

Agenda Item	6
Report No	RDB/09/23

HIGHLAND COUNCIL

Committee: Redesign Board

Date: 31 May 2023

Report Title: Renewable Investment in Solar and Battery Storage

Report By: Interim Depute Chief Executive

1 Purpose/Executive Summary

- 1.1 This Report focuses on the opportunities for the planned development of income generation/cost-saving benefits to The Highland Council from the development of our understanding of the potential around Solar photo voltaic (PV) and Battery Storage in the region

The report provides insight into how existing Assets could be managed to maximise the benefit to the Council.

2 Recommendations

- 2.1 Members are asked to:-

- i) **Note** progress to date in evaluating and identifying a plan of action to ensure all energy assets across the Council estate provides optimum cost-saving benefits to the Council;
- ii) **Agree** the proposed changes for the operation of self-generating assets to ensure future management and reporting reflect the importance of energy assets within the Council;
- iii) **Note** the potential for developing a commercial onsite Power purchase agreement (PPA) model across tenanted properties within the Council's commercial estate;
- iv) **Agree** the development of a pilot business case for the development of solar PPA self-generation model;
- v) **Note** progress to date in identifying and assessing the potential for the development of utility-level solar generation and storage on Council owned land;
- vi) **Agree** the engagement of an independent Grid consultant to establish grid constraint and connection viability across all sites;
- vii) **Agree** the development of sites identified as viable to a full business plan for development potential; and

- viii) **Agree** that a separate report is brought to Highland Council to seek investment funds to proceed to investment Decision stage on the projects set out in this report.

3 Implications

- 3.1 **Resource** – Resource implications are significant, with most of the renewables input likely to be an investment. The Highland Council will be required to adopt robust governance for monitoring asset performance to ensure a consistent return of investment is delivered over the whole life of any project. The development and delivery of this type of project will require input from various officers across the Council and external specialists. All projects will require internal resources with specialist knowledge of designing, installing, and managing a commercial energy asset portfolio. Members should note that investment funds are earmarked for the development of business cases.
- 3.2 **Legal** – The Council has the power to sell electricity under the Sale of Electricity by Local Authorities (Scotland) Regulations 2010 (2010 No.1908): ‘2. For the purpose of section 170A(3) of the Local Government (Scotland) Act 1973, a local authority shall be entitled to sell electricity produced from the following sources— (b)solar.’

Consideration as to the mechanism adopted by the Council to manage financial investment in battery storage will require consideration. Energy Trading Owned and operated solely by the Council for Financial gain would not be permitted under current regulations.

- 3.3 **Community (Equality, Poverty, Rural and Island)** – The ability to deliver community benefit from renewable development is significant and widespread. Three clearly identifiable areas are:-

- **Procurement:** potential for local suppliers and supply chains to benefit from the significant investment. Through the provision of services and materials both during construction and ongoing operational phases;
- **Land and Assets:** The Proposal explores alternative use of our land and assets that currently are not productive and re-purposes those assets; and
- **Financial Power:** Commits investment to support actions to reduce carbon emissions both internally and regionally.

Community benefits supports the Council's ability to safeguard and enhance public services through innovative approaches and allows the Council to show green economic leadership.

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- 3.4 **Climate Change / Carbon Clever** – Investment in Renewable production across the region will assist in the sustainable deployment of low-carbon infrastructure across the Highlands. Attracting scalable investment into the region will provide opportunities to secure funding both directly and indirectly to assist in our net-zero ambition.

- 3.5 **Risk** – The current risk to the Council is in the failure to ensure we utilise existing energy assets to realise a premium return on investment. The risk in progressing the development of both solar and energy storage would be that any delays in securing any possible grid connection at the earliest possible stage could delay any planned development significantly, with over 300Gw of accepted connections already in the Transmission Entry Capacity (TEC) register and an ever-growing pipeline of proposed projects, the lead-in time for connection will become increasingly congested. Any Risk from the development of any/all of the proposed sites would be fully assessed as part of the full business case.
- 3.6 **Gaelic** – There are no Gaelic implications arising from this report.

4 Background

4.2 A workshop focussed on Investment in Renewable Technologies was held on 25 April 2023 for Members of the Redesign Board (please refer to the presentation contained in **Appendix 1**). Members were provided with an evaluation of work carried out to date and an assessment of renewable potential within the region. Members were encouraged to comment on a variety of developments being considered across the following technologies:-

- Battery Storage
- Biomass
- Geothermal
- Heat Networks
- Hydro
- Solar
- Tidal
- Wave
- Wind

All technologies have demonstrated potential within the region. Further assessment is required in respect of several technologies to understand the direct potential for the Council.

Solar and Battery Storage have been developed to a stage where additional resources are required to develop our full understanding of how they could directly contribute to the Council's economic and climate ambitions for the region.

4.3 Work is progressing with Zero Waste Scotland (ZWS) and the Scottish Futures Trust (SFT) to understand how we develop the potential for Heat networks in the region. Work between representatives of ZWS, SFT and the Council is planned for this summer. Options for developing a heat network business case will be presented to the Redesign Board later this year.

4.4 Work in conjunction with the Scottish Government's Hydrogen team and Council Officers is planned to identify how we can work with all developers interested in accelerating Hydrogen production and distribution in the Highlands. The potential within the Highlands and Islands for Green Hydrogen Production is recognised. Work this summer should help shape its development and create clear pathways to delivering at scale. It is expected that this and the progress on potential opportunities for Hydrogen across the region will be presented where? Redesign Board? later this year.

5 Solar PV

5.1 Self-Generation

Solar deployed across the council estate comprising of systems directly connected to properties owned and operