



# Uist

## Local Energy Plan



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Community Energy Scotland  
67a Castle Street  
Inverness  
IV2 3DU

T: 07920 182308  
E: [info@communityenergyscotland.org.uk](mailto:info@communityenergyscotland.org.uk)  
W: <http://www.communityenergyscotland.org.uk>

## COMMUNITY ENERGY SCOTLAND

Community Energy Scotland (CES) is a Registered Scottish Charity and company limited by guarantee established in 2007. Our main charitable objectives are community development, environmental protection and the alleviation of poverty. Our mission is to build confidence, resilience and wealth through sustainable energy development at community level.

CES has been at the heart of community renewable energy development for over a decade and with our substantial experience we are best positioned to offer advice and support to Scotland's communities. As Scotland's first, and only, national charity dedicated to supporting community renewable energy development, we have firmly established ourselves as impartial, independent specialists.

## ACKNOWLEDGEMENTS

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- Ameena Camps, North Uist Development Company
- Jemma MacVicar, North Uist Locality Planning Partnership
- Sheena Stewart, UCVO
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- Lynda MacLean, Uist Citizens Advice Bureau
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- Euan Scott, Coimhearsnachd Bharraidh agus Bhatarsaidh Ltd
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## Contents

1. <b>LIST OF TABLES</b> .....	<b>6</b>
2. <b>EXECUTIVE SUMMARY</b> .....	<b>7</b>
Methodology.....	7
People and Place.....	7
Energy and Infrastructure .....	8
Community Engagement .....	8
Early Stage Feasibility Reports .....	8
Local Energy Plan Actions .....	12
3. <b>INTRODUCTION AND PURPOSE</b> .....	<b>15</b>
4. <b>METHODOLOGY</b> .....	<b>17</b>
Steering Group Development and Facilitation .....	18
Data and Information Collection.....	18
Community Engagement .....	18
Project Prioritisation and Options Appraisal .....	20
Early Stage Feasibility Reports and ULEP Compilation .....	22
5. <b>PEOPLE AND PLACE</b> .....	<b>23</b>
Geography.....	23
Transport and Infrastructure .....	23
Car Ownership .....	23
Roads.....	24
Ferries .....	25
Air Travel.....	25
Busses.....	25
Community Transport.....	26
Electric Vehicle Charge Points.....	27
Active Travel.....	28
Population.....	28
Economic Activity.....	29
Housing .....	29
Fuel Poverty .....	30
Culture, Religion and Language .....	31
Natural Environment .....	31

<b>6. ENERGY AND INFRASTRUCTURE .....</b>	<b>34</b>
Fossil Fuel Energy Supply in Uist.....	34
Electricity Network.....	34
Outer Hebrides.....	34
Uist Grid .....	35
Loch Carnan Power Station.....	36
Grid Constraints .....	36
Planned Upgrades.....	36
Renewable Energy .....	37
Energy Demand.....	38
Electricity.....	38
Heating and Gas Networks .....	39
<b>7. COMMUNITY ENGAGEMENT .....</b>	<b>41</b>
Energy Café Engagement .....	41
Energy Café Results.....	41
Community Ideas Survey Engagement .....	42
Community Ideas Survey Results.....	42
CoDeL Tailored Engagement.....	44
CoDeL Tailored Engagement Outputs.....	45
Primary Schools Engagement .....	46
Project Prioritisation .....	47
Top 40 Projects .....	47
<b>8. NEXT STEPS.....</b>	<b>51</b>
Options Appraisal.....	51
Early-stage Feasibility Studies.....	52
<b>9. CONCLUSION .....</b>	<b>55</b>
<b>10. REFERENCES .....</b>	<b>56</b>

## LIST OF TABLES

Figure 1. Off-grid energy system on the isle of Eigg, June 2008 .....	9
Figure 2. Initial Workflow for ULEP Development. Due to budgetary constraints, staffing challenges and the impacts of COVID-19 not all aspects of the plan were carried out.....	17
Figure 3. Energy Cafe in Stonybridge, January 2022 .....	<b>Error! Bookmark not defined.</b>
Figure 4. School Engagement at Lochdar Primary School .....	19
Figure 5. Poster advertising ULEP Energy Cafes. Events were held across all the Islands comprising Uist and focussed on either Home Energy or Transport.....	20
Figure 6. Delivery team member Ameena Camps with the ULEP project ideas table. The table was made available in public locations for community members to vote to prioritise community ideas .....	21
Figure 7. Aerial Map of Uist. Source: ESRI, ArcGIS Online .....	23
Figure 7. Vehicle ownership on Uist. (Scotland's Census , 2011) .....	24
Figure 9. Commuting distances of Uist residents. (Scotland's Census , 2011) .....	24
Figure 10. Constraints and issues on ferry services serving Uist. (Comhairle nan Eilean Siar, 2020) .....	25
Figure 11. Map of EV chargepoints on Uist. Source: (Chargeplace Scotland, 2023) .....	27
Figure 12. Age demographics of Uist. (Scotland's Census , 2011) .....	28
Figure 13. Housing stock of Uist. (Home Energy Analytics, 2021) .....	29
Figure 14. Map of environmental designation in and around Uist. (Marine Scotland, 2023) .....	33
Figure 15. Map showing subsea power cables across Uist.....	35
Figure 16. Estimated energy consumption across the Western Isles. (Price, 2021).....	39
Figure 17. Postcodes of ULEP Community Ideas Survey respondents .....	42
Figure 18. . Gender demographic of ULEP Community Ideas Survey respondents.....	42
Figure 19. Responses to Q5 “Is there anything you would like to be able to do to help you power and heat your home and/or business more efficiently? Is there anything you would like to be able to do to help transport you and your family more efficiently?.....	43
Figure 20. Responses to Q7 “What could be implemented to help alleviate these challenges? Please specify below.” .....	44
Figure 21. Final results of Options Appraisal .....	51
Table 1. Community Ideas Priority Projects - The five highest priority projects identified in the ULEP community engagement work.....	8
Table 2. Housing stock of Uist (Home Energy Analytics, 2021) .....	30
Table 3. Fuel types and uses across Uist (Element Energy, 2014) .....	34
Table 4. Large wind installations across Uist .....	37
Table 5. Energy demand across Uist by fuel type. (Comhairle nan Eilean Siar, 2011).....	38
Table 6. Estimated energy consumption for domestic properties in Uist. (Home Energy Analytics, 2021).....	39
Table 7. Energy demand by sector. (Element Energy, 2014).....	40
Table 8. Community Ideas – Top 40 prioritised projects .....	47
Table 9. Community Ideas Priority Projects - The five priority projects taken forward for early stage feasibility reports .....	52

## EXECUTIVE SUMMARY

Local Energy Plans (LEPs) are community led documents which set out the energy-related needs, opportunities and priorities of a local area (Local Energy Scotland, 2023). The Uist Local Energy Plan (ULEP) came about following discussion at the Uist and Barra Local Energy Forum around opportunities for developing the energy system on Uist. There was an ambition to follow the communities of Barra and Vatersay who developed a local energy plan in 2018. Taking inspiration from this, a number of Uist based organisations were successful in securing funding to develop an LEP for Uist. Work on the plan began in earnest during summer of 2021.

For the people of Uist energy is an existential issue, not just because the islands are on the outer edge of the UK National Grid and are particularly affected by outages, but because Uist is on the front line of climate change due to the low-lying topography and exposure to Atlantic storms (Crouse, 2021). This plan is designed to help move Uist to a more secure and sustainable energy system, by providing the information necessary to understand the local energy system and by outlining local priorities and development actions required.

### Methodology

In order to ensure the ULEP had a strong link to the community of Uist, a Steering Group was formed from representatives from the Uist community (Berneray to Eriskay) with identified skills and knowledge to take ownership of the plan and provide direction & decision-making.

Community Energy Scotland delivered the ULEP in close partnership with North Uist Development Company (NUDC) and Coimhearsnachd Bharraidh agus Bhatarsaidh (CBAB). NUDC led on the delivery of Work Package 2 on Communication & Engagement.

A multi-dimensional community engagement plan was designed with support from external agencies -The Surefoot Effect (The Surefoot Effect, 2023) and Community Development Lens (Community Development Lens, 2023) encompassing:

- Facilitator Training
- Uist Energy Café Part 1
- Community Energy Ideas Survey
- Tailored engagement for hard-to-reach groups
- School Engagement
- Energy Cafés Part 2
- Project Prioritisation
- Ownership and ongoing community feedback

### People and Place

Uist is home to a dispersed and decreasing population of 4,800 people spread across the seven islands of Berneray, North Uist, Baleshare, Grimsay, Benbecula, South Uist and Eriskay. Transport within, and from, Uist can be challenging due to adverse weather, limited infrastructure for active travel or electric

vehicles and unreliable links to the mainland. These factors, alongside a poor housing stock, result in Uist facing some of the highest levels of fuel poverty in Scotland. The numerous environmental designations around the islands are testament to the rich natural heritage of Uist and there is a long history of Gaelic language and culture which remains vibrant today.

### Energy and Infrastructure

Whilst Uist has abundant renewable energy resources in wind, wave and tidal, the community face challenges in developing new energy projects due to a lack of capacity to export energy to the mainland. This has been a longstanding issue and has largely limited the growth of renewables in Uist to two major community energy projects located in North and South Uist. National energy market regulations currently prevent local consumers directly using energy generated on Uist and many households are still reliant on fossil fuels for heating.

### Community Engagement

Over 400 local people engaged in the development of the ULEP through Energy Café's, a Community Ideas Survey, school engagement and Community Development Lens's (CoDeL) tailored engagement work. Key insights from this work included a strong desire amongst the community to use more of the islands' energy resource locally through domestic renewables or the creation of local energy markets, and the importance of financial support for individuals to make sustainable changes such as buying electric vehicles or installing renewable heating systems. Community engagement culminated in a prioritised list of community ideas which provide a direction and mandate for several sustainable community development projects. The community engagement process was also important for prompting local people to think about and discuss energy, creating a sense of participation and ownership over the ULEP.

### Early Stage Feasibility Reports

To build on the community engagement CES developed "Early Stage Feasibility Reports" (ESFRs) for each of the top five community priority projects (Table 1.). Unfortunately, funding applications to pay for more in depth feasibility studies were unsuccessful. The Early Stage Feasibility Reports were produced using desk-based research and drew on experience from the previous work and research of CES or other organisations working within Uist. The complexity of some of the Priority Projects is such that further feasibility work will be required before projects can be piloted or launched. The ESFRs provide introductions to each topic, case studies of similar initiatives and leads for key contacts or sources of support for furthering each idea. Short summaries of each ESFR are provided below.

*Table 1. Community Ideas Priority Projects - The five highest priority projects identified in the ULEP community engagement work*

Community Ideas Priority Projects
Local smart grid with local sustainable generation, making use of resources e.g. wind energy and local sales of electricity for self-sufficiency (as independent as possible from the mainland grid to minimise exports & ideally for reduced local energy costs)



Investigate the potential for local wave energy and local tidal energy (including tidal built into causeways) and implement projects accordingly

Each township to have its own renewable energy generation assets e.g. wind and storage facilities with a local network (including potential for network of district heating schemes)

Multi-purpose demand responsive eco-friendly community transport vehicles available to residents i.e. community electric minibuses in each township

Create more community growing spaces, including more allotments, and food growing groups

**1. LOCAL SMART GRID WITH LOCAL SUSTAINABLE GENERATION, MAKING USE OF RESOURCES E.G. WIND ENERGY AND LOCAL SALES OF ELECTRICITY FOR SELF-SUFFICIENCY (AS INDEPENDENT AS POSSIBLE FROM THE MAINLAND GRID TO MINIMISE EXPORTS & IDEALLY FOR REDUCED LOCAL ENERGY COSTS)**

A smart grid is a general term for an electricity system which better integrates demand and generation of energy to improve sustainability, efficiency and security of energy systems. Smart grids can also be developed to maximise local utilization of nearby energy resources. Typically, smart grids incorporate some or all of the following; renewable energy generation, advanced energy monitoring, energy storage, demand side energy management and energy efficient devices.

Smart grids have been implemented in a number of locations around Scotland including the off-grid energy system of the Isle of Eigg and the Active Network Management (ANM) system in Orkney. There remain however a number of barriers to developing smart or independent grids in other locations, notably the cost of increased energy monitoring and management, regulatory barriers to local energy markets and challenges in gaining independence from the national grid due to statutory requirements for secure supply to energy consumers. The next steps towards a local smart grid project would be to explore the potential for innovation projects within Uist, possibly in partnership with Comhairle nan Eilean Siar and Uist and Barra Local Energy Forum, or considering alternative approaches such as Energy Local Clubs.



Figure 1. Off-grid energy system on the isle of Eigg, June 2008

## **2. INVESTIGATE THE POTENTIAL FOR LOCAL WAVE ENERGY AND LOCAL TIDAL ENERGY (INCLUDING TIDAL BUILT INTO CAUSEWAYS) AND IMPLEMENT PROJECTS ACCORDINGLY (OFFSHORE ENERGY WAS ALSO CONSIDERED DUE TO SIMILARITIES IN PROJECT DEVELOPMENT)**

The seas around Uist have huge potential to provide a world class source of sustainable renewable energy. Energy can be harnessed from tides, waves and offshore winds and due to the direct exposure to the Atlantic Ocean on the west coast of Uist there is abundant energy available. Despite extensive research being undertaken at the European Marine Energy Centre (EMEC) in Orkney all forms of marine energy remain at early stages of deployment in Scotland. Case studies within Shetland and the Inner Hebrides demonstrate the potential for marine energy within island energy systems and are summarised alongside several previous studies which have explored marine energy in the Outer Hebrides.

There are significant barriers to marine energy development in Uist such as the technical readiness of marine energy devices, local grid constraints, environmental designations and restrictions relating to MoD operations. The next step would be to explore the potential for pilot projects within Uist with support from external partners such as Wave Energy Scotland and the European Marine Energy Centre. There is also some possibility that waters nearby Uist may be suitable for the deployment of Offshore Wind which would create an opportunity for community ownership or benefit from these developments.

## **3. EACH TOWNSHIP TO HAVE ITS OWN RENEWABLE ENERGY GENERATION E.G. WIND AND STORAGE FACILITIES WITH A LOCAL NETWORK (INCLUDING POTENTIAL FOR NETWORK OF DISTRICT HEATING SCHEMES)**

There are many wind and solar renewable energy projects across Uist already. Despite the proven success of renewables in Uist through community energy projects there is no clear route to integrating such technologies directly with townships due to barriers relating to regulation, infrastructure and finance. Due to this apparent impasse we recommend exploring innovative solutions to operating within these barriers such as the Energy Local model. Energy Local is a cooperative model which allows householders to connect with local renewable energy generators and match their energy use to generation, creating a better deal for both parties.

Planning permission is a major challenge for new wind projects in Uist due to MOD radar constraints. There may be potential for a wind project outwith the MOD constrained area, e.g. in Lochmaddy or Lochboisdale. It is recommended that a detailed feasibility study is carried out to assess the best site for a project as well as the options for that generation to be exported through either:

- Future grid upgrades
- New demand
- Future storage opportunities

The experience of local communities and development trusts such as Storas Uibhist and NUDC should provide important foundations for future community initiatives and would be ideal bodies for engaging with Energy Local or initiatives such as the ICNZ to explore connections between townships and renewable energy resources on Uist.

#### **4. MULTI-PURPOSE DEMAND RESPONSIVE ECO-FRIENDLY COMMUNITY TRANSPORT VEHICLES AVAILABLE TO RESIDENTS I.E. COMMUNITY ELECTRIC MINIBUSES IN EACH TOWNSHIP**

Community Transport (CT) refers to a diverse array of services and solutions delivered by communities to meet local transport needs. CT providers use a mix of methods including mopeds, cars and minibuses to support local journeys to amenities and services which typically include school, hospital and community group transport, dial-a-ride, busses which take residents to shops, or deliver shopping to residents. Electric Vehicles (EVs) are now established as reliable and widespread features of transport mixes across Scotland and although concerns remain around EV use in rural areas, such as limited local maintenance options and poor charging networks, the past 10 years have seen a steady increase in EV's across Scotland and Uist.

Tagsa Uibhist, based in Balivanich, are the main community transport provider on Uist offering a range of services to residents in North Uist, Benbecula, South Uist, Eriskay, Grimsay and Berneray. Services are typically lifts to enable community members access to medical appointments, day care, adult learning, and respite, as well as shopping and any other appointment required. Tagsa currently run three EVs as part of their transport provision with charging facilities at their office. Potential barriers to rolling out EVs in townships across Uist include the financial cost and limited access to chargers or EV trained mechanics.

A shared community transport vehicle could be trialled in a smaller, distinct community within Uist and, if successful, replicated across the Island chain. Given their growing experience with EVs in a CT context, Tagsa Uibhist are best placed to support new sustainable community transport projects in Uist.

#### **5. CREATE MORE COMMUNITY GROWING SPACES, INCLUDING MORE ALLOTMENTS, AND FOOD GROWING GROUPS**

Small island communities rely heavily on long food supply chains and thus are especially vulnerable to food insecurity; the rising cost of food is being felt by households in Uist and is exacerbated by ferry problems and the rising cost of fuel. Case studies of community growing initiatives can be seen in Orkney, Great Bernera and Barra and provide inspiration to complement the existing work of Uist based organisation such as Tagsa Uibhist, Cothrom and Torlum.

Uist faces barriers to food growing and production due to the dispersed geography of the islands, adverse weather and climate, lack of access to suitable land and competition with supermarkets or mass producers. There are, however, opportunities for developing more local growing such as through supporting the rollout of polycrubs to enable longer growing periods and sharing seedlings and

resources. (More detailed information can be found in the mini-feasibility study). Tagsa Uibhist have secured a Partnership Development Grant from Sustainable Food Places through the Third Sector Interface (Western Isles) with which they aim to lead the development of the Western Isles Food Partnership. This will make Tagsa well placed to support local growing initiatives across Uist.

### Local Energy Plan Actions

The following actions have been drawn from the community's priorities and needs. Those highlighted in green are actions taken from the Priority Projects listed above.

#### TRANSPORT

- More EV charging points
- Improvements to encourage more walking and cycling such as more paths & cycle facilities
- Revised & clearer bus timetables available in printed versions, at bus stops and online
- Increased frequency, better connectivity and decarbonised public transport
- Establish a pilot shared community transport vehicle project in a township or smaller island in Uist (Eriskay, Grimsay or Berneray).
- Community eco car sharing 'car clubs' with a range of suitable vehicles e.g. short and long range EVs, with car sharing app

#### COMMUNITY ENGAGEMENT & LEARNING

- Build on the deep understanding of local energy needs, the surrounding environment and climate, and the ability to adapt and find solutions. Much of this understanding comes through generations of crofting and fishing, as well as low-impact lifestyles and the re-use and repair of resources. More recently, the community has developed knowledge around the use of renewable energy, reviving horticulture, new recycling centres, and efficient resource use.
- Dedicated project for education and engagement on the net zero transition including what it means and what options there are for Uist. This will enable everyone to make informed decisions and develop their skills.
- Build on the aspirations and commitment among younger generations, reflected so much in this report, for a sustainable future for our islands. Young people are already delivering on these agendas through crofting, businesses and social enterprises, creative activities (such as art) and education, and moving towards more sustainable living.
- Enact regular and widespread communication about issues and potential solutions, leading to bottom up decision making processes.
- Promoting traditional and indigenous varieties of crops that are more resilient and adapted to the local climate.
- Providing vegetable plants that would limit the time and energy spent on growing produce from seed and working in sympathy with the environment and community.
- Engage landowners and crofters to open up access to land for growing for new entrants.
- Provision of agricultural and horticultural training building on the nationally accredited Crofting and Local Food Production courses which were written in Uist.

#### POLITICAL & NETWORK ENGAGEMENT

- Create a local Uist lobby group to work with the Scottish Islands Federation to lobby for change.

- Engage with SSEN through their HOWS work to make the case for proactive grid reinforcement for Uist.
- Lobby for the Local Electricity Bill which would establish a Community Electricity Export Guarantee and a Community Electricity Supplier Services Scheme. This would enable smaller-scale renewable energy and community-owned renewable energy schemes in Uist to sell their power directly to local households and businesses.
- Campaign for Smart Metering in Uist, and an annual analysis of what householders use so they know exactly where their money is going.
- Campaign for lifting of MOD planning restriction on wind turbines (One of two main barriers to more renewable energy)
- Campaign/engage for new subsea cable to Skye (One of two main barriers to more renewable energy)
- Campaign for a connected approach to land management which blends regenerative farming, woodland and horticulture in the form of a crofting woodland garden grant.

### STUDIES, STRATEGY & DATA

- Explore the potential for Energy Local Clubs in townships in Uist.
- Explore the potential to create more local renewable energy generation in Uist through Active Network Management in Uist (and possibly Barra).
- Explore the potential and appetite for a partnership with ICNZ and Barra for a Regulatory Sandbox application for Uist (and Barra).
- Explore the potential for pilot marine projects within Uist alongside external partners such as Wave Energy Scotland and the European Marine Energy Centre.
- Explore the potential for Offshore Wind off Uist which would create an opportunity for community engagement or community benefit.
- Carry out a detailed grid constraint analysis in Uist (& Barra) to gain a better understanding of the potential implications on wind generation energy production levels and the need for and basis of any alternative connection options.
- Complete the study to carry out life cycle assessment of peat use in Uist from a carbon perspective(home based, rather than commercial cutting) when compared with other heat sources.
- Creation of a progressive land management strategy to unlock Uist's ability to adapt to- and mitigate future challenges which include crofting succession plans, climatic variations, economic shocks and transitioning to a Good Food Nation.
- Explore a tapestry of land uses which complement and complementone another within the landscape which aligns to the environmental, social, and economic demands of the 21<sup>st</sup> century.
- Provide Transport information on:
  - the cost of electric vehicles
  - grants for the purchase of electric vehicles and/or access to affordable electric and hybrid vehicles
  - the range of electric vehicles and how to manage longer distance journeys
  - the environmental impacts of batteries
  - the potential for low-carbon large vehicles such as ferries and bin lorries



- Explore why we changed from how we lived in the past, including travelling post offices and shops
- Provide Heat & Power information on:
  - how to heat homes with increasing costs of fuel and electricity, and associated health impacts
  - whether renewable energy technologies are environmentally friendly when considering how they are made and built
  - why we aren't using local resources such as wind, solar, wave and tidal to heat and power our homes directly
  - clarity if local people will be able to cut and use peat as a cheap heat source in the future
- Other
  - Provide information on the impact of high energy and transport costs on depopulation in Uist.

## INTRODUCTION AND PURPOSE

Local Energy Plans (LEPs) are community led documents which set out the energy-related needs, opportunities and priorities of a local area (Local Energy Scotland, 2023). LEPs can be powerful documents for galvanizing communities and demonstrating a mandate and strategy for developing energy projects. Developing LEPs involves extensive community engagement and collaboration with various stakeholders which creates consensus around shared ambitions for energy development. The purpose of LEPs is to draw together all the relevant information on how energy is generated, utilized and managed within a local area. This information then acts as a foundation for community-led sustainable energy use and development projects.

The Local Energy Forum came together in 2020 to ensure there is a strategic and joined-up approach to community energy in Uist & Barra in order to promote decarbonisation, energy efficiency, reduction of fuel poverty, creation of a local energy economy, and to maximize the socio-economic gain achieved from our renewable resources. The Uist Local Energy Plan (ULEP) came about in Spring/ Summer 2021 following discussion at the Uist and Barra Local Energy Forum around opportunities for developing the energy system on Uist. The Local Energy Forum's membership comprises of Uist & Barra Councillors, Barra LEP Implementation Group, North Uist Development Company (NUDC), Storas Uibhist, CnES, Community Energy Scotland and HIE.

The communities of Barra and Vatersay developed a LEP in 2018 (Wood Group, 2018) as part of Local Energy Scotland's "COBEN" project (Interreg - North Sea Region, 2023). The impact of the LEP can be seen through follow on projects, research undertaken in Barra and a number of successful funding applications which have referenced the LEP as evidence of local mandate for sustainable energy development. Taking inspiration from this, a number of Uist based organisations were successful in securing funding to develop an LEP for Uist. Work on the plan began in earnest during summer of 2021.

The ULEP was developed by the people of the Uist with coordination by Community Energy Scotland (CES) in partnership with North Uist Development Company (NUDC) and Coimhearsnachd Bharraidh agus Bhatarsaidh (CBAB). Work on the ULEP was undertaken against the backdrop of the global climate emergency and the COVID-19 pandemic followed by global energy price volatility and rapidly increasing energy prices. Alongside a high dependence on oil for heating and transport in Uist, these global changes have massively increased the everyday focus on energy use: how much it costs, where energy comes from, security of supply and whether and how we can drastically reduce carbon emissions in how energy is generated and used. These factors have amplified the need for a comprehensive LEP to support sustainable and fair energy solutions for the Uist community.

For the people of Uist energy is an existential issue, not just because the islands are on the outer edge of the UK National Grid and are particularly affected by outages, but also because the communities of Uist are on the front line of climate change due to the low-lying topography and exposure to the full force of Atlantic storms (Crouse, 2021). This plan is designed to help move Uist to a more secure and sustainable energy system, by providing the information necessary to understand our energy system and by outlining local priorities and the development actions required.

The plan broadly follows the layout of the Scottish Government’s Local Energy Policy Statement (Energy and Climate Change Directorate, 2021), which provides a strategic framework for local energy development, and guidance around Local Energy Planning from the COBEN Project (Interreg - North Sea Region, 2023). Firstly, this plan covers the methodology and process followed during development of the ULEP, then provides an overview of the local characteristics of Uist including population demographics, energy infrastructure, heating and transport provision and existing energy initiatives. Finally, results from community consultation are presented and followed by the findings of project prioritization and options appraisal work. Key project ideas are explored in Early Stage Feasibility Reports, providing early stage direction into next steps for Uist communities.

## METHODOLOGY

The main areas of work undertaken in the development of the ULEP are outlined below and displayed in the workflow visuals below:

1. **Steering Group Development and Facilitation** – Building a Steering Group of local residents and representatives to help inform and shape the LEP.
2. **Data and Information Collection – Desk based research to draw together information on the current Uist energy ‘system’** (where ‘system’ means all aspects of energy generation, supply and use).
3. **Community Engagement** – Carrying out comprehensive and multi-pronged approach to community consultation and engagement with a particular focus on engaging with harder to reach groups.
4. **Options Appraisal** – Undertaking a project prioritisation exercise and options appraisal considering costs and benefits of various community ideas
5. **Early-Stage Feasibility Study Research and ULEP Compilation** – Conducting high-level desk-based research into the feasibility of high priority community projects and ideas. Bringing together all the results to formulate this document as the Local Energy Plan.

