do in the future to enable these activities for its customers and to facilitate a discussion amongst industry stakeholders.

Recognising the increasing roll-out of residential generation and demand technologies across the electricity industry ESB Networks structured its P2P objective in the Dingle Project to understand how the distribution network might be impacted as a result of P2P services and how the Distribution System Operator (DSO) could facilitate P2P energy services into the future.

The project objective was to develop, document and disseminate an understanding of how ESB Networks, as DSO, could facilitate P2P energy trading and through trialling one of several possible P2P trading concepts, provide insights into what impact this might have on ESB Networks and provide some general insights into platforms and systems required to enable this. The expectation was that the demonstrations and trials delivered as part of this objective would allow ESB Networks and other industry stakeholders to understand the role P2P could play in enabling the Active Energy Citizen, the potential operation of Local Energy Communities, the adoption of renewable technologies and gain an understanding of the impact of P2P from a network facilitation perspective. It should be noted that ESB Networks' definition of Active Energy Citizen and "local" Energy Communities, for the purposes of progressing its P2P energy trial, was completed in advance of CRU decisions on how the related elements of the Clean Energy Package would be implemented in Ireland. As such ESB Networks' definitions for the purposes of its intended P2P trial may differ, including in terms of their implementation, from those subsequent to CRU decisions in this regard.

ESB Networks considered that, by nature of its role in the industry and not being an active participant in the energy markets, that it was well positioned to facilitate this P2P trial. ESB Networks was also motivated to maximise use of its evolved flexibility trial environment at Dingle to enable learnings for interested stakeholders.

## 1.4 Specific Benefits Expected from P2P Objective

The Dingle Project Initiation Document (PID) envisaged 5 potential benefits associated with the P2P objective:

1. Inform ESB Networks on how P2P could impact the technical operation of the LV network;
2. Inform ESB Networks of the functional requirements of metering (if any) to support P2P;
3. Inform how P2P might incentivise the uptake of renewable generation at domestic level;
4. Inform ESB Networks of the impact of P2P on its financial & regulatory model; and
5. Use analysis and results to inform both commercial and regulatory structures that the DSO may be required to develop.

## 1.5 Digital Platform Strategy Overview

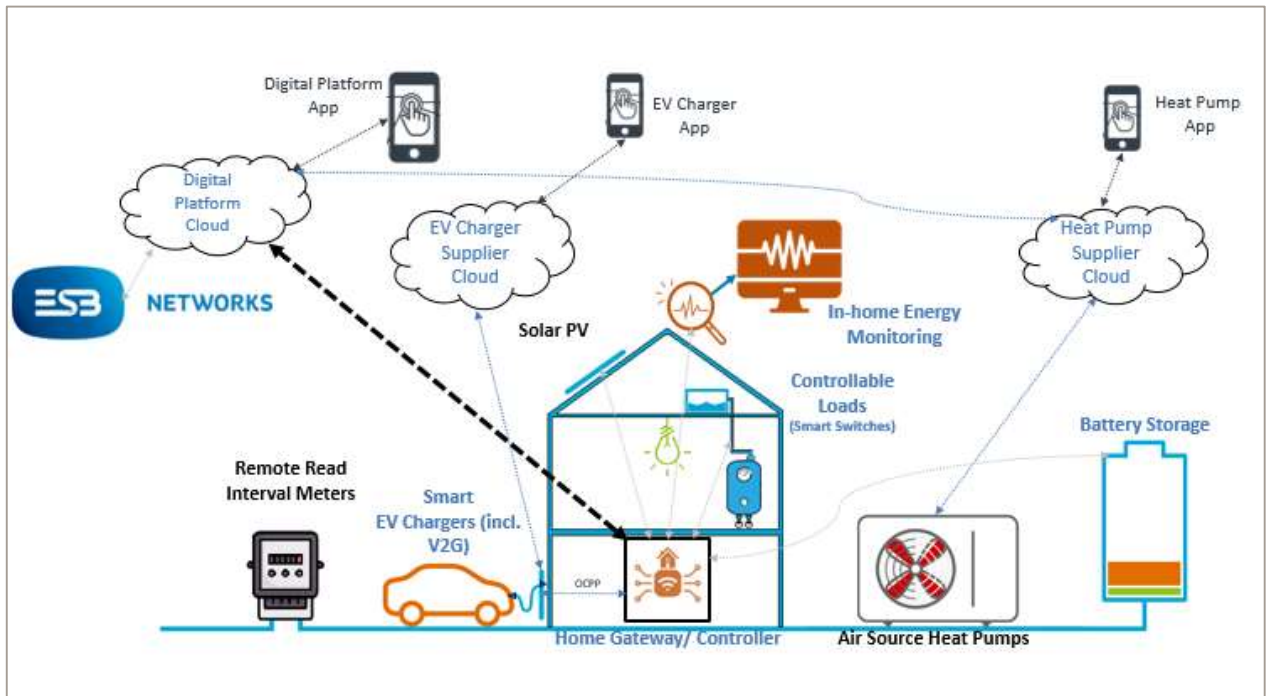
ESB Network's digital platform strategy for the Dingle Project was to procure one ICT system / digital platform that would support and enable all of the intended technical trials: flexibility trial(s) and P2P energy trial. The rationale behind the sourcing of a single platform was three-fold:

- Minimise the integration challenge between distributed energy technologies / monitoring devices in trial participant premises and centralised controlling ICT systems and architecture;
- Provision of a comprehensive and fully integrated single interface for all technology trials and control; and
- Cost minimisation;

It should be noted that the specification of the ICT platform incorporated the minimal functionality required to facilitate the trial and model the operation of P2P, but not all that would be required for a production system to support the operation of commercial P2P trading arrangements.

Furthermore, while the scale of the trial envisaged a relatively small number of participants, ESB Networks did recognise that since margins in P2P trading would be expected to be quite small, that for any future P2P trading arrangements to be commercially viable, any overhead costs in terms of new/modified equipment would need to be minimised or eliminated, and potentially, that any implementation might only prove economical if involving software only, where economies of scale might be more readily realised.

The following graphic shows an overview of the intended technology roll-out and the integration between each of these technologies and ESB Networks, via the digital platform. For the P2P energy trial, it was intended that those participants for whom Solar PV had been installed, would be invited to participate in the trial, together with other consumers within those defined energy communities. Those consumers for whom electric vehicles, EV chargers, heat pumps, batteries and controllable load devices have been installed by ESB Networks will be invited to participate in the flexibility trials.

