



Appendix 1

ORION STATUS REPORT

June 2021

Providing clean affordable sustainable energy for our future

1. Executive Summary

The ORION (Opportunity Renewables Integration Offshore Networks) project was initiated in April 2020 with Shetland Island Council (SIC) and the OGTC (with a focus on Energy Hub technology advancement) working in partnership with Highland & Islands Enterprise (HIE), government and industry. Strathclyde University joined in May 2021 as a strategic partner.

The Shetland region has all the critical ingredients of clean energy provision, significant onshore & offshore wind and tidal resource, strategically important current and future hydrocarbon resource, established oil & gas infrastructure for use and re-use and a knowledgeable and skilled local workforce.

The aim of ORION is threefold:-

- Enable offshore oil & gas sector transition to net zero by electrification, utilizing initially onshore and then offshore wind, sustaining thousands of jobs & security of supply.
- Transform Shetland's current dependency on fossil fuels to affordable renewable energy to address fuel poverty and improve community wealth.
- Create on Shetland a green hydrogen export business at industrial scale by harnessing offshore wind power and creating new jobs.

ORION has set several ambitious targets namely abating 8mT/year of CO₂ from offshore oil & gas production, supplying 32TWh of low carbon hydrogen annually, which is 12% of UK expected requirement, and generating more than 3GW of wind, all by 2050. The annual revenue generated by the project by 2050 would be in the order of £5Bn per annum and provide sustainable employment, both locally and regionally, for 1750 people.

The project is currently at a stage where techno-economic screening is in the process of being undertaken and several individual opportunities are undergoing concept and feasibility analysis.

The ORION project is truly transformational, on both a local and regional scale, firmly placing Shetland to be one of the first green energy islands in the UK.

2. Objectives

The prime objective of ORION is to deliver clean energy to Shetland, the offshore oil & gas sector, and export to mainland Scotland & Europe.

The objectives of ORION can be summarised as:-

- By 2050 supply 32TWh of low carbon hydrogen annually, which is the equivalent of 12% of the expected UK total requirement.
- Provide more than 3GW of wind generated power for onshore use, green H2 production & electrification of the offshore oil and gas sector.
- Produce green hydrogen, utilising (onshore) wind and tidal energy, to fuel domestic heating, road, and marine transportation.
- Enable all West of Shetland hydrocarbon assets to be net zero by 2030 and abate 8Mt/year CO2 by 2050.
- Generate £5bn in annual revenue by 2050 contribute significantly to the UK Exchequer.
- Provide sustainable employment for 1,750 people, both regionally and locally, whilst maintaining a pristine environment.

By 2030, the plan is for Shetland to be net zero and for the ORION Clean Energy Project to harness the rapid growth in offshore wind to accelerate the production of green hydrogen, electrify oil and gas production in the North Sea, and create high-quality net zero jobs.

In addition, ORION will deliver a range of local benefits:

- Fuel poverty: Help eradicate fuel poverty on Shetland by 2035
- Strategic advantage: Harness Shetland's natural resources
- Energy transition: Enable the oil and gas industry to transition to net zero
- Innovation: Secure Shetland's position as a leader in clean technology development
- Natural environment: Protect the environment for future generations
- Partnerships: Create powerful partnerships and alliances to accelerate net zero

3. Governance

3.1 Project Board

In May 2021 Strathclyde University joined as a strategic partner signing an MOU and NDA with SIC.

The current project board consists of four strategic partners with the following members who meet on a quarterly basis.

PROJECT BOARD	ORGANIZATION	POSITION
Maggie Sanderson	SIC	Chief Executive
John Smith (Chair)	SIC	Director of Infrastructure Services
Neil Grant	SIC	Director of Development Services
Douglas Irvine	SIC	Future Energy Executive Manager
Gunther Newcombe	SIC	ORION Project Coordinator
Joe Najdich (Secretary)	SIC	Future Energy Project Manager
Audrey MacIver	HIE	Director Energy & Low Carbon
Martyn Tulloch	OGTC	Head of Energy System Integration
Roy Stenhouse	OGTC	ORION Project Manager
Willie Reid	Strathclyde	Director Oil & Gas Institute

3.2 Steering Group

An industry project steering group, consisting of BP, EnQuest, Equinor, Shell, SSE, TOTAL and since May 2021 Siccar Point Energy (SPE), meet on a monthly basis. The purpose of the steering group is to provide project guidance, support, engagement, and steerage with industry stakeholders also providing funding and/or resource in kind for a number of studies.