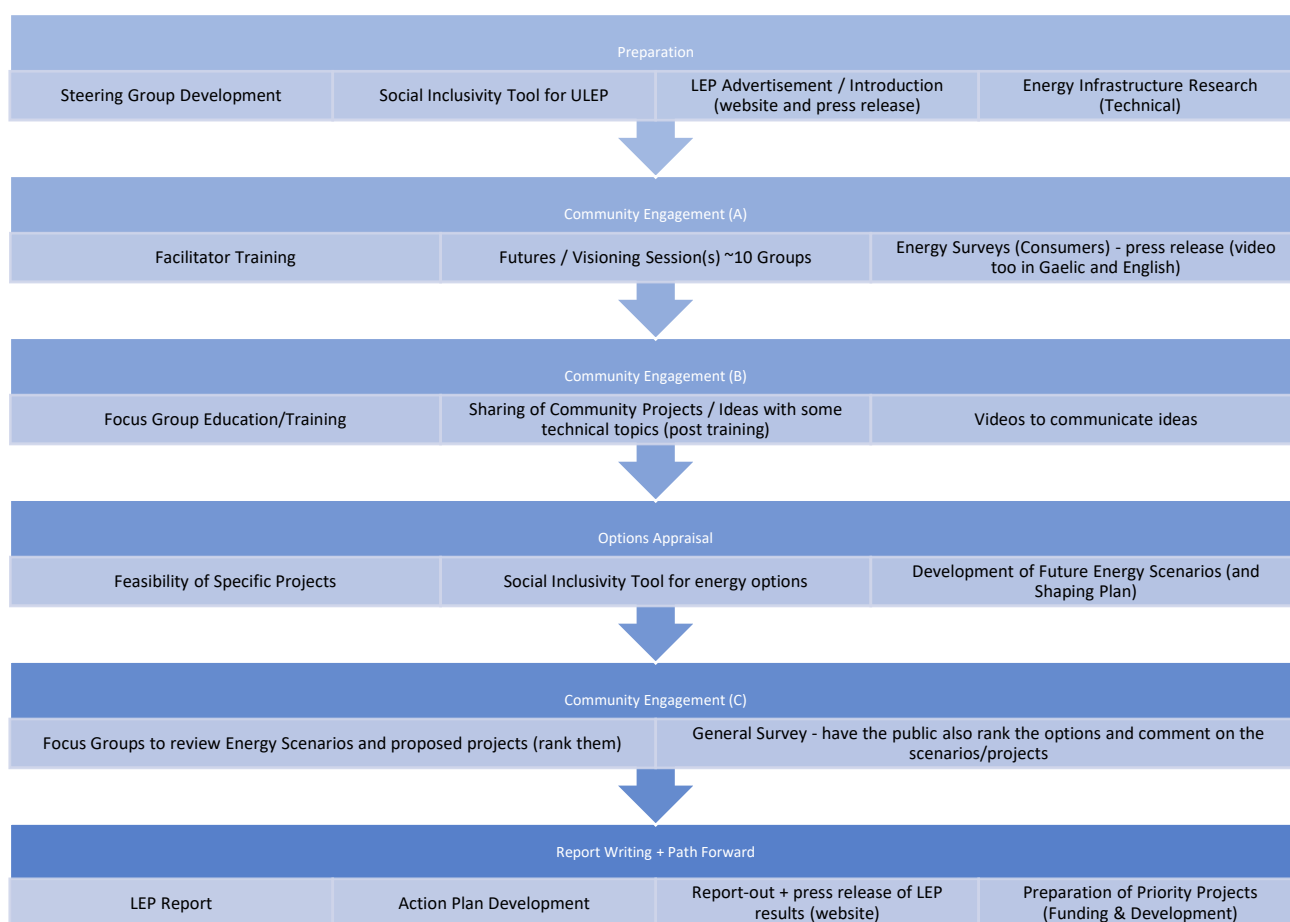


Figure 2. Initial Workflow for ULEP Development. Due to budgetary constraints, staffing challenges and the impacts of COVID-19 not all aspects of the plan were carried out.

## Steering Group Development and Facilitation

In order to ensure the ULEP had a strong link to the community and organisations of Uist we established a Steering Group (SG) during the early stages of the project. The SG comprised of representatives from various local agencies such as community development trusts, third sector coordinators and local councillors (a full list of members can be found in the acknowledgements section). We aimed to create a Steering Group which was representative of the demographics and needs of the Uist community and invited members following an initial stakeholder mapping exercise. During the Steering Group kick-off meeting we then reflected with attendees as to any gaps in the membership or other organisations who should be represented.

A Terms of Reference for the Steering Group was developed which included a code of conduct for members as well as outlining the purpose, composition and procedures for the group. Steering group meetings were typically held monthly and comprised of updates on project progress and discussion about the project approach. Wherever possible the delivery team (CES, NUDC and CBAB) looked to include the Steering Group in decision making. The contributions from Steering Group members were important for shaping the development of the ULEP.

## Data and Information Collection

To create a picture of the Uist energy system CES and CBAB collaborated on desk-based research into qualitative (policies, previous community consultations and energy infrastructure maps) and quantitative (demographics, technical energy reports, housing and transport statistics) data available on Uist. A range of data sources were drawn upon primarily including Census data and existing research and feasibility study work.

## Community Engagement

Meaningful engagement must be tailored to the needs of the local community, needing time and flexibility to find a variety of ways to connect, making full use of local knowledge, skills and experience and using existing networks to communicate. Building on from lessons learnt from LEP engagement activities during the COBEN project and community-based knowledge and experience from numerous projects across Uist, a multi-dimensional community engagement plan was designed with support from external agencies - The Surefoot Effect (The Surefoot Effect, 2023) and Community Development Lens (Community Development Lens, 2023). This incorporated:

- **Facilitator Training** – Developing and embedding local facilitator skills and experience, as Local Energy Ambassadors, for the delivery of future visioning focus group energy café engagement sessions. Training and design of energy cafés by The Surefoot Effect.
- **Uist Energy Café Part 1** – Delivery of energy cafés focussing on home energy and transport by Ambassadors to vision the ideal Uist energy future and produce list of project ideas to meet that vision.
- **Community Energy Ideas Survey** – Online and paper survey distributed across Uist to understand concerns and generate a list of project ideas.



- **Tailored engagement for hard-to-reach groups** – Delivery of a range of different activities by CoDeL to reach younger members of the community, and by Caraidean Uibhist to reach people who are isolated, have learning difficulties, vulnerable and older member of the community.
- **School Engagement** – Focused engagement in Uist primary schools to increase understanding of Uist energy.
- **Energy Cafés Part 2 and Project Prioritisation** – Gather community feedback on projects identified, address any missing projects and prioritise projects, with prioritised projects going forward for the options appraisal.
- **Ownership and ongoing community feedback** – Enable ongoing feedback through local community ownership of the Uist Local Energy Plan, as a living document to be updated in future years.



Figure 3. Energy Cafe in Stonybridge, January 2022



Figure 4. School Engagement at Iochdar Primary School

**Uist Local Energy Plan Presents**  
**ENERGY CAFÉS**

**How would you like energy to be developed in Uist?**  
Join us for tea, biscuits and a blèther about the future of energy. Share concerns, questions and work together to map out your ideas for Uist's energy future. Workshops will be tailored for home energy or transport - pick a topic you are most interested in or join both!

**SOUTH UIST**

Saturday 29 <sup>th</sup> January	2 - 4pm:	Stoneybridge Hall	Home Energy
Saturday 5 <sup>th</sup> February	2 - 4pm:	Stoneybridge Hall	Transport
Wednesday 16 <sup>th</sup> February	6 - 8pm:	Talla an lochdair	Transport

**ONLINE – IN GAELIC**

Thursday 10 <sup>th</sup> February	6pm - 8pm:	Online	Home Energy & Transport
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**BENBECULA**

Friday 18 <sup>th</sup> February	6 - 8pm:	An Caladh, Balivanich	Home Energy
Tuesday 1 <sup>st</sup> March	12 noon - 2pm:	UCVO, Balivanich	Home Energy
Invitation only email - admin@caraideanuibhist.org			
Thursday 3 <sup>rd</sup> March	12 noon - 2pm:	UCVO, Balivanich	Transport
Invitation only email - admin@caraideanuibhist.org			

**GRIMSAY & NORTH UIST**

Thursday 3 <sup>rd</sup> February	6pm - 8pm:	Claddach Kirkibost Centre	Home Energy
Tuesday 8 <sup>th</sup> February	1.30pm - 3.30pm:	Ceann na h-Àirigh, Grimsay	Home Energy
Friday 11 <sup>th</sup> February	10am - 12 noon:	Lochmaddy Hall	Transport

Community Energy Scotland, Cothrom, UCVO

Figure 5. Poster advertising ULEP Energy Cafés. Events were held across all the Islands comprising Uist and focussed on either Home Energy or Transport

The community engagement strategy used in developing the ULEP was extensive and had a novel approach to engaging with hard-to-reach groups. This report only covers key details and results and the approach has been outlined in a complimentary document for any readers who wish to replicate any aspects of this approach or understand how the community ideas were gathered. The community engagement process and the results are described fully in the accompanying document “ULEP Community Engagement Approach and Results” which can be found in the Appendices.

### Project Prioritisation and Options Appraisal

The project ideas generated during the Energy Cafés, Community Ideas Survey and the tailored engagement were tabulated and ranked according to the number of times a particular idea was suggested. Some project ideas were combined where there were similarities. The projects were ordered within the table according to a rough theme, with higher rows in each theme representing

ideas that appeared more often and lower rows projects that appeared less regularly. The Community Ideas Survey can be seen in full in the Appendices.

Three Energy Café – Part 2 events were then held to facilitate conversations about the process of collecting the results, what the results will be used for and some brief examples of projects within the table. The table of results was presented and participants asked to mark which projects they felt should be a priority for future action. This was accompanied by discussions so community members could express their opinion as to why such projects should be a priority or to suggest any additional projects that may have been missed in the first round.

Following these three events, the project ideas table was made available at the co-op in Creagorry, engaging customers before and after their shopping which was an effective way of gathering a variety of peoples thoughts, the majority of whom had not engaged at other stages of the project. North Uist Locality Planning Partnership kindly also presented the results at the North Uist Show in July 2022. A total of 65 people marked the poster, expressing their thoughts on what projects should be prioritised going forward.

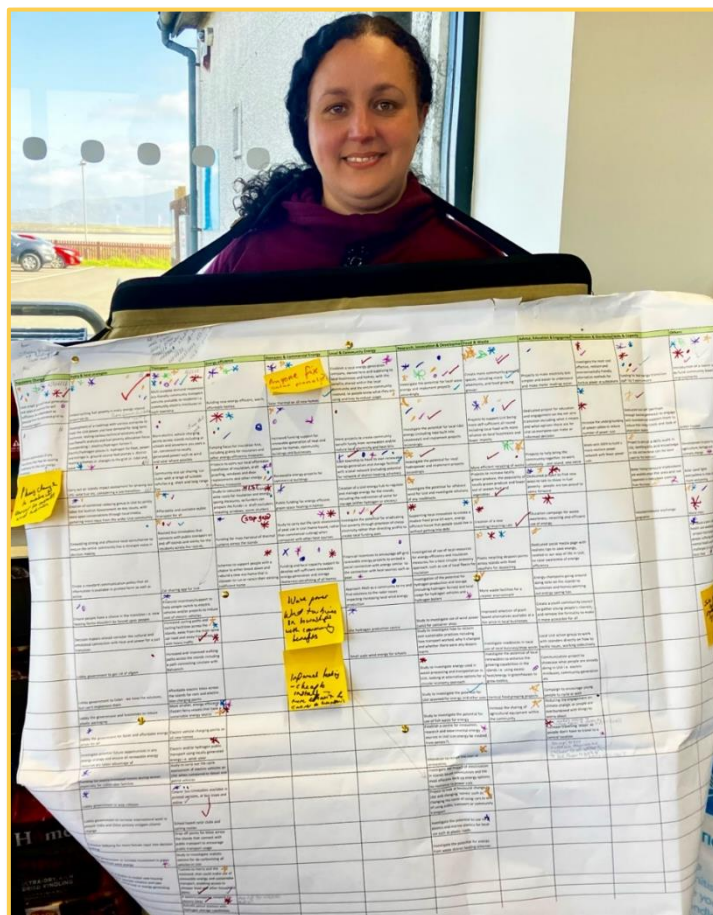


Figure 6. Delivery team member Ameena Camps with the ULEP project ideas table. The table was made available in public locations for community members to vote to prioritise community ideas

Following the Project Prioritisation exercise that was conducted, a high-level options appraisal with the ULEP Steering Group using the online platform “Miro”. This involved reviewing the 10 highest priority projects, for their impact and deliverability:

- “Impact” referred to how each project or idea would impact on the Environment, Society and Economy of Uist
- “Deliverability” related to the readiness or constraints associated with each project with Technical, Financial, Environmental constraints considered and Community Capacity to deliver projects also assessed.

This exercise served two purposes; updating the steering group on the results of the community engagement and providing a high-level analysis of the community ideas and projects gathered. The latter of these helped, alongside the project prioritisation exercise, to inform the selection of five project ideas to investigate through mini-feasibility reports.

### Early Stage Feasibility Reports and ULEP Compilation

Following the project prioritisation and options appraisal stages CES staff developed “Early Stage – Feasibility Reports” for each of the five community priority projects ([Table 1.](#)). This involved further desk-based research and drawing experience from the previous work of CES or other organisations working within Uist. This final phase of the ULEP provides early-stage direction for organisations and communities in Uist as to the more feasible next steps for project development. The complexity of some of the Priority Projects is such that further feasibility work will be required before projects can be developed but the Early Stage Feasibility Studies provide useful introductions to each topic, case studies of similar initiatives, and signposting to key contacts or support sources for developing each idea/project.



## PEOPLE AND PLACE

The people, culture, and connection with the land and seamaake a Uist the special place it is and shapes what is possible for the future of the place. This part of the report provides a snapshot of people and place in Uist.

### Geography

Uist is a chain of now connected islands (see Figure 1.), with principal islands of the Isle of North Uist, Isle of Benbecula and Isle of South Uist, with distinct islands and communities on Berneray, Baleshare, Grimsay and Eriskay. The three main settlements are Lochmaddy on the Isle of North Uist, Balivanich on the Isle of Benbecula, and Lochboisdale on the Isle of South Uist. Otherwise, settlements are typical of crofting communities, with a network of crofting townships and widely spaced individual croft houses dispersed along main routes.



Figure 7. Aerial Map of Uist. Source: ESRI, ArcGIS Online

## Transport and Infrastructure

### Car Ownership

There are almost 2,800 cars or vans across Uist, with around 80% of households having two or more vehicles (Scotland's Census , 2011). The car is the most commonly used form of transport to work or study and reflects limitations in public transport. Although most daily journeys are relatively short, over 20% of daily journeys are over 10km, with 15% over 40km (Scotland's Census , 2011).



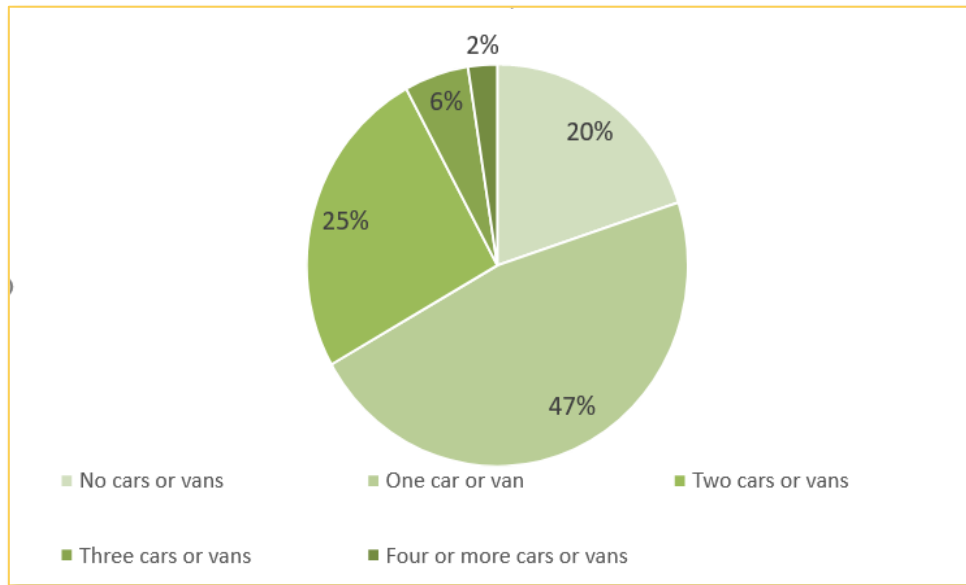


Figure 8. Vehicle ownership on Uist. (Scotland's Census , 2011)

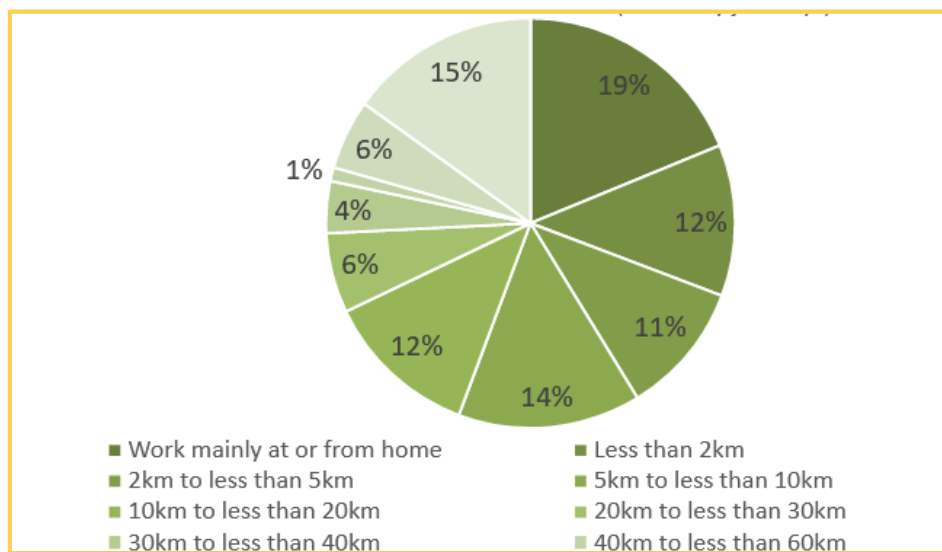


Figure 9. Commuting distances of Uist residents. (Scotland's Census , 2011)

### Roads

Uist is served by a network of roads radiating from the spinal route between Berneray and Eriskay which includes the B893, A865, A867, B868 and Rathad na h-Eaglaise. This route crosses a number of causeways and bridges that connect, from north to south, Berneray, North Uist, Baleshare, Grimsay, Benbecula, South Uist and Eriskay. Around 44% of the spinal route (including roads in Barra) is double tracked with plans from CnES to continue upgrading the route (Comhairle nan Eilean Siar, 2020).

### Ferries

Scheduled ferry services operated by Caledonian MacBrayne run throughout the year from Uist to Harris, Barra and the Scottish mainland on the routes below (Caledonian MacBrayne, 2023).

- Berneray to Leverburgh (Harris)
- Lochmaddy (North Uist) to Uig (Skye)
- Lochboisdale (South Uist) to Oban (summer) and Mallaig
- Eriskay to Ardmhor (Barra)

Residents on Uist regularly face disruption to ferry services due to breakdowns and malfunctions on aging ferries, infrastructure failures at ports, adverse weather or other issues (see Figure 7). During such periods residents and businesses on Uist are often left stranded or face significantly longer journeys to reach the mainland by travelling through Barra, Harris or Lewis.

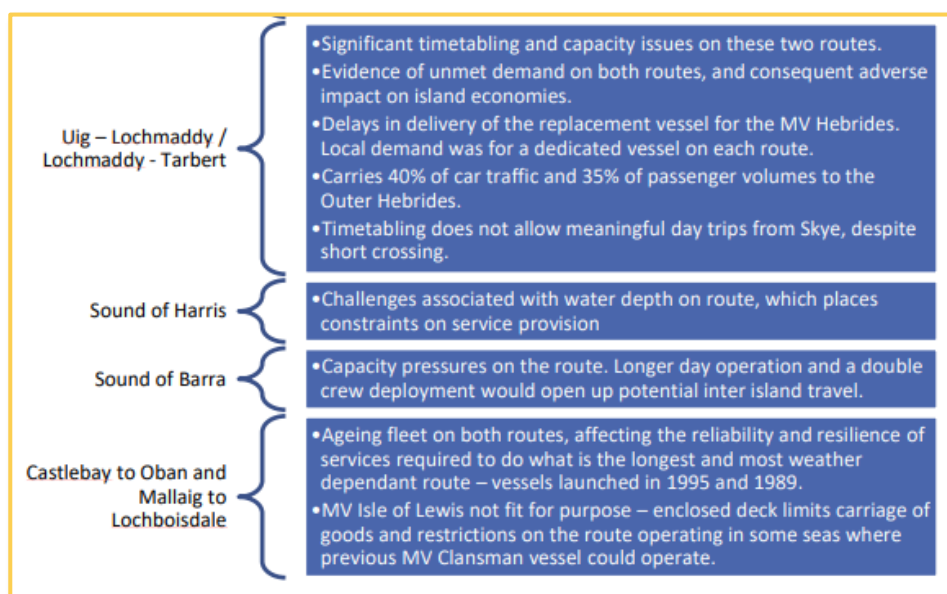


Figure 10. Constraints and issues on ferry services serving Uist. (Comhairle nan Eilean Siar, 2020)

### Air Travel

Uist is also served by an airport on Benbecula which operates passenger, cargo and hospital flights. As well as supporting military operations at the South Uist Range. There are five flights per week year-round to Glasgow and three flights per week year-round to Inverness; additionally, a Monday and Friday single return flight to Stornoway and morning and afternoon return flights on Tuesday, Wednesday and Thursday (Comhairle nan Eilean Siar, 2020).

### Busses

A number of regular bus services operate on Uist through local companies D.A. Travel and W Macvicar (DA Travel, 2023). With routes W16 to W19 serving communities from the north to the south of Uist respectively. All bus services in Uist are operated under subsidy by Comhairle nan Eilean Siar. Declining budgets have impacted on frequency of services and the rationalisation of services has been a feature of recent years. Services tend to provide morning and evening workers' buses, with multiple runs through the middle of the day. Current and projected cuts in public services will further impact

on the availability of readily-accessible transport in some communities (Comhairle nan Eilean Siar, 2020).

### ***Community Transport***

Tagsa Uibhist run a number of community transport services across Uist and particularly in Benbecula and North Uist. These services support vulnerable community members and those needing transport assistance to access amenities and social activities throughout the Islands (Tagsa Uibhist, 2023). There is some additional community transport operated on an ad-hoc basis by other community organisations but Tagsa Uibhist are the most significant provider.

### Electric Vehicle Charge Points

There are ten public charge points across Uist located across ferry terminals, community centres and public buildings (Chargeplace Scotland, 2023). These sites are listed below with the connection power ratings at each site. Despite fairly comprehensive coverage of charge points across the islands, EV drivers on Uist often face issues with unreliable charge points due to technology or weather-related malfunctions. Charge point outages can last a long time due to a lack of local EV qualified engineers and travel times for mainland servicers (Aquaterra, 2019).

#### EV Charge Points on Uist

- North Uist:
  - o Lochmaddy Ferry Terminal
    - 43kW
    - 50kW
    - 50kW
  - o Claddach Kirkibost Centre
    - 51kW
    - 51kW
    - 22kW
- Benbecula:
  - o Balivanich Council Offices
    - 22kW
    - 22kW
  - o Uist and Barra Hospital
    - 22kW
    - 22kW
  - o Lionacleit School
    - 44kW
    - 43kW
    - 43kW
- South Uist:
  - o Cothrom ReStore
    - 51kW
    - 51kW
    - 22kW
  - o Daliburgh School
    - 22kW
    - 22kW
- Eriskay:
  - o Eriskay ferry Terminal
    - 22kW
    - 22kW

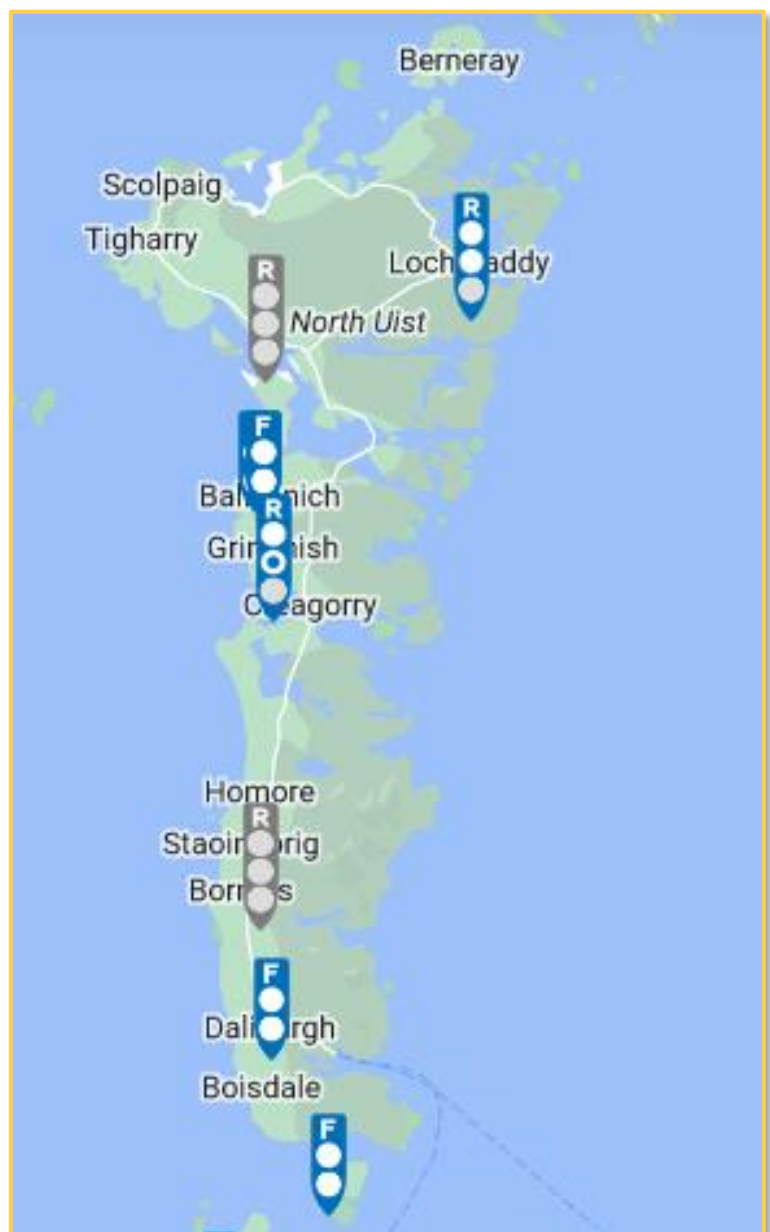


Figure 11. Map of EV chargepoints on Uist. Source: (Chargeplace Scotland, 2023)

### Active Travel

Active travel can be challenging in Uist where most villages are widely dispersed and have no footpaths and instead have high grassed verges and deep ditches or steep embankments. These, alongside the adverse weather on the islands, are significant barriers to active travel.

There are currently no sections of the National Cycle Network in Uist meaning cyclists and walkers have to use main roads or off-road paths (Comhairle nan Eilean Siar, 2020). Roads on Uist can be quiet in some areas but are often narrow and used by heavy machinery and trucks.

lochdar Community Council are currently developing a shared-use path which will connect the local shop, community hall, care home, football pitch, and the school (Council, 2023). This will allow local residents to choose active travel every day to get around the village and will create an attractive new walking option for communities across Uist and tourists alike. The pathway may act as inspiration for other villages or areas across Uist and will hopefully lead to a network of purpose-built shared use pathways.

### Population

The current population in Uist is 4,846, showing a population decline over the last 50 years. Additionally, there is an aging demographic, with just under 30% of the population over 60 years old (National Records of Scotland, 2023).

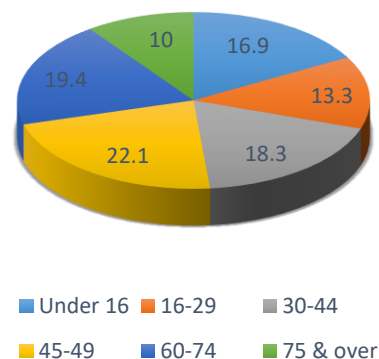


Figure 12. Age demographics of Uist. (Scotland's Census , 2011)

The major ethnicity is White-Scottish, followed by White-Other British, with a very small number of people from other ethnicities. The gender split is fairly equal with a slight swing towards more people identifying as female (Scotland's Census , 2011).