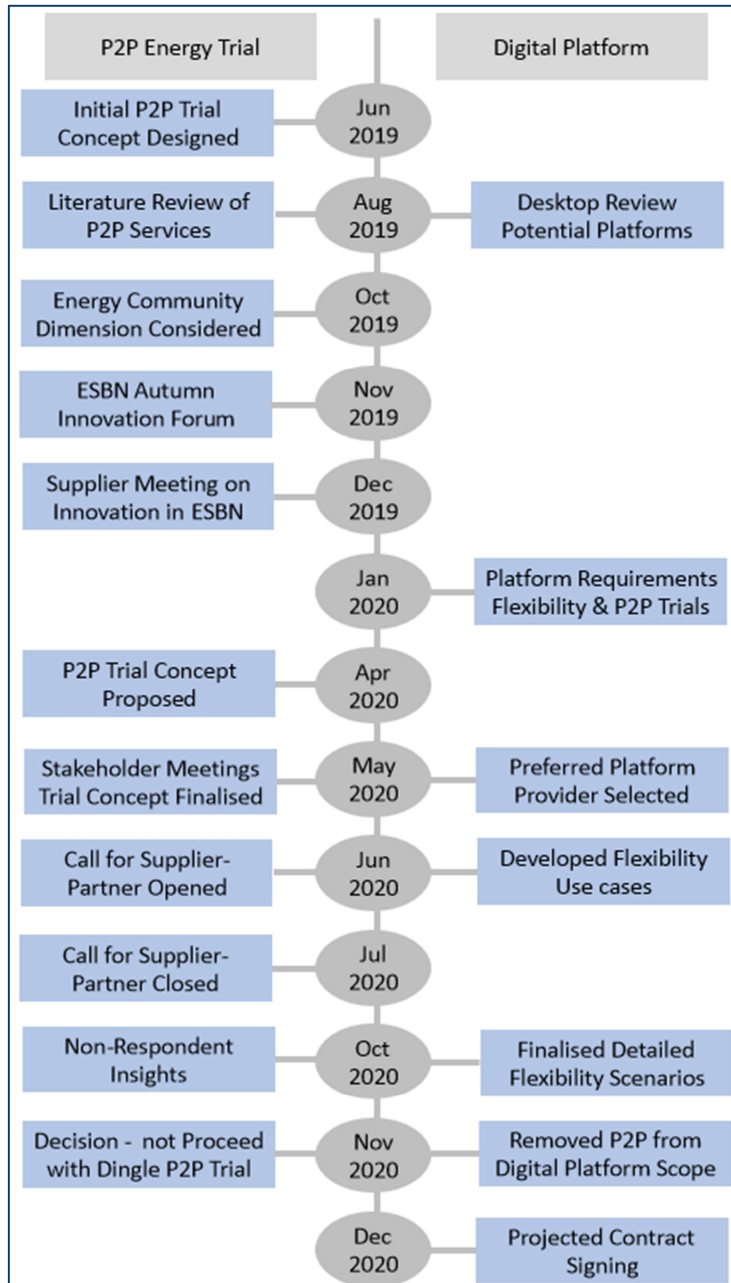


**Figure 1 – Intended Technology Roll-Out**

While ESB Networks was aware of the potential that an existing electricity supplier (potential partner on the P2P energy trial) might propose providing the ICT Solution for the P2P energy trial, it envisaged that the integration challenge of a second platform would potentially be overly burdensome in the context of the trial timeframe and objective of the Dingle Project, and could overly complicate the procurement of the distributed energy technologies, thereby potentially putting all of the trials at risk. On balance, the decision to source a single platform, with the full suite of functionality sought, was considered the best fit for this project.

## 1.6 P2P Project Timeline

ESB Networks commenced development of its P2P energy concept in mid-2019, in parallel with evaluating potential ICT solution, i.e. digital platform, to support both the P2P energy trial and the flexibility trials. The following graphic shows the timeline for both these activity streams.



**Figure 2 – Timeline of Activities**

## 1.7 Leveraging Dingle Innovation Trial Site

ESB Networks manages an annual programme of innovation projects to realise learning objectives under three Innovation Roadmaps:

- Future Customer;
- Climate Action; and
- Network Resilience;

In the context of P2P energy, ESB Networks does not envisage having an enduring role in the operation of market-facing P2P energy services into the future, with such services, in ESB Networks' opinion most appropriately delivered by parties who are active in energy trading.

Nevertheless, with foresight of the distributed energy technologies that it was planning to roll-out in its Dingle trial site, in support of its flexibility trial, ESB Networks saw the opportunity to carry out a limited P2P trial across active energy citizens and local energy communities on the Dingle Peninsula.

## 1.8 Trial Principles

The trial was designed with several guiding principles from the outset. These principles aimed to ensure the proposed P2P trial would facilitate Irish industry learning and discussion on the topic through stakeholder involvement in the development of the trial and dissemination of learnings, promote consumer choice, enable the participants to understand and become Active Energy Citizens, all the while maintaining security of supply and remaining in compliance with all legislative requirements. These principles were as follows:

- Enable the transition of consumers to Active Energy Citizens;
- Allow consumer choice regarding potential purchase and sale of electricity;
- Ensure users can access a network in non-discriminatory and cost-effective manner;
- Ensure the consumer can clearly understand the consequences of his/her actions;
- Engage with industry and policy makers given the diversity of views on how P2P might be achieved;
- Consider the regulatory changes that might be required; and
- Ensure security of supply for all consumers.

## 1.9 Extensive Stakeholder Engagement

When ESB Networks set out to develop a trial of the P2P energy concept in Dingle, it engaged early and extensively with stakeholders on the topic. This engagement took place from Q4, 2019 through to Q2, 2020 – see P2P Project Timeline, earlier in this document. This engagement was to explore how Active Energy Citizens, within local energy communities, might engage in market services and what P2P energy trading might look like. ESB Networks' consultations and stakeholder engagement indicated that there is indeed significant interest in the topic, however, it also observed significant diversity and differing perspectives across industry of what P2P means in the context of energy and how it might be accommodated in Ireland.



