REQUEST FOR INFORMATION: FLEXIBILITY SERVICES IN SCOTLAND'S ISLANDS

29/08/2024

Scottish & Southern Electricity Networks

CONTENTS

Introduction

This Request for Information (RFI) aims to identify new Flexibility Participants in a selection of Scottish and Southern Energy Networks' (SSEN) island communities and establish routes to market, to help inform our future procurement strategy for certain Flexibility Services in this geographical location. Flexibility is a service procured by SSEN from third parties that can change their demand or supply of electricity to help us release capacity and manage constraints on our distribution networks. This RFI is not a pre-qualification, tender nor a guarantee of any future tender opportunities, and does not guarantee any agreements, contracts or delivery of the required services.

The areas in question are Orkney, Shetland, Outer Hebrides, Mull, Coll, Tiree, Islay, Jura, and Colonsay. These are the areas across the Inner and Outer Hebrides and Northern Isles where thermal constraints are identified, and diesel generation is commonly used. They are further defined throughout this report. Subject to the success of this RFI, we may look to expand the scope to cover more island communities within the Hebrides.

We are interested in responses from: owners or operators of generation and energy storage; aggregators; businesses of all sizes and other stakeholders in offering flexible services to SSEN. Your asset may already be installed or contracted or with a plan to do so.

We seek to understand the current flexibility available on the network and gather insights on future availability. Each island group has unique challenges and network configurations. For example, some communities operate as separate networks permanently, while others operate like this only during certain outages. In some cases, this separation is unplanned. As such, the Flexibility Services used elsewhere in our license areas may not be suitable. This RFI outlines various network challenges that Flexibility Services could help us address while gathering information on key barriers to participation in each region. By gathering information from potential providers, we aim to match our network issues with suitable solutions. This approach will support our investment programme in these communities and provide additional options when networks are constrained.

About SSEN

SSEN is responsible for ensuring a safe and reliable supply of electricity to 3.9 million customers across two distribution licence areas: Scottish Hydro Electric Power Distribution (SHEPD) in the North of Scotland and Southern Electric Power Distribution (SEPD) in central Southern England.

At SSEN Distribution, we have set a cumulative five-year target of 5 GW for the procurement of Flexibility Services across our northern and southern license areas. Although this ambitious target reflects our commitment to meeting the evolving needs of the electricity grid and ensuring a secure and reliable energy supply, we only use flexibility when it creates the best value for SSEN and our customers. We are dedicated to enhancing electricity reliability in remote and island communities and are aiming to combine investment and Flexibility Services to achieve this. These services can support build programmes, reduce energy costs, lower emissions by reducing reliance on diesel generator use, and increase renewable energy integration.

Background

Our SHEPD area faces unique challenges as it transitions to net zero, particularly in the north of Scotland. Serving 59 inhabited Scottish islands via a subsea network and Distributed Embedded Generation (DEG) stations, our network connects remote communities and significant renewable generation critical for meeting national net zero targets. The Hebrides and Orkney Whole System Uncertainty Mechanism (HOWSUM) re-opener addresses the future needs of these communities with a whole system approach.

The Hebrides, Orkney, and Shetland share common drivers for change but are geographically and electrically distinct, interacting more with the Scottish mainland than with each other. We are applying a tailored methodology to the Outer Hebrides, Inner Hebrides, Orkneys and Shetland (noting Shetland is not part of HOWSUM) progressing each area based on specific drivers. This approach allows us to customise solutions for individual communities and industries while leveraging learning opportunities across island groups. We are considering future system needs through to 2050.

Understanding the uncertainties of long-term projections, we are focusing on immediate drivers for change while refining longer-term plans. This approach ensures proactive network development and efficient consumer decisions, minimising early sub-optimal investments.

Flexibility Services are considered for managing outages and future demand peaks which forms the basis of this Request for Information. We see flexibility potentially being required as part of all developed options for reinforcement. For load related drivers, it can help optimise the timing of future investment needs. Our global calls for flexibility to date have not identified any appropriate existing or pipeline services. Our phased approach to delivery in our net zero strategic plan for the Outer Hebrides will allow time for such new technologies to mature and inform whether they can credibly help support the security of supply for the Outer Hebrides. By ensuring that we're making appropriate use of Flexibility Services we can deliver an efficient whole systems solution at the optimum time.

How to Respond

This RFI is open to a variety of entities capable of adjusting electricity use (either increasing or decreasing) at specific times upon request. Entities that could achieve this with some investment and guidance on effective methods are also encouraged to apply.

We invite interested parties to express their interest in the island regions specified later in this report. We have listed examples of potential participants below, but this is not an exhaustive list, and we welcome feedback from others not included:

- **Discrete Asset Resources:** If you own or operate generators such as battery storage, hydro, or thermal. Particularly where the output can be adjusted independently of surrounding weather conditions.
- **Aggregators:** If you own or operate aggregated assets capable of shifting electricity usage (for instance, batteries, generators, EV chargers, non-storage heaters, or heat pumps) across multiple sites.
- **Industrial and Commercial Consumers:** If you own or operate a commercial or industrial site (for instance, whisky distilleries or fish farms) that can reduce or shift electricity demand in response to grid needs.
- **Electricity Suppliers:** If you manage portfolios of demand and generation that can be reduced or shifted.

Flexibility Provider Requirements

To help you understand how you can provide Flexibility Services, we have outlined the following conditions that must be met by the provider:

- **Network Connection:** The flexible resource must be connected or planned to be connected to SSEN's distribution network in the listed geographic regions. Where needed, a valid connection agreement must be in place before a contract is entered.

- **Delivery and Management:** The provider must be capable of delivering and managing a reduction in load or an increase in export upon SSEN's request. We are interested in understanding your capability to respond in different timescales, in terms of speed of response and duration of service.
- **Technology Types:** We welcome all technology types that can meet our requirements. Flexibility service providers may come from any existing or emerging industry sectors and utilise response mechanisms, such as demand reduction (permanent i.e. through energy efficiency measures or temporary i.e. moving an industrial shut down), demand offset, generation export, or electrical storage discharge.

The initial focus for this RFI is on services to manage thermal overloads, therefore we are particularly interested in the capability to change active power use at given times. We anticipate further needs on some islands such as reactive support, stability and inertia services. Any insight into the capability to provide these services can be included in the RFI response.

How to Get Involved

Respond to this RFI by submitting this Microsoft Form.

- Form link: https://forms.office.com/e/dTcrHcsuaZ

The window for responses will close on Friday 20th September at 17:00.

This information will help us understand what flexible resources are currently active in our region and identify those willing to participate. Your responses will shape our future approach to flexibility in island communities. To understand past contracts and pricing, refer to the Contracts Register in our document library: Flexibility Services Document Library - SSEN.

For more details and if you have any questions or specific feedback please contact: Flexibilityprocurement@sse.com.

Assessing Responses

SSEN will use the information provided to shape the types of services tendered. We will consider stakeholder preferences to refine our approach effectively. Understanding the volume of interest will help us design and create services that address our needs. Specifically, we seek feedback on what specific considerations in service design are necessary for effective participation. We also want to know what commercial structures would encourage participation in flexibility.

We are particularly interested in:

- The number of participants.
- The types of technologies proposed for providing flexibility, from both domestic and small commercial premises (e.g., demand side response, EV chargers, heat pumps, batteries, etc.).
- The locations of interested parties.
- Preferred length of contracts.
- Speed of response

- Duration of service
- Preferred payment structures.

Your feedback will play a crucial role in shaping our investment programme and providing additional options when networks are constrained.

We invite all respondents and stakeholders to share their views on our current approach to flexibility and suggest improvements. Key areas of focus for SSEN are reducing barriers to participation, improving island community networks while providing transparency throughout the process.

Your input is invaluable in helping us enhance our Flexibility Services and meet the evolving needs of these island communities.

NETWORK REQUIREMENTS

In this section, we explain the specific requirements and outline the identified island groups. These island groups are based solely on electrical connectivity. The accompanying maps illustrate segmentation within islands, highlighting smaller electrical connectivity groups. In some cases, there is a 'within island' requirement in addition to the requirement for the entire island group. The place names on the images describe the name of the higher voltage substation in that area, which may not always align with local regional definitions.

By seeking Flexibility Services, we will deliver our whole system approach to network development by uncovering opportunities to collaborate and drive efficiencies. As stated in our HOWSUM Re-Opener Application in January 2024, we see flexibility as having a part to play in future network development by deferring network reinforcement. Our specific requirements are the ability to delay or reduce electricity demand, and the ability to supply electricity. These requirements manifest under the following situations:

1. During faults: ad hoc demand and generation services where we want to reduce diesel usage or reduce power flow on our network.
2. During planned outages: planned demand and generation services where we need to reduce diesel usage and increase the options available to us to maintain a reliable supply.
3. During peak demand periods, particularly as demand increases with widespread electrification: delay or reduce demand or supply electricity during peak periods.

Orkney

Orkney boasts significant amounts of wind energy; however, winter demand can still create a bottleneck at Scorradale substation where electricity is distributed from the mainland and throughout the islands. In line with our Whole Systems approach, we have a series of proposed solutions to alleviate this burden, some of which are published here.

During outages to one of the 33 kV subsea cables feeding the islands, we are reliant on diesel generation at Kirkwall to help support and manage winter demand in conjunction with the remaining in-service cable. Whilst we look to optimise the upgrades to the network, we seek up to 16.3 MW of demand turn down and generation turn up Flexibility Services in the short to medium term.

Your participation could help us manage winter peaks, and outages to either of the subsea cables currently feeding the island. Planned outages to these cables generally last 1-2 days and are conducted in the summer. However, unplanned outages are more complex and can take over a year to address. Flexibility has the potential to reduce diesel reliance in all cases, thereby minimising environmental impact and operational costs in the following scenarios:

- The ability to delay electricity demand to outside peak periods (typically between 12:00 – 20:00).
- The ability to reduce electricity demand during short, planned outages.
- The ability to reduce demand or provide generation during potentially long, unplanned outages.

There are generation sites in Orkney connected to an Active Network Management (ANM) scheme, this means the generation may be restricted below its generating capability due to constraints on our network. It particularly occurs when other local generation is producing electricity, for Orkney this is typically in times of high wind. Where ANM connected generation can provide an additional service over and above its normal operating regime, then we will seek to allow ways for these to participate, for example addition of storage or additional controls to existing connected assets.