According to Sustainable Uist, if the population is to be stabilised or increased, securing and managing inward migration in a way that is realistic and beneficial is required, with a need for net inward migration of around 60 persons per year. Comhairle nan Eilean Siar have recently appointed Settlement Officers and there are new financial incentives to encourage this inward migration (Comhairle nan Eilean Siar , 2023).



## Economic Activity

Current data indicates that 28% of the 16-64-year-old age group are economically inactive: mostly students and early retirees (Scotland's Census , 2011). The largest source of employment is health and social work at 16%, followed by construction, education, wholesale and retail, agriculture, forestry and fishing and then transport and storage (Scotland's Census , 2011). The significance of accommodation and food services reflects the importance of tourism to the local economy.

The pandemic also highlighted how the economic base is reliant on a small number of sectors, and the level of Uist's dependence on external transport links for food and drink, and for access to markets. Outer Hebrides Local Child Poverty Action Report in 2020 noted key sectors for the Outer Hebrides of fisheries, aquaculture, and food & drink (when seen in the context of tourism along with export of products) are outward facing and dependent on transport connectivity (Outer Hebrides Anti-poverty Strategy Group, 2020). Therefore, during the pandemic where connectivity has reduced and access to markets severely affected through national and global lockdowns, there has been a substantial impact and limited scope for these sectors to be able to mitigate this.

The earliest and largest impacts occurred in industries such as transport, retail sales, entertainment, tourism, and personal services, rather than in the public, professional, ICT, and financial services; showing how sensitive these sectors are to challenges and highlighting the importance of building resilience. The Lochboisdale Ferry Business Impact Group 2022 estimate that for each day of cancelled sailings Uist suffers a loss of £46,285 (Ross & McLachlan, 2022).

## Housing

Detached houses make up the largest proportion of dwellings, at approximately 67%, with a significant proportion dating from before World War 2 and the largest proportion post-1983.

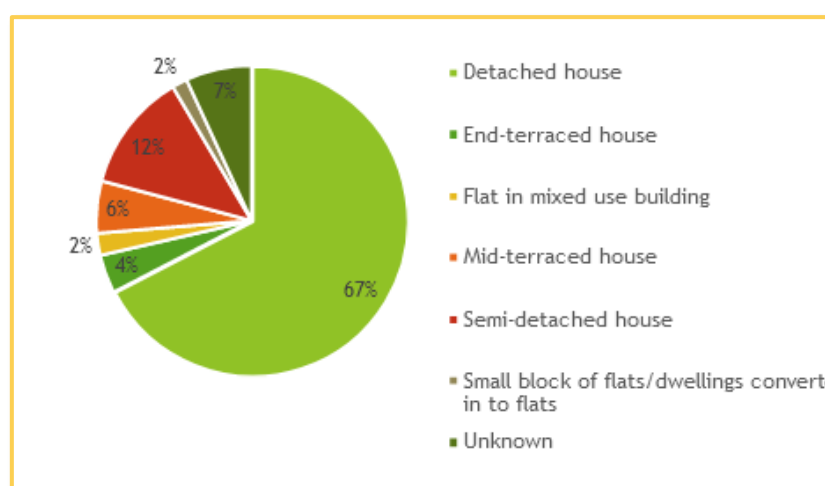


Figure 13. Housing stock of Uist. (Home Energy Analytics, 2021)

Table 2. Housing stock of Uist (Home Energy Analytics, 2021)

	Barra and South Uist - 03	Barra and South Uist - 04	Barra and South Uist - 05	Benbecula and North Uist - 01	Benbecula and North Uist - 02	Benbecula and North Uist - 03	Benbecula and North Uist - 04	Total
<b>Property type</b>								
Detached house	282	195	335	175	170	390	413	1960
End-terraced house	3	15	3	10	72	4	10	117
Flat in mixed use building	8	22	7	6	6	3	15	67
Mid-terraced house	2	20	2	17	96	7	14	158
Semi-detached house	36	65	54	33	67	45	61	361
Small block of flats/dwellings converted in to flats	1	11	9	6	2	2	15	46
Unknown	26	24	30	18	15	44	43	200
<b>Property tenure</b>								
Housing Association	37	81	64	33	47	41	66	369
Local Authority	7	12	5	4	26	7	23	84
Owner Occupied	261	200	298	192	267	359	394	1971
Privately Rented	27	35	43	18	73	44	45	285
Unknown	26	24	33	19	15	47	47	211

Past grants also encouraged people to build new housing rather than retrofitting older properties, which has created a housing stock with numerous newer properties alongside older properties that are no longer in use, with neither being energy efficient.

Most housing in Uist is privately owned, with a total of 2,725 houses, with an average of 8.5% as vacant homes across Uist, an average of 7.1% of second homes and the remainder as occupied locally. The percentage of vacant homes in South Uist is the highest across the Outer Hebrides, however, this has decreased by 1% over the last year (Comhairle nan Eilean Siar, 2022).

There are a large proportion of hard-to-treat homes in Uist. Housing has been categorized into 6 types which have one or a combination of the following characteristics: built between 1880 and 1990, solid walls of stone masonry or poured concrete, rooms in the roof with combed ceilings, uninsulated floors and single glazed windows. Around 750 houses require wall and/or roof and/or floor energy efficiency improvements, with a further 250 that would benefit from floor insulation and around 200 houses requiring glazing improvements (Sustainable Uist, 2011). These figures are however out of date and more up to date information would be beneficial. The upcoming Local Heat and Energy Efficiency Strategy from Comhairle nan Eilean Siar will provide a detailed analysis of the housing stock across Uist.

### Fuel Poverty

The cost of living on the islands is higher than any other remote rural area on mainland Scotland or the UK (Outer Hebrides Anti-Poverty Workign Group, 2019) with households facing increase costs of living resulting from:

- Higher prices for food, clothes and household goods
- Considerably higher household fuel bills, influenced by climate, fuel sources and systems
- Longer distances that people have to routinely travel, particularly to work.

All these factors apply to Uist. The Scottish House Condition Survey (Scottish Government, 2020) noted a significant increase in fuel poverty in remote rural areas (rising from 33% to 43% between

2018-2019) and that households using electricity have the highest level (43%) compared to households using oil (23%) and other fuel types (31%) in 2019.

Hebridean Housing Partnership (HHP) contacted 1,600 HHP households following COVID-19. 85% of households reported being unaffected, with 15% (220 households) affected in terms of debt, mental health/isolation, food supply and/or fuel poverty. The impact of COVID-19 in terms of fuel poverty and debt is likely to be long-term as the cost of living crisis increases fuel poverty and uncertainty remains over business security and employment.

With 30-40% rises in consumer energy costs from April 2022, EAS now estimates that the fuel poverty rate across the whole of the Outer Hebrides is 57%, and there are concerns this could increase to around 70% (Lawrie, 2022). Average annual fuel bills could rise by as much as £2,000 - a huge increase. It is highly likely, therefore, that many more people in Uist will be unable to heat their homes properly. Energy Action Scotland highlighted poor energy efficiency of the dwelling, low disposable household income, high price of domestic fuel, and how energy is used in the home as main causes.

### Culture, Religion and Language

Uist remains as one of the heartlands of crofting culture in Scotland, with many people either having or being connected in some way to a croft, mostly managing sheep and/or cattle on family crofts. Family connections are strong across all islands and communities still retain a level of cohesion.

Religion remains as a strong influence on local society, with Catholic as the dominant religion in the islands South of North Uist, and Protestant as the dominant religion in the Northern Isles, connecting to the same protestant dominance in Lewis and Harris.

Gaelic is also the first language in the islands, connecting strongly to the culture of local communities. However, local people have widely varying degrees of proficiency in Gaelic, many speak the language fluently but cannot read or write Gaelic confidently. The language changes slightly across the islands, with specific words for things different in the various islands, representing times when the islands were not connected by causeways as they are now, and similarly local traditions and culture can change from one settlement to the next. With high archaeological and historic interest, Uist has also seen a renaissance of the Gaelic language, music and traditions and these underpin a strong sense of place and identity.

### Natural Environment

Renowned for its coastline & machair, Uist generally is of very high environmental interest. The low-lying peatlands, upland areas and abundant lochans mean the islands are of high significance for breeding and migratory birds as well as other species. As a consequence, a relatively large area of the landscape is designated under International, European and UK nature conservation legislation (Marine Scotland, 2023). These designations are aimed at the protection of the integrity of chosen sites and their habitats, and as such any development within these areas is either prohibited or strictly controlled to minimise any adverse impacts that could be caused. Key off- and onshore designations affecting Uist are listed below:

### Offshore designated areas

- Special Protection Areas (SPA): These are internationally protected sites designated by the UK government under the 1979 EC Directive on the Conservation of Wild Birds. SPA's are areas of the most important habitat for rare or vulnerable species and migratory birds within the European Union. SPA's in terrestrial areas and territorial marine waters out to 12 nautical miles are classified under the Wildlife and Countryside Act 1981. In respect to the Western Isles, there are numerous small SPA's spread along the north and west coasts of North and South Uist. This is likely to limit the prospective locations at which onshore infrastructure works and potential grid connections can be sited. In addition, it should be noted that the Monach Islands and St Kilda are also SPA's.
- Special Areas of Conservation (SAC): These are internationally designated areas by the UK Government under the 1992 EC Habitats and Species Directive. SAC's may be designated for habitats or species of conservation importance in terrestrial, coastal and marine areas. In particular, Marine SACs are those which contain qualifying marine habitats and/or qualifying marine species.
- Marine Nature Reserves (MNR): Statutory MNR's are established under the Wildlife & Countryside Act 1981) to conserve marine flora and fauna and geological or physiographical features of special interest, while providing opportunities for study of the marine systems involved. They are the mechanism for the protection of nationally important marine (including sub-tidal) areas.

### Onshore designated areas

- Site of Special Scientific Interest (SSSI): These are national protection sites under the Wildlife and Countryside Act 1981 (with improved provisions for the protection and management of SSSIs having been introduced by the Nature Conservation (Scotland) Act 2004). SSSI's are designated by Scottish Natural Heritage and protect some of the best examples of Britain's natural features, including flora, fauna, geology or physiographical features. Within the area of an SSSI, the designation aims to limit or prevent operations that are potentially damaging to the wildlife interest of the area.
- Ramsar sites: are designated under the Convention on Wetlands of International Importance (1971), intended to protect sites of importance especially as waterfowl habitat, covering all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.
- World Heritage Sites: These are internationally protected sites under the World Heritage Convention. They are designated for their globally important cultural or natural interest and require appropriate management and protection measures. Natural properties may be terrestrial or marine areas. Saint Kilda is identified as being a World Heritage Site. Although located outside of the study area, it should be noted that a development need not be located inside a designated area to affect it.

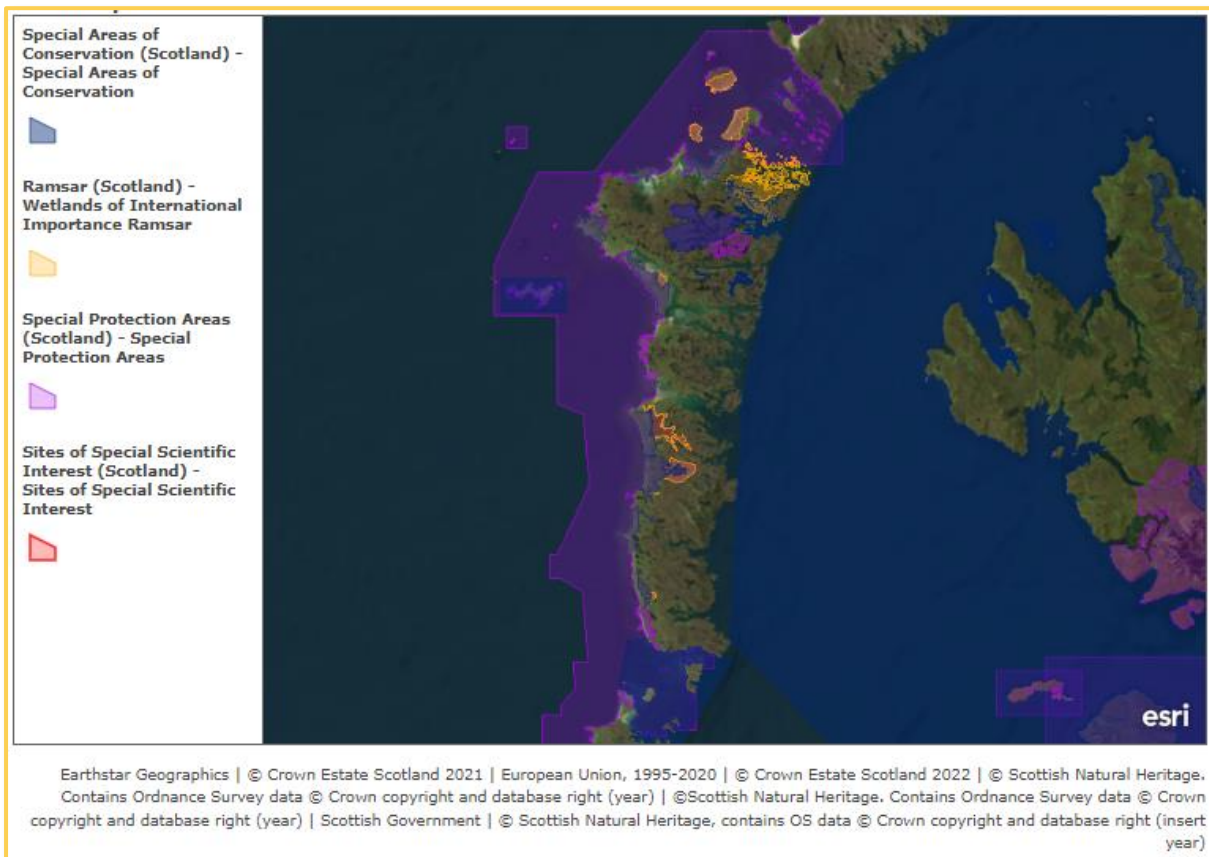


Figure 14. Map of environmental designation in and around Uist. (Marine Scotland, 2023)

## ENERGY AND INFRASTRUCTURE

### Fossil Fuel Energy Supply in Uist

Oil is the main source of energy, predominantly for heating, transport but also electricity generation at the Loch Carnan Power Station. All oil products are imported via marine and road transport. The following table provides an estimate of the consumption breakdown across the range of uses (Element Energy, 2014)

Fuel Type	Use	Annual Consumption	%
Diesel	Electricity generation	600,000 litres	23
Kerosene	Heating	6,880,000 litres	42
DERV	Transport	2,450,000 litres	14.8
Petrol	Transport	1,749,000 litres	9.6
Autogas	Transport	518,728 litres	2
Coal	Heating	619,550 kg	2.6
Peat	Heating	1,600,000 kg	4
Propane	Cooking	27,000 litres	0.1

Table 3. Fuel types and uses across Uist (Element Energy, 2014)

### Electricity Network

#### Outer Hebrides

The Outer Hebrides electricity network is fed via a high voltage 132 kV overhead transmission line extending across the Isle of Skye to Ardmore from Loch Lundie on the Fort William – Fort Augustus 132 kV circuit.

The 132kV electricity transmission system serving the Outer Hebrides terminates at Ardmore on Skye, where a transformer rated at 45MVA reduces the voltage to 33kV to feed separate cables to Loch Carnan, rated at 14MVA, and to Harris, rated at 23.4MVA. There are currently no electrical links between Uist and Harris, other than via Ardmore on Skye and thus the distribution networks in the northern and southern isles are effectively independent networks fed from Ardmore in Skye (Scottish and Southern Electricity Networks, 2023).



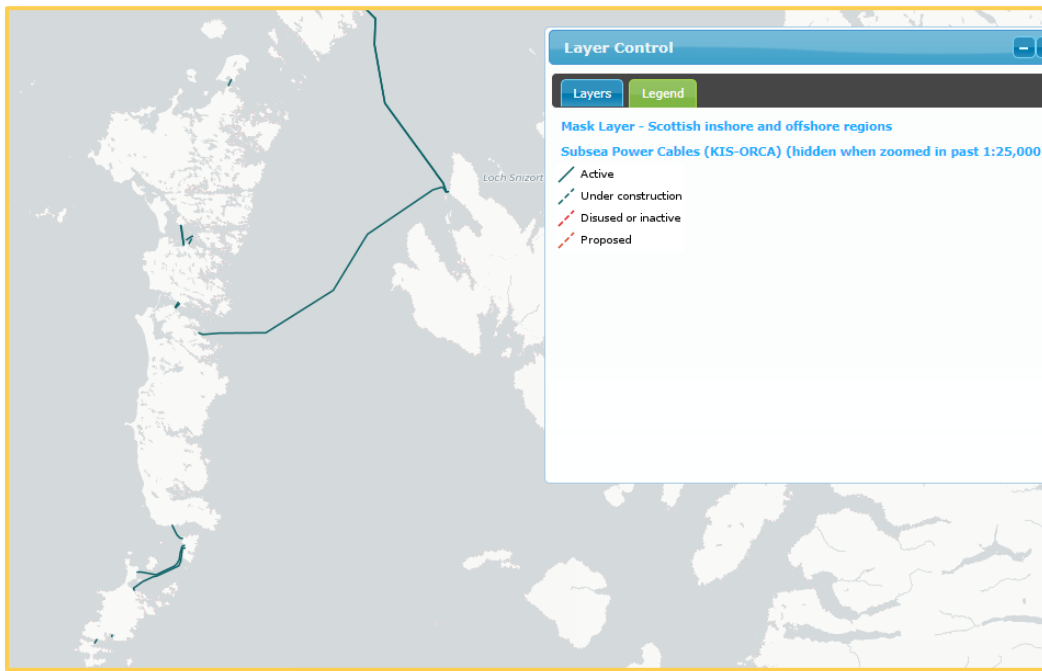


Figure 15. Map showing subsea power cables across Uist, Marine Scotland National Marine Plan interactive

### **Uist Grid**

On South Uist, the 33kV subsea cable from Skye comes ashore and links into the Southern Isles distribution network at Loch Carnan Power Station, which has a generating capacity of 11.8MVA. From there, twin 33kV circuits supply Benbecula, North Uist and South Uist north of Drimore. A single 33kV line closely follows the main road south to Polachar. Five primary substations, at Loch Carnan, Polachar, Drimore, Aird and Clachan, feed and regulate the voltages of the 11kV local network (Scottish and Southern Electricity Networks, 2023).

The 33kV and 11kV network almost entirely consist of overhead lines, with a few 'undergrounded' sections of cable passing beneath causeways and lochs. The most recent upgrading work carried out to improve the robustness of the South Uist grid included removing the primary substation at Daliburgh, constructing the new one at Drimore, fed by a new second 33kV line from Loch Carnan, and some associated alterations.

This 11kV network is 3 phase (3 wires) principally, with single phase (2 wires) serving peripheral loads including Loch Aineort and eastern Benbecula. Transformers, usually pole-mounted, convert the voltage down to 230 volts for individual dwellings. In built up areas, larger transformers supply many consumers usually via buried 230/400-volt cable.

Eriskay is supplied by an 11kV line that runs overhead from the substation at Polachar and then under the causeway. A subsea cable continues this line beneath the Sound of Barra to serve Barra and Vatersay.

### ***Loch Carnan Power Station***

Loch Carnan Power Station consists of five generators totalling 14 MVA capacity, capable of supplying the entire southern isles peak winter demand, and of operating in 'islanding mode', independent of the rest of the UK grid, in the event of the interconnection to the mainland being lost through planned maintenance or a fault. Annual maintenance usually means Uist is in "islanded mode" for at least one month a year resulting in high carbon emissions from using fossil fuel generators. During this period generation from wind farms is heavily constrained due to the lack of option to export.

Additional standby generation capacity exists on Barra (2MVA), principally to serve Barra and Vatersay but with the capability to export north to the southern part of South Uist. Backup generators for site supply only exist at various sites.

### ***Grid Constraints***

The 14MVA connection between Loch Carnan, Uist and Ardmere, Skye, is already at maximum capacity and despite planned upgrades to the Skye-Fort Augustus line, a key network bottleneck. A new interconnector between Uist and Skye, currently being explored by SSEN as part of the Hebrides and Orkney Whole System (HOWS) study with ED2. Until a new interconnector is installed there is little scope for additional local generation due to existing queues for grid connections.

The existing SSEN assessment methodology for the export loading of the Loch Carnan to Ardmere cable is understood to be based on maximum generation capacity plus minimum island demand, which would mean that any total island generation capacity of more than approx. 16.3MVA could be subject to a constrained connection.

While the existing 33kV circuits and 33/11kV transformers within Uist may have sufficient capacity to accommodate additional generation capacity, the Loch Carnan – Ardmere cable presents the major restriction on the development of new generation within the islands. It is possible that new generation schemes with a net export capacity of less than 50kW would be able to connect to the SSEN network without being subject to constraints, although this would require to be confirmed with SSEN.

The capacity of the grid to enable connection of large-scale renewable energy generation is therefore severely constrained. SSEPD emphasise that, in the present supply situation, any significant size of renewable energy generation can be achieved only if there is a significant additional local energy demand for it to meet. Otherwise current capacity is limited to 3.6 kW per phase.

Through the HOWS work currently being undertaken by SSEN, holistic and future-proof solutions to developing the electricity network for the Outer Hebrides will be considered which could potentially release generation constraints on Uist. SSEN are expecting to engage with the community as part of the HOWS work during 2023.

### ***Planned Upgrades***

In May 2021 Scottish and Southern Electricity Networks (SSEN) Distribution announced plans to accelerate £2m of investment in the Outer Hebrides local electricity network for upgrading the

Clachan Primary Substation in North Uist which connects to the island of Berneray in the north, and south across Benbecula. The upgrade will see the existing transformer replaced with two upgraded counterparts, which will increase the capacity of the network serving around 1,300 homes and businesses on the islands by creating 6.31MW of additional capacity.

The restrictions in generation developments within the islands is evident from the upgraded connection offer for the Lochcarnan Community Windfarm extension which in expanding the current 7.5MW Loch Carnan wind generation capacity by 6.9MW to 14.4MW, included a constrained element of 4.3MW. Based on the connection offer provided by SHEPD, the constraint would be controlled by an Active Network Management system monitoring the power flow on the Loch Carnan – Ardmore cable. The fact that the connection offer for the Loch Carnan Extension generation contains both a constrained and unconstrained element indicates that it is the connection of this generation which is causing the export capacity of the Loch Carnan – Ardmore cable to be breached. It is unclear if this connection offer is still valid, and this should be confirmed and assessments undertaken to quantify potential constraint impacts.

While a constraint may be in place, the impact of the constraint on the energy yield from the generation would be dependent on the correlation between high wind output levels and low demand levels, with the largest potential for constraints during summer evening/night periods when demand is typically at its lowest levels. A detailed constraint analysis based on consideration of the time series, typically ½ hr period, measured demand, Loch Carnan – Ardmore circuit loading and measured/predicted generation output profiles would require to be undertaken to gain a better understanding of the potential implications on wind generation energy production levels and the need for and basis of any alternative connection options.

### **Renewable Energy**

Uist has seen significant renewable energy development over the last 20 years, principally in the form of wind energy generation from a combination of large and small-scale wind turbines. The table below provides a summary of the current position of large-scale wind farms in Uist which export to the national grid:

*Table 4. Large wind installations across Uist*

Wind Energy Installation	Installed Capacity
Loch Carnan Windfarm, Storax Uibhist	6.9MW
UistWind, North Uist Development Company (Trading) Limited	1.8MW
Lionacleit Turbine, Element Engineering	0.9MW
Torrana Ltd and Hebridean Energy Ltd	0.33MW

Additionally, there are approximately 35 smaller turbines and several solar arrays at domestic and commercial properties around Uist. with an estimated additional installed capacity of 100kW. This gives a total capacity of 10MW of renewable generation across Uist.

### Energy Demand

The most recent estimation of annual electrical energy consumption in Uist was undertaken in 2010 as part of the IslesPACT project (Comhairle nan Eilean Siar, 2011). Whilst the intervening years have seen some changes to energy demand on Uist through population change and electrification of some heating and transport systems this has not happened on a widespread scale and is thus likely to have had little effect on overall energy demand and supply.

Table 5. Energy demand across Uist by fuel type. (Comhairle nan Eilean Siar, 2011)

Energy Type	Total Sector Estimate kWh	Proportion
Electricity	40,506,440	23.0%
Burning Oil (kerosene)	22,924,082	13.0%
Gas Oil (red diesel)	51,120,244	29.1%
Fuel Oils	N/A	0.0%
Autogas (LPG)	3,470,290	2.0%
Bottled Gas	181,647	0.1%
Diesel (Derv)	25,940,545	14.8%
Petrol (Unleaded)	16,791,341	9.6%
Aviation	N/A	0.0%
Coal	4,491,738	2.6%
Peat	7,104,000	4.0%
Other (Wood)	17,845	0.01%
Renewable Energy	3,188,283	1.8%
TOTAL	175,749,151	100%

### Electricity

Energy use data is not disaggregated for Uist but an immediate impression of energy use can be gained from the chart below (Price, 2021), which is for the whole of the Outer Hebrides. A key point is the overall dependence on petroleum products followed by electricity and this applies across the whole of the island chain.

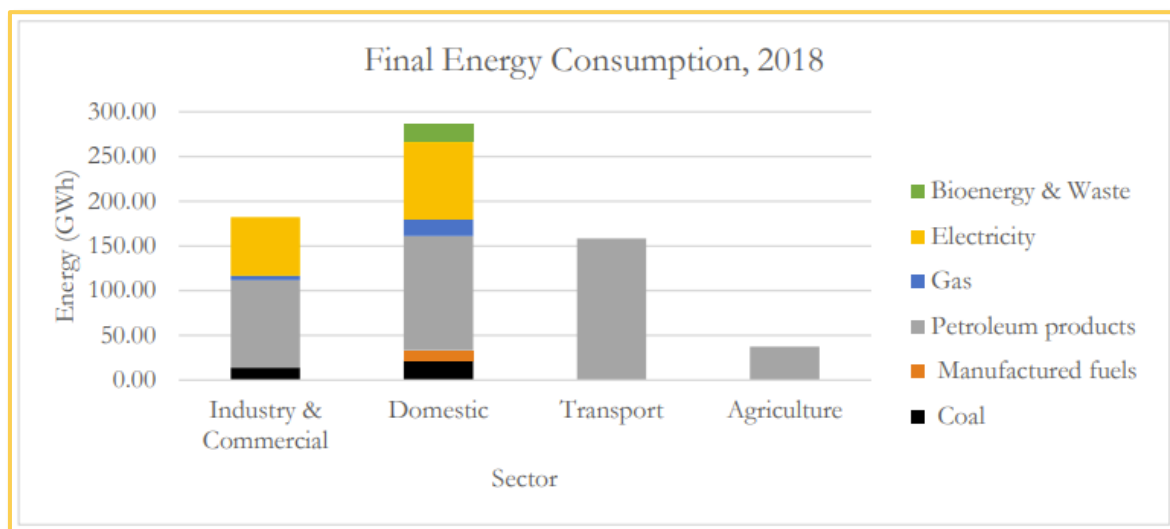


Figure 16. Estimated energy consumption across the Western Isles. (Price, 2021)

The IslesPACT project used half-hour demand data for the “Loch Carnan” circuit provided by SHETL. This circuit covers both Barra and Uist and estimated an annual use of 53.31GWh. Unfortunately, there is no data available to separate out the relative Barra and Uist components from the shared figure but an estimate of consumption in Uist was made by using relative populations and connected customers. This gave an average figure for the Uists of **40.51 GWh**.