ESB Networks relayed to stakeholders, that in practice the constraints imposed by the overall Dingle Project timeline meant that it would not be possible to use the Dingle trial as the mechanism and process to agree a P2P design that would meet the enduring requirements of these various stakeholders across the industry. ESB Networks was motivated nevertheless, to use the existence of the Dingle Project and its trial infrastructure to further learnings for itself, policy makers and wider stakeholders on P2P energy services.

With this in mind, the stakeholder input and feedback received in its engagements contributed to ESB Networks progressing to designing a P2P energy trial that would set out to achieve the following objectives:

- Learn about the impact of P2P energy services on the LV and MV network;
- Understand the potential benefits that P2P energy services may offer in terms of network efficiency, e.g., opportunity for deferral of reinforcement investments;
- Learn about the data, technology, and processes required to enable P2P energy services;
- Identification of potential regulatory changes which may be required to enable P2P energy services;
- Appraisal of this P2P energy model to deliver benefits to customers; and
- Understand the effectiveness of P2P energy services in empowering the Active Energy Citizen.

### **Innovation Forum November 2019 & Stakeholder Feedback**

ESB Networks held its inaugural Autumn Innovation Forum on the 26<sup>th</sup> of November 2019. A workshop dedicated to P2P energy was held. This workshop was oversubscribed indicating the significant level of interest in the topic of P2P energy across attendees.

One of the primary objectives of the workshop was to discuss proposed definitions for local energy communities and P2P energy services. The definitions proposed were as follows:

- *“A local energy community is a group or organisation where its shareholders/members cooperate on the generation, distribution, storage and supply of energy in areas geographically close to each other”*
- *“Peer-to-Peer is the bidirectional trading of energy within a local energy community”*

The views amongst the workshop attendees differed on the proposed definitions. Some felt that they were broad, inclusive and the concepts made sense for providing a return on investment to members of the community. However, others felt that definitions should not be linked to locality and that there was a significant gap in understanding and knowledge on the concept of P2P to support the definitions. There was also discussion on whether the term Local Energy Community should be updated to reflect Renewable Energy Community and Citizen Energy Community as per the latest EU Directives.

It was evident to ESB Networks at the 2019 Autumn Innovation Forum workshop that there were differing views on the potential of P2P energy among the attendees. This was to be expected, with potentially different service opportunities and business models relating to P2P energy being considered

within that stakeholder group. It was also clear that for the P2P energy concept to be trialled successfully that the industry would broadly have to agree on a format, structure and model for P2P.

### **Supplier Workshop May 2020**

In May 2020, ESB Networks hosted an online workshop for electricity suppliers. A webinar was delivered explaining the objectives of the Dingle Project, providing an overview of the proposed P2P energy trial, the design of local energy communities to support that trial and outlining what ESB Networks intended to do, to progress this trial.

This webinar explained why ESB Networks wished to trial P2P energy and the potential learnings that all stakeholders could expect from the trial. ESB Networks explained how the trial was envisaged to operate from the perspective roles of ESB Networks, the digital platform provider and the potential electricity supplier partner.

The energy community construct was discussed and it was explained to all attendees that it was proposed to design such local energy communities (for the purposes of the P2P energy trial) with recognition of the underlying electricity infrastructure, i.e. a community might be constructed as a cluster of customers behind a specific transformer or a number of customers on the same spur or feeder on the distribution network. The objective of limiting P2P energy services within a local energy community was explained with the intention to understand whether benefits might accrue to customers, while at the same time not causing unintended network affects beyond the boundaries of the local energy community, e.g. non-optimal power flows or voltage issues.

ESB Networks explained its thinking on how an incentivisation mechanism might work, to support and encourage P2P energy transactions within each community. ESB Networks proposed a mechanism whereby prosumers would be initially encouraged to optimise their individual generation with self-consumption, with subsequent incentives to encourage alignment of energy production and consumption within each energy community. ESB Networks' proposal also recognised the potential for excess spill beyond the level of consumption in the energy community, with a lower incentive applying in those situations. The intention for the trial was to refine, with the support of the electricity supplier partner, the design of incentivisation use case(s) as the trial progressed. An overview was also provided of the behind-the-meter technologies to be rolled out as part of the Dingle Project and of the metering and monitoring infrastructure and technologies that would capture the data to support the trial.

Opinions were sought from webinar attendees on aspects of the trial and the preferred timeline and approach for the sharing of learnings across suppliers and the wider stakeholder group. A general questions and answers session was held to provide further clarity on aspects of the proposed trial.

### **One-to-One Supplier Meetings**

As part of the then ongoing stakeholder engagement activities in support of ESB Networks 2020 Innovation Consultation, an additional number of meetings with individual respondents to the broader innovation consultation were scheduled. During a number of these meetings, and where notified of

this point of interest in advance of their scheduling, ESB Networks re-shared the same overview of the proposed P2P energy trial that was previously discussed at the supplier meeting in May.

Meetings were held with the following organisations on the dates as shown below:

- Demand Response Association of Ireland – 6<sup>th</sup> May 2020
- SSE Airtricity – 7<sup>th</sup> May 2020
- Energia – 15<sup>th</sup> June 2020

By late May, subsequent to the supplier workshop and a number of the one-to-one meetings, ESB Networks was clear regarding the objectives of its P2P energy trial and believed that there was good understanding of and interest in these objectives across those electricity suppliers with whom it had engaged with over the previous months. As such, ESB Networks anticipated that there would be a positive response to the subsequent call for expressions of interest to partner with it on the trial and on that basis, prepared to issue the call to all registered electricity suppliers in Ireland.

### **Commission for Regulation of Utilities (CRU) Meeting**

On an ongoing basis, ESB Networks, as DSO, updates and engages with CRU on all activities, including innovation projects and emerging learnings.

ESB Networks met CRU in April 2020 to share its thoughts and proposed plans for the P2P energy trial and to provide an opportunity for CRU to understand the value of the proposed trial to all stakeholders.

ESB Networks outlined its timeline for the trial and committed to advising CRU on progress.

## **2 Partnership Proposition**

As previously mentioned, ESB Networks saw the value in using its Dingle demonstration site to trial one form of P2P energy, in order to enable the provision of insights and learnings to industry stakeholders and to it as DSO. As an electricity networks business, ESB Networks realised that to best appreciate the benefits and consequences that the proposed P2P trial would have on customers or on the energy market, that it required the active participation of a partner with those experiences, relationships and knowledge. As such, ESB Networks sought a partner (through an Expression of Interest process detailed in Section 2.1) to help uncover those learnings and support the operation of this trial, such that the full learnings could be shared with all customers, policy makers and industry stakeholders.