We are interested in hearing from ANM connected generation on their ability to increase generation at times they would not normally expect to be generating and capability to deliver non-thermal services such as reactive control, inertia and stability support. These non-thermal services are not the focus of this initial RFI but will give us a greater understanding of opportunities to potentially procure these services on Orkney in future.

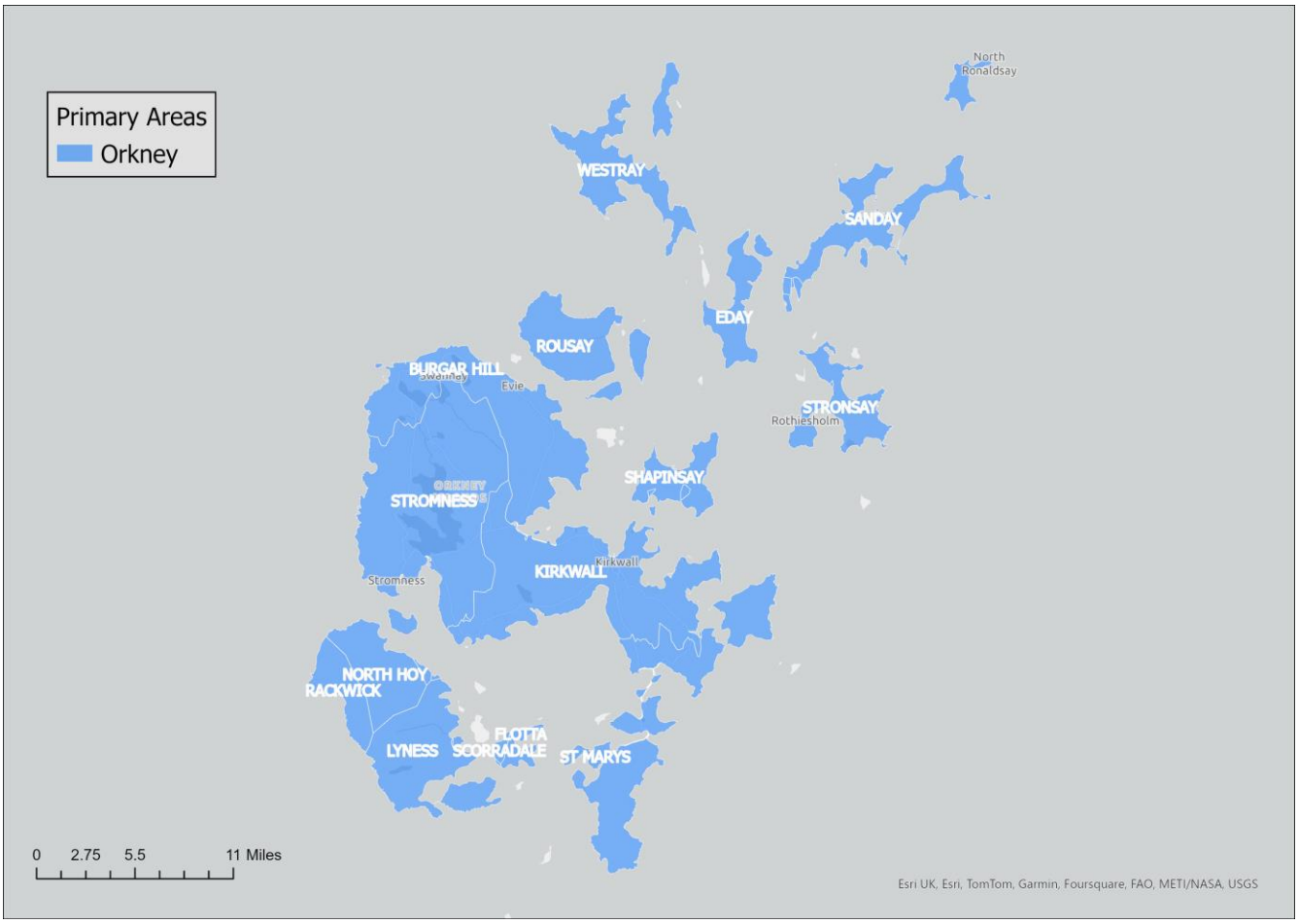

Figure 2: Map of Primary Substation Zones in Orkney

Given the robust network throughout the Orkneys, assets located within all the zones marked in blue in Figure 2 can deliver flexibility. These are: Rackwick, Lyness, Scorradale, Flotta, St Marys, Kirkwall, Stromness, Burgar Hill, Rousay, Westray, Eday, Sanday, Stronsay, and Shapinsay. Locations labelled on the map reflect the centre

point of the area covered by each higher voltage substation and may not correspond with the location of towns or substations.

Outer Hebrides

There are currently several network reinforcements planned in the Outer Hebrides across Lewis, Harris, North Uist, Benbecula, South Uist, and Barra which are outlined here. These works will boost the reliability of the network greatly and create a more resilient network throughout the entire region. Currently, there are 2 x 33 kV lines from Ardmore — one feeds Harris whilst the other feeds Loch Carnan on South Uist. If the line from Ardmore to Loch Carnan goes down, then the Uists, Benbecula, and Barra are entirely reliant on diesel generation from Loch Carnan and Barra substations.

The transmission line from Fort Augustus to Ardmore currently goes down for around 2 weeks every summer for planned maintenance. While there are sufficient back feeds from other networks to sufficiently power Skye, in this situation, all feeds to the Outer Hebrides are down and the islands are entirely reliant on diesel generation.

As there is currently no connection between the northerly and southernly Outer Hebrides any available flexibility will be contained to two regions: Lewis and Harris and North Uist, Benbecula, South Uist and Barra (outlined in Figure 2). Future reinforcements will mitigate existing issues and reduce reliance on diesel but they are also designed to accommodate projected load growths in the region. Significant load growths are anticipated in the area across various sources: renewable energy (particularly wind), battery storage, road transport, aviation, marine vessels, heating, whisky distilleries, and aquaculture. This could create significant peak loads in the future that could require flexible solutions.

SSEN invites flexibility providers to help reduce the usage of diesel generation, minimising environmental impact and operational costs, and managing peaks created by future load increases.

- The ability to reduce demand during planned outages in summer, on a continuous basis, for around 2 weeks.
- The ability to reduce demand during unplanned outages.
- The ability to delay electricity demand to outside future peak periods (typically from 14:30 – 17:30 on Lewis & Harris and 16:00 – 20:00 on the Uists, Benbecula, and Barra)

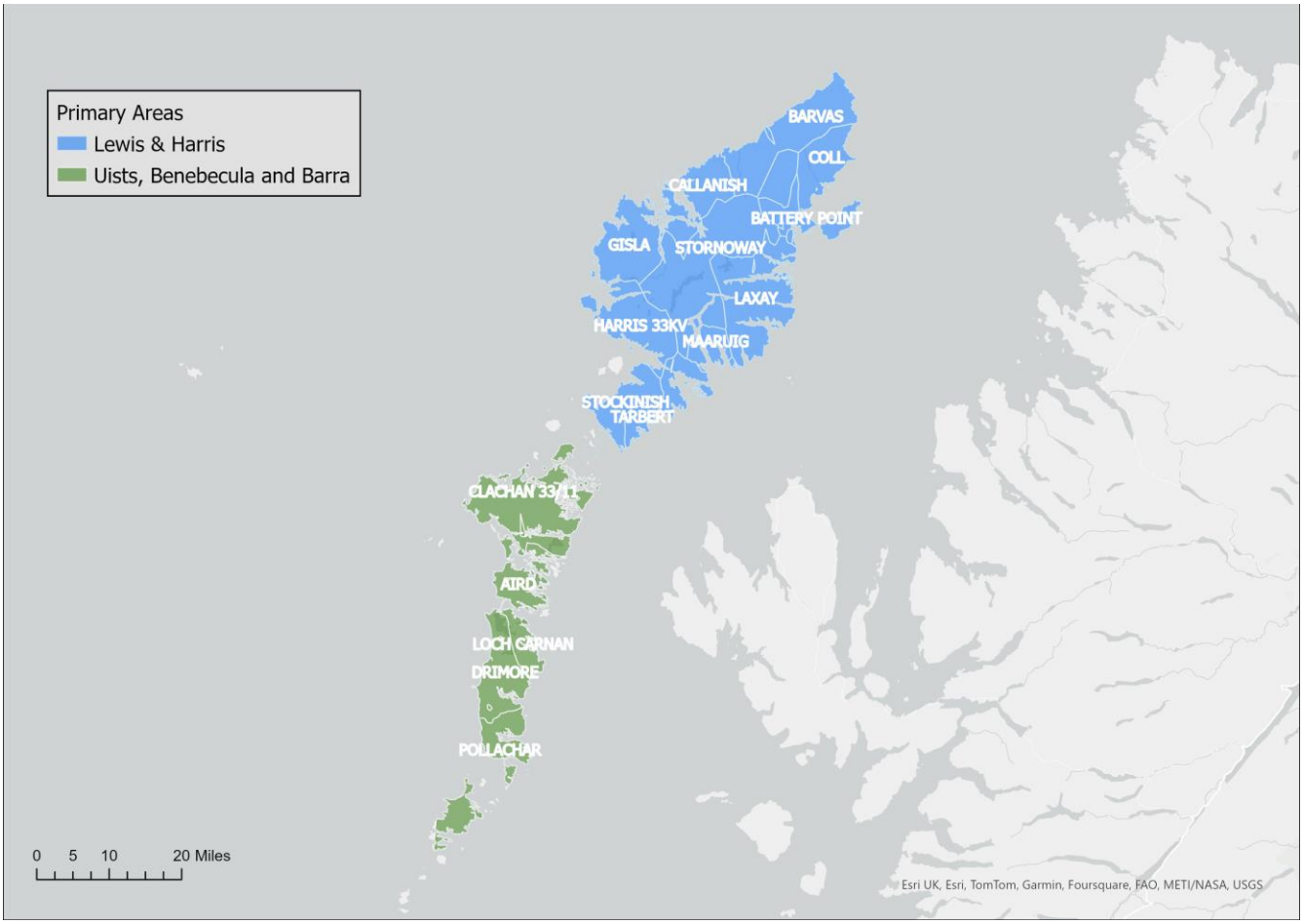

Figure 3: Map of Primary Substation Zones in the Outer Hebrides

The network on Lewis and Harris has a relatively low rating at points. Given most demand centres around Stornoway, assets closer to this point are preferable. Regardless, we are interested in talking to potential providers of flexibility located within the zones marked in blue (Lewis & Harris) and green (Uists, Benbecula, and Barra) in Figure 3, which are:

- Lewis & Harris: Barvas, Coll, Callanish, Battery Point, Stornoway, Laxay, Gisla, Harris 33 kV, Maaruig, Stocknish, and Tarbert.
- Uists, Benbecula, Barra: Clachan, Aird, Loch Carnan, Drimore, and Pollacher.

Locations labelled on the map reflect the centre point of the area covered by each higher voltage substation and may not correspond with the location of towns or substations.

Mull, Coll, and Tiree

Alongside several installations to manage voltage on Mull, Coll, and Tiree, there are some planned network improvements on this island group that will improve resilience. Coll and Tiree are fed by a single 11 kV line from Dervaig on Mull. During outages, both Coll and Tiree are entirely reliant on the 2.7 MW (increasing to 3.7 MW in 24-25 financial year) diesel power station at Tiree for all electricity demand.

Furthermore, increasing electrification in aquaculture, heat, transport and at ferry terminals will drive significant future demand growth in Mull, Coll, and Tiree.

SSEN invites Flexibility Providers that can:

- Reduce electricity demand during outages and minimise the use of diesel with demand turn down flexibility services and generation turn up.
- Help manage rising electricity demand and ensure stable and efficient grid operation through demand turn down and generation turn up at peak times (typically from 15:30 – 20:00).

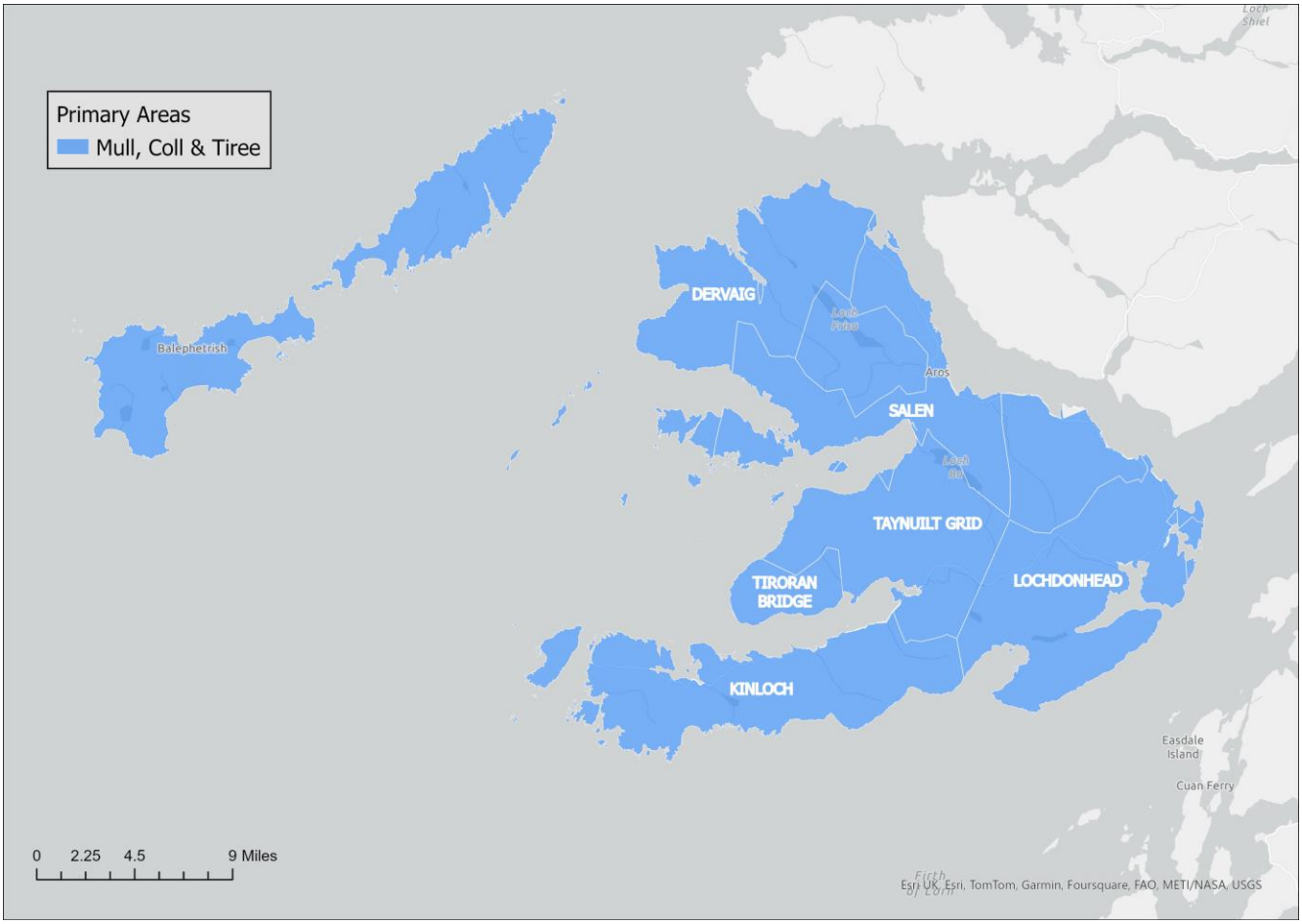

Figure 4: Map of Primary Substation Zones in Mull, Coll, and Tiree

Potential flexibility providers can be located within the zones marked in blue in Figure 4, which are: Kinloch, Lochdonhead, Tiroran Bridge, Taynuilt Grid, Salen, and Dervaig — however, providers needed to reduce diesel usage at Tiree must be connected directly to Coll or Tiree. Locations labelled on the map reflect the centre point of the area covered by each higher voltage substation and may not correspond with the location of towns or substations.