### Heating and Gas Networks

There are no gas grids or district heating schemes in Uist so most houses are heated by oil and/or electricity. It is estimated that just over 54% are heated by oil (Home Energy Analytics, 2021). Heat pumps have become more common in recent years, due to the roll out of incentives. Solid fuel (including peat, wood and coal) are commonly used as secondary heating, with some use of propane and butane gas see Table 6.

There are changes in the main type of heat used by locality, with a higher proportion of electricity-based heating sources, and less solid fuel, in the Isle of Benbecula, with a larger proportion of oil used in South and North Uist. Similarly, there seems to be a larger proportion of storage heaters in the Isle of Benbecula, with a small percentage of the population of all islands still having no heating or hot water system.

Table 6. Estimated energy consumption for domestic properties in Uist. (Home Energy Analytics, 2021)

Main Fuel Type	Total Homes	Electricity (kWh)
Biomass/ Solid	203	2,000,159
Electricity	1,024	18,239,488
LPG	66	650,298
No fuel	18	0
Oil	1,384	13,636,552
Unknown	211	2,078,983
<b>Total</b>	<b>2,906</b>	<b>36,605,480</b>

Solid fuel is by far the most commonly used form of secondary heating in South Uist, with a stronger dominance of electricity in Benbecula. Approximately 65% of Uist homes have non-electric heating. The kWh hours domestic estimates above are based upon data available across the Western Isles and information that was collated for a specific study for Barra and Vatersay (Frangos, 2020).

The significance of domestic energy demand in the overall picture of energy use is shown in the table below (Element Energy, 2014):

Table 7. Energy demand by sector. (Element Energy, 2014)

Sector	%
Residential/Domestic	37.1%
Primary Sector	17%
Secondary Sector	3.2%
Tertiary Sector	19.3%
Transport	23.5%
<b>TOTAL</b>	<b>100%</b>

It's notable that transport is the second most significant demand. A large proportion of transport demand arises from private vehicle, illustrating the distances involved in travel to work, school, shops & movement of goods and products and reflecting the level of car ownership. It also reflects the significance of road transport (mainly car-based) in the tourist sector.

This study has attempted to estimate visitor transport on the islands by estimating the number of visitors per year, an estimate of the number of cars visiting Uist each year and then an average distance travelled. Approximately 4,059 cars visit Uist each year (Outer Hebrides Tourism, 2017); then assuming an average of 60km of visitor driving each day and a typical stay of 3 days; this would provide a total distance travelled by visitors annually of 1,293,500km, which would provide an annual fuel use of 73,000 litres and an annual energy consumption of 701,627 kWh.



## COMMUNITY ENGAGEMENT

Community-led Local Energy Plans are developed by local people for local people. To ensure these plans address the needs and opportunities of everyone in the community, meaningful and inclusive engagement is imperative.

### Energy Café Engagement

A total of 9 energy cafés (Part 1) were hosted by the Local Energy Ambassadors with a total of 57 attending the events plus one conversation with an individual business. Of these 58, 33 were women and 24 men, with 46% of these over the age of 60, 15% between ages of 50 and 60, 19% between 40 and 50, 11% between 30 and 40 and 9% younger than 30. Approximately 36% were from North Uist & Grimsay, 30% from Benbecula, 20% from South Uist and Eriskay, 12% from Berneray and 2% unknown.

The Ambassadors aimed to have additional energy café events in South Uist & Eriskay to increase the representation but unfortunately the team couldn't find the capacity to do so. Additionally, of those attending, 4 were known to have distinct needs and the engagement was adapted accordingly by the Ambassadors. The online session was delivered in Gaelic by an island resident and received very positive feedback, with local Gaelic speakers appreciating being able to speak in their native language about topical issues such as energy and projects for a sustainable island future.

### Energy Café Results

Plenty of time was provided for general discussion, with the Ambassadors listening intently to people's concerns and ideas. A selection of the concerns raised are listed below with full lists found in Appendix 1.

Transport:

- Electric vehicles are currently too expensive for most people. Also concerns about the number of charging points and the range of electric vehicles being unsuitable for travelling long distances.
- Potential environmental impacts of batteries.
- Whether it is possible to have battery operated large vehicles such as ferries and bin lorries.
- Why we changed from how we lived in the past, including travelling post offices and shops.

Heat and Power:

- Extreme fears about how to heat homes with increasing costs of fuel and electricity, and associated health impacts.
- Whether renewable energy technologies are environmentally friendly when considering how they are made and built.
- Why we aren't using local resources such as wind, solar, wave and tidal to heat and power our homes directly.
- Strong concerns that local people will no longer be able to cut and use peat as a cheap heat source.

Others:

- Top down decision making processes and poor communication about issues and potential solutions.
- Energy and transport impacts on depopulation.
- Solutions not fit for purpose in island environments.
- People working in silos rather than joined up voices across the islands to lobby for change.

### Community Ideas Survey Engagement

A user friendly online “Survey Monkey” survey was designed to inform the Uist Local Energy Plan, with the opinions of those unable to attend energy cafés.

126 community members responded to the study, but of these only 124 responses have been considered as part of the detailed analysis as 2 lived outside of the study area, as noted in the chart below. 45% of responses were from people living in the HS7 postcode area, which is for the Isle of Benbecula, and there was a fairly equal weighting between Isle of South Uist & Eriskay postcodes and those of North Uist which also includes Berneray and Grimsay (Chart 1). 62% of respondents classified themselves as female, with 37% classifying themselves as male and there was one respondent who didn’t complete this aspect of the survey (Chart 1).

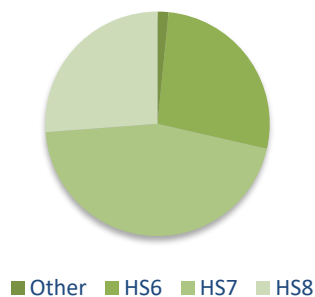


Figure 17. Postcodes of ULEP Community Ideas Survey respondents

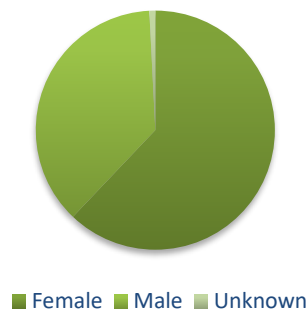


Figure 18. Gender demographic of ULEP Community Ideas Survey respondents

### Community Ideas Survey Results

When asked what people would like to do to heat and power their homes or businesses more efficiently, or transport themselves and their family more efficiency, the most popular answer was people would like access to affordable renewable energy and/or home battery storage, with the second most popular answer being grants for the purchase of electric vehicles and/or access to affordable electric and hybrid vehicles; highlighting that many people would like to switch to vehicles that aren’t reliant on fossil fuels however, the affordability is a limiting factor. Improved public transport, in terms of frequency, better connectivity and decarbonised public transport were popular answers, as were the ability to install a wind turbine to power the home and improvements to enable more walking and cycling.

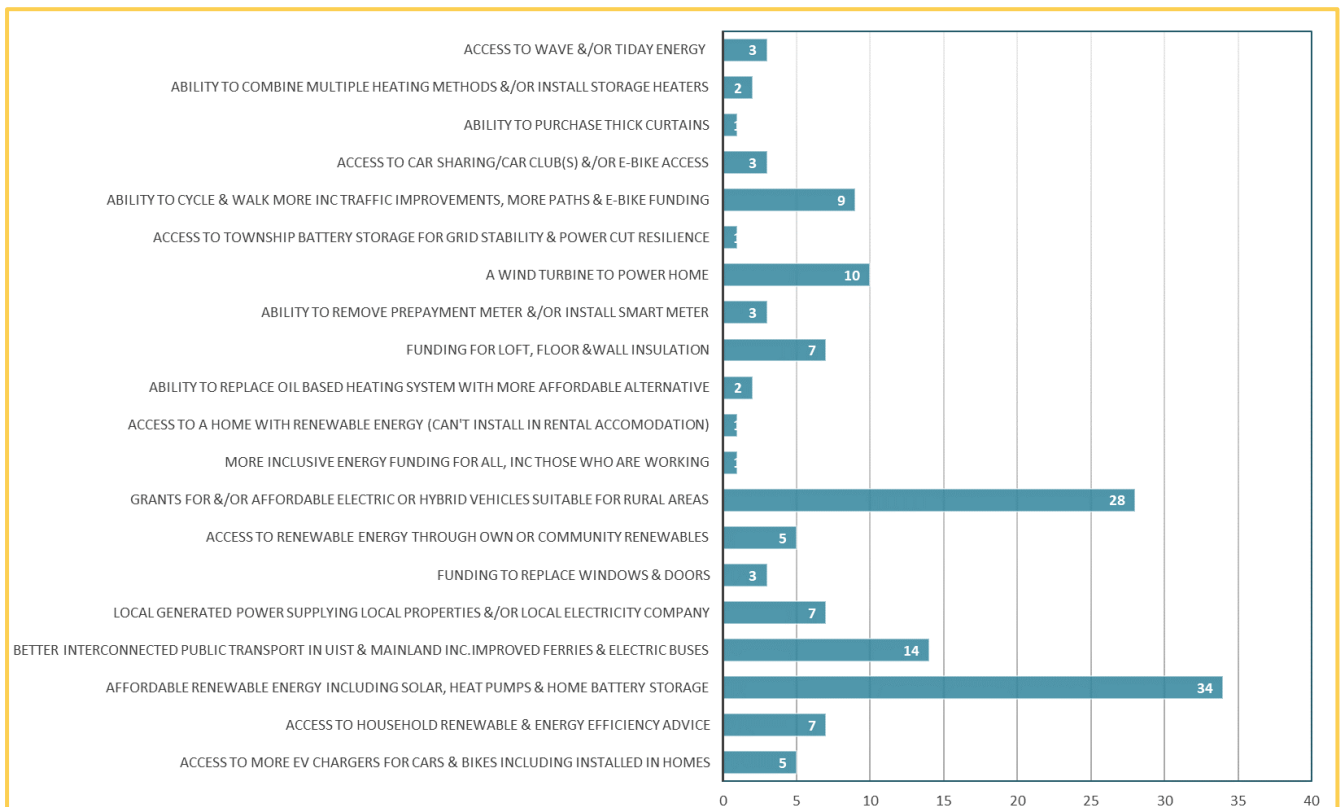


Figure 19. Responses to Q5 “Is there anything you would like to be able to do to help you power and heat your home and/or business more efficiently? Is there anything you would like to be able to do to help transport you and your family more efficiently?”

When asked what measures they would like to take to use energy more sustainably by far the most popular response the most popular answer was people would like access to affordable renewable energy and/or home battery storage, with the second most popular answer being grants for the purchase of electric vehicles and/or access to affordable electric and hybrid vehicles; highlighting many people would like to switch to vehicles that aren’t reliant on fossil fuels however, the affordability is a limiting factor.

Looking at the challenges faced in trying to implement some of the actions people in the community considered in question 5, the largest roadblock identified by respondents, with 66 responses out of the 110 who responded to this question, was the cost and lack of sufficient financial support, including grant aid. The importance of financial aid was also highlighted in responses to Question 6 where 35% of respondents selected financial support through grants and loans as a means of alleviating challenges to using energy more sustainably.

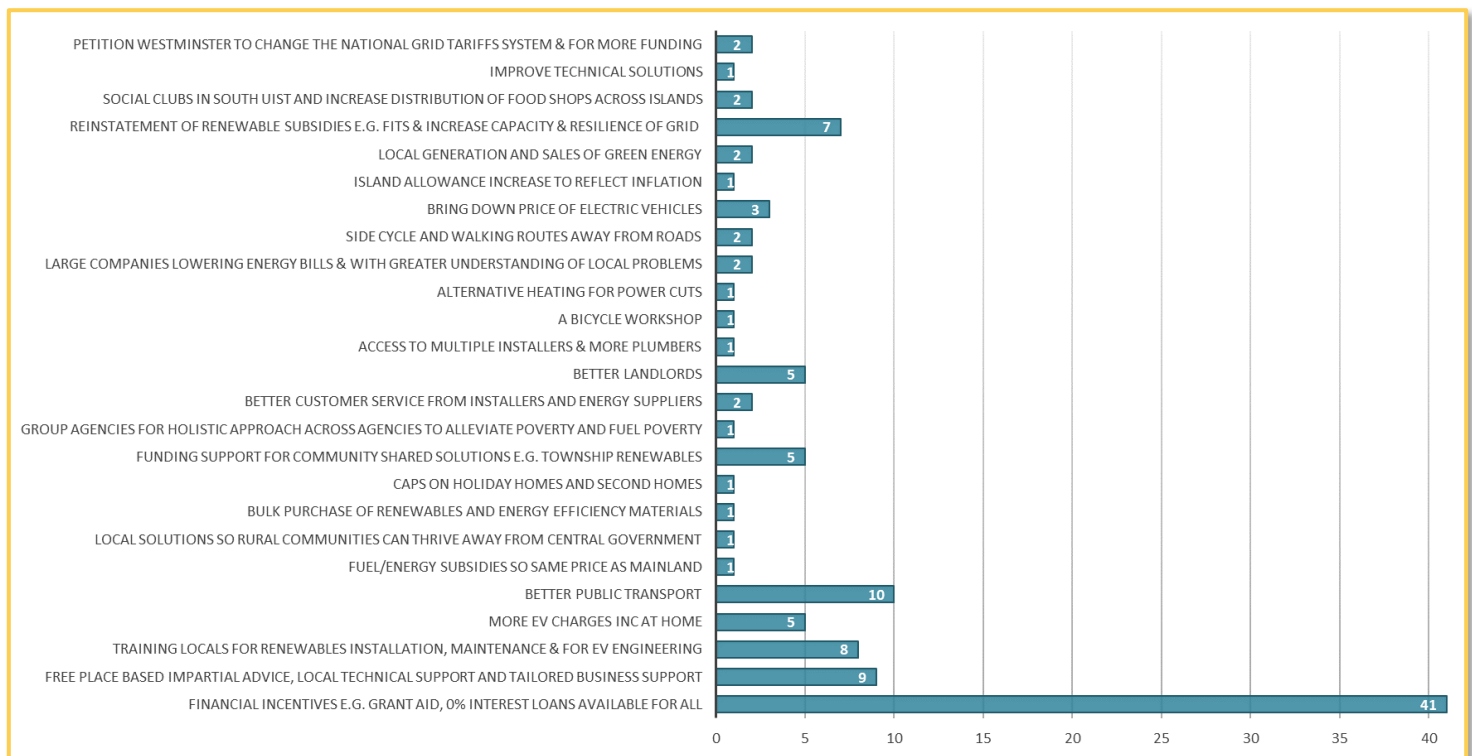


Figure 20. Responses to Q7 “What could be implemented to help alleviate these challenges? Please specify below.”

Responses to question 8 – “Picture your ideal future for Uist. What ideas or energy related projects would you like to see developed to create that ideal vision for Uist?” have been drawn together with the energy café part 1 project results and the tailored engagement to generate the Priority Projects List (Table 8).

### CoDeL Tailored Engagement

Tailored engagement was undertaken by CoDeL to reach out to harder to reach groups: the young, elderly and vulnerable. A full report on CoDeL’s engagement work is available in the appendices.

With the help of a range of community partners, CoDeL reached out through the following events.

- Consultation with participants at the Carinish Craft Group (especially elderly participants): informal individual conversations facilitated in December 2021, with a few potential questions provided by CoDeL to trigger conversation
- Consultation with participants at the resumed weekly session with volunteers at Tagas Uibhist gardens (Feb 22); group conversation over 1.5 hours in the Keder House, facilitated by Tagas worker and CoDeL Directors
- Two sessions of the Youth Cafè (which is supported by Cothrom and Community Learning & Development): around 20 secondary
- pupils (S2 upwards) (Feb/Mar 22): activity with local business (1 hour) and Quiz on Kahoot (30 minutes)

- Consultation with individual clients of Caraidean Uibhist through their befriending service using a pre-prepared booklet (Jan to Mar 22).

CoDeL also drew on other consultations with young people around the islands on climate change, including CoDeL's Uist Young Voices – engaging young adults, Taigh Chearsabhagh's Message in a Bottle project engaging with primary school pupils across Uist (and Barra) (Taigh Chearsabhagh, 2021). CoDeL also incorporated information from their engagement with social enterprises about the climate emergency priority; all of which took place in 2021. Overall, CoDeL's engagement reflects the views of over 100 residents: up to 20 elderly and/or vulnerable individuals, over 20 secondary school pupils, approximately 30 young adults and about 50 primary school pupils.

### CoDeL Tailored Engagement Outputs

A key recommendation that emerged from the consultations is the need to build on the deep understanding of energy and climate issues and solutions in Uist. Useful understanding and solutions, some going back generations through crofting and fishing in particular, and low-impact lifestyles, not least low resource use and reusing so many resources, should be recognised and adapted to apply to our modern lives where possible. Some knowledge has been developed more recently through widespread generation and use of renewable energies, reviving horticulture, new recycling centres and resource use.

Another recommendation is to build on the aspirations and commitment among younger generations, reflected so much in this report, for a sustainable future for our islands. Young people are already delivering on these agendas through crofting, businesses and social enterprises, creative activities (such as art) and education, and moving towards more sustainable living. Full results can be found in the CoDeL report in appendix 1 but the selected quotes below give a flavour of the engagement:

Many of the vulnerable individuals consulted, said, in response to the question, "What would help you most in reducing how much energy you use/or how much you pay for it?", said there was little that could be done.

#### **"Reduce the price"**

**"An annual analysis of what I use, if this was done for people, then they would know exactly where their money is going. This would be a step above meter reading. I submit a monthly meter reading and budget on that."**

**"Under floor heating (won't reduce energy costs though). Under floor insulation would, but I am reluctant to take up carpets. I'm already on a fixed rate for two years, which helps me save money."**

Many respondents also thought that rising energy costs should be addressed by finding ways to enable our islands to benefit from our own energy generation:

**"Local generation of electricity for direct local sales."**

**“Local energy sales to homes and businesses from local generation.”**

***“There is not much if anything I can do to save on energy costs. What should happen is the energy the islands produce should stay here and not be sold to the National Grid.”*** (79 year old)

***“Why can’t we have an alternative cheaper way of producing energy at low prices? We have wind farms, sea lochs with tides. We have a plethora of natural resources but can’t seem to do anything with them for local people.”*** (Session at Tagsa Uibhist gardens)

***“We need to make the transition from oil and gas into renewables.”***

***“We need to shift to all electric.”***

The above recommendations from young and old adults alike are in tune with recommendations that emerged from pupils in four teams at the Youth Cafe, summarised by one respondent:

***“There is a global climate crisis, but I think locally we also have to look at how we are dealing with the climate crisis. Because we’re an island, and because we’re quite a low-lying island, we have to really be careful about what we are going to look like in the future, and if there are ways that we can actually combat these climate changes. I know that that is a massive issue and question, but we have to do our own bit locally, and build structures that’ll help our coasts, and also just stop using so much energy, and using some renewable energy that’s available, that we can create within the islands. We’re quite a windy wee place, we’ve got quite a lot of water around us, so let’s use it to our advantage to hopefully keep ourselves afloat for as long as we can.”***

### **Primary Schools Engagement**

Three sessions were run across 2 primary schools engaging with approximately 100 pupils. Unfortunately, it wasn’t possible to access the other two primary schools and the secondary school at the time due to covid-19 related constraints on visiting schools. Across the sessions pupils engaged well and enjoyed learning and talking about energy. The key outcomes of this aspect of ULEP engagement are listed below:

- ~ 100 pupils engaged as part of the Uist local Energy Plan and educated on energy around us, energy at home, energy on Uist and Local Energy Plans
- Conversations started at home between pupils and their households
- Increasing community awareness of Uist Local Energy Plan
- Energy Ideas gathered and incorporated with local energy survey results
- Posters created as part of final workshop exercise, see examples below and in Appendix A



## Project Prioritisation

The results from Energy Cafés -Part 2, ad-hoc engagement and engagement at the show were combined with the original ranking tallies to generate the final list of prioritised projects. As there were a large number of projects identified by the community, projects have been further combined where associated themes have been identified by the community and Steering Group during this last phase of engagement. The top 40 are detailed here, with the full list of projects detailed in the Appendices.

### Top 40 Projects

The following detailed the top 40 projects according to the number of times these projects came up during engagement sessions combined with the number of marks made on the A0 project list poster.

Table 8. Community Ideas – Top 40 prioritised projects

Prioritised Projects	Number of respondents
Local smart grid with local sustainable generation, making use of resources e.g. wind energy and local sales of electricity for self-sufficiency (as independent as possible from the mainland grid to minimise exports & ideally for reduced local energy costs), and Establish a local energy generation company, owned here and supplying to local businesses and homes, with the benefits shared within the local community and the entire community involved, so people know what they are using and how to reduce usage	84
Investigate the potential for local wave energy and local tidal energy (including tidal built into causeways) and implement projects accordingly	55
Embed tackling fuel poverty in every energy related project we do including Scottish Government, Local Authority and local developers & Investigate the potential for eradicating fuel poverty through provision of cheap electricity rather than directing profits to create local funding pots	52
Funding focus for insulation first, including grants for insulation and other energy efficiency measures, prioritising the most vulnerable & poorly insulated homes, and projects to carry out local affordable installation of insulation, draft proofing, windows and door replacements and other energy efficiency measures	46
Each township to have its own renewable energy generation e.g. wind and storage facilities with a local network (including potential for network of district heating schemes)	41
Multi-purpose demand responsive eco-friendly community transport vehicles available to residents i.e. community electric minibuses in each township	36
Create more community growing spaces, including more allotments, and food growing groups	32

Affordable and available public transport for all with revised bus timetables that connects with public transport on and off islands and works for the residents across the islands	31
Increased funding support for renewable generation of heat and power for homes, community buildings and businesses	24
Increased wind and solar energy including small scale wind energy for public, private buildings and homes	21
More electric vehicle charging points across islands including at schools and anywhere you park a car, connected to locally generated power such as wind and solar where possible	20
Development of a roadmap with various scenarios to meet the Uist power and heat demand for long term resilience, testing various technical solutions ensuring all renewable energy resources are taken advantage of with cost/benefit analysis and fuel poverty alleviation focus incorporating i. electric/hydrogen ferries ii. Electric/hydrogen planes iii. hydrogen for heat, power and storage iv. ground source heat pumps v. district heating schemes vi. changes to the grid vii. tidal and wave	20
Increased cycling paths and cycling facilities across the islands, away from the main spine car road and away from areas with heavy traffic & Increased and improved walking paths across the islands including a path connecting Liniclate with Balivanich	19
Creation of combined lobbying group in Uist to jointly lobby the Scottish Government on key issues, with more open conversations through local media, gathering more input from the wider Uist community & lobby the government for fairer and affordable energy prices for all	18
Funding for local energy transition staff, for 3 years or more	18
Funding and local capacity support to develop self-sufficient renewable energy generation and storage (batteries) retrofitting of all homes	17
Electric and/or hydrogen public transport using locally generated energy Inc. ferries i.e. wind, solar	17
More smaller, regular, energy efficient (faster) ferry vessels that have a sustainable energy source	16
More community renewable projects to create community benefit funds from renewables and/or reduce local electricity and heat bills	16
Solar thermal on all new homes	15
Detailed examination of any regulations & planning restrictions that may be causing roadblocks for the Uist energy transition including approaching MoD to find solutions to radar issues impacting further wind energy installation	15
Building new energy efficient, warm, affordable homes e.g. to "Passivhaus" standards; resilient to climate change	14

Investigate the impact of electrification in islandsbased communities and the most effective back up energy options for resilience to power cuts e.g. battery reinforcement & the most cost-effective, resilient and environmentally friendly alternative methods for backup power at substations	13
Dedicated local staff (perhaps through business gateway) to engage with businesses and householders to support them to reduce their energy costs and look at alternative supplies & Local energy advice accessible to all including technical energy knowledge sharing and support	13
More efficient recycling of waste & more waste facilities for a cleaner environment	13
Ensure people have a choice in the transition i.e. new heating forms shouldn't be forced upon people & Embedding strong and effective local consultation to ensure the entire community has a stronger voice in decision making	13
Projects to support Uist being more self-sufficient all round including local food with more reliance on local businesses and fewer imports	12
Investigation of the potential for green hydrogen production and storage (including hydrogen ferries) and local usage for hydrogen vehicles and hydrogen boilers	10
Financial incentives to encourage off-grid renewable energy projects, which will also embed a social connection with energy similar to the connection with heat sources such as peat.	10
Tunnels to Harris and the mainland, that could make use of renewable energy and sustainable transport, enabling access to cheaper food and other household items	9
Study to carry out life cycle assessment of peat use in Uist (home based, rather than commercial cutting) when compared with other heat sources	9
Investigate the potential for offshore wind for Uist and investigate solutions of any roadblocks	9
Plastic recycling deposit points across islands with food vouchers for depositing & less plastic packaging	9
Projects to increase locally grown produce, the popularity of locally grown produce and fewer out of season fruit and vegetables	8
Dedicated project for education and engagement on the net zero transition including what it means and what options there are for Uist so everyone can make an informed decision and skills development	8
Financial incentives/support to help people switch to electric vehicles and/or projects to reduce cost of electric vehicles	8
Clearer bus timetables available in printed versions, at bus stops and online	8
Uist hydrogen production centre	7
Investigate the potential for local hydropower and implement projects accordingly	7

Community eco car sharing 'car clubs' with a range of suitable vehicles e.g. short and long range EVs, with car sharing app	7
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The most popular project by far is the need for Uist to be less reliant on energy imports and use local resources to power and heat all homes and businesses in Uist. This came up time and time again with a lot of people confused and frustrated by the current energy system with reliance on large corporations to purchase electricity from imported supplies.

The analysis of the results has been as rigorous as possible with qualitative data, but this is subjective in some part when analysing people's statements and facilitators notes due to the nature of the data available.

The top five projects, apart from ideas 3 and 4 due to their policy focussed nature, were taken forward to a qualitative cost benefit analysis before early feasibility reports were conducted to better understand the scope for these projects in Uist. The second section of idea 1 was also not investigated due to extensive previous work exploring this initiative through Hebrides Energy, a council led Community Interest Company.

The five projects taken forward for early feasibility studies were therefore:

- Local smart grid with local sustainable generation, making use of resources e.g. wind energy and local sales of electricity for self sufficiency (as independent as possible from the mainland grid to minimise exports & ideally for reduced local energy costs)
- Investigate the potential for local wave energy and local tidal energy (including tidal built into causeways) and implement projects accordingly
- Each township to have its own renewable energy generation e.g. wind and storage facilities with a local network (including potential for network of district heating schemes)
- Multi-purpose demand responsive eco friendly community transport vehicles available to residents i.e. community electric minibuses in each township
- Create more community growing spaces, including more allotments, and food growing groups

## NEXT STEPS

Community-led Local Energy Plans are an exercise in understanding, preparing and galvanizing communities to act on energy. Plans are a springboard for developing local energy projects of all forms and scales and understanding the first steps of these projects is key.

## Options Appraisal

Following the Project Prioritisation exercise a high-level options appraisal was conducted with the ULEP Steering Group. This involved reviewing the “Impact” and “Deliverability” of the 10 highest priority projects (table 8). “Impact” referred to the impact each project or initiative would have on the Environment, Society and Economy of Uist. “Deliverability” related to the Technical, Financial, Environmental readiness of each idea and the Community Capacity to deliver each project. Participants could mark score each field with “Negative”, “Low”, “Medium” or “High”. For example, under Impact “Developing local wave and tidal generation” was marked as “High” for positive environmental, financial and economic impact on Uist but in Deliverability the idea was marked “Low” or “Medium” for technical readiness, financial and environmental constraint and community capacity due to the complexity and resource requirements for developing marine energy projects (Figure 18).

This exercise served two purposes: 1) updating the steering group on the results and engaging them in the LEP development process; and 2) providing analysis of the community ideas and projects gathered during community engagement. The latter of these helped, alongside project prioritisation, to inform the selection of 5 project ideas to investigate through mini-feasibility reports (see table 9 below). Guidance on running the options appraisal can be found in Appendix 1. Whilst the Options Appraisal was useful, ultimately most of the 10 projects considered scored similarly in the assessment, likely due to the lack of detailed knowledge at that stage about the impact of each project, thus the process did not particularly further the progress of the ULEP.



Figure 21. Final results of Options Appraisal

Table 9. Community Ideas Priority Projects - The five priority projects taken forward for early stage feasibility reports

Community Ideas Priority Projects
Local smart grid with local sustainable generation, making use of resources e.g. wind energy and local sales of electricity for self-sufficiency (as independent as possible from the mainland grid to minimise exports & ideally for reduced local energy costs), and Establish a local energy generation company, owned here and supplying to local businesses and homes, with the benefits shared within the local community and the entire community involved, so people know what they are using and how to reduce usage
Investigate the potential for local wave energy and local tidal energy (including tidal built into causeways) and implement projects accordingly
Each township to have its own renewable energy generation e.g. wind and storage facilities with a local network (including potential for network of district heating schemes)
Multi-purpose demand responsive eco-friendly community transport vehicles available to residents i.e. community electric minibuses in each township
Create more community growing spaces, including more allotments, and food growing groups

### Early-stage Feasibility Studies

The five priority projects selected through the project prioritisation and options appraisal processes (Table 9) were explored in more depth by Community Energy Scotland with an Early Stage Feasibility Report (ESFR) being written on each topic. These reports provide overviews of each initiative and the technologies involved. Case studies of previous work or existing initiatives undertaken in Uist or in similar contexts around Scotland are then outlined. The final section of the ESFR's considered the next steps for developing project ideas and which local organisations or sources of external support will be most relevant to progressing projects. Below, each of the ESFR's is briefly summarised with full reports provided in the appendices (Appendix 3-7).

**Local smart grid with local sustainable generation, making use of resources e.g. wind energy and local sales of electricity for self-sufficiency** (as independent as possible from the mainland grid to minimise exports & ideally for reduced local energy costs)

A Smart Grid is a general term for an electricity system which better integrates demand and generation of energy to improve sustainability, efficiency and security of energy systems. Smart Grids can also be developed to maximise local utilization of local energy resources. Typically, smart grids incorporate some or all the following; renewable energy generation, advanced energy monitoring, energy storage, demand side energy management and energy efficient devices.

Smart grids have been implemented in a number of locations around Scotland including the off-grid energy system of the Isle of Eigg and the Active Network Management system in Orkney. There remain however a number of barriers to developing smart or independent grids in other locations, notably



the cost of increased energy monitoring and management, and regulatory barriers to local energy markets. Next steps involve exploring the potential for innovation projects within Uist alongside Comhairle nan Eilean Siar and Uist and Barra Local Energy Forum or considering alternative approaches such as Energy Local Clubs.

**Investigate the potential for local wave energy and local tidal energy (including tidal built into causeways) and implement projects accordingly** (Offshore energy was also considered due to similarities in project development)

The seas around Uist have huge potential to provide a world class source of sustainable renewable energy. Energy can be harnessed from tides, waves and offshore winds and due to the direct exposure to the Atlantic Ocean on the west coast of Uist there is abundant energy available. Despite extensive research being undertaken at the European Marine Energy Centre in Orkney all forms of marine energy remain at early stages of deployment in Scotland. Case studies within Shetland and the Inner Hebrides demonstrate that there is potential for marine energy within island energy systems. A number of previous studies looking into this topic in detail are summarised.

Unfortunately, there are currently several significant barriers to marine energy development in Uist such as the technical readiness of marine energy devices, local grid constraints, environmental designations and restrictions relating to MoD operations. Next steps involve exploring the potential for pilot projects within Uist alongside external partners such as Wave Energy Scotland and the European Marine Energy Centre. There is also some possibility that waters nearby Uist may be suitable for development of Offshore Wind which would create an opportunity for community engagement or community benefit.

**Each township to have its own renewable energy generation e.g. wind and storage facilities with a local network (including potential for network of district heating schemes)**

A number of renewable energy sources can be harnessed on Uist such as wind, wave and solar. Despite the proven success of renewables in Uist through community energy projects there is no clear route to integrating such technologies directly with townships due to regulation, infrastructure and finance related barriers. Due to this apparent impasse it is recommended that innovative solutions to operating within these barriers such as the Energy Local model are explored. Energy Local is a cooperative model which allows householders to connect with local renewable energy generators and match their energy use to generation, creating a better deal for both parties.

Existing sites throughout the Western Isles highlight the ability for a wind turbine project to be replicated. It is recommended that a detailed feasibility study to be done to assess the best site for a project as well as the options for that generation to be exported through either:

- Future grid upgrades
- New demand
- Future storage opportunities

The experience of local communities and development trusts such as Storas Uibhist and NUDC should provide important foundations for future community initiatives and would be ideal bodies for engaging with Energy Local or initiatives such as the ICNZ to explore connections between townships and renewable energy resources on Uist.

**Multi-purpose demand responsive eco-friendly community transport vehicles available to residents i.e. community electric minibuses in each township**

Community Transport (CT) refers to a diverse array of services and solutions delivered by communities to meet local transport needs. CT providers use a mix of methods including mopeds, cars and minibuses to support the most important local journeys which typically include school, hospital and community group transport, dial-a-ride, buses which take residents to shops, or deliver shopping to residents. Electric Vehicles are now well established and reliable and are a widespread feature of transport across Scotland and the islands. Although valid concerns around EV use in rural areas such as limited local maintenance options and charging networks remain, the past 10 years have seen a steady increase in EV's on across Scotland and continued uptake in Uist.

Tagsa Uibhist are the main community transport provider on Uist and Tagsa are based in Balivanich and offer a range of services to residents in North Uist, Benbecula, South Uist, Eriskay, Grimsay and Berneray. Services are typically lifts to enable community members access to medical appointments, day care, adult learning, and respite, as well as shopping and any other appointment required. Tagsa currently run 3 EVs as part of their transport provision and have charging facilities at their office and thus have ideal experience of running EV's on Uist. Potential barriers to rolling out EV's in townships across Uist include the financial cost and limited access to chargers or EV trained mechanics.

There are a number of local organisations who would be well placed to lead in developing such projects as well and suitable grants available to help establish the project. As set out above, a shared community transport vehicle could be trialled in a smaller, distinct community within Uist and, if successful, replicated across the Island chain.

**Create more community growing spaces, including more allotments, and food growing groups**

Small island communities who rely so heavily on long food supply chains are especially vulnerable to food insecurity; the rising cost of food is being felt by households in Uist and is exacerbated by ferry problems and the rising cost of fuel. Case studies of community growing initiatives can be seen in Orkney, Bernera and Barra and provide inspiration to complement the existing work of Uist based organisation such as Tagsa Uibhist, Cothrom and Torlum.

Uist faces barriers to food growing and production due to the dispersed geography of the islands, adverse weather and climate, lack of access to suitable land and competition with super markets or mass producers. There are however, opportunities for developing more local growing such as supporting land access and the rollout of polycrubs to enable longer growing periods and sharing seedlings and resources. Tagsa Uibhist have secured a Partnership Development Grant from Sustainable Food Places through the Third Sector Interface (Western Isles) with which they aim to lead

the development of the Western Isles Food Partnership. This will make Tagasa well placed to support local growing initiatives across Uist.

## CONCLUSION

The ULEP is a product of comprehensive community-led engagement on energy, marking a novel approach to LEP development and creating a mandate for sustainable, locally-led energy development on Uist. The projects identified and community discussions started through the ULEP provide a foundation upon which community organisations can develop sustainable energy projects which utilise local energy resources, reduce householder bills and support life on Uist.

Cothrom collaborated with the project team to engage with hard-to-hard to reach groups and held specific workshops for young people, ensuring young people to have a strong voice in the ULEP. Similarly, the project team worked with Caraidean Uibhist to ensure isolated and vulnerable people, and those with learning disabilities were represented. The surveys were advertised on social media and enabled us to reach and target age groups who hadn't been represented well at the energy cafes.

It will be vital to identify people in the Uist community (perhaps the Uist & Barra Community Energy Forum) to take ownership of the plan and ensure it is actioned and updated when appropriate. In the short term the five priority projects should be explored through the Early State Feasibility Studies and the actions should be assigned to organisations or appropriate people in the community to lead on.

## REFERENCES

- Aquaterra. (2019). *Uist Energy in Motion*. Stromness, Orkney: Aquaterra.
- Caledonian MacBrayne. (2023, 03 01). *Timetables - Outer Hebrides*. Retrieved from Caledonian MacBrayne: <https://www.calmac.co.uk/summer-timetables/barra-eriskay>
- Chargeplace Scotland. (2023, 03 01). *Scotland's Public EV Charging Network*. Retrieved from Chargeplace Scotland: <https://chargeplacescotland.org/>
- Comhairle nan Eilean Siar . (2023, 03 01). *Uist Repopulation*. Retrieved from Comhairle nan Eilean Siar : <https://cne-siar.gov.uk/business/economic-development-and-business-support/uist-repopulation/>
- Comhairle nan Eilean Siar. (2011). *Island Sustainable Energy Action Plan Uist*. Stornoway: Pact of Islands.
- Comhairle nan Eilean Siar. (2020). *Outer Hebrides Local Transport Strategy 2020-30*. Stornoway: Comhairle nan Eilean Siar.
- Comhairle nan Eilean Siar. (2022). *Socio Economic Update 45*. Stornoway: Comhaire nan Eilean Siar. Retrieved from <https://www.cne-siar.gov.uk/media/20277/socio-economic-update-45.pdf>
- Community Development Lens. (2023, 03 01). *Community Development Lens - Home*. Retrieved from Community Development Lens: <http://codel.scot/>
- Council, I. C. (2023, 03 01). *Slighe an Iochdair - Iochdar Pathway Project*. Retrieved from Crowdfunder: <https://www.crowdfunder.co.uk/p/slighe-an-iochdair---iochdar-pathway-project>
- Crouse, L. A. (2021, 11 10). CLIMATE CHANGE AND THE HEBRIDES: The rising sea and an eerily prophetic tradition. *West Highland Free Press*. Retrieved from <https://www.whfp.com/2021/11/10/climate-change-and-the-hebrides-the-rising-sea-and-an-eerily-prophetic-tradition/>
- DA Travel. (2023, 03 01). *Home*. Retrieved from DA Travel: <https://datravel.co.uk/>
- Element Energy. (2014). *Western Isles Energy Audit*. Stornoway: Element Energy .
- Energy and Climate Change Directorate. (2021, 01 6). *Scottish Government Publications*. Retrieved from Local energy policy statement: <https://www.gov.scot/publications/local-energy-policy-statement/>
- Frangos, K. (2020). *Alleviating Fuel Poverty in Barra and Vatersay*. School of Engineering. University of Edinburgh.
- Home Energy Analytics. (2021). *Home Energy Analytics Data - Uist*. Energy Savings Trust.
- Interreg - North Sea Region. (2023, 03 01). *COBEN - Making civic energy work*. Retrieved from Interreg - North Sea Region COBEN: <https://www.civic-energy.eu/>
- Lawrie, E. (2022, 03 28). *Hebrides: Life on beautiful islands with the UK's worst fuel poverty*. Retrieved from BBC News: <https://www.bbc.co.uk/news/uk-scotland-60848672>
- Local Energy Scotland. (2023, 03 01). *Local energy plans*. Retrieved from Local Energy Scotland: <https://localenergy.scot/hub/local-energy-plans/>
- Marine Scotland. (2023, 03 01). *Marine Scotland*. Retrieved from Web Maps Services (Third Party): <https://marine.gov.scot/maps/map-services>
- National Records of Scotland. (2023, 03 01). *Mid-2019 Small Area Population Estimates for 2011 Data Zones*. Retrieved from National Records of Scotland: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by->

- theme/population/population-estimates/2011-based-special-area-population-estimates/small-area-population-estimates/mid-2019
- Outer Hebrides Anti-poverty Strategy Group. (2020). *Outer Hebrides Local Child Poverty Action Report 2020*. Stornoway: Comhairle nan Eilean Siar.
- Outer Hebrides Anti-Poverty Workign Group. (2019). *Outer Hebrides Anti Poverty Strategy 2019 - 2024*. Stornoway: Outer Hebrides Community Planning Partnership. Retrieved from <https://www.cne-siar.gov.uk/media/16889/outer-hebrides-anti-poverty-strategy.pdf>
- Outer Hebrides Tourism. (2017). *Outer Hebrides Islands Visitor Survey 2017*. Stornoway: Outer Hebrides Tourism. Retrieved from <https://www.visitscotland.org/research-insights/regions/outer-hebrides>
- Price, A. (2021). *Modelling the Energy Transition on the Western Isles, Scotland: Scenario analysis to compare future pathways on the island of Lewis and Harris*. KTH, School of Industrial Engineering and Management (ITM), Energy Technology. Retrieved from <https://kth.diva-portal.org/smash/record.jsf?pid=diva2%3A1584551&dsid=3867>
- Ross, J., & McLachlan, E. (2022, 07 07). 'The life of the community will bleed away': ferry group calls for action after loss of vital service costs £648,000 in two weeks. *The Press and Journal*. Retrieved from <https://www.pressandjournal.co.uk/fp/news/highlands-islands/4510498/call-for-action-after-loss-of-ferry-service-costs-648000-in-two-weeks/>
- Scotland's Census . (2011, 01 01). *Area Overviews*. Retrieved from Scotland's Census: <https://www.scotlandscensus.gov.uk/search-the-census#/explore/snapshot>
- Scottish and Southern Electricity Networks. (2023, 03 01). *Network Maps*. Retrieved from Scottish and Southern Electricity Networks: <https://network-maps.ssen.co.uk/opendataportal>
- Scottish Government. (2020, 12 01). *Scottish House Condition Survey: 2019 Key Findings*. Retrieved from Scottish Government: <https://www.gov.scot/news/scottish-house-condition-survey-2019-key-findings/#:~:text=It%20is%20a%20two-part%20survey%20combining%20both%20an,SHCS%20measures%20will%20be%20published%20in%20February%202021.>
- Sustainable Uist . (2011). *Improving Energy Efficiency in Traditional Uist Homes*. Uist: Sustainable Uist . Retrieved from <https://www.cne-siar.gov.uk/media/CommitteeArchive/OldCommitteeDocs/environmental/agendas/june2012/M%20ITEM%2013B%20Uist%20Final%20Report.pdf>
- Tagsa Uibhist. (2023, 03 01). *How we help - Community Transport*. Retrieved from Tagsa Uibhist: <https://www.tagsa.co.uk/how-we-help/community-transport/>
- Taigh Chearsabhagh. (2021, 03 01). *Climate Change Message in a Bottle*. Retrieved from Taigh Chearsabhagh: <https://www.taigh-chearsabhagh.org/events/cop26messagebottle/>
- The Surefoot Effect. (2023, 03 01). *The Surefoot Effect*. Retrieved from The Surefoot Effect step by step: <https://www.surefoot-effect.com/>
- Wood Group. (2018). *Barra and Vatersay Local Energy Plan*. Wood Group .

## Uist Local Energy Plan – Early Stage Feasibility Study

### Community Idea:

“Multi-purpose demand responsive eco-friendly community transport vehicles available to residents i.e., community electric minibuses in each township. So, this is a minibus (and perhaps a car) operated by local committees in townships/specific islands, available for hire and can be booked for weekly dentist, doctors, shopping runs etc.”

### Technology and conceptual overview:

#### Community Transport

Community Transport (CT) refers to a diverse array of services and solutions delivered by communities to meet local transport needs. CT providers use a mix of methods including mopeds, cars and minibuses to support the most important local journeys which typically include school, hospital and community group transport, dial-a-ride, busses which take residents to shops, or deliver shopping to residents (Community Transport Association, 2023).

Historically CT providers have predominately used minibuses due to their versatility and larger size allowing transport for larger groups, however, many communities have begun providing shared transport options as well. There are a number of models in which shared transport projects can be delivered; some create hubs in central areas where vehicles are kept when unused and can be picked up and dropped off; floating schemes, in which vehicles (usually bikes or e-scooters) can be left at any location within a certain area after use and also popular for bike and scooter sharing projects; peer to peer sharing is increasingly common, whereby a vehicle is shared between members of a community and moves from user to user as and when needed.

CT is often motivated by a lack of public services and the need to support vulnerable community member. Shared transport can meet these needs but is often developed primarily as a more affordable and sustainable transport option. In CoMoUK’s survey of car share users in Scotland 75% of users reported that car sharing saved them money (CoMoUK, 2021). The average car club removes around 18 cars from the road meaning even small initiatives can have a large impact on the carbon emissions of a local area.

#### Electric Vehicles

Electric Vehicles are now well established reliable and widespread feature of transport across Scotland and the islands. Although valid concerns around EV use in rural areas such as limited local maintenance options and charging networks remain, the past 10 years have seen a steady increase in EV’s on across Scotland (Transport Scotland, 2021) and further uptake in Uist. Prices for EVs still remain high and may be prohibitive to communities, particularly for larger minibuses as the market is still at a relatively early stage of development.

*Table 1. Popular Electric Vehicle (cars and vans) makes in the UK. (Driving Electric, 2023)*

Model	Number of Seats	Range	Price (approximate)
Nissan Leaf	5	168	£30,000
Vauxhall Combi-e Life	7	130	£30,000
Nissan e-NV200	7	120	£30,000
Vauxhall Vivaro	9	140	£30,000
Fiat E-Ducato Passenger 35 47kWh	9	83	£50,000
LDV EV 80	12	120	£55,000



## Case study examples:

Examples of township or island specific community transport can be found elsewhere in Scotland, with several communities in Orkney delivering such services:

### **Rousay Car Club**

Since 2015 the Rousay, Egilsay and Wyre Development Trust (REWDT) have owned and operated a first-generation Nissan LEAF, funded through National Lottery funding (Rousay, Egilsay and Wyre Development Trust, 2023). The vehicle is principally operated as a single vehicle car club available to residents of the island. It is stationed at the registered office of the development trust and charged through a dedicated charger for the vehicle. The vehicle is hired by the residents in order to cover activities on Rousay itself, and also used to make longer journeys on the other islands of Orkney, but primarily just the mainland. Rousay has a population of roughly 220 people allowing an understanding of how a similar scheme may work for townships at road ends or Berneray, Grimsay and Eriskay.



*Figure 1. Rousay, Wyre and Egilsay Development Trust's Electric Vehicle*

Throughout 2019, the vehicle covered approx. 2,700 miles across 850 individual vehicle movements and an average of 3.18 miles per movement.

From the data made available for 2019, it is possible to determine the vehicle's utilisation rate. In that year, the vehicle covered approx. 2,700 miles and was used on 118 individual days throughout the year, an average of 9.8 days per month; this equates to 32% of the days in the year the car was used at least once. The use rates of the booking showed there is little to no seasonality in the vehicles use. This would be expected for a vehicle used by the community rather than have a connection to the tourism; it was requirement of becoming a member that people must be a resident of the island (Rousay, 2022).

REWDT price the rates of their car club to make hiring the vehicle as accessible as possible; starting from £2.50 for first three hours, down to £1.50 for up to 12-hours; and £18.00 for 24-hours. It is also free to become a membership of the car club, which is requirement to being able to hire the car.

Booking is primarily done online, but the staff within the office can also be called in order to make a booking. In place of an automated system, the staff at the registered location for the car will complete the fill paperwork, provide the keys to the car, and provide an introduction to the car. This means that management fees that would usually be paid to operators of a car club platform, say within the community and pay for staff time. However, this manual process makes the car club only available during working hours.

Existing community transport provision in Uist:

### **Tagsa Uibhist**

Tagsa Uibhist is the main provider of community transport in Uist. Tagsa are based in Balivanich and offer a range of services to residents in North Uist, Benbecula, South Uist, Eriskay, Grimsay and Berneray (Tagsa Uibhist, 2023). Services are typically lifts to enable community members access to medical appointments, day care, adult learning, and respite, as well as shopping and any other appointment required. In order to prioritize service users according to need, Tagsa gives priority to those who do not have a vehicle or an immediate family member in the same household who can provide transportation.

Whilst these criteria are necessary due to the demand for Tagsa's services and the vulnerability of many service users, it limits the users of the service to those most in need. Therefore, there are limited options for other residents who wish to travel sustainably. Therefore, a more flexible and less staff intensive model of shared community transport could fill a gap in sustainable transport provision across Uist.

### **Barriers to implementing this initiative in Uist**

Key barriers to this initiative include:

- Limited local EV infrastructure: Although there are a growing number of EV charge points across Uist in some areas and Islands there are no, or very few, public chargers available. There may be options to install chargers specifically for community vehicles in the future, however this will be expensive and thus we recommend focusing on utilizing existing chargers to begin with (Aquaterra, 2019).
- There are also very few options for servicing EV's on Uist and thus any vehicle maintenance could require transport to EV certified garages in Inverness which would have a cost and take time.
- It should also be noted that due to the remoteness, culture and common lifestyles of Uist there is a high reliance on personal vehicles. Many people will use their own vehicle for work, crofting or leisure and thus may not be interested in participating in a vehicle-share scheme. However, if shared community vehicle schemes can offer convenient, sustainable, and affordable transport then there will likely be interest.

### **Next steps to take community initiative forward.**

In order to develop this community initiative, there are three key steps that Uist communities should take:

- Identifying a lead local organisation and pilot area
- Sourcing funding
- Pilot project

Identifying a lead local organisation and pilot area

Any community project must be driven forward by local people and thus a key first step is to find a local organisation, community or individual who is enthusiastic about sustainable transport and can lead on setting up this project.

**Tagsa Uist** – As the local CT provider, Tagsa are well placed to support new local transport initiatives due to their experience, knowledge of the local area and need and contacts within funding, local authority and transport organisations. Due to Tagsa’s existing service provision they may have limited capacity for exploring new projects, however, it is vital that they are consulted with and involved in project discussion to ensure that there is no duplication or unnecessary competition between projects.

**Community Development Trusts** – Local development trusts Storas Uibhist and North Uist Development Company may also be suitable lead organisations for this initiative given their involvement in many previous projects and capacity as local anchor organisations.

**Community Councils** – Individual Community Councils may also be suitable as lead organisations given the relatively small populations and areas they represent which may prove good sizes for piloting community cars.

### Sourcing Funding

Although business models to cover the running costs of this initiative are viable, as shown in the Rousay example, launching and sustaining community car clubs will likely require funding. The organisations and sources below are the best suited to support this initiative:

**Paths for All:** A Scottish charity promoting everyday walking and supporting a wide range of sustainable transport projects. Paths for All support diverse transport projects which encourage changes in everyday travel behaviours through the Smarter Choice, Smarter Places fund. Helping groups across Scotland to develop active travel for shorter journeys and better, public, community and shared transport services for longer journeys. They would be a key funder for any community led transport projects in Scotland (Paths for All, 2023).

**Energy Savings Trust:** A key funder in Scotland for electric vehicles, the Energy Savings trust could support this project through the Plugged in Communities Grant which helps community transport operators purchase electric vehicles and has previously been awarded to Tagsa Uibhist (Energy Savings Trust , 2023).

**CoMoUK:** A charity working across the UK for the public benefit of shared cars, bikes e-scooters and rides. With over 20 years of experience in promoting shared transport modes, CoMoUK are well placed to assist communities on developing ideas and delivering projects when anything “shared” is involved. CoMoUK work with a number of community groups across Scotland to design shared transport schemes from the ground up and thus could be a helpful agency for developing shared transport on Uist (CoMoUK, 2023).

**Ecocars:** For long term expansion of this project across Uist it may be helpful to work with Ecocars, an Orkney based second-hand electric vehicle car dealership. Ecocars deliver across the UK and have been an important part of the rapid uptake of EV’s across the Orkney islands. They could be a useful partner in sourcing affordable EVs for communities across Uist (Ecocars, 2023).

### Pilot project

As proven in the case studies above, shared electric vehicles for Island communities can be successful in creating more sustainable transport options for local people. The first step in bringing this approach to Uist would be to launch a pilot with a local community. This would allow a trial of the approach within the unique local context of Uist and lessons to be learned for further roll out of shared community vehicles and other transport interventions.

A lead organisation could advertise for interested pilot communities through local media outlets or social media pages. The following criteria are also worth considering when selecting a pilot:

- **Charging access:** Are there accessible charging facilities nearby or could a solution using a supportive household and a domestic charger be found?
- **Transport need:** What are the transport needs of the local community? What journeys are people typically making and would a community vehicle be a good fit for these? It's important that the pilot community are enthusiastic about the project and happy to be local leads.
- **Local Community:** As was the case in Orkney it may be that a smaller, distinct community would be a good way to begin the project. This would make it easy to identify service users, arrange and coordinate a booking process for the vehicle and build some community momentum for the project. A township or smaller island within Uist could serve this role.

## Summary

Given the advanced state of the technologies involved (electric vehicles), relatively low running costs and falling prices on EV's, alongside learnings from successful case studies in similar settings across Scotland, it is possible to establish shared community transport vehicles in Uist.

There are a number of local organisations who would be well placed to lead in developing such projects as well and suitable grants available to help establish the project. As set out above, a shared community transport vehicle could be trialed in a smaller, distinct community within Uist and, if successful, replicated across the Island chain. The ULEP community engagement has evidenced interest and demand for such projects and this feasibility work demonstrates the possibility.

## References

- Aquaterra. (2019). *Uist Energy in Motion* . Stromness: Aquaterra.
- Community Transport Association. (2023, 03 01). *What is Community Transport*. Retrieved from Community Transport Association: <https://ctauk.org/about-cta/what-is-community-transport/>
- CoMoUK. (2021). *Car Club Annual Report Key Findings Scotland 2021*. Edinburgh: Co-Mobility UK. Retrieved from <https://www.como.org.uk/documents/car-club-annual-report-key-findings-scotland-2021>
- CoMoUK. (2023, 03 20). *Home*. Retrieved from CoMoUK: <https://www.como.org.uk/>
- Driving Electric. (2023, 03 02). *Your Ultimate Guide to Buying and Owning an Electric Car*. Retrieved from Driving Electric: <https://www.drivingelectric.com/>
- Ecocars. (2023, 03 20). *Home*. Retrieved from Ecocars: <https://eco-cars.net/>
- Energy Savings Trust . (2023, 03 20). *Home*. Retrieved from Energy Savings Trust : <https://energysavingtrust.org.uk/>
- Paths for All. (2023, 03 20). *Home*. Retrieved from Paths for All: <https://www.pathsforall.org.uk/>
- Rousay, E. a. (2022, 06 01). Personal Correspondance . (C. E. Scotland, Interviewer)
- Rousay, Egilsay and Wyre Development Trust . (2023, 03 02). *Car Club and Booking*. Retrieved from Rousay, Egilsay and Wyre Development Trust: <http://www.rewdt.org/carClub.php>
- Tagsa Uibhist. (2023, 03 01). *Home*. Retrieved from Tagsa Uibhist : <https://www.tagsa.co.uk/>
- Transport Scotland. (2021). *Report on Public Electric Vehicle (EV) infrastructure in Scotland - Opportunities for Growth*. Edinburgh: Transport Scotland.



## Uist Local Energy Plan – Early Stage Feasibility Study –

### Community Idea:

Create more community growing spaces, including more allotments, and food growing groups

Much of the information for this Mini Feasibility Study has been taken from the most recent local research into growing and local food: Tagsa Uibhist's report published in February 2023, *Small is Beautiful, Growing a Sustainable Local Food Eco-System in Uist* (MacKenzie, 2022).

Tagsa Uibhist was funded by The Pebble Trust in 2022 to undertake research with local producers, consumers, and experts to provide new insights to strengthen the local food economy with an emphasis on environmental and social sustainability, resilience, affordability and on broadening access to low-cost nutritious food. A copy of the full report can be obtained from Tagsa Uibhist (Tagsa Uibhist, 2023).

### **Technology and conceptual overview:**

Small island communities who rely so heavily on long food supply chains are especially vulnerable to food insecurity; the rising cost of food is being felt by households in Uist and is exacerbated by ferry problems and the rising cost of fuel. These islands which once contributed to feeding the nation during wartime, and which still export huge amounts of livestock, fish, and seafood, are now almost completely reliant on finished food products transported on a CalMac ferry.

Island systems are among the most vulnerable to the impacts of the climate emergency, in particular, warmer, wetter, and windier weather, as well as rising sea levels. As the Intergovernmental Panel on Climate Change (IPCC) predicts a widespread deterioration in food security in the coming years, a reevaluation of our food systems has never been more critical. Yet, the solutions for a resilient food system are often close to home and communities in the Outer Hebrides are well placed to draw upon human and natural resources to respond to the threat of deteriorating food security. The communities of Uist are blessed with an abundant eco-system and have the potential to combat climate change whilst safeguarding our food system.

Yet, a food growing culture which was more commonplace in previous generations is not as present now because *'most able-bodied people are out working'*. Most islanders work multiple paid and voluntary jobs, crofting and undertaking care duties within the community and across their family networks. It is an inherent part of island life which allows for a very connected community as residents perform a number of crucial functions for the community's well-being. Work patterns, dietary habits and roles within the family have changed over the years. The busyness of life makes convenient, easily accessible food a priority and more appealing. Growing your own produce can involve a huge effort. However, the rising cost of living, Brexit, transport disruptions and inflation costs on goods and services being felt across all food sectors and within the community has upended the status quo. The





precarious nature of our access to sufficient nutritious food is stark and demands that we look at solutions rooted in our island communities.

## **Introduction to the technology/ initiative proposed**

The proposal from the Local Energy Plan community engagement is to create more community growing spaces, including more allotments, and food growing groups. The following case studies illustrate ideas for projects from other islands:

### **1. Rousay, Egilsay & Wyre Development Trust Allotments Association:**

Rousay, Egilsay & Wyre Development Trust (Orkney) set up allotments and Community Gardens in 2011 with funding from the Climate Challenge Fund to reduce their carbon footprint by reducing food miles and encouraging local growing. Eight large allotment strips have been created, and a large polytunnel was also erected housing 12 plots which are rented to local residents. Members of the allotments can also hire equipment to use on the site or in their own gardens.

The Membership Fees are £5 a year plus:

- £20 annually for an outside allotment plot including the use of a shed
- £10 annually for a bed in the polytunnel

The Community Garden is located at the primary school and is used as a community facility and outdoor learning environment which comprises of raised beds (for accessibility) a poly-tunnel and decking areas which includes a bird hide.

The Allotment site is located adjacent to social houses and offers external allotment plots, and plots inside the poly-tunnel.

Learning: The allotments were very active in the first two to three years at the allotment site but unfortunately with turnover of social housing residents, some of the new householders have not taken up the plots and therefore some of the plots are unused at the moment. (Rousay, Egilsay and Wyre Development Trust, 2023)



## 2. Bernera Community Association



Bernera Community Association (Lewis) were awarded £8,000 from Tesco Bags of Help to encourage local residents on the island of Great Bernera to grow their own vegetables. The site is run day to day by volunteers and the produce is used by the nearby Community Café and the Soup and Sandwich Club that meet in the Community Centre. The community, including Bernera Primary School, are encouraged to come along to help in the tunnels and to grow their own. Their project has given the community robust, weather and rabbit proof poly-tunnels. The new structures needed to combat a short growing season, storms blowing

in from the Atlantic, heavy acid soil, constant high-water table and a plague of determined rabbits. Keeping ethically green, pipes and blocks of polystyrene washed up on the shore from the fish farm industry were collected to make the skeleton, provide insulation and drainage, then covered with Shetland Polycrub. Local voluntary labour cleared and levelled the ground with road chippings left from road surface works. "We provide more fresh produce to the community and bedding Plants for a new community garden to brighten up local homes. Volunteers have taken a great pride in the buildings and continue to gain satisfaction from growing their own plants in a construction they have been involved in putting up. The other good thing is the structures have inspired at least two residents on Bernera to build their own based on the same design." - Colin Halliday, Volunteer (Greenspace Scotland, 2023)

## 3. Gàradh a' Bhàgh a' Tuath

Gàradh a' Bhàgh a' Tuath is a horticultural-based project offering a range of facilities to the community of the Barra and its neighbouring Islands. They grow and sell local produce whilst helping people with special needs and reducing the carbon footprint of the local area. Through a range of community gardening and conservation activities they improve the environment and health of the area.





Throughout the year Gàradh a' Bhàgh a' Tuath have seasonal vegetable produce available to buy, along with hardy Barra shrubs for planting hedges and a diverse range of perennials. They also sell vegetable seedlings in the spring and in spring and early summer they have abundant supplies of bedding plants! (Gàradh a' Bhàgh a' Tuath, 2023)

## **Previous work and existing initiatives in Uist:**

There have been many growing initiatives in Uist over the last 20-30 years. Here are some examples of legacy projects:

### **1. Sustainable Uist**

As part of its long term plan to substantially reduce carbon emissions in the southern Hebrides, Sustainable Uist embarked on a local food programme in 2010 with the aim of reducing so called 'food miles' by encouraging more production and availability of locally produced food. Early on it discovered that very few home grown vegetables and salads were produced locally compared to other areas of Britain, and when asked why, local residents said 'it's too difficult'. Sustainable Uist set out to discover if this was true, if so what the reasons were, and if the difficulties could be overcome (Sustainable Uist, 2012).

The aims of the project were:

1. To build on the findings of the vegetable growing research completed in 2010-11 by repeating the growing techniques which delivered the best results on a larger scale. Also to try new ideas for those crops which failed. The results to be disseminated through Open Days, Evening Classes, Growers' Forums and a project leaflet entitled Growing Vegetables on Uist Machair Soils.
2. Demonstrate and promote one of the key elements of year round local food - winter salad production - using the 100m<sup>2</sup> sustainable greenhouse in which day length is increased using LED lighting powered by a small wind turbine. This aims to raise 2,000 lettuces over the winter of 2011/12.
3. To repeat the preliminary growing trials already carried out on the machair soils at Liniclate on the peaty black soils of central and eastern Uist.
4. To build a new community greenhouse which would be set up as a test allotment arrangement for up to 8 tenants.
5. To host a Uist Local Food event, the primary purpose of which would be to see if there is an unfulfilled need for a local food supply chain.

The work lasted for two years and was carried out on ½ acre of machair land at Liniclate on Benbecula. In the first year around 50 crops were grown in 10 different ways using different cultivation methods. In the second, the best results from the first year were re-tested on a larger scale to confirm they were correct. This pamphlet sets out how the best results for a wide range of crops were achieved, and why it was not possible to grow some at all!

It was discovered that there are three main factors which make growing vegetables and salads on Uist a lot more difficult:



1. The challenging climate – particularly the high average wind speeds all year.
2. The very poor soils.
3. The short winter and long summer days which mean plants behave differently to those growing in southern Britain.

In April 2011 Sustainable Uist was awarded around £30,000 by the Climate Challenge Fund to continue the Uist Local Food project started the previous year.

During 2010 a self-build 100m<sup>2</sup> greenhouse was built at the Liniclate site. The aim was to look at the benefits of growing crops inside in the short Uist growing season. In particular an experiment was carried out looking at whether this could be extended by growing crops under artificial lighting using a wind turbine to supply the electricity. Noticeable differences in growth rates were recorded between the lit and unlit crops and this idea does therefore hold out some hope for the future.

Following a request from a number of islanders living and gardening on the peat soils on the east side of the Uists, a vegetable growing trial, parallel to that at Liniclate, was carried out on a croft on Grimsay Island, North Uist. This set out to establish a similar set of guidelines for growing vegetables and salads in this very different soil type. By adopting the lazy bed technique, used by the local crofters for generations, good growing conditions were eventually established by midsummer and a number of brassica, legume and beet crops were successfully grown.

The conclusions from the Sustainable Uist projects confirmed that not only a wide range of foods could and were being produced on Uist, but that there was real demand for these from consumers. The results pave the way for a new direction for Uist Local Food where direct action can be taken with confidence to develop the local food economy in the future.

The conclusions of the Sustainable Uist Project were:

- The trials established that it is possible to grow a wide range of vegetable and salad crops on the islands for a good part of the year.
- The potential CO<sub>2</sub> emission savings from developing this local food industry are significant and have a good chance of becoming permanent and therefore structural.
- The community response suggests that despite thinking that growing vegetables and salads at home is a great idea, in practice relatively few people are willing to get actively involved.
- Sustainable Uist is reviewing the possibilities of setting up a medium scale vegetable and salad production unit based on some form of Community Enterprise.

## 2. Tagsa Uist

Tagsa are now pursuing a **Uist Community Food Hub** and value chain development project on the back of the findings from their report 'Small is Beautiful'; linking up with Cothrom who will provide the training and skills development element of the project. A funding proposal has been submitted Tagsa are also in talks with CNES, Soil Association, Scottish



Rural Network, Nourish Scotland and local producers concerning local procurement contracts.

Recognising the challenges of Uist's geography and dispersed communities Tagsa are also wanting to meet people where they are at with their various food needs. They are looking to expand the product range of **NeighbourFood** to include more staple produce and include a refillery service. Tagsa hopes to take NeighbourFood on the road to communities with a delivery van service, outfitting one of their electric vehicles, to make this food service more accessible to all. They are also proactively pursuing a **Meals on Wheels** service, in collaboration with Macleans Bakery and Tagsa's care department, to provide nutritious ready meals with local produce for our vulnerable elderly living on their own in Uist. Tagsa is looking to model a full circular economy involving in the sharing, reusing and recycling of all the materials and products in this local supply chain so there is limited waste. The larger producers are also interested in 'gifting' produce which illustrates the principles of reciprocity and the gift economy at work within these island communities which aligns more with Doughnut Economics.

Tagsa is also planning to work with the Uist Agriculture Show committees, Taigh Chearsabhagh and local third sector partners to have a **festival of events** to encourage the sharing of food and knowledge of growing in social spaces. They are planning to organise a series of harvest events to launch their Meals on Wheels service centred around *Lùnastal*; one of the four Gaelic seasonal festivals.

The Tagsa Community Gardens team is focused on developing the **Tagsa community gardens** site at East Camp in Balavanich into a more appealing and accessible space for visitors, staff and volunteers and turning their volunteer shed into a community cafe and venue space. In addition to the site changes the community gardens team have concentrated their efforts on popular staple produce and delivering high quality vegetable plants and produce to the community; a key recommendation from the 'Small is Beautiful' study. Owing to the challenges within the current food supply chains Tagsa are trying to respond by getting more local produce into the local food system and helping people to grow their own with our vegetable plants. In time they hope to develop their outreach horticultural support and training.

Tagsa are taking an **advocacy role** within Uist on local food development as a result of their research to date which provides clear data on community need. In partnership with Nourish Scotland, in January 2023 Tagsa launched **Our Right to Food** survey to explore, compare and make sense of how the availability and price of foods differ across Uist & Barra and against mainland prices and supplies. They recruited 24 community researchers from Berneray to Barra, representing 8 Outer Hebridean Islands, to undertake this study. One key outcome has been the setting up of a local food lobbying group to tackle key food security issues and on the recommendations of Peter Faassen de Heer, Senior Policy Manager from the Directorate for Population Health, Scottish Government, Tagsa hope to submit their findings to MSP Jenni Minto – Minister for Public Health.



Tagsa are also leading on the development of a **Western Isles Food Partnership**; taking a whole food systems approach involving regional and national organisations represented in the Outer Hebrides with the goal of achieving a Sustainable Food Places award for the Western Isles. The WIFP will also have a role in the development of Local Good Food Nation Plans as set out in the Good Food Nation Act.





## Barriers and opportunities for implementing technology/ initiative in Uist

The following barriers exist to growing and local food projects in Uist:

**Geography:** Uist's linear geography, which extends 60 miles from Berneray to Eriskay, with a population of approximately 4,500 people, can make buying and delivering food difficult. The townships with shops are located in Eriskay, Lochboisdale, Daliburgh, Creagorry, Balivanich, Lochmaddy, Sollas, and Berneray with many households located many miles away from the nearest outlet. This in contrast to just two or three generations ago, preceding the islands being linked by causeways, there would be a merchant's shop in every community.

**Weather and Climate:** Producers are acutely aware of the shifts in the weather patterns due to the changing climate and the difficulties the weather conditions can bring. Island people are resilient and resourceful and have adapted to these changes, reverting back in part to traditional methods or adopting new techniques and materials to weather the storms. Producers are in tune with the ebb and flow of the climatic conditions and have altered their stock to hardier varieties of crops or traditional/ indigenous breeds of animals which can winter outside.

**Lack of Access to Suitable Land:** 6.2 million hectares of land is farmed in Scotland (approximately 80% of the total land area). Of this area, 86% is classified as Less Favoured Area, that is land considered to be more difficult to farm because of climate and soil conditions (this includes crofts in Uist).

**Vacant and Under-Utilised Land:** Vacant or underutilized croft land is a missed opportunity particularly when there's a substantial part of the community willing and able to grow more food. There is a mismatch between who has control of land and who would want it even in an informal basis such as a sublet. Yet as highlighted by one interviewee - 'People hang on to their crofts because it's what ties them to the land'. This is an emotive topic which has roots in the brutal clearance of people from their land by landowners to make way for more profitable sheep. Any reform of crofting tenure to address the lack of access to crofts for new entrants would require a grassroots approach. The people who have worked the land would need to be part of that journey. It is essential that a land management strategy is put in place to unlock the potential Uist has to adapt and mitigate the future challenges ahead which including crofting succession plans, climatic variations, economic shocks and enabling communities to transition to a good food nation.

**Regulation Challenges for Small Businesses:** Small scale producers with the potential to supply the market may be put off by the need to meet food hygiene, environmental health, and accountancy regulations. This may require training, cost, and administration time which small-scale producers may not be able, or willing, to invest.

**Supermarket Competition:** Matching the convenience, diversity and regularity of supermarkets is always going to be difficult for small-scale producers. Supermarket produce is not constricted to seasonality factors in the same way as local fruit and vegetable producers on the Islands are faced with due to a short growing season. Customers can buy avocados



and mangos 12 months of the year in local supermarket. Creating a regular and consistent throughput of produce to a local market is challenging. To be able to compete with supermarkets, customers would need to opt for the quality, freshness, seasonality and provenance of local produce.

**Economies of Scale:** Local producers cannot easily compete with large mainland producers who drive down their unit costs through economies of scale – which has impacted the model of farming elsewhere, the drive for more volume at cheaper costs, leading to more monoculture which is now in trouble for its contribution to emissions and fall in diversity. However, crucially, the true cost of food is not reflected in the cost of imported goods. Pricing mechanisms to embed environmental externalities in the cost of food, for example the CO2 emissions emitted in transportation, the environmental damage caused by intensive farming methods and the enormous quantities of food waste. Producers are pressured to meet extortionate costs for imported goods and services. There has been a significant increase in the cost of seed, animal feed, fertiliser, plastic wrapping to name but a few items.

**Pricing:** Producers interviewed by Tagsa Uibhist reflected that if they were to sell local fruit and vegetables at a price that included all of the hidden costs of production, it may be unaffordable. On the other hand, some of the interviewees who grow vegetables are retired and do not wish to make money from sales of their produce but were wary of selling for a very low price in case this undermined local producers who were trying to make a living. These interviewees were more interested in sharing their produce than selling it. A challenge is deciding on a price point which is both competitive and sufficient to make the work and investment worthwhile for producers.

**Lack of Processing, Finishing and Storage Facilities:** Local producers in different food sectors, are stymied by the lack of aggregation, processing, finishing and storage facilities on Uist. This prevents much of the produce entering the local food system.

**Few Places to Sell Local Produce:** Related to the above is the lack of a market for local produce, or even a procurement policy by supermarkets or the local authority to buy locally.

**Time Poverty:** One of the symptomatic pressures of modern life - not having enough time - was a recurring theme in our interviews. Creating and maintaining a productive garden or selling produce, can demand a significant time commitment, especially if done alone. Many islanders work a number of jobs and have responsibilities for children and elderly relatives, so finding the time to grow is more challenging without teamwork and planning. The people we interviewed who were successfully growing fruit and vegetables at scale were either doing so as part of their role within a third sector project enabled through grant funding, retired people, full time crofters or people working part time who were growing to supplement their income.

**Problems with Funding:** Third Sector Organisations in receipt of funding for growing initiatives, and who sell fresh produce locally, for example in veg boxes, can increase the competition that small scale producers have to contend with. These community-based organisations are effectively subsidised and may be able to offer lower prices than small-scale



producers who need to rely on sales for their time and inputs. The lack of coordinated grant funding to develop a local food system has also led to piecemeal and fragmented operations throughout the islands. These projects tend to be short term and not coordinated with other compatible projects. With many small grants, some from the Scottish Government and local government, and some from trusts and foundations, there have been a multitude of mini projects with an initial outlay of equipment such as polytunnels. In most of these projects, once funding dried up, or the driving force from a key individual left the operation, the project declined and stopped.

The following opportunities exist to encourage growing and local food projects in Uist:

**Access to Land and Supporting Small Scale Producers:** Improving access to land for new entrants who want to grow food is critical. Alongside this it is vital to build synergies in how land is used to align to the environmental, social, and economic demands of the 21<sup>st</sup> century. This will mean considering how people with a range of time commitments can profitably contribute to local food production and to maintain local value chains and market linkages for the local market.

**Vegetable Seedlings:** Tagsa Uibhist' Community Gardens provides seedlings throughout the year. These are established vegetable plants that have been grown and hardened off outside. Customers can trust that they are suitable for the conditions. This assists growers by reducing the time and energy spent growing from seed, especially for those with time in short supply.

**Polytunnels:** The lack of natural shelter for crops has always been a key challenge in Uist. Polycarbonate tunnels which were piloted in Shetland have unlocked the potential of growing more produce under cover and extending the growing season. Growing is still limited by the winter daylight hours but good crop selection and timing can allow crops to be harvested all year round. Polycarbonate materials are expensive to buy and setting up the necessary infrastructure to grow produce either commercially or for one's own consumption is time consuming.

**Seaweed and Manure:** The crofters Tagsa Uibhist interviewed highlighted these increasing costs and the importance of drawing on local solutions such as gathering seaweed and animal manure for fertiliser, choosing indigenous breeds of animal stock to winter outside and sourcing established vegetable plants locally.

**Cross Generational Support:** Uist has a high proportion of elderly people living alone who could be kept healthier with the support from younger generations. This could be through helping older people to maintain 'kitchen gardens' for example, or to hold social events where people can cook and eat together. The many benefits of producing your own food can be imparted in informal and social settings. An exchange of traditional knowledge is crucial to the wellbeing of young and old.

**Sharing Knowledge:** Food focused Community events can facilitate learning from experts within the community, whilst also encouraging a growing culture. Uist has many kitchen facilities in community and church halls that can be used. Older people can help educate



younger generations on how to cook economical and nutritious meals from local produce and to use every part of the produce. This could help families save money, time, and energy which in a cost-of-living crisis is invaluable. Formal qualifications, whilst important, are not the only way to learn and share knowledge!

**Power up a Gift Economy:** Producers believe that there is huge potential to increase the amount of local food available to the local community. As noted above, a strong theme that emerged is that increasing access does not necessarily mean through sales. For many producers, sharing and bartering fresh produce is attractive and has merit. Frequent ferry disruption means that shelves are often empty in shops, particularly of fresh fruit and vegetables. Local producers were clear that this could be one of the responses to improve access affordable nutritious food. This would build more of a well-being community rather than tied to a purely economic paradigm, which is how this community operated previously.

### **Next steps to take initiative forward**

There is a need for increased access to growing spaces, providing start-up funding, agricultural and horticultural training building on the nationally accredited Crofting and Local Food Production courses which were written in Uist. There is a need for additional support for community-led initiatives at a micro-scale as well as small businesses.

A progressive land management strategy is essential to unlock the potential Uist has to adapt and mitigate the future challenges which include crofting succession plans, climatic variations, economic shocks and transitioning to a Good Food Nation. A concerted effort is required to open up access to land for new entrants and look at a tapestry of land uses which complement and aid one another within the landscape which aligns to the environmental, social, and economic demands of the 21<sup>st</sup> century.

Growing staple produce and introducing traditional/ indigenous varieties of crops that have been developed to be resilient to local weather, such as the internationally recognized landrace Bere Barley which doesn't require high inputs. Providing vegetable plants that would limit the time and energy spent on growing produce from seed and working in sympathy with the environment and community which is intrinsically interdependent, interconnected and intergenerational.

There are strong calls from community members to significantly reduce the numbers of deer from Uist. This is due to destruction of gardens, crops, trees and the negative impact on biodiversity, the risk of Lyme Disease caused by ticks carried by deer and the opportunity costs of not managing the land to produce more food and to prioritise the environment. Further discussion is needed on this. Further information on the impact of deer in the Uist community can be found in Bornish Community Council's *Survey of the Impact of Deer in our Community*.



The Scottish Government can rekindle communities towards a growing culture through holistic land management strategies and policies which support different land uses under the one banner. With the new Agriculture Bill in motion, there is an opportunity to support a connected approach to land management which blends regenerative farming, woodland and horticulture in the form of a crofting woodland garden grant.

## Pilot Project Opportunities

The following opportunities are from recommendations which were made in *Small is Beautiful*:

- **Small is beautiful:** Food growing initiatives and projects to be rooted into the community, evolving slowly, and led by community members will help build a resilient local food system. Many producers in Uist are not chasing endless growth but favour scaling deep based on the recognition that culture plays a powerful role particularly with respect to reciprocity. Rather than introducing top-down approaches, the development of local food in Uist must be rooted in people, relationships, communities, and culture, including small scale producers as well as larger businesses and making linkages between them.
- **Exchanging Knowledge:** Establish community events to help promote a growing culture whilst utilising the many community and church hall kitchen facilities across the Islands for people to cook and eat together. Creating a network of 'Taigh Cèilidhs' communal warm spaces for the sharing of food and knowledge.
- **Working together:** All the producers wanted to be part of a local food network to aggregate and market food locally. The benefit is to be more than the sum of its parts and to create a system of collaboration where everyone benefits. It is believed that the local market, or the community food system, is too small for each small business and producer to compete against one another. Instead, it is beneficial to form cooperatives to share resources, skills, and knowledge.
- **Uist Local Food Market:** Secure funds and deliver a locally led Local Food Value Chain Development Project. This would support growers, provide infrastructure, and make market linkages with shops, restaurants and hotels as well as establish local fortnightly Local Food Markets. Contribute to the provenance of food, an increasing important influence for buying choices for locals and visitors alike.
- **Local Food Box Schemes:** Preference for a local food delivery service distributing local produce to community hubs and townships. This could be coordinated with existing community transport links and food suppliers.
- **Meals on Wheels:** Establish a delivery service using fresh and healthy local produce for people who may find it difficult to make their own meals. This has the benefit of



increasing access to nutritious food whilst also supporting local businesses and producers.

- **Community Fridges:** This is an approach that is becoming more widespread and could work well in Uist. Fridges would be set up in strategic locations and would be stocked by local businesses with goods that wouldn't otherwise be sold in time, fresh produce from local gardeners, and food given by households.
- **Harness Local Government Procurement:** Establish a project to assist local growers to access procurement opportunities from Comhairle nan Eilean Siar and the NHS, for example for school meals and hospital cafeterias, so that local potatoes, vegetables, meat, eggs, and fish can be purchased locally.
- **Build Capacity to Establish Food Cooperatives:** A cooperative of crofters and growers would enable the aggregation of sufficient produce to allow collective bids for procurement, and to invest in storage and processing facilities. This is best achieved by building on smaller initiatives whilst providing training and support in the establishment of the cooperative, including the constitution, business planning, procurement bids and meeting all required standards.

### **Outer Hebrides Food and Drink Programme**

The Outer Hebrides Food and Drink Programme under the Islands Growth Deal offers an opportunity to invest in local food value chain systems by engaging directly with local producers (islands Deal, 2023). The Programme will be supported with investment of up to £1.5 million from the Scottish Government and will support capital investments agreed as priorities with community landowners, aquaculture and fishing industry representatives:

- Local food hub at Grogarry
- Ice plant, chill facilities and other improvements at pier head to facilitate local supply.
- Community food hub / food growing projects

As outlined in the priorities above, the Programme will set out to provide opportunities for local communities to lead the development of sustainable food systems and supply chains. The development of the Local Food Hub in Grogarry marks a particular opportunity for communities in Uist and a key project to engage with over coming years.





## References

- Gàradh a' Bhàgh a' Tuath. (2023, 03 01). *Home*. Retrieved from Gàradh a' Bhàgh a' Tuath: <https://www.garadh.co.uk/>
- Greenspace Scotland. (2023, 03 10). *Berneria Food Project*. Retrieved from Greenspace Scotland: <https://www.greenspacescotland.org.uk/news/berneria-food-project>
- MacKenzie, A. (2022). *Small is Beautiful, Growing a Sustainable Local Food Ecosystem in Uist*. Balivanich: Tagsa Uibhist. Retrieved from <https://www.tagsa.co.uk/how-we-help/small-is-beautiful/>
- Rousay, Egilsay and Wyre Development Trust. (2023, 03 20). *Allotment Association* . Retrieved from Rousay, Egilsay and Wyre Development Trust: <http://www.rewdt.org/allotments.php>
- Sustainable Food Places. (2023, 03 03). *Sustainable Food Places Scotland*. Retrieved from Sustainable Food Places: <https://www.sustainablefoodplaces.org/scotland/>
- Sustainable Uist. (2012). *Uist Local Food Project*. Balivanich: Sustainable Uist. Retrieved from <https://www.croftingyear.org.uk/userfiles/file/horticulture/Uist-Local-Food-Project-Final-Report-Pt-1.pdf>
- Tagsa Uibhist. (2023, 03 01). *Home*. Retrieved from Tagsa Uibhist: <https://www.tagsa.co.uk/>

# Uist Local Energy Plan – Early Stage Feasibility Study –

## Community Idea:

Investigate the potential for local wave and tidal energy (including tidal built into causeways) and implement projects accordingly

### **Technology and conceptual overview:**

The seas around Uist have huge potential to provide a world class source of sustainable renewable energy. Energy can be harnessed from tides, waves and offshore winds and due to the direct exposure to the Atlantic Ocean on the west coast of Uist there is abundant energy consistently available.

#### **Tidal Energy:**

Tidal energy is generated from the pull of the moon which creates the rise and fall of the tide around islands and headlands. This creates tidal streams in and around narrow channels such as causeways or inlets. The energy within these tides can be harnessed by a variety of devices which typically use turbines to generate electricity which is exported to land through undersea cables. The predictability and consistency of tides is a key advantage of tidal energy when compared to other renewable sources such as wind or solar energy.

Tidal barrages are dam or causeway like structures which allow water to flow into a bay or river during high tide, before releasing this water during low tide. This is done by measuring the tidal flow and controlling the sluice gates at key times of the tidal cycle. Turbines are placed at these sluices to capture the energy as the water flows through. Barrages can be combined with flood defences or causeways to bring economies of scale. As large infrastructural developments tidal barrages can be detrimental to coastlines, ecosystems and movement of wildlife and thus their placement must be carefully considered.