A West of Shetland (WOS) working group has been set-up under the steering group looking at electrification of the West of Shetland offshore oil and gas sector and discussions have also been held to investigate electrification of SVT, SGP and Sullom Voe port areas utilizing onshore renewable energy sources. An offshore WOS electrification operator group with BP, Equinor and SPE has also been set-up

3.3 Project Team

The current project team consists of part & full-time members of SIC, OGTC, HIE and Strathclyde University with three new staff joining the SIC Future Energy team in May.

PROJECT TEAM	ORGANIZATION	POSITION
Roy Stenhouse	OGTC	Project Engineer Energy System Integration
Emma Swiergon	OGTC	Project Engineer Energy System Integration
Graeme Rogerson	OGTC	Project Engineer Energy System Integration
Douglas Irvine	SIC	Future Energy Executive Manager
Joe Najduch	SIC	Future Energy Project Manager
Gunther Newcombe	SIC	Project Coordinator
Harry Thomson	SIC	Future Energy Project Manager
Andrea Grochowski	SIC	Future Energy Communications Officer
Jennifer Sjoberg	SIC	Future Energy Project Manager
Katrina Wiseman	HIE	Area Team Leader Shetland
Willie Reid	Strathclyde	Director Oil & Gas Institute

4. Communication

The ORION project requires government, investor, industry, supply chain and community participation and engagement at technical, commercial, and societal levels.

During 1Q 2021 an ORION communication plan was finalized, with input from Aspect Reputation Management an Aberdeen based PR company, which is in the process of implementation.

Goal	Position Shetland to become a recognised world-leading clean energy hub				
Objectives	Drive awareness of Shetland's clean energy ambition national and internationally	Work in partnership with the people of Shetland, industry and stakeholders	Promote Shetland as an attractive place for clean energy investment		
Priorities	Engagement Deliver a comprehensive stakeholder engagement and events programme	Content Create high quality content to bring the project to life	Digital Develop a strong digital presence on social media and a project website	Media Design a media relations and editorial campaign to drive awareness	Community Involve the local community to shape and develop the project
This means	<ul style="list-style-type: none"> Industry engagement Government engagement Investor engagement NGO engagement Stakeholder events Consultation activities 	<ul style="list-style-type: none"> Films and animations Graphics and infographics Visualisations and maps Presentations and speeches Brochures and literature Event and exhibitions 	<ul style="list-style-type: none"> Project website Social media campaigns Facebook and LinkedIn Virtual events Simulator 'Digital experiences' 	<ul style="list-style-type: none"> Press briefings Local media engagement Scottish media engagement Media relations programme Editorial and opinion content Creating a drumbeat of news 	<ul style="list-style-type: none"> Community briefing events Establish feedback channels Regular updates Strong leadership Education and STEM Training & skills development
SOCO	Shetland: the home of affordable clean energy				
Key messages	Shetland: start production of green hydrogen by 2025	Shetland: sustain & create 500 net zero jobs by 2030	Shetland: creating a healthy and diversified economy by 2035		

Key activities currently in process: -

- ORION updated branding document issued.
- Working with Shetland based NB Communications to develop an ORION website with “soft-launch” in June and full launch in July.
- ORION animation is being developed with Aspect Reputation Management for release in 3Q 2021.
- ORION has been presented at numerous webinars with NECCUS & DeepWind in March, OGUK and Energy Institute in April and Westminster Energy & Environmental Forum in May.
- A Shetland Net Zero Energy forum has been established with local companies and organisations.
- Press announcements have been carried in Energy Voice, P&J, Shetland Times, Shetland News and Glasgow Herald, and there have been several ORION articles in technical journals e.g., OGUK Wireline magazine <https://cld.bz/Hnu6h1w>
- Engagement sessions have been held with several key politicians such as Andrew Higgins MP & UK Net Zero champion, Peter Aldous MP & Chair of the All Party Parliamentary Group (APPG) Oil & Gas Forum, Alistair Carmichael MP & Secretary APPG Oil & Gas Forum, Andrew Hogg Deputy Director, Energy Industries Division Scottish Government, and Richard Sweetnam Head of Economic Development Aberdeen Council.