Islay, Jura and Colonsay

With the whisky industry's forward-thinking decarbonisation efforts, the potential establishment of new distilleries on Islay and Jura and several new generators awaiting connection, there are future needs for network reinforcements. There is currently a single 33 kV feed from Port Ann GSP through Jura to Islay. A new 33 kV overhead line between Port Askaig and Bowmore is already complete, with a new overhead line from Bowmore to Port Ellen planned for February 2025 and a 33 kV cable augmentation between Islay and Jura planned for

September 2024. Future proposals will continue to increase the capacity of the network in anticipation of increasing electricity demands.

In the meantime, faults and planned outages between Port Ann GSP, Jura and Islay make the islands reliant on diesel generation at Bowmore. The island group uses ~7.5 MW of electricity at peak times, with 8 MW of diesel generation (6 MW at 33 kV and 2 MW at 11 kV) so flexibility services would aim to reduce the amount of diesel burned.

SSEN invites flexibility providers to help ensure a stable, resilient, and decarbonised energy supply:

- Reduce electricity demand during outages and minimise the use of diesel with demand turn down flexibility services and generation turn up.
- Help manage rising electricity demand and ensure stable and efficient grid operation through demand turn down and generation turn up at peak times.

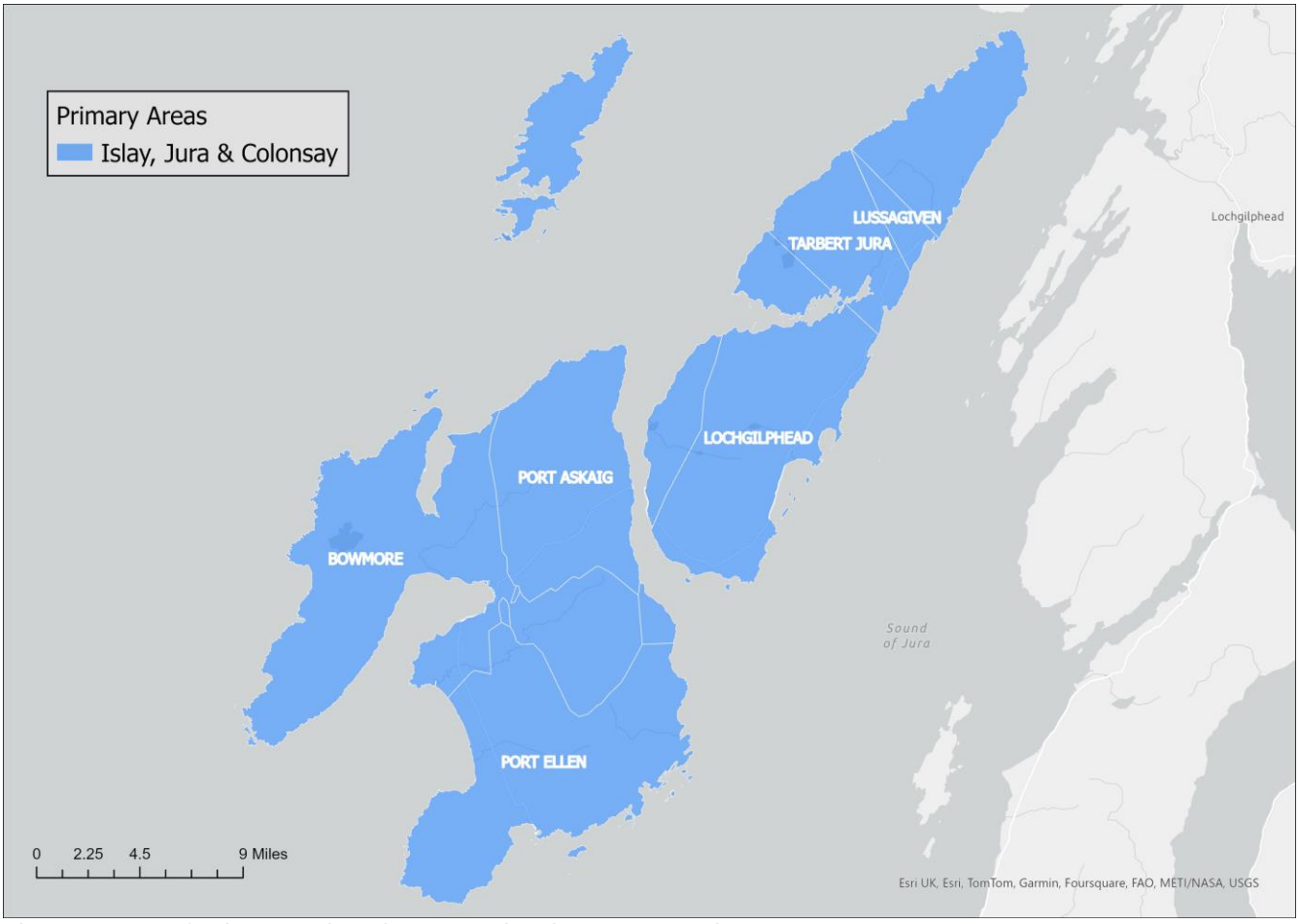

Figure 5: Map of Primary Substation Zones in Islay, Jura & Colonsay

We are interested in talking to potential providers located within the zones marked in blue in Figure 5, which are: Port Ellen, Bowmore, Port Askaig, Lochgilphead, Tarbert Jura, and Lussagiven. Locations labelled on the map reflect the centre point of the area covered by each higher voltage substation and may not correspond with the location of towns or substations.