#### **Wave Energy:**

Wave energy is generated from winds generating seas and swells, and lunar and solar gravitational fields causing waves. Wave power is very dependent upon the weather and thus is randomly produced, although it is higher in winter and lower in summer which matches the seasonal variations in energy demand. It is possible to estimate the range of supply in advance which eases distribution to the grid challenges in variability, as faced with wind energy, remain. Various devices can be used to harness wave energy but most rely on a floating device which converts kinetic energy to electric energy through moving up and down on the surface of the sea.

#### **Offshore Wind Energy:**

Offshore Wind Energy, energy generated from turbines situated at sea, is a rapidly developing area of renewables. Offshore turbines are typically larger than their onshore equivalent, are able to take advantages of more consistent wind patterns than onshore locations and can face less opposition than onshore wind farms due to their distance from settlements. Offshore turbines are typically either “fixed foundation”, with rigid connections to bases on the seabed or “floating”, tethered to the seabed but with the core structure floating at the surface. Floating turbines have enabled the deployment of offshore renewables across a wider range of areas and enabled turbines to be build further from shorelines. The environmental impact of offshore wind farms is less understood than other renewable sources due to the nascent nature of the technology.

## Case study examples:

### **Tidal – Nova Energy, Shetland**

Nova Innovation operate a six-turbine tidal array in Bluemill Sound, Shetland (Nova Innovation, 2023). The array was first pioneered in 2014 with a single 30kW prototype turbine and since then has expanded with three larger 100 kW turbines installed in 2016 and the fourth, fifth and sixth turbines installed in 2020 and 2022 (Shetland News, 2023). Since 2016 the tidal array has exported energy to the Shetland grid through a subsea cable, powering homes, commercial buildings and the world's first 100% tidal powered electric vehicle charge point. Nova Innovation are now planning to expand their generation in Shetland with a larger tidal array between the Islands of Yella and Bigga (Nova Innovation, 2022).

Whilst the success of Nova's Bluemill Sound array is partially due to the external factors (suitability in location and access to the grid), it is encouraging to see a Scottish success story for tidal energy and highlights the potential for replication in other Scottish Island locations such as Uist.

### **Wave - Albatern, Isle of Muck**

Albatern are a Scottish SME who developed a wave energy generation device called WaveNET which was trialled off the coast of the Isle of Muck in 2014 (Blain, 2014). The Isle of Muck is the smallest of the four "Small Isles", located in the Inner Hebrides. Albatern partnered with Marine Harvest Scotland to supply a fish farm with energy from their WaveNET devices whilst testing the survivability of the device in exposed waters. The technology proved successful in supplying power to the fish farm, although were only used to supply supplementary power on top of diesel generation. Application of the technology for rural islands are also mentioned but there is no record of demonstration projects as yet (GREBE, 2017). Whilst there is still a long way to go for the widescale adoption of wave power generation the successful deployment of Albatern's "WaveNET" is encouraging. Exploring the possibility of similar trial projects within Uist may be worthwhile.

### **Offshore Wind -**

Offshore Wind is a rapidly expanding industry within Scotland. Despite success in several locations off the East Coast of Scotland, such as Beatrice Wind Farm in the Moray Firth, Offshore wind in new to the West Coast and seas around the Outer Hebrides. Scope for community involvement in Offshore Wind development around Uist can be learned from looking at current plans for other Hebridean waters.

'ScotWind' was the first Offshore Wind for Scottish sites run by Crown Estate Scotland in 2021-2022. The leasing round included for 17 sites around Scotland, including three 'Hebridean' sites in the waters west, north and northeast of Lewis (Crown Estate Scotland, 2022). Canadian developer Northland Power were awarded Lease Options for ScotWind Areas N2 (1,500MW) and N4 (840MW) while Magnora Offshore, a joint venture between Norwegian Firm Magnora and French Company Technip F.M.C hold a Lease Option for ScotWind Area N3 (495MW) (Crown Estate Scotland, 2022). The developers are now conducting full environmental and site assessments before applying for Marine Scotland consents and Contracts for Difference. Final decisions to invest and develop the sites will not be made until 2028.

The scale and investment required to develop offshore wind farms has thus far presented a challenge for communities wishing to secure local benefit from offshore local energy resources. There is currently no requirement for offshore developers to provide community benefit, but it is increasingly commonplace as companies look to avoid controversy and build social capital. Communities on the Isle of Lewis were proactive in contacting prospective developers to discuss community benefit

options and have signed a Memorandum of Understanding with both developers with the aim of highlighting local projects which could be supported through community benefit funds or support (Comhairle nan Eilean Siar, 2022). It is expected that more detail proposals of community benefit arrangements will be published by developers in summer 2023.

Following the progression of community benefits from offshore wind in the Hebrides and across Scotland may be worthwhile for Uist communities to prepare for the potential of more local projects through future ScotWind Leasing rounds.

### **Previous work or existing initiatives in Uist:**

Several detailed reports and feasibility studies into the potential of Tidal and Wave energy in the seas around Uist, and the Outer Hebrides have been produced over the last 20 years. Much of the information within these reports remains relevant due to the climatic and geographical conditions remaining unchanged and slower than expected progress in the development of marine energy technologies or grid infrastructure. Summaries of the most relevant reports are given below.

#### **Development of Wave Energy in the Western Isles – Halcrow, 2008**

This study outlines the main issues related to the development of wave energy in the Western Isles and assessed the requirements of developers interested in wave energy projects in the Western Isles (Halcrow, 2008). The report finds that the wave energy resource in the Western Isles has an estimated annual mean wave power of 41 to 45kW/m of wave crest at the 50m water depth contour. As such, the potential wave energy available along the approximate 200km stretch of coastline of the Western Isles is about 8 GW. The report finds that extreme sea states faced in the Outer Hebrides will have an impact on both the operability and maintainability of prospective wave energy projects, and on the installation operations.

The report also involved circulating a questionnaire to a number of Wave Energy Developers on their interest in deploying wind energy devices in the Western Isles. Whilst all developers were interested concerns were held over the severity of the wave energy regime, the restricted availability of grid connections or capacity of export and the availability of a skilled local workforce or supply chain. Grid connection was outlined as the main engineering issue preventing wave energy development.

#### **North Uist Partnership Community Renewable Energy Study – RD Energy, 2009**

This report was written by R D Energy Solutions for the North Uist Partnership to investigate renewable energy options (wind, biomass and tidal technologies) for the islands of North Uist, Berneray and Grimsay (Solutions, 2009). There is a small section on the potential for tidal stream or barrage technologies within the study area however it is deemed that these technologies present little opportunity for the community due to the considerable capital cost, high environmental impact, lack of availability for grid connection and scarcity of suitable sites. Only one site, North of Berneray, is mentioned as having suitable tidal resource but the likelihood of a project being feasible in this area is low due to the factors listed above and the risk of impacting the local ferry service.

Wave energy is also considered with small to medium scale shoreline developments highlighted as having the highest potential for success, especially when paired with high consumer sites located near the shoreline. However, the report highlights that no devices have reached the stage where they could be deployed in this manner.

#### **Exploring the Potential for Constructing Tidal Turbine Races, Isles of Barra and Vatersay - University of Glasgow School of Engineering, 2013**

This MSc Thesis explores the potential for a tidal barrage scheme within the Vatersay Causeway south of Barra (MacInnes, 2013). Although not focused on Uist some lessons can be learned due to the proximity of the study area and similarity with some of the causeways in Uist. The report proposes an array of 9 turbines providing an output of 2.3MW (a slightly greater output than the existing back up diesel generator on Barra), paired with a pumped-water storage system next to the causeway. There is more work to be carried out to compile a full feasibility study, however, there is much useful information contained in this report and inviting researchers to consider similar approaches for causeways in Uist would be worthwhile.

## **Barriers and opportunities for implementing technology/ initiative in Uist**

### **Technical Readiness Level**

A significant barrier to development of tidal and wave energy generation in Uist is the technical readiness level of these technologies. Despite progress in wave and tidal energy technology made in the last 20 years, the reality is most devices are not mature or proven enough to be cost –effectively deployed beyond demonstration or research projects. The high capital costs and infrastructure requirements for developing marine energy still hamper the expansion of the industry and until devices are more reliable there is likely to be little scope for widescale deployment, particularly for community organisations given the financial risks involved. Industry experts predict 2035 would be the earliest that wave or tidal power generation will become more mainstream, however, there may be earlier opportunities to invite pilot projects to the waters around Uist (Enterprise, 2023).

### **Limitations to Grid Capacity**

Another major challenge to the deployment of marine energy projects in Uist, and indeed any new renewable energy, is the electricity network infrastructure. The network linking Uist to mainland Scotland is already at maximum capacity and despite planned upgrades to the Skye-Fort Augustus line, a key network bottleneck, and the possibility of a new interconnector between Uist and Skye, currently being explored by SSEN as part of the Hebrides and Orkney Whole System (HOWS) study with ED2, there is little scope for additional local generation due to existing queues for grid connections. Therefore, there is little scope for additional generation without significant reinforcement of the grid. The best avenue to explore this is engaging with SSEN through their HOWS work and making the case for proactive grid reinforcement for Uist.

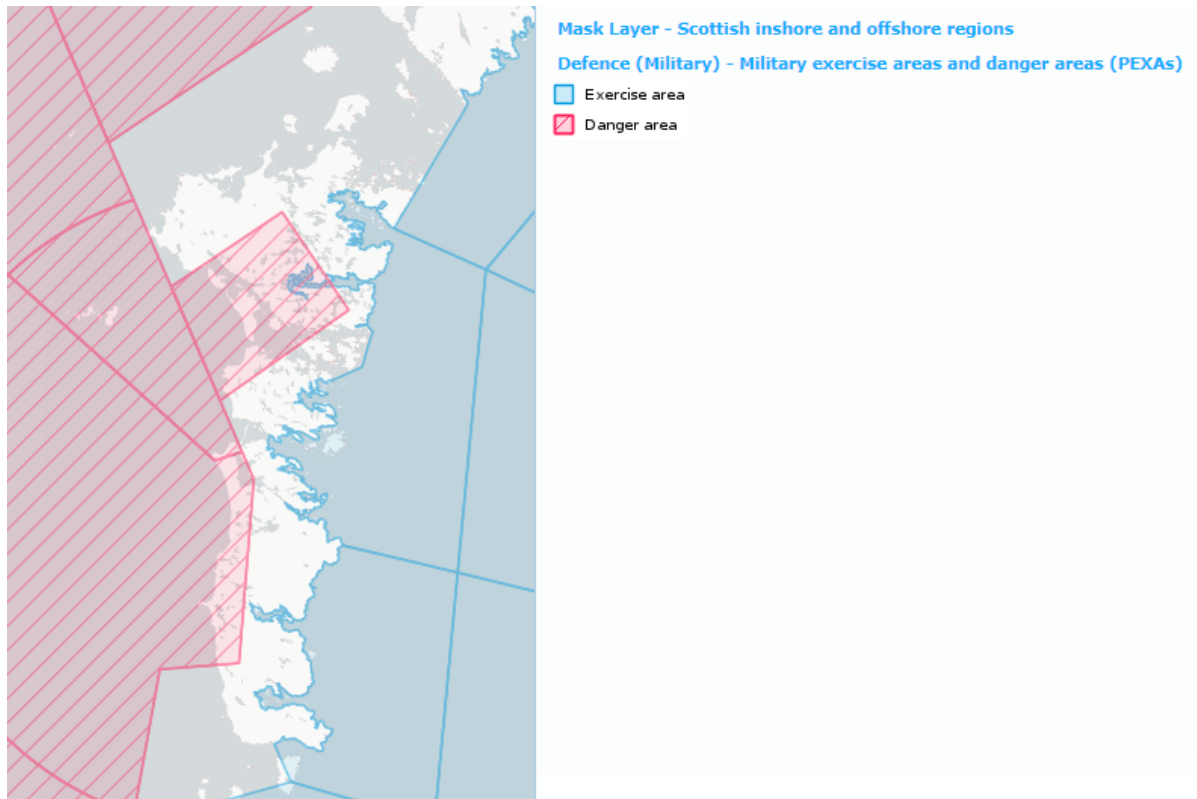
The capability of the existing network to accommodate small-scale projects is also questionable. This has the potential to restrict the viable installation of demonstration and small-scale projects, thus hindering technology testing and development.

### **Ministry of Defence Restrictions**

The Hebrides range, located to the north of South Uist and managed by QinetiQ, is the largest test range in the UK. The facility provides a controlled environment in which to conduct test and evaluation firings of land, sea and air weapons, the firing of in-service missile systems and the operation of unmanned air vehicles. Offshore practice and exercise areas are located to the west of Uist, cover much of the Sea of Hebrides and the Minches (see map 1). Submarine, aircraft and ship exercises take place in this region around two or three times a year.

It is not possible to define the constraints placed on any specific region by the MoD. Although it is possible to identify firing ranges and training areas (as indicated below), there is very little information available to judge if these activities might or might not represent a problem to marine renewables development. Therefore, at this stage they can only be flagged as a potential risk to future

developments. North Uist Development Company faced significant delays to the development of their two-turbine windfarm from the MOD due to a risk of interfering with air defence radar systems. This exact same risk is unlikely for any marine based devices due to their distance from land and lack of vertical profile, however, proactive engagement with the MOD is recommended regardless.

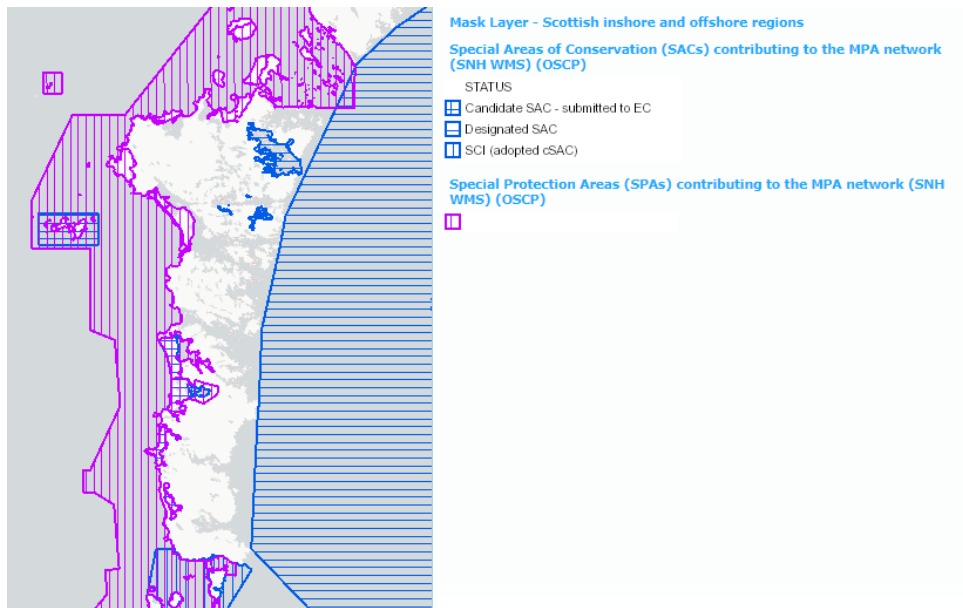


**Map 1.** Ministry of Defence exercise and danger areas surrounding Uist. (Marine Scotland, 2023)

### Environmental Designations

There are numerous designated areas in the Western Isles split broadly into offshore and onshore designated areas, including a large Special Protection Area (SPA), Special Areas of Conservation (SAC), National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI), Ramsar Sites and the Saint Kilda World Heritage located outside of the study area but possibly affected by a marine energy development. As seen below the SPA and SAC, to the west and east of Uist respectively, are likely to affect any marine energy deployment.

The Western Isles has a rich range of marine life which could be impacted by marine energy developments. The potential effects include collision risk, physical disturbance and marine noise, barrier to movement, habitat exclusion, substratum loss, smothering and changes in suspended sediment and turbidity.



**Map 2.** Environmental Designations in the waters around Uist. (Marine Scotland, 2023)

### Other

Wave energy projects will share the sea space with a number of other sea users and should therefore be located to cause minimum disturbance. There is a Deep Water Route located off the west coast of the Western Isles, which is the recommended route for large vessels and laden tankers of over 10,000 tonnes, and the high vessel traffic density area to the south of Barra. Wave energy developments could also affect fishing activity. Therefore, any prospective developments would require significant community engagement.

### Next steps to take Marine Energy opportunities forward

#### Organisation to take lead

**Comhairle nan Eilean Siar** - The local authority has previously looked at creating a Wave Energy Zone within the Outer Hebrides to explore wave energy devices and the work undertaken to develop these plans could be revived if there was substantial local interest and potential. Engaging with the Comhairle and collaborating on any shared ambitions will be important.

**Uist and Barra Local Energy Forum** – The Uist and Barra Local Energy Forum was a collaborative initiative set up by local authority officers, councilors and community organisations. The Forum set out with the intention of exploring opportunities to develop the energy systems of Uist and Barra, develop renewable energy and capitalize on opportunities presented by emerging technologies such as Hydrogen. The Forum could be the best local body for further exploration of marine energy opportunities in the seas around Uist.

**Wave Energy Scotland (WES)** - WES are a subsidiary of Highlands and Islands Enterprise who serve as a research and development body for wave energy across Scotland with the aim of ensuring Scotland is a world leader in developing wave energy devices. They share opportunities for research and industry partnerships and may be a good port of call for communities wishing to explore local opportunities or just learn more about wave energy development in Scotland (Wave Energy Scotland, 2023).

**European Marine Energy Centre** - Established in 2003, the European Marine Energy Centre (EMEC) Ltd is the world's first and leading facility for demonstrating and testing wave and tidal energy



converters in the sea. EMEC is also pioneering the development of a green hydrogen economy and smart local energy systems. Both for their extensive expertise and industry contacts EMEC are a key contact for any marine energy developments across Scotland (European Marine Energy Centre, 2022).

### **Potential funding pots**

There are currently no funding sources designed for marine energy projects. Therefore, networking with the support bodies listed above to explore potential for partnering or engaging in trial projects.

### **Pilot Project Opportunities**

As mentioned above, exploring pilot or partnership opportunities, likely holds the most potential for marine energy around Uist.

Any project will require early negotiation with statutory bodies and key stakeholders will be essential to the successful implementation of a MEZ. This will include discussions with the Scottish National Heritage (SNH), the Maritime and Coastguard Agency (MCA), the Crown Estate, the Ministry of Defence (MOD) and representatives from the local fisheries industry. Consultation with SHETL will be needed to find a solution to the grid constraint problem. Early liaison with EMEC is recommended to assess their interest in a complementary satellite operation in the Western Isles.

Although the outlook for tidal or wave energy generation in Uist is not currently particularly positive, the world class energy resource around the coasts of Uist may well be worth exploring through small scale, off-grid pilot projects. Proactive engagement with device developers or technology bodies is recommended.

### **ScotWind 2**

Later this year Crown Estate Scotland are expected to progress plans a ScotWind 2 leasing round which will see more areas of Scotland seabed open for Offshore wind development.

The ScotWind Lease Areas are based on Offshore Wind Areas of Deployment identified in Marine Scotland's Sectoral Marine Plan for Offshore Wind. Early iterations of the Sectoral Marine Plan included a candidate Offshore Wind Area of Deployment between Barra and Tiree. This Area of Deployment was removed from the SMP in 2019 on the grounds of the distance from the grid and a risk of constraining shipping routes into the Southern Minch. Emerging opportunities around Green Hydrogen production linked to Offshore Wind may warrant a reassessment of this area and a smaller Area of Deployment around Barra would have less impact on shipping.

The Comhairle are currently involved in discussions with Marine Scotland on the possible reinstatement of a smaller Offshore Wind Area of Deployment around Barra. There is no guarantee that Marine Scotland will agree to this reinstatement but, if it does, significant opportunities could be opened up for Green Hydrogen production in Barra and / or South Uist. Engaging with the Comhairle, potentially through the Uist and Barra Local Energy Forum, would allow communities to keep abreast of any developments.

## References

- Blain, L. (2014, 09 26). *WaveNET – the floating, flexible wave energy generator*. Retrieved from New Atlas: <https://newatlas.com/albatern-wavenet-squid-floating-wave-energy/34942/>
- Comhairle nan Eilean Siar. (2022, 07 17). *Estate Group and Comhairle Team Up to Maximise Windfarm Community Benefit*. Retrieved from Comhairle nan Eilean Siar: <https://www.cne-siar.gov.uk/news/2022/july/estate-group-and-comhairle-team-up-to-maximise-windfarm-community-benefit/>
- Crown Estate Scotland. (2022, 01 7). *Scotwind list of successful project partners*. Retrieved from Crown Estate Scotland: <https://www.crownestatescotland.com/resources/documents/scotwind-list-of-successful-project-partners-170122>
- Crown Estate Scotland. (2022, 01 17). *ScotWind offshore wind leasing delivers major boost to Scotland's net zero aspirations - News*. Retrieved from Crown Estate Scotland: <https://www.crownestatescotland.com/news/scotwind-offshore-wind-leasing-delivers-major-boost-to-scotlands-net-zero-aspirations>
- Enterprise, H. a. (2023, 01 21). Personal Correspondance . (C. E. Scotland, Interviewer)
- European Marine Energy Centre. (2022, 03 03). *Home*. Retrieved from European Marine Energy Centre: <https://www.emec.org.uk/>
- GREBE. (2017). *Albatern WaveNet Device*. Northern Periphery and Arctic Programme, European Union. Retrieved from <https://grebeproject.eu/about-renergy/>
- Halcrow. (2008). *Development of Wave Energy in the Western*. Halcrow.
- MacInnes, A. (2013). Exploring the Potential for Constructing Tidal Turbine Races, Isle of Barra and Vatersay.
- Marine Scotland. (2023, 03 03). *Web Map Services (Third Party)*. Retrieved from Marine Scotland Information: <https://marine.gov.scot/maps/map-services>
- Nova Innovation. (2022, 02 6). *Nova Innovation wins seabed lease to help drive Shetland's clean energy future*. Retrieved from Nova Innovation .
- Nova Innovation. (2023, 03 04). *Home*. Retrieved from Nova Innovation: <https://www.novainnovation.com/>
- Shetland News. (2023, 01 31). *Nova's six strong tidal energy array completed*. *Shetland News*. Retrieved from <https://www.shetnews.co.uk/2023/01/31/novas-six-strong-tidal-energy-array-completed/>
- Solutions, R. E. (2009). *North Uist Partnership Community Renewable Energy Study*. RD Energy Solutions.
- Wave Energy Scotland. (2023, 03 03). *Home*. Retrieved from Wave Energy Scotland: <https://www.waveenergyscotland.co.uk/>

## Uist Local Energy Plan – Early Stage Feasibility Studies

### Community Idea:

“Each township to have its own renewable energy generation e.g. wind and storage facilities with a local network (including potential for network of district heating schemes)”

### Technology and conceptual overview:

#### **Renewable Energy Generation:**

Uist is rich in renewable energy resources with primary sources of wind, solar and hydro, all of which have been explored or developed in Uist to various extents over the past two decades. Wave and tidal energy is also abundant around the Islands but as yet has proven harder to develop.

#### **Wind:**

Wind energy is harnessed using turbines which can vary greatly in style and generating capacity. Typically, island projects by local anchor organisations have installed wind turbines in the region of 900kW-3MW per turbine and projects such as North Uist Wind and South Uist Renewable Energy have showcased the impressive wind regime in Uist as well as the ability of Class I turbines to perform well and generate dividends which tackle key community needs within the local area. Wind energy has proven the most abundant and accessible source of energy in the Outer Hebrides.

#### **Hydro:**

Hydro, energy generated from turbines turned by rivers or falling water, is very reliable and well-established renewable energy technology. Typically, hydro projects have high capital costs due to the significant civil works required and need for a high head of water or a large flow of water to make them viable.

#### **Solar:**

Solar panels convert the sun's rays into electricity or heat depending on the type of panel installed and are typically either ground mounted or installed on the roof of buildings. A solar water panel differs in that rather than create electricity it heats water which can then be used within the building.

#### **Heat Pumps:**

A heat pump are devices which provide heat by transferring thermal energy from the outside using the refrigeration cycle. Common types are air source heat pumps, ground source heat pumps and water source heat pumps, the name is based on where the heat they draw originates. Heat pumps are often used in district heating systems.

#### **Energy Storage:**

Energy can be stored in a number of vectors that could have application on the township, or Uist wide, level such as pumped hydro storage, battery storage or storage in hydrogen. Pumped- storage hydro stores energy by pumping water to a higher elevation during times of surplus energy generation and releasing this water through a turbine when there is demand. Batteries can be used to store renewably generated energy for later deployment, Lithium-Ion batteries are currently the most economically viable and common battery type. Storing energy as Hydrogen requires first generating hydrogen from water with an electrolyser, the hydrogen can then be used similarly to gas fuels to generate energy in vehicles, generators or heating systems.

### District Heating:

District Heating, or Heat Networks, is a system for distributing heat from a central location through insulated pipes to service commercial or residential buildings. The heat distributed in such systems can be generated from a number of sources such as combustion of fossil fuels or biomass, geothermal heat, solar heat or heat pumps.

### Township/ Locality Energy Systems

The ambition of linking townships with local energy generation has long been held by communities across Scotland. It seems like a simple solution to a number of problems such as fuel poverty, reliance on fossil fuels and local depopulation or economic challenges. Unfortunately, in reality such a solution has proven extremely hard to develop due to numerous factors but primarily due to:

- regulations on operation of existing grid infrastructure and markets
- prohibitive capital costs incurred when setting up private wiring or storage systems

### Case study examples:

Although no township specific projects have been developed yet there are many great examples of similar projects to be found by looking to community energy groups across Uist, the Western Isles and Scotland.

#### Community Energy Model

The development of North Uist Development Company – Trading's community energy project, Uist Wind, which comprises of two 900kW turbines near Clachan-na-Luib, North Uist, demonstrates what can be achieved by determined communities despite encountering barriers to project development along the way (Local Energy Scotland, 2023).

Uist Wind was driven by North Uist Development Company (NUDC) who secured funding from private and public investors alongside successfully launching a round of community shares which brought investment from over 200 investors. Despite NUDC initiating development of the windfarm in 2010 it was not until 2019 that the turbines became operational. This long development period was largely due to a rejection during the planning phase from the Ministry of Defence (MOD) due to the risk that the turbines could interfere with MOD air defence radar systems at South Clettraval.

In response to this NUDC engaged in extensive discussions with MOD staff to find a solution which worked for both parties. A mutual agreement was eventually reached and turbine commissioning was completed in September 2019. The turbines now produce more than enough energy to power all households across North Uist (6,370MWh per year) and are forecast to generate £105,000 annually for local community projects.

Storas Uibhist's 6.9MW Lochcarnan Community Windfarm is another example of a significant achievement of the local community and exemplifies the potential for local energy projects despite apparent barriers faced along the way (Local Energy Scotland, 2023).

#### Energy Local:

Generating and supplying electricity directly to a township is challenging due to the operating and market requirements of the current energy system. As Uist is connected and relatively well served by the national electricity grid the only viable routes to local supply is through either rollout of domestic scale renewables or "virtual" local supply arrangements within current market regulations (Energy Local, 2023).

One such avenue to arranging local supply within current market regulations is through Energy Local Clubs, a cooperative model which allows householders to connect with local renewable energy generators and match their energy use to generation, creating a better deal for both parties. The Energy Local Solution requires a few key elements to run successfully including:

- a partnership with a local generator
- a partnership with national energy supplier (such as Octopus or SSEN) to supply power when local assets aren't generating
- all households involved in the club must be registered to the partnered energy supplier
- all households involved must have smart meters installed
- both the local generator and households involved must be connected "behind" the same substation on the grid. This essential means they can be grouped as one system and thus energy in and out of the substation can be tracked

The Energy Local model reduces household energy costs and by cutting out the middle man of an energy supplier and directly connecting local households with local generators. Typically, a generator would be paid ~5p per kWh and a household would pay ~14 p or more per kWh. The energy local solution allows householders to pay a price in between this, ~8p for example, when their used is matched with local generation.