The proposition for partnership was contingent on a number of factors that are shared here:

- The partner having an electricity supply licence and currently operating in I-SEM;
- The partner's proposed resources / team having appropriate experience to support the operation of the trial and the identification of learnings;

- The partner agreeing to bear the costs of P2P incentives for participants throughout the trial (the preliminary estimates for which were in the region of €5k-€10k);
- The partner agreeing to self-fund its involvement in the trial. This was expected to include expenses for attendance at customer workshops on the Dingle peninsula, and any sub-partner or joint venture costs which the partner may have wished to undertake; and
- ESB Networks funding and implementing the Solar PV technology and installations, home energy monitoring devices, smart switches, communication gateways and the digital platform to enable and support the trial, together with provision of resources to manage the trial, analyse resulting data and contribute to the development of and sharing of learnings across interested stakeholders.

While ESB Networks intended to share the learnings from the trial with all interested stakeholders through publication, it considered that the partner would additionally benefit from the P2P trial in several ways:

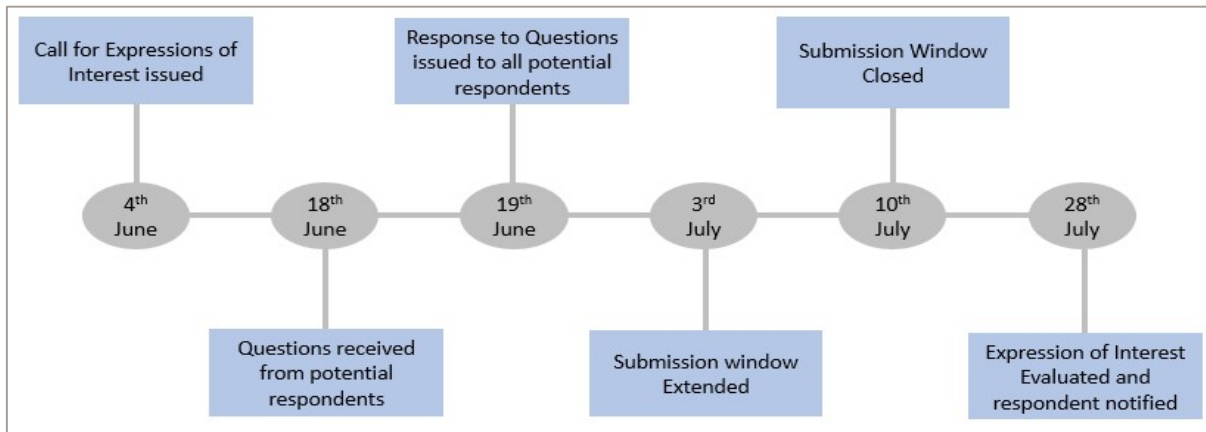
- Gain first-hand understanding of the data, technologies and processes that are necessary to support P2P energy services;
- Detailed understanding of the impact of “incentivisation” on participant behaviour;
- Input, where appropriate, into the refinement of scenarios to be trialled;
- Detailed understanding of the learnings from the trial, including those related to participant engagement and activation; and
- An increased profile across the wider Dingle community and public;

## 2.1 Expression of Interest (EOI) Process

ESB Networks issued a call for expressions of interest (EOI) for the role of supplier partner on the Dingle Project in June 2020. The EOI document was emailed directly to all licensed domestic electricity suppliers in Ireland and was also published on the ESB Networks’ website. Potential respondents were asked to submit expressions of interest by early July 2020. A link to the call for EOI document is included in Appendix 1 of this document.

## 2.2 Expression of Interest Timeline

The expression of interest timeline was as shown in the following graphic.



**Figure 3 – Expression of Interest Timeline**

## 2.3 Queries Received on EOI Document and P2P Trial

Nineteen questions were received from recipients of the call for EOI as issued. These queries were across a range of areas from technical, to P2P design, to regulatory. A response providing answers to all questions was issued on 19<sup>th</sup> June 2020 to all parties that had been invited to respond to the EOI request. This response is included in Appendix 2 of this document.

An area of significant focus in these queries related to the specifics of the digital platform that would be implemented to support the P2P trial and whether the opportunity existed for the potential electricity supplier partner to also provide this ICT infrastructure to support P2P energy trading.

In its response to these queries, ESB Networks made it clear that the digital platform was being procured separately and did not form part of the request for expressions of interest from potential electricity supplier partners. ESB Networks intention was to select a single digital platform solution to support both the P2P energy and the flexibility trials (as outlined in Section 1.5 above) and not to rely on an electricity supplier-provided platform for the P2P trial and a separate ESB Networks procured platform for the flexibility trial. This strategy was chosen, in part, so as to minimise the integration challenge for technologies behind the meter which would be common to both trials, for example, the Home Energy Monitoring devices and data.

As it was, at the stage when it was engaging with potential electricity supplier partners on the scope and design of the P2P energy trial, ESB Networks was also at an advanced stage in discussing the scope of work and contractual responsibilities with its preferred vendor of a digital platform solution that would support both the flexibility trials and the P2P energy trials, with that vendor having previously been chosen by ESB following a rigorous selection process.

## 2.4 International Interest in the P2P Trial

In addition to the questions submitted from invited respondents, contact was received from two international organisations:

- A German university-based research group; and
- An Australian software company;

Both organisations were interested in understanding ESB Networks' intention or otherwise to use blockchain technologies to support P2P trading and offered to become a partner in the provision of this platform technology.

Both organisations were advised that ESB Networks did not intend to use blockchain as a means to transact and track P2P energy transactions within the Dingle trial. The reasons for this were primarily related to:

- Scale and design of P2P model – it was not envisaged that there would be more than 100 participants on the P2P trial and an energy-exchange type model where any participant could trade with any other, was not part of the design; and
- Preferred digital platform provider - ESB Networks was separately negotiating with its preferred vendor of the digital platform to support both the P2P trial and the flexibility trial and given the timelines and budget associated with this innovation project did not intend to purchase or integrate two separate platforms;

## 2.5 Extension of EOI Response Window

At the close of the original deadline for receipt of expressions of interest, only one response had been received. Being aware of at least one organisation who had sought clarity late in the process on the submission timeframe, ESB Networks decided to offer an additional week (until 10<sup>th</sup> July) to ascertain whether additional responses would be forthcoming.