SIC and/or OGTC, on behalf of the ORION project have also joined several organizations to promote the ORION project and share learnings, namely: -

- NECCUS
- Scottish Hydrogen Fuel Cell Association (SHFCA)
- Deepwind
- Wind Europe
- North Sea Hydrogen Ports & Marine Community (NS HyMaP)
- Hydrogen Utilization & Green Energy (HUGE) organization
- One North Sea (OGTC & TNO initiative)
- Blue Economy Cluster
- European Hydrogen Strategy - application made

5. Studies

A number of key studies are in the process of commencing which have taken several months of preparation and groundwork to finalize the companies undertaking the work and putting sponsorship in place.

5.1 Techno-Economic Study

A techno-economic study will be initiated in June 2021 to help create an integrated energy vision for the wider Shetland region and Northeast Scotland and understand which energy industries will generate value based on access to energy sources. These two areas have been working closely together for almost half a century within the oil and gas era and as previously described have significant existing infrastructure that could be re-purposed to enable the energy hub concept.

This study will review all renewable energy sources, plus CO₂ capture, assess the timeframe of opportunities and solutions and address market value locally, nationally, and internationally plus scenario benefits. The key outcomes of the study are: -

- Creation of the integrated energy vision for the wider Shetland region and Northeast Scotland and synergies between the two areas.
- Understanding energy industries which will generate value based on access to energy sources demonstrating growth potential.
- Export and import and storage of H₂ & CO₂.
- Timeframe of opportunities and solutions.
- Understanding of the energy volumes wind, tidal, H₂ & CO₂ that can be created and managed on the island.
- Understanding of the market value locally, nationally & internationally and scenario benefits to the Northeast of Scotland.
- Identification of the technology gaps and key issues including technical and regulatory
- Pilot projects (including technology development) to develop specific ambitions of an energy island concept.

Economic modelling will be undertaken, including sensitivity assessment, to develop business and investment cases which will potentially lead to pilot and demonstration projects. A consortium consisting of Worley, VOAR and Wood Mackenzie were chosen to lead the project, which should be completed by end September 2021, with financial support provided by BP, Equinor, OGTC, Siccar Point Energy, SIC, Shell, and data by EnQuest and TOTAL.

5.2 Onshore Power Study

Strathclyde University, with support from Hitachi ABB Power Grids, will evaluate the onshore power system on Shetland which has several challenges, namely: -

- Renewable potential cannot be fully utilized now due to restrictions of the existing power system infrastructure.
- To deliver reliable and affordable electricity to Shetland's consumers there needs to be a balance for the demand for electricity with supply from intermittent wind sources in the context of the likely decommissioning of the Lerwick and SVT power stations.
- Develop validate and deploy robust energy management systems to enable the integration of regional offshore oil & gas platforms, offshore wind farms, storage and flexibility services, and the planned Shetland HVDC link with the onshore Shetland electricity network.
- Fault and system disturbance conditions, and the protection, control and response services needed to manage these conditions need to be understood especially in the light of high penetration of power electronics-based converters.
- There is a current lack of cross-sector regulatory frameworks around the construction, ownership, and operation of the potential future integrated energy systems.
- Requirement to take on board new power transmission routes to be built to connect major production, export, and distribution interface nodes in Shetland in line with major onshore wind and HVDC interconnector energization. This will be a completely new development in Shetland, as all power delivery is through the existing distribution grid.
- Provision of reserve and flexibility services for operation of the power system while accommodating network contingencies and low wind scenarios. That will accommodate network asset outages including for the HVDC cable, and other interruptions.