There may be scope to explore establishing Energy Local Clubs in Uist depending on the grid infrastructure connecting communities (location of substations) and the ability to roll out smart meters (which has proven difficult in the past). It would be worth connecting with Energy Local to explore the potential to set up clubs on Uist.

## Scope for Renewables Energies in Uist

### Wind:

Existing wind generation projects in Uist have showcased the ability of local schemes to generate large amounts of electricity, and in turn benefits to the community through sale to grid alongside Feed in Tariff (FiT) or Renewable Obligation Certificates (ROCS) payments. Typically, island projects have installed wind turbines in the region of 900kW-3MW per turbine and projects such as North Uist Wind and South Uist Renewable Energy have showcased the impressive wind regime in Uist as well as the ability of Class I turbines to perform well and generate dividends which tackle key community needs within the local area. Wind energy by its very nature is intermittent and this does cause added complications in terms of accessing grid connections and looking at innovative ways of utilising or storing the energy.

### Hydro:

Hydro has been explored in the past in Uist and across the Western Isles though a comprehensive Feasibility Study undertaken in 2008 (Faber Maunsell, 2008) found that there were no potential sites for development in Uist. Funding levels for small scale hydro have decreased since 2008 and the Feed In Tariff has been removed, therefore it is not envisaged that the outlook for hydropower on Uist will have improved. A more detailed study into the feasibility of a hydro scheme near Lochboisdale was undertaken in 2010 (Fairhurst, 2010) and concluded that such a scheme was unlikely to offer a viable source of income to the local community due to the high construction costs. The 2010 report found that a Lochboisdale Hydro scheme would have a payback period of over 60 years which relying on the Feed in Tariff which has since been removed.

#### Solar:

Both solar and solar water panels have been installed at a domestic scale on Uist but are unlikely to be viable at a larger community scale project due to limited sunlight of the islands and the current lack of subsidy for renewably generated energy. However, there is value in exploring this concept at a householder level, and with advances in battery storage technology it could be that this type of combined system could be trialled locally to see if it impacts on the way people interact with and use their electricity. It is worth highlighting that solar power is less effective in the winter months when households rely on heating and additional power the most.

#### District Heating:

Limited work has been undertaken to explore district heating in Uist, largely due to the dispersed nature of crofting townships in the Islands which would require extensive infrastructure and create high capital costs for any project. A feasibility study into a district heating scheme in Lochmaddy, North Uist using Surface Water Source Heat Pumps was carried out by CES in 2017 and explored options for heating large public buildings, such as the local school and former hospital, as well as domestic properties in the wider village (Community Energy Scotland, 2017). The study found that installing water source heat pumps was feasible but economically marginal if capital costs were funded through loan finance or public finance and that a district scheme could be similarly viable but would require piloting first.

Due to this marginal economic case, the scheme was not taken any further since the study. However, there may be merit in revisiting this idea and exploring the suitability of water source heat pump district heating systems in other densely populated locations around Uist such as Balivanich or Lochboisdale.

## Barriers to implementing this initiative in Uist

### **Regulatory Barriers**

Under current grid regulations it is not possible to directly purchase energy from local generators and transfer this through the national grid. Sales of energy must be made through a licensed Energy Supply Company (ESCO) and this license comes with obligations to set up comprehensive customer support, data handling and security of supply systems. Meeting these obligations therefore comes with high costs and thus ESCOs typically require 50,000 - 100,000 customers as a minimum in order to be financially sustainable, far beyond the available customer bases within townships, or indeed across Uist as a whole.

### **Private Wire:**

The other avenue to enable direct township energy supply would be through private wiring. Private wires are cables built and connected to sources of generation and demand that are independent to the national grid. This independence allows them to operate outside of national regulations and could therefore enable townships to operate their own renewable systems. However, setting up a private wire system typically comes with a high cost unless there is existing unused infrastructure. Laying cables to form private networks typically costs £10,000 per 500 meters of cable. Purchasing storage to add reliability to a private wire network also come with high costs, with a 13.5 kWh Tesla Power Wall, which would store about 50% - 100% of a household's daily electricity demand costing around £5000. This means project costs would rise quickly and additionally many funders will not fund private cables when there is existing grid infrastructure in-situ.

Due to these barriers alternative models for harnessing the benefits of local energy have developed. The most common of these being variations of the Community Energy Group model, which can be seen in operation in Uist through Stòras Uibhist's Lochcarnan Community Windfarm and North Uist

Development Company's Uist Wind project. Where by the benefits of local generation are provided to communities through grants and investment in local projects.

**Local Grid Constraints:**

Significant distribution and transmission constraints now exist locally, meaning that prospects are uncertain for export of energy produced to conventional mainland markets. There is currently no capacity for G99 connections (exceeding 3.6kW per phase) in the Western Isles, due to constraints on the existing 33kV subsea cable between Uist and Skye. The main pinch-point to date for new generation on Uist has been the subsea cable, although there are also transmission constraints on the Skye-Fort Augustus line, which is due for upgrade but which Scottish and Southern Electricity Networks (SSEN) have stated is unlikely to have any additional capacity once existing contracted generation has connected.

**Designations:**

Comhairle nan Eilean Siar's Spatial Strategy for Wind Farms map below highlights some of the key hurdles facing Uist when it comes to exploring wind energy. The Ministry of Defence (MOD) has issued a blanket ban for wind energy developments in most of Uist. However, as technology constantly evolves it would be worthwhile for the community to approach the MOD and ask for this to be reviewed. Currently some small pockets of land around the Lochboisdale area are all that seem to be possible for development and it is recommended that this forms a key next step for the community. This could be done as a consortium of communities if it helped to spread the benefit more widely due to the constraints experienced by other parts of the islands.



Figure 1. Comhairle nan Eilean Siar Spatial strategy for Wind Energy (Comhairle nan Eilean Siar, 2023)



## Next steps to take technology/ initiative forward

In order to develop this community initiative, there are three key steps that Uist communities should take:

- Identifying a lead local organisation and pilot area
- Sourcing funding
- Pilot project

### Identifying a lead local organisation and pilot area

Any community project must be driven forward by local people and thus a key first step is to find a local organisation, community or individual who is passionate about sustainable transport and can lead on setting up this project.

**Community Development Trusts** – Local development trusts Stòras Uibhist and North Uist Development Company are likely best placed as lead organisations for exploring community renewable initiatives due to their experience of building windfarms and connections with communities across the Islands. It is important that there is buy in within the local community for these types of projects and so it is recommended that there is extensive community engagement so as to ensure local people are aware of the benefits and also open to renewable projects being developed locally.

**Energy Local** – As mentioned earlier the Energy Local model may present the best opportunity for townships to harness local renewables. Linking with Energy Local CIC or an active Energy Local Club, such as those in Bethesda, Wales or Bridport, England, would be a good first step to finding out more about the initiative and how applicable it may be to townships and locations in Uist.

**Comhairle nan Eilean Siar** – The local authority of the Western Isles has provided support to community energy projects across the islands and are a key stakeholder in many aspects of project development such as planning, regulations and funding. Engaging with the Comhairle and collaborating on any shared ambitions will be important.

**Hebridean Housing Partnership** – As the housing authority for the Outer Hebrides, Hebridean Housing Partnership (HHP) could be an important partner in developing district heating schemes. HHP are developers and landlords for over 2200 properties across the Western Isles and their role in overseeing small clusters of housing or estates may present them with opportunities to adopt district heating schemes. If the community wish to explore opportunities for district heating schemes in more detail discussions with HHP to explore their interest and experience would be important first steps.

### Sourcing funding:

**CARES** - The Scottish Government's Community and Renewable Energy Scheme (CARES) is still the main avenue for community and local energy support. There is a pre planning fund delivered by Local Energy Scotland (LES) at present but projects could get access to £150,000 of loan funding. This funding also contains a write off facility to ensure that risk is minimised for communities in the very early stages of development.

**Islands Deal** – Although funding mechanisms emerging from the Islands Deal are still in development it seems likely that through projects such as the Islands Centre for Net Zero (ICNZ) will present funding

opportunities for innovative, community backed projects. Therefore, engaging with local ICNZ partners will be important.

Pilot project or expanding:

It is recommended that existing sites be explored for opportunities to expand, with this potentially lowering capital costs of various elements such as access tracks and other smaller planning requirements.

It is important for Uist to consider what alternative options there might be for more lucrative and viable local sale and use of the energy generated due to the grid constraints highlighted above.

- 1) New demand - Currently, having had discussions with SSEN the main or only opportunity for connecting renewable generation is through new demand opportunities. It is therefore important that any new demand planning to connect to the local system, particularly new larger business demands, are asked to explore collaboration with the community at as early a stage as possible. It is important that looking at powering that new demand through a renewable is discussed with Scottish and Southern Energy Networks (SSEN) prior to any connection agreements having been submitted.
- 2) Storage opportunities – Storage and its viability is constantly evolving, and it is envisaged that battery storage and hydrogen production could both become important players in the energy market in the years to come. There have been some concerns raised over how worthwhile hydrogen is as a heating fuel. Just as electricity and gas play different roles in providing power and heating so too will hydrogen. Existing infrastructure will partly shape how hydrogen is used. For example, areas with gas grids are more likely to be enabled to use hydrogen to heat their homes in the future compared to areas without gas networks. It is more likely that non-hydrogen dependent methods will be the main route to decarbonise heating. (Community Energy Scotland, 2023)

Existing sites throughout the Western Isles highlight the ability for a wind turbine project to be replicated. It is recommended that a detailed feasibility study to be done to assess the best site for a project as well as the options for that generation to be exported through either:

- Future grid upgrades
- New demand
- Future storage opportunities

## Summary

Despite the proven success of renewables in Uist through community energy projects there is no clear route to integrating such technologies directly with townships due to regulation, infrastructure and finance related barriers. Due to this apparent impasse we recommend exploring innovative solutions to operating within these barriers such as the Energy Local model.

The experience of local communities and development trusts such as Stòras Uibhist and NUDC should provide important foundations for future community initiatives and would be ideal bodies for engaging with Energy Local or funding streams such as the ICNZ to explore connections townships and renewable energy resources on Uist.

## References

- Comhairle nan Eilean Siar. (2023, 04 01). *Local Development Plan (LDP)*. Retrieved from Comhairle nan Eilean Siar: <https://www.cne-siar.gov.uk/planning-and-building/planning-service/development-planning/development-plan/local-development-plan/>
- Community Energy Scotland. (2017). *Lochmaddy Warmth from Water Feasibility Study:: potential for Surface Water Source Heat Pumps*. Inverness: Community Energy Scotland.
- Community Energy Scotland. (2023). *Community Energy Scotland position paper on Hydrogen*.
- Energy Local. (2023, 03 03). *About Energy Local CIC*. Retrieved from Energy Local: <https://energylocal.org.uk/about-us>
- Faber Maunsell. (2008). *Western Isles Hydro Power Feasibility Study*. Edinburgh : Faber Maunsell AECOM.
- Fairhurst. (2010). *Provision of technical Assistance to Community Hydroelectric projects in teh Western isles*. Inverness: Fairhurst.
- Local Energy Scotland. (2023, 03 03). *Lochcarnan Community Windfarm*. Retrieved from Local Energy Scotland: <https://localenergy.scot/project/lochcarnan-community-windfarm/?developer=122>
- Local Energy Scotland. (2023, 03 03). *North Uist Wind Turbines*. Retrieved from Local Energy Scotland: <https://localenergy.scot/casestudy/north-uist-wind-turbines/>

# Uist Local Energy Plan – Early Stage Feasibility Study

## Community Idea:

Local smart grid with local generation and sales of electricity for self-sufficiency (as independent as possible from the mainland grid to minimise exports)

### **Technology and conceptual overview:**

#### Smart Grid:

A Smart Grid is a general term for an electricity system which better integrates demand and generation of energy to improve sustainability, efficiency and security of energy systems. Smart Grids can also be developed to maximise local utilization of local energy resources. Typically, smart grids incorporate some or all of the following; renewable energy generation, advanced energy monitoring, energy storage, demand side energy management and energy efficient devices.

#### Active Network Management (ANM):

Active Network Management (ANM) is an energy management system that monitors constraints on an area of the grid and allocates the maximum amount of capacity available to customers in that area. Capacity is made available based on the date that connection applications were successful. ANM can allow more generators to access grid connections in areas where there are constraints on the electricity network.

ANM refers to a type of energy control system which manages generation and load in order to keep energy systems balanced. ANM systems are typically automated although complex systems can feature human management. Both approaches require a high degree of real-time monitoring of energy flows.

ANM systems are used to maintain voltage, power and frequency within workable limits. They can also enable renewable generation to be balanced with demand by either bringing forward or delaying loads. There is also potential to use ANM systems to allow additional generation onto electricity grids by shutting off generation if grid infrastructure is constrained. This can allow generators to gain a constrained connection which can later be expanded if grid infrastructure is improved.

#### Self/ Local Supply and Local Energy Markets:

Due to existing regulations on operation of the national electricity grid and working within the energy market, supplying a local area with locally generated energy is not straightforward or easily accessible. There are, however, various solutions to work around these regulations which enable some level of local energy markets. These include the Energy Local Model, Behind the Meter supply and Private Wire systems.

### **Case study examples:**

#### **Smart Grid:**

A working example of an island based smart grid which utilizes local renewable energy and operates independently from the national grid (all be it in a different grid context from Uist) is Eigg Electric on the Isle of Eigg (Isle of Eigg Heritage Trust , 2023). Driven by the need to ease dependence on diesel generators and an ambition of providing 24-hour continuous power to island residents and businesses, the local community established Eigg Electric Ltd, a community owned energy company. Eigg Electric installed a number of solar panel arrays, a hydroelectric generator and wind turbines to supply a total of 300kW of energy across the island alongside a bank of batteries which can provide back-up power

to the island and a pair of diesel generators to provide back-up energy in periods of low renewable generation.

Central to the self-sustaining system is a control system which regulates generation, demand and the state of charge of the batteries. The basic function of the control system is to charge the batteries during periods of excess energy generation and to draw power from the batteries during periods of insufficient generation. If required, then the reserve generators can be used to recharge the batteries. This is triggered if the batteries reach 50% of charge. Likewise, if the batteries are nearing fully charged, i.e. 90% full, then the renewable generation is transmitted to space heaters in community buildings and churches. Periods of surplus generation often occur in winter, so this solution is a win-win for the community.

The Eigg Electric system is innovative, unique and has succeeded in supplying 95% of power consumed on the island and doing so all year round due to the combination of three renewable energy resources. However, there are limitations to the system and challenges in applying the same approach to other islands or areas. Primarily there is a limit on the supply available to domestic and business premises at 5kW to 10kW respectively. To regulate this limit all consumers were given energy monitors which allow them to monitor when they are reaching their limit. This system was brought in to avoid overloading the system or excessively running the reserve generators and was brought in at an early stage of Eigg Electric. Residents are supportive of the energy use limit which has contributed to the success of the system.

Similar projects to Eigg Electric have since been developed on the islands of Canna, Muck, Foula and Fair Isle as well as the remote mainland community of Knoydart. Whilst such projects provide useful examples and insight as to how a self-sustaining, renewably powered local energy system can function, they all operate in the unique context of being disconnected from the national electricity grid. This has presented opportunities to innovate and develop solutions which are not available to communities on the mainland grid due to statutory duties for DNO's to keep consumers connected and constraints of adding generation or control systems to the national grid.

#### **Active Network Management (ANM):**

The first ANM scheme in Britain was developed by SSEN in Orkney in 2009 with the aim of creating more space for new renewable energy generation (SSEN, 2023). The ANM system provides an alternative to network reinforcement to allow quicker access for those generators trapped between the current network configuration and the upcoming network reinforcement.

The system primarily balances wind energy generation and, when launched, enabled 21.8MW of new generation to connect to the network that was already filled to capacity. Within the ANM system the mainland of Orkney and the surrounding Islands are divided into 9 zones which are connected by 7 Network Management Points. Each zone represents a constraint point in the network due to additional generation. If generation exceeds preset limits with a zone, then the ANM system automatically reacts to balance the influx of energy with demand and capacity to export. Reactions from the ANM system include fully curtailing one or more generator, partially curtailing one or more generator or removing any curtailments.

The Orkney ANM system manages constraints for each generator by using a Last in, First off (LIFO) system whereby the last generator to accept a connection offer is restricted before the first. Therefore, whilst the Orkney ANM system has allowed a significant amount of additional generation to connect in advance of network reinforcement, this generation has faced a higher level of constraint than expected which has led to significant financial problems. This was partly due to an unexpected increase in <50kW connections leading to more periods of constraint for >50kW connections.

Additionally, some generators produced more energy than forecast due to high wind speeds and improved efficiency of turbines meaning that those with later connections are curtailed more than predicted (Orkney Renewable Energy Forum, 2023). In a statement about the ANM scheme Orkney Renewable Energy Forum stated that

*“While the Orkney ANM scheme has been a success there have been several lessons learnt. If looking at ANM in another area, then a different approach which would produce a more equitable sharing of curtailment between generators would enable more generation to be connected.”*

An ANM approach could allow for more generation on Uist and could potentially be used to match local generation with periods of high local demand. It is important that any exploration of an ANM scheme for Uist is carefully considered and the impact of the future system and process for connections must be carefully thought through.

### **Energy Local Clubs:**

Generating and supplying electricity directly to a township is challenging due to the operating and market requirements of the current energy system. As Uist is connected and relatively well served by the national electricity grid the only viable routes to local supply is through either rollout of domestic scale renewables or “virtual” local supply arrangements within current market regulations (Energy Local, 2023).

One such avenue to arranging local supply within current market regulations is through Energy Local Clubs, a cooperative model which allows householders to connect with local renewable energy generators and match their energy use to generation, creating a better deal for both parties. The Energy Local Solution requires a few key elements to run successfully including:

- a partnership with a local generator
- a partnership with national energy supplier (such as Octopus or SSEN) to supply power when local assets aren't generating
- all households involved in the club must be registered to the partnered energy supplier
- all households involved must have smart meters installed
- both the local generator and households involved must be connected “behind” the same substation on the grid. This essentially means they can be grouped as one system and thus energy in and out of the substation can be tracked

The Energy Local model reduces household energy costs by cutting out the middle man (energy supplier) and directly connecting local households with local generators. Typically, a generator would be paid ~5p per kWh and a household would pay ~14 p or more per kWh. The energy local solution allows householders to pay a price in between this, ~8p for example, when their usage is matched with local generation.

Barriers and opportunities for implementing technology/ initiative in Uist:

### **Active Network Management Risk:**

An ANM system could enable more renewable generation on the Uist and may also allow greater utilization of energy locally by monitoring the demand and supply of energy on Uist. Setting up an ANM system is a complex and a long term undertaking however and there are a number of risks associated including:

- Issues over capacity allocation and interactions with current ANM systems have in some instances impeded solutions for local energy and capacity trading.

- Ensuring ANM development does not hamper better alignment of demand, generation and carbon intensity of energy generation. This is particularly prevalent for any ANM systems that start to interact with behind-the-meter generation.
- The remits of DNO control over emerging markets and solutions for network flexibility, particularly regarding constraint management, remain unclear

Overall ANM systems can be cost and time intensive to establish, due to the energy monitoring requirements involved and the real-time balancing of demand and generation that can be required. However, as proven in other locations in Scotland and the UK ANM can release additional capacity for generation on constraint grids. As existing projects show however it is likely that ANM systems would primarily allow for increased generation rather than better balancing of existing generation and demand. Whilst this could create new options for community benefits from renewable generation it would ultimately continue the export of locally generated energy from Uist rather than create an independent system. However, given the potential to increase generating capacity on Uist, exploring options for developing a local ANM system in Uist may be worthwhile.

### **Challenges in gaining independence from the national grid:**

Due to the statutory demands on ESCo's to provide consumers with electricity and the additional human and technical resources required to balance micro-grids, gaining independence from the National Grid is challenging and completely disconnecting from the grid likely impossible due to the risk it would place on householder energy supply. Whilst a number of work-arounds to this situation do exist, as laid out in this document, there are limited opportunities to make significant changes. One route which may open the door for more significant trials of energy independence on Uist is requesting a Regulatory Sandbox derogation from Ofgem.

A regulatory sandbox is a form of agreement between Ofgem and District Network Operators which enables innovators to trial new products, services and business models without some of the usual rules applying (Ofgem, 2023). Regulatory sandboxes are designed for areas in which regulation prevents the launch of a product or service that could benefit consumers and where trial projects could provide better solutions for consumers. If a strong case was made that increased independence from the national grid would benefit energy consumers on Uist, and possibly Barra as well given the shared grid connection of the two island groups, and technical feasibility work highlighted a potential solution out with current regulations, then an application for Regulatory Sandbox could be submitted to Ofgem.

The DNO for Uist, SSEN has previously been involved in projects at the "Grid Edge" looking at local supply solutions, such as Project LEO (Local Energy Oxford), and thus may be open to developing a Regulatory Sandbox application alongside local communities. The emerging Islands Centre for Net Zero may also be a useful partner for developing such an application given their desire to support innovation across the Outer Hebrides, Orkney and Shetland.

### **Regulatory Barriers to local energy sales**

Under current grid regulations it is not possible to directly purchase energy from local generators and transfer this through the national grid. Sales of energy must be made through a licensed Energy Supply Company (ESCo) and this license comes with obligations to set up comprehensive customer support, data handling and security of supply systems. Meeting these obligations therefore comes with high costs and thus ESCOs typically require 50,000 - 100,000 customers as a minimum in order to be financially sustainable, far beyond the available customer bases within townships, or indeed across Uist as a whole.



### **Barriers to Private Wire:**

The other avenue to enable direct township energy supply would be through private wiring. Private wires are cables built and connected to sources of generation and demand that are independent to the national grid. This independence allows them to operate outside of national regulations and could therefore enable townships to operate their own renewable systems. However, setting up a private wire system typically comes with a high cost unless there is existing unused infrastructure. Laying cables to form private networks typically costs £10,000 per 500 meters of cable. Purchasing storage to add reliability to a private wire network also come with high costs, with a 13.5 kWh Tesla Power Wall, which would store about 50% - 100% of a household's daily electricity demand costing around £5,000. This means project costs would rise quickly and additionally many funders will not fund private cables when there is existing grid infrastructure in-situ.

Due to these barriers alternative models for harnessing the benefits of local energy have been developed. The most common of these being variations of the Community Energy Group model, which can be seen in operation in Uist through Stòras Uibhist's Lochcarnan Community Windfarm and North Uist Development Company's Uist Wind project. Where by the benefits of local generation are provided to communities through grants and investment in local projects.

### **Next steps to take technology/ initiative forward**

In order to develop this community initiative, there are three key steps that Uist communities should take:

- Identifying a lead local organisation and pilot area
- Sourcing funding
- Pilot project

#### **Identifying a lead local organisation and pilot area**

Any community project must be driven forward by local people and thus a key first step is to find a local organisation, community or individual who is passionate about local energy systems and can lead on setting up this project.

**Uist and Barra Local Energy Forum** – The Uist and Barra Local Energy Forum was a collaborative initiative set up by local authority officers, councilors and community organisations. The Forum set out with the intention of exploring opportunities to develop the energy systems of Uist and Barra, develop renewable energy and capitalize on opportunities presented by emerging technologies such as Hydrogen. The Forum could be the best local body for furthering discussions with SSEN or Ofgem around enabling local supply or exploring ANM trials as it would allow this to be done in a collaborative and holistic manner.

**Comhairle nan Eilean Siar** - The local authority have previously looked to enable local energy supply through the Hebrides Energy initiative and through this gained valuable experience in understanding regulations and technical aspects of enabling local energy supply. Although Hebrides Energy has been inactive in recent years there is potential that CnES may be interested in developing local supply initiatives again. Engaging with the Comhairle and collaborating on any shared ambitions will be important.

**Community Development Trusts** – Local development trusts Stòras Uibhist and North Uist Development Company are likely best placed as lead organisations for exploring community renewable initiatives due to their experience of building windfarms and connections with

communities across the Islands. It is important that there is buy in within the local community for these types of projects and so it is recommended that there is extensive community engagement so as to ensure local people are aware of the benefits and also open to renewable projects being developed locally.

**Energy Local** – As mentioned earlier the Energy Local model may present the best opportunity for townships to harness local renewables. Linking with Energy Local CIC or an active Energy Local Club, such as those in Bethesda, Wales or Bridport, England, would be a good first step to finding out more about the initiative and how applicable it may be to townships and locations in Uist.

Sourcing funding:

**Innovate UK** – Innovate UK (part of UK Research and Innovation: UKRI) act as the UK's national innovation agency and support innovation in all sectors, technologies and UK regions. They provide grants for a range of energy themes and projects types. It would be worth keeping engaged with Innovate UK, and wider UKRI, funding opportunities.

**Energy Systems Catapult** – Energy Systems Catapult are an independent not-for-profit centre which works with industry, government, academia and research to drive energy system innovations. They provide technical and policy advice to organisations who are developing sustainable energy solutions. Although Energy Systems Catapult typically work with Local Authorities, they could provide useful support for exploring local supply opportunities if this is done in partnership with Comhairle nan Eilean Siar.

**CARES** - The Scottish Government's Community and Renewable Energy Scheme (CARES) is still the main avenue for community and local energy support. There is a pre planning fund delivered by Local Energy Scotland (LES) at present but projects could get access to £150,000 of loan funding. This funding also contains a write off facility to ensure that risk is minimised for communities in the very early stages of development.

**Islands Deal** – Although funding mechanisms emerging from the Islands Deal are still in development it seems likely that through projects such as the Islands Centre for Net Zero (ICNZ) will present funding opportunities for innovative, community backed projects. Therefore, engaging with local ICNZ partners will be important.

Pilot project opportunities:

### **Get in touch with Energy Local**

Currently there are no clear opportunities to pilot Smart Grids on Uist and due to the significant challenges in developing smart grid solutions. However, there may be further scope to explore such solutions through SSEN's ongoing HOWS work, the ICNZ or through engagement with Energy Local.

The network linking Uist to mainland Scotland is already at maximum capacity and despite planned upgrades to the Skye-Fort Augustus line, a key network bottleneck, and the possibility of a new interconnector between Uist and Skye, currently being explored by SSEN as part of the Hebrides and Orkney Whole System (HOWS) study with ED2, there is little scope for additional local generation due to existing queues for grid connections. Therefore, there is little scope for additional generation without significant reinforcement of the grid. The best avenue to explore this is engaging with SSEN through their HOWS work and making the case for proactive grid reinforcement for Uist.

## References

Energy Local . (2023, 04 01). *Home*. Retrieved from Energy Local :  
<https://energylocal.org.uk/index.php/>

Isle of Eigg Heritage Trust . (2023, 04 01). *Eigg Electric* . Retrieved from The Isle of Eigg:  
<http://isleofeigg.org/eigg-electric/>

Ofgem. (2023, 04 01). *What is a regulatory sandbox?* Retrieved from Ofgem:  
<https://www.ofgem.gov.uk/publications/what-regulatory-sandbox>

Orkney Renewable Energy Forum. (2023, 04 01). *Grid - Active Network Management*. Retrieved from Orkney Renewable Energy Forum : <https://www.oref.co.uk/orkneys-energy/grid/>

SSEN. (2023, 04 01). *Orkeny ANM*. Retrieved from Scottish and Southern Electricity Networks:  
<https://www.ssen.co.uk/our-services/active-network-management/orkney-anm/>