## 2.6 Responses Received and Evaluation

At the close of business 10<sup>th</sup> July 2020, only the one expression of interest from an electricity supplier for partnering with ESB Networks on the Dingle P2P trial had been received. One other email notification of intention not to respond to the EOI request was also received from another supplier.

The single expression of interest received was evaluated using the criteria and scoring methodology provided in the Request for EOI document issued. The response was deemed not to have achieved the minimum scoring under several criteria and as such the respondent was not selected as electricity supplier partner for the P2P trial.

The applicant was formally notified by email on 28<sup>th</sup> July, that it had been unsuccessful in its application.

## 3 ESB Networks Decision to Consider the Implications of the EOI Process

It should be noted that ESB Networks was disappointed with the outcome of the expression of interest process to select an electricity supplier partner for the P2P energy trial. The earlier engagement and interest indicated by suppliers in the various stakeholder engagement fora did not materialise in terms of the expected volume of expressions of interest or any acceptable candidates for this role on the project.

As a result, regrettably, ESB Networks made the decision to suspend further work on the P2P energy trial until the reasons for such a low response to the request for expressions of interest could be better understood and detailed, and a decision made on the viability of proceeding with a P2P trial at a future stage in the Dingle Project.

Having had extensive stakeholder engagement and collaboration throughout the development of the trial, ESB Networks was keen to publish the considerations and learnings of the Dingle Project's P2P journey to date (this report) with the aim of encouraging a broader discussion around the ultimate lack of interest from electricity suppliers, at that time, and whether such a trial is viable within the timeline of this innovation project or whether it might be progressed elsewhere in Ireland by others.

The immediate implications of this decision included:

- The removal of the functional requirements to enable the establishment of energy communities, P2P energy transactions, associated data recording and reporting functionality within the digital platform; and
- A reduction in the number of gateway hardware devices required to be procured and installed in properties on the Dingle peninsula.

### 3.1 Direct Contact and Feedback from Individual Suppliers

As a way to comprehensively report and share learnings on the low level of response, ESB Networks made an effort to contact several electricity suppliers who, at the 2019 Autumn Innovation Forum workshop and throughout the engagement process, had shown interest in the proposed P2P energy trial, but who subsequently did not respond to the call for expressions of interest, so as to understand their motivations and to gauge the state of interest across the market.

The detail of these conversations is confidential to ESB Networks and the individual suppliers, however a summary of supplier sentiment reflecting the timing of the call for expressions of interest, the proposed P2P model, the digital platform strategy, ESB Networks-led engagement approach and potential supplier-led P2P projects in the future, is shared here:

#### **Timing of Call for Expressions of Interest:**

- The call for expressions of interest for a P2P electricity supplier partner came at a time when significant regulatory uncertainty existed regarding how the concepts of energy communities



and active energy citizens, as considered under the CEP (Clean Energy Package) at a European level, would be implemented in Ireland. With this backdrop of uncertainty, the relevance of the P2P energy model proposed for the trial was considered unclear by some suppliers and on that basis, it was difficult for them to justify the specialist resource commitment for this exploration trial;

- The timing of the launch of the call for expressions of interest, coinciding with the period when the market challenges and impact of Covid-19 on electricity demand across suppliers was beginning to materialise, had a mixed bearing on the decision of suppliers as to whether or not to respond to the call. Some potential respondents found themselves unable to dedicate resources to evaluating the proposed P2P model in order to understand how it might support or influence their future business strategies;

### Proposed P2P Model

- Notwithstanding the stakeholder collaboration on the development of the trial concept, some suppliers found it difficult to understand where a commercial opportunity for them might arise from the specific P2P model earmarked for this trial, so as to merit their full participation in such a trial;
- The proposed P2P model was not one that suppliers considered would provide sufficient market learnings to them, to merit their partnering with ESB Networks on the trial. Suppliers' view was that the model as designed was likely to provide greater insights to ESB Networks, as DSO, on the potential impacts of P2P energy transactions on the network and the potential of P2P transactions to resolve network constraints, than provide early learnings about how P2P might operate at a market-level;
- It was considered by some suppliers that the relative small scale of the trial proposed, with focus on LV-connected customers only, would likely result in low volumes of energy transacted and therefore not provide the early market learnings that a trial designed, in the first instance, around MV connected customers might otherwise provide;
- The fact that settlement of P2P energy transactions was intended to be performed off-line and "outside the market" was seen as a missed opportunity, by some potential respondents, to understand the integration of P2P settlement with existing billing and settlement processes across the market. (It should be noted that ESB Networks had considered that the design and approval of a ratified in-market settlement mechanism and process to accommodate the P2P trial would likely be disproportionate to the scale and duration of the trial and as such had not proposed that approach);

### Digital Platform

- There were some concerns and mixed opinions expressed in relation to the technical platform and business process learnings that would accrue to the electricity supplier partner. The trial as proposed was considered likely to be successful as a proof of concept in the general sense. However, in terms of data gathering, design and execution of optimisation algorithms and data communications, the fact that the design of the proposed P2P trading was to encourage optimization of energy production and consumption within communities, whose design was aligned to the physical characteristics of the network, rather than market-wide trading was considered likely to make emerging business process learnings less applicable to suppliers;
- The lack of opportunity for potential suppliers to trial a full-service model, (energy offerings coupled with other platform driven services) limited the attractiveness of the trial. While ESB Networks had its own valid reasons for selecting the platform to support the P2P trial, i.e. to ensure a single platform for P2P and flexibility trials (see section 1.5 above), this nevertheless,



in the opinion of some suppliers, minimised the potential for supplier learnings on how the platform could be adapted over time for an evolving P2P energy market;