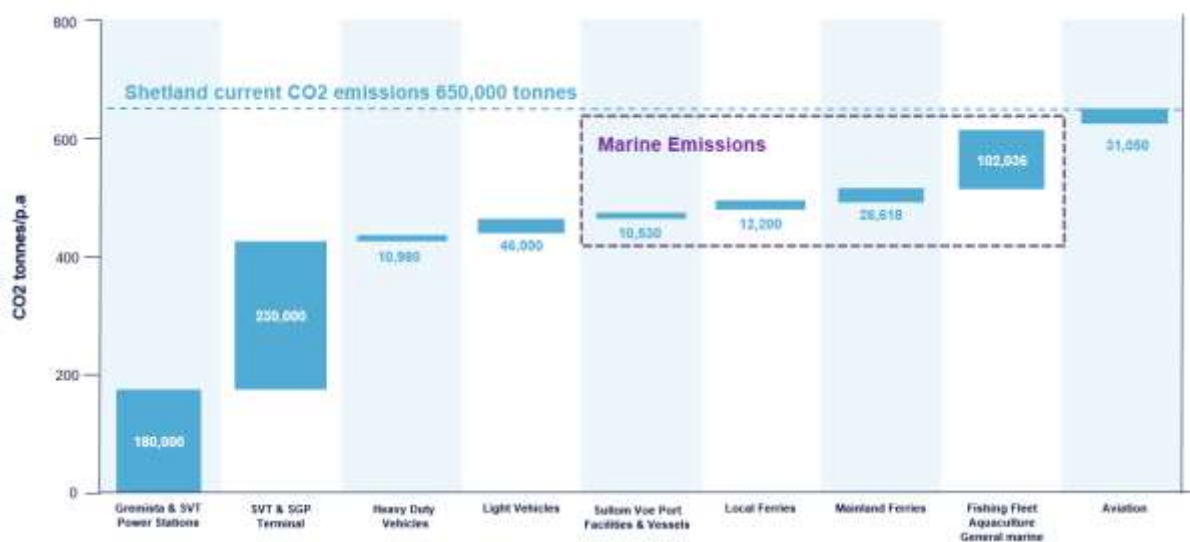
The study will run in three phases over a period of 2-3 years with an initial phase looking at the current power system and near-term electrification options. The second stage will focus on offshore electrification and onshore vehicle electrification. The final stage will focus on the integration of offshore wind potential and green hydrogen production.

Financial support is being provided by BP, Equinor, OGTC, Siccar Point Energy, SIC, Shell, and data by EnQuest and TOTAL.

5.3 Marine Study

The International Maritime Organization (IMO) is aiming for a 40% reduction in emissions from marine vessels by 2030 and a 70% reduction by 2050. Given UK and Scottish emissions targets there is an urgent requirement to understand marine vessel activity and emissions in the Shetland region and the role renewable energy can play.

In Shetland high levels of marine activity contribute significantly to Shetland CO2 emissions and ORION is in the initial stages of understanding activity, energy usage and emissions.



CO2 emissions in the Shetland region

There are several key steps required to develop an understanding of marine activity and energy consumption, namely: -

- Map marine activity around Shetland and collect data about mode of operation and power and energy requirements
- Gather data regarding the energy generation and storage and potential production capacity of non-carbon e-fuels (H2/NH3)
- Map the port facilities and identify critical limitations (draughts, cranes, bunkering facilities, legislation, human resources)
- Identify the appropriate decarbonized technologies for each ship type

Strathclyde University Department of Naval Architecture, Ocean and Marine Engineering will be leading the development of an ORION marine strategy with an initial workshop planned for 17th June attended by over 60 representatives from Shetland supply chain companies.

Strathclyde University, working with Ricardo and Babcock, made a submission to the UK Clean Maritime Demonstration Competition on June 2nd for £550K of funding to develop a desk-based Decision Modelling Support System (DEMOSS) tool. DEMOSS will create a digital model of the energy system and will be able to capture operational activity for each ship type and critical scenarios in the energy supply chain.

6. Industry Engagement

During 2Q 2021 there has been significant progress made on engaging and receiving commitment from several companies to contribute both financially and resource wise to ORION projects.

6.1 Techno-economic screening study

BP, Equinor, Shell, and Siccar Point Energy are all individually contributing £20K, plus information and resource, to this study and EnQuest and TOTAL are providing data. Worley, VOAR and Wood Mackenzie, who are the consortia undertaking the study, will be contributing resource and information valued at £150K as an in-kind contribution.

6.2 Onshore Power Study

BP, Equinor, Shell, Siccar Point Energy, and SSE are all individually contributing £20k to this study and EnQuest, SSE and TOTAL are providing data. Hitachi ABB Power Grids will be working closely with Strathclyde University, who are leading the project, and will be contributing resource in kind.