Shetland

Shetland is not currently connected to the main electricity transmission system, although works are underway to connect the island group to the mainland via a high voltage direct current (HVDC) subsea cable. SSEN Transmission is also building a new 132 kV island network that will supply most of Shetland's demand needs.

Through a combination of managing residential storage heating and renewable generation these islands already use significant amounts of renewable energy. We want to increase the amount of renewable energy utilised and could do this by increasing use of battery storage by further reducing peak demand. We have already optimised residential heating and are not looking to change this through this approach.

SSEN invites parties that can reduce peak demand by 5 MW (this can be across multiple suppliers) by:

- Reducing demand during peak periods.
- Supply electricity during peak demand periods.

Peak demand is typically between 05:30 – 08:30 and 15:00 – 18:00.

There are four Generator sites in Shetland (including Sullom Voe Terminal) connected to an Active Network Management (ANM) scheme, this means the generation may be restricted below its generating capability due to constraints on our network. The Shetland ANM manages the electricity generation against the demand of local loads, as we cannot store this electricity on our network.

We allow ANM connected sites to operate to maximum capacity that is safe to do so and any additional Flexibility Services will not change this. We are particularly interested in services when these existing DERs do not have enough capacity to support the local demand. The consideration of overall energy position is also included in the rules for the ANM. Where ANM connected generation can provide an additional service over and above its normal operating regime, then we will seek to allow ways for these to participate, for example addition of storage or additional controls to existing connected assets.