- Suppliers did not consider that they had any influence over the user/participant interface design or nature of the platform with the risk that irrespective of the incentivisation parameters set for P2P trading, a non-user-friendly design could compromise the experience for trial participants and damage potential P2P opportunities in the market over time;
- The fact that ESB Networks couldn't share details of the proposed digital platform or its vendor to potential respondents, due to the status of commercial contractual negotiations at the stage the call for expressions of interest issued, was problematic for potential respondents. Some suppliers were concerned that the vendor of the ESB Networks-preferred platform might already have had a relationship with a competitor supplier in the Irish electricity market or that the core platform may already have been in use by a competitor as a basis for other services offered to customers. These suppliers were concerned that electricity market competitors could be advantaged by the learnings that would accrue to the digital platform provider through the efforts of the supplier-partner throughout the trial;

### **Engagement Approach and Potential Future Supplier-Led P2P Projects**

- The approach followed by ESB Networks, i.e. the call for expressions of interest subsequent to a period of stakeholder engagement, was considered to be pragmatic;
- However, it was considered that an extended response period and greater interaction and engagement by ESB Networks throughout the response period, in order to further consider the potential or otherwise for supplier partner to provide the supporting P2P platform and on the design of the P2P model, may have resulted in a more successful outcome for ESB Networks from the expression of interest process;
- Suppliers indicated their intentions over the coming years, to continue to explore the commercial opportunities for P2P energy and integrated service offerings, reflecting their individual business strategies in conjunction with the emerging regulatory rules around the active energy citizen and energy communities. These evolving business strategies may result in supplier-led P2P trials at some point in the future;
- Suppliers remain optimistic that P2P trading of renewable energy can form part of the eventual solution set to support greater integration of renewables onto the system while also enhancing choice available to customers over time;
- Some suppliers would be open to discussing with ESB Networks, the opportunities for the DSO participating in future supplier-led, market-focused P2P trials, in order that the DSO can understand how P2P-energy trading may impact on the operation of the distribution network;

## **3.2 Consideration of Supplier Feedback**

ESB Networks has carefully considered the feedback received from electricity suppliers subsequent to the call for expressions of interest. This feedback suggests that while suppliers recognised some merit in the proposed P2P trial, in terms of general learnings that would be gained by all trial partners, the overarching view was that the majority of learnings would most likely benefit ESB Networks, as DSO, along with the digital platform provider.

Suppliers, in general, did not consider that the trial as designed would sufficiently enable them to understand how P2P energy might operate in a market context or provide sufficient learnings to help them evaluate commercial opportunities over time, in order to justify their participation as a partner on the ESB Networks-led trial of P2P energy.

### 3.3 Other Potential P2P Models with a Community Dimension

Over the same period that ESB Networks was collecting feedback from suppliers, it also carried out a high-level desk-top review to determine whether there were other potential P2P energy models, with a defined community-wide dimension, which might be practical to deliver within the timeframe of the Dingle Project and which might be capable of delivering the P2P learnings that were desired from the Dingle Project.

#### **Ripple Energy concept**

Free Electrons is a global utility accelerator programme for start-up companies. ESB is a core member of Free Electrons. As part of the Free Electrons information outreach programme, which facilitates an introductory channel to start-up companies, thereby enabling ESB Networks to effectively consider relevant innovation ideas and opportunities, it became aware of Ripple Energy and its innovation project, under implementation in Wales.

ESB Networks' understanding is that the Ripple Energy concept is built upon shared ownership of a generation asset across members of a community with the energy output from that asset then being allocated to the owners in accordance with the size of their individual shares. The asset owners / consumers sign-up with Ripple Energy's supplier partner, who, under the terms of a governing Power Purchase Agreement (PPA), discounts their energy bill with the value of their share of energy output from the asset over pre-agreed periods.

Having considered the Ripple Energy concept, ESB Networks was of the view that whilst this model appeared to provide a potentially inexpensive form of P2P using existing market mechanisms, this model did not provide for the community-wide optimisation and Active Energy Citizen engagement opportunity as desired under its Dingle proposal, which was intended to examine network impacts of P2P rather than P2P of itself.

In addition, while on paper, the spilled Solar PV energy from the prosumer participants in Dingle could be aggregated together and an electricity supplier engaged to credit this energy against prosumer participants' bills while also selling surplus energy to other consuming participants, such a model would require all the participants switching to this common electricity supplier, something which ESB Networks did not wish to stipulate as part of its P2P trial where it would only have been practical to involve one Supplier. Of course, in practice this model could work with multiple Suppliers, as different groups of customers in the community could have their portion of the generator output credited and allocated accordingly, but for the purposes of the proposed Dingle P2P trial, this was considered to be overly complex.

It was also felt that the timing of the forthcoming microgeneration support scheme (June 2021) would likely enable participants with surplus energy production to be credited for their energy regardless of

involvement in the trial, which would mean that it would likely be less beneficial to trial P2P trading when export would be paid for in any case.

The complexity of establishing, and agreeing with all participants, the PPA to underpin these transactions was considered likely to be challenging, particularly when the relatively low volume of spill, anticipated for the trial area over the relatively short lifetime of such a PPA, in the context of the Dingle Project duration, was considered. As such, ESB Networks considered that a P2P trial based on the Ripple Energy model might be most appropriately led by an electricity supplier or another market participant and not appropriate as a P2P model for the Dingle Project.

### **RegEnergy Peer-to-Peer Trial**

TSSG, of Waterford Institute of Technology, plans to trial its P2P energy trading technology at the Údarás na Gaeltachta facilities on the Dingle Peninsula. It is intended that these P2P transactions will be individually contained within, restricted to and involve only companies located at each of those two sites and will not involve other participants across the wider peninsula footprint.

ESB Networks intends to install monitoring devices at appropriate transformer locations so as to understand the impacts, if any, of any future P2P energy trading at both these Udarás na Gaeltachta locations.

### **Positive City Exchange Project (+CityxChange)**

ESB Networks is partnering on a Horizon 2020 funded project to develop a positive energy block within the Georgian district of Limerick city ([www.cityxchange.eu](http://www.cityxchange.eu)). This project aims to investigate how cities can transform from net energy consumers to net energy producers, enabling decarbonisation of urban environments. This project will also investigate P2P energy trading within that smart energy community and ESB Networks' role on this project, positions it to understand any proposed P2P design and gain further insights into the impact of same, if implemented, on the electricity network.

## **3.4 Decision not to Proceed with Dingle Project P2P Energy Trial**

ESB Networks' learnings from its efforts to partner with an electricity supplier on a P2P energy trial in Dingle clearly showed that suppliers were not prepared, for various reasons at that time, to dedicate resources for the trial as proposed.