6.3 Marine Study

Ricardo and Babcock will be providing industry matched-funding, coupled with resource, for the UK Clean Maritime Demonstration Competition and both companies have expressed interest in being involved in the development of an ORION marine strategy.

6.4 Sullom Voe Terminal (SVT) & Port of Sullom Voe (POSV)





EnQuest SVT team and the SIC POSV team have held workshops with SSE, Peel Energy, Statkraft, NOVA Innovation, Siemens Energy & Technip FMC during 1H 2021. Regular bi-weekly meetings between the EnQuest SVT and SIC POSV team are now in place to jointly work electrification and transformational opportunities in the Sullom Voe region.







SVT are also now discussing renewable energy opportunities with a number of these companies.

SIC are discussing renewable energy opportunities, especially green hydrogen production, with a number of these companies.

7. Risk Management

There are several key risks facing the project which will evolve and change with time. A number of risks were recognized by the project team and mitigation measures put in place which are reviewed by the project board on a quarterly basis.

ISSUE	ASSIGNED TO	STATUS
Project governance with short term risk of inability to initiate project consortium development and long-term requirement to have governance processes in place	SIC & OGTC 	Monthly steering group meetings being held and quarterly board meetings. Project board and steering group meetings held in May.
Project funding requirement from industry and government to undertake initially concept studies leading to pilots and implementation at industrial scale	SIC & OGTC 	Awaiting outcome of ETF funding request. Islands Growth Fund set aside £5m for green H2 pilots on Shetland and £8m for Dales Voe deepening. SIC council hiring for futures energy completed with new positions filled in 2Q 21
Opportunities lost and adverse reaction from stakeholders due to lack of engagement	SIC & OGTC 	Active UK and Scottish government engagement ongoing. Webinars and press articles in April. Conference attendance at Offshore Europe, Wind Europe and COP26 being planned with relevant materials
Opportunity for offshore electrification	Steering Group 	WOS electrification project, being worked at steering group and now at operator group level, will enable integration of interconnector and work is in progress. Power system study approved by workgroup and planning in progress.

Local communities and press taking issue with the project due to lack of understanding or misinformation	SIC 	Communication strategy progressing on several fronts including website which will see an initial soft launch in June, plus webinars and articles.
Lack of or disjointed Scottish and UK government support could result in project failing	SIC & OGTC 	Meetings held in May with Peter Aldous, Alistair Carmichael and Aberdeenshire Council and additional meetings with Scottish & UK government representatives being planned for June.
Local supply chain and workforce are key enablers of the project	SIC 	Marine workshop, which will include local supply chain, being planned for June 17th
Requirement to ensure CMT & SIC council are consulted and informed on key decisions and project progress	SIC 	Regular information sharing and briefings of SIC Council set-up. Regular meetings with SIC council with next briefing end June.
Competition with other energy hubs which are seeking funding and stakeholder engagement	SIC & OGTC 	Project being promoted and connections made with and other hubs to share lessons learnt and approaches. Good information sharing with Pale Blue Dot Acorn project and Port of Cromarty Firth
Interest in floating offshore wind development in Shetland region	SIC & OGTC 	Membership of Deepwind & Wind Europe organizations will enable better stakeholder engagement and several meetings held with developers. Interest being shown by developers in ScotWind round & OOR projects under review

7. Government Funding

OGTC, on behalf of the ORION project, is seeking funding from the Scottish Government £62m Energy Transition Fund, announced back in June of 2020 for £2.6m to undertake concept and feasibility studies over the next 2-3 years, matched by industry. OGTC submitted a business case to the Scottish Government, with input and help from Scottish Enterprise, end October 2020. Since that time there have been numerous discussions and clarification meetings between the OGTC and the Scottish Government and it is hoped that a decision will be forthcoming by mid 2021.

SIC & HIE submitted a Strategic Outline Case in October 2020 for Islands Deal funding consideration outlining a number of green hydrogen pilot projects on Shetland. A provision of £5m was approved in the Heads of Terms (HOT) agreement in 1Q 2021 and SIC & HIE are working together to develop an appropriate business case.