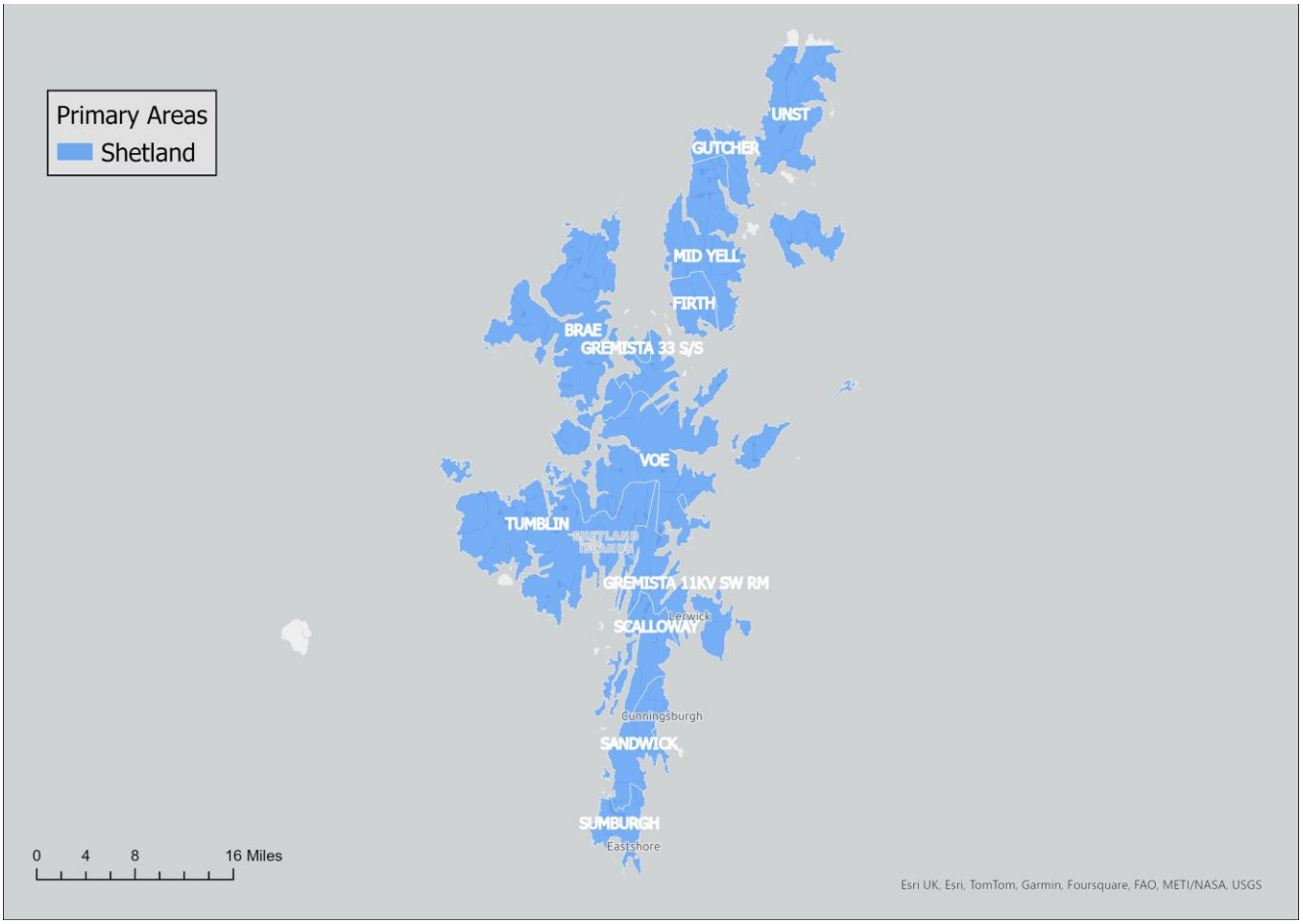

Figure 6: Map of Primary Substation Zones in Shetland

We are interested in talking to potential providers of flexibility located within the zones marked in blue in Figure 6, which are: Sumburgh, Sandwick, Scalloway, Gremista 11 kV, Gremista 33 kV, Tumblin, Voe, Brae, Firth, Mid Yell, Gutcher, and Unst. Locations labelled on the map reflect the centre point of the area covered by each higher voltage substation and may not correspond with the location of towns or substations.

COMMERCIAL REQUIREMENTS

This section discusses how the technical requirements and considerations for using the network may affect the commercial design of these services.

Standard Flexibility Products

A standard set of Flexibility Service Products are used for most of the procurement across all DSOs in GB. The DSOs have collaborated on development and consulted with flexibility providers to align on these services. There are five standard products: Peak Reduction, Scheduled Utilisation, Operational Utilisation, Scheduled Availability + Operational Utilisation, and Variable Availability + Operational Utilisation. These services are defined in accordance with Open Networks standards.

These products are defined by two elements - the payment structure and the times when different instructions are issued.

Product Selection

Different Flexibility Products can be a better fit for different network needs. The selection of the right flexibility product can be a combination of when information is available about a particular need, the duration of the need and the commercial certainty for a potential provider.

This set of considerations leads us to conclude the service combinations in Table 1 are likely to be most appropriate, particularly when looking at how to procure these services in the longer term (typically a year or season ahead of any potential service delivery).

	Change in energy use at a specific, repeatable time (typically, peak demand)	Change in energy use at any time for a short period	Change in energy use for a long period of time (i.e. until or after a planned outage)
Network Operating Normally (no faults or outages)	Variable Availability + Operational Utilisation - Week Ahead Response Schedule Availability + Operational Utilisation – Day Ahead Response Peak Reduction	Variable Availability + Operational Utilisation – Week Ahead Response	N/A
During Planned Outages	Variable Availability + Operational Utilisation – Day Ahead Response Operational Utilisation – Week Ahead Response	Variable Availability + Operational Utilisation - Day Ahead Response Operational Utilisation – Week Ahead Response	Scheduled Utilisation Operational Utilisation Peak Reduction
During Faults or unplanned outages	Operational Utilisation – All Response Durations Variable Availability + Operational Utilisation – All Response Durations	Operational Utilisation - All Response Durations	Operational Utilisation - All Response Durations

Table 1: Existing Service Use Cases

We welcome feedback on whether you think this selection would drive your participation to a particular need set or if there are any other considerations. Within the options, there are multiple response durations that would allow us to manage the network. We are interested in understanding which are easiest to accommodate in the island communities.

Managing Uncertainty

The different products have limitations within them for some of our specific needs on the islands. This is primarily due to our needs, which are influenced by faults and outages, resulting in the continuous use of diesel generators until the issues are resolved. As such, we require services that can be called on in relatively short

notice, and infrequently, but can then be repeated for long durations. We recognise this is a challenging service to deliver and are interested in understanding what commercial structures would support requirements. This section outlines some options we are considering. Feedback on these and on anything we have missed is appreciated.

Multiple Procurement Timescales

We recognise that maintaining a contract that remains inactive for extended periods but must be fulfilled on short notice can be challenging. This can be particularly challenging when looking to stack services in multiple horizons. It would be possible for other standard ENA products to be used, such as Scheduled Utilisation and Scheduled Availability + Operational Utilisation if these were procured quickly. Our new Flexibility Markets Platform allows us to procure these services quickly, from providers on existing Overarching Agreements. The Overarching Agreement would set the General Terms and conditions, but the 'Call Off Contract' would be awarded after a bidding exercise, which would define the: volume; time and price of a service.

Complementary Products

We are willing to use combinations of Flexibility Products to build the overall portfolio of response we need, for example combining a longer-term Variable Availability + Operational Utilisation - Week Ahead Response Products (where Availability is declared at month ahead) with a shorter, less repeatable Operational Utilisation – Day Ahead response product. This will add to the complexity of the dispatch process, but we would be interested in understanding if there are different actions, each provider can take, depending on timescales, that would make this approach beneficial.

Service Structure

Long-term contracts with short delivery notice (Operational Utilisation can be as brief as 2-minutes) and uncertain delivery can be difficult for all parties to rely on. We also recognised there may be initial set up costs to enable the services to be available, meaning that providers would need to have confidence in recovery. We welcome feedback on what service structure would ensure reliability for us while delivering the necessary revenue to Providers.

GET IN TOUCH

We look forward to receiving your responses to this request for information. Please respond by submitting this Microsoft Form: https://forms.office.com/e/dTcrHcsuaZ. For more information and if you have any questions or specific feedback please contact: Flexibilityprocurement@sse.com.