ESB Networks recognises that electricity suppliers face some uncertainty with respect to how the provisions of the Clean Energy Package will be implemented and what that will mean regarding the design and operation of energy communities and consequential commercial opportunities, including for P2P energy trading. ESB Networks also recognises that electricity suppliers are uncertain regarding the implementation of a microgeneration support scheme and what that might mean regarding the purchase of energy spilled onto the system by their customers.

However, mobilising an electricity supplier partner, was a pre-requisite for ESB Networks in any P2P energy trial as part of the Dingle Project. As such, following careful consideration of electricity supplier

feedback, coupled with understanding of the anticipated cost to implement the digital platform functionality to support the P2P trial, the decision was taken not to proceed with a P2P trial as part of the Dingle Project.

ESB Networks considers it sensible, as a next step, to understand whether the introduction of a microgeneration support scheme and regulations surrounding community energy schemes, give rise to new supplier-led P2P energy services.

While ESB Networks has decided not to proceed with a P2P trial as part of the Dingle Project for the reasons outlined in this report, it does envisage that P2P energy services involving consumers and energy communities will evolve over time. As such services and trading will most likely involve use of the distribution network, ESB Networks will continue to monitor developments and consider opportunities in the future to lead trials of its own or to participate in trials led by other parties to enable P2P and understand impact on the operation of the distribution network and the DSO.

Note that this decision not to proceed with the P2P energy trial, as part of the Dingle Project, does not affect or impact on ESB Networks' involvement in other ongoing P2P trials such as that to be trialled in the +CityxChange project.

## 4 Conclusion and Next Steps for ESB Networks

ESB Networks made significant efforts to implement a trial of P2P energy as part of its Dingle Project. Following extensive engagement with industry stakeholders, a P2P model was proposed and a call for expressions of interest from electricity suppliers, to partner with ESB Networks on the trial, was issued. This was not successful as no suitable responses were received.

ESB Networks endeavoured to understand the reasons for the low level of response to the request for expressions of interest to partner with it on the proposed trial. A number of common themes emerged, across those supplier that it spoke to, including uncertainty over how the Clean Energy Package would be implemented in Ireland, relevance to suppliers of the P2P model proposed for the trial and concerns over the digital platform to be used to support the trial.

Having a supplier partner was a pre-requisite for ESB Networks in its proposed P2P trial. When a suitable partner didn't materialise and the reasons for this became clear, ESB Networks, unfortunately, had to make the decision not to proceed with its proposed P2P trial as part of the Dingle Project.

However, ESB Networks does envisage that P2P energy services and trading, involving active consumers and energy communities on the distribution system, will be a feature in the future after the market rules, to enable the Clean Energy Package, have been implemented in Ireland.

As such, ESB Networks will be monitoring developments in Ireland and will be open to considering opportunities for future trials of P2P. It will also endeavour to keep up to date and abreast of P2P experiences and learnings of other DSOs, and will continue to explore other opportunities, for example, partnering with Third Level / Research Organisations to enhance its learnings on the potential impact of P2P energy on the operation and evolution of the Irish electricity distribution network.

## 5 Feedback

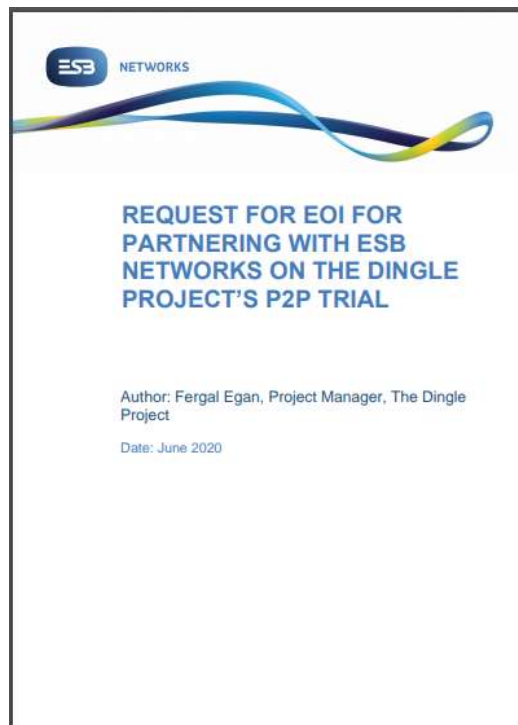
ESB Networks is interested in any views that readers of this report have on the conclusions drawn.

Views can be shared with ESB Networks by email to [innovationfeedback@esbnetworks.ie](mailto:innovationfeedback@esbnetworks.ie).

## Appendix 1

### Request for Expressions of Interest for Partnering with ESB Networks on P2P Energy Trial

The document issued to registered electricity suppliers in Ireland in June 2020, and published on ESB Networks website, is available [here](#).



**Figure 4** – Image of request for EOI document issued to electricity suppliers

## Appendix 2

### Responses to Questions Raised on Request for EOI for Partner on Dingle Peer to Peer Trial

The anonymized questions received by 18<sup>th</sup> June 2020 from suppliers invited to respond to the call for expressions of interest, and answers provided to these questions on 19<sup>th</sup> June are listed below.

#### Questions and Answers

**Question 1:** If you had more information on the project it would be appreciated.

**Answer:** The information provided in the document issued by email on 4<sup>th</sup> June 2020 provides sufficient information for potentially interested parties to understand the objectives of the Dingle peer-to-peer trial, the roles and responsibilities of each party and functional design of the trial. ESB Networks considers that the information provided is sufficient to enable interested parties make a decision as to whether they wish to express an interest in partnering with ESB Networks on this trial. The information provided in this Response to Questions document may supplement the information already communicated.

**Question 2:** Has there been a call for 'EOI's' for this platform and or a specific tendering process as we would see the potential for providing both the partners requirements for this call and the digital platform?

**Answer:** ESB is a partner on the Free Electrons accelerator programme. ESB Networks is engaging with a company which has previously been selected as a Supplier to ESB through the Free Electrons accelerator programme, for provision of the digital platform, in line with required and approved procurement guidelines.

**Question 3:** How are the ESB objectives going to be measured?

**Answer:** ESB Networks will collaborate with the Digital Platform provider and the selected Partner to progress the peer-to-peer trial and will engage with trial participants throughout.

ESB Networks will install devices to monitor the local electricity network in Dingle to determine the impact of peer-to-peer energy services on the network and to support our evaluation as to whether peer-to-peer energy services, at a local level, could help alleviate the necessity for network reinforcements in particular circumstances.

The learnings from the trial will provide greater understanding on the technology, processes and data that are required to enable peer-to-peer energy as well as highlight potential regulatory changes that may be required to support the form of peer-to-peer energy services being trialed in Dingle, should regulatory decision be made to permit this within the electricity market at some point in the future.

The Dingle Project will continue to engage extensively with citizens in the community to understand the behaviors and perspectives of these citizens with respect to the active energy consumer including peer-to-peer energy.

**Question 4:** If ESB already has their own retailer "Electric Ireland" and the partner in the EOI can't participate in the trial what is the benefit for the partner to participate in this trial?

**Answer:** ESB Networks will evaluate all expressions of interest received from licensed domestic electricity suppliers in Ireland in selecting its preferred partner. The request for EOI document includes a section which identifies the benefits, as ESB Networks sees them, for partnering on this trial. The trial will not require participants to be contracted to or switch to a specific Supplier in order to participate. As such the benefits to the selected Partner will be in the learnings gained from involvement in the trial.

**Question 5:** What vehicles will be used?

**Answer:** ESB Networks will sign a lease with a leading vehicle manufacturer for the provision of electric vehicles for its trials. As the lease has not yet been signed, ESB Networks does not wish to identify the brand or model(s) of electric vehicle(s) that will be deployed.

**Question 6:** How will the vehicle to grid be connected? What mechanism?

**Answer:** ESB Networks is at an advanced stage in the procurement of vehicle to grid devices to support its trials. As procurement has not been completed at this time, ESB Networks does not wish to disclose the intended Supplier of these units. The V2G units will enable energy to be discharged from the vehicle into the home when required. Should any discharged energy be unused in the home it will spill onto the local distribution network. It should be noted that there will not be a contract in place to provide energy to the grid as part of the trial.

**Question 7:** What means will be used to monitor and control DER devices?

**Answer:** ESB Networks intends to install home energy monitors in each of the trial participants' properties. Data from these monitors will feed back to the Digital Platform. The Digital Platform will be fed with data from all DER devices deployed as part of the trial. ESB Networks will have the ability to determine and issue control set points to the DER devices via the platform.

**Question 8:** Digital Platform – The Request for EOI states there will be a separate procurement process to be completed by August 2020 for the Digital Platform Partner (DPP). Please can you advise;

- a. What is the status of this portion of the tender?
- b. Where can we obtain a copy of the EOI for the DPP?
- c. Are you looking for an external partner for this component or has one already been selected?
- d. Is the timeline to appoint a DPP by August realistic? What is the proposed process for this appointment?

**Answer:**

- a. ESB Networks is engaged in discussions with its preferred supplier of the Digital Platform.
- b. As mentioned in the answer to Question 2 above, ESB Networks is engaging with a company which has previously been selected as a Supplier to ESB through the Free Electrons accelerator programme, for provision of the digital platform, in line with required and approved procurement guidelines.
- c. A preferred Supplier of the Digital Platform has already been selected.
- d. ESB Networks believes that the proposed timeline to appoint the Digital Platform provider is realistic.



**Question 9:** Would you welcome an EOI proposal from a Partner that had a partnership with a proven digital platform provider already in place?

**Answer:** This request for expressions of interest does not include provision of a digital platform.

**Question 10:** Clusters – clarify a cluster. Why is P2P not permitted between clusters?

**Answer:** ESB Networks will define a number of local energy communities / clusters of prosumers & consumers delineated by their connection to the local electricity network. These clusters may be defined by a specific physical transformer, network spur or network feeder. ESB Networks wishes to understand whether energy production and consumption in a local energy community / cluster can be optimized locally using peer-to-peer and what impact that will have on the local network.

**Question 11:** If customers do not have to switch retailers for the pilot is it envisaged that their existing retailers will permit the trading?

**Answer:** The determination of incentives for participation in the trial will be designed after the partner has been selected and mobilized. It is intended that any financial incentives will be managed for the peer-to-peer trial “outside the market” and as such separate to the existing customer – supplier billing relationships that exist.

**Question 12:** How is it envisaged that consumption data and relevant market messaging will be provided to the pilot if the current retail supplier is not the Partner?

**Answer:** The peer-to-peer trial will be managed “outside the market” and as such will not impact on market messaging.

**Question 13:** What smart meter technology will be used to capture relevant data? Will this be the meter of record or another digital device behind the meter?

**Answer:** ESB Networks will install a home energy monitoring solution within each trial participant’s premises. Data from this device will be used to support the peer-to-peer trial.

**Question 14:** The timeline/schedule seems very tight. Is there any opportunity for a time extension?

**Answer:** ESB Networks requires to select its preferred partner by end July, in order to ensure engagement with potential trial participants can commence at the earliest date possible. As such it is not possible to extend the timeline for submission of expressions of interest.

**Question 15:** If the Trial is successful what will be the next steps?

**Answer:** Learnings from the trial will be shared with interested parties. These parties will be in a position to incorporate those learnings into any subsequent analysis or business activities which they wish to pursue. It should be noted that ESB Networks does not envisage the operation of market-facing P2P energy services as being an ongoing responsibility of ESB Networks.

**Question 16:** How will the project’s success or failure be measured?

**Answer:** The peer-to-peer project is a trial to provide learnings in line with the objectives identified in the request for expressions of interest. These learnings may be exploited differently by interested parties.

**Question 17:** What regulatory changes do you deem required to facilitate Peer to Peer Trading?

**Answer:** One of the objectives of the trial is to understand what regulatory changes may be required should it be decided by the regulator, at some stage in the future, to implement within-market, the form of peer-to-peer energy being trialled in Dingle or a form of peer-to-peer energy similar to that.

**Question 18:** Are there any changes required in ISEM to facilitate Peer to Peer trading?

**Answer:** See answer to question 17 above.

**Question 19:** How is it proposed that Suppliers and or Peer to Peer trading platforms will be bonded to protect to the consumer?

**Answer:** As the Dingle peer-to-peer trial is being managed “outside market”, the issue of bonding of Suppliers and Peer-to-Peer trading platforms is not considered to be part of the scope of the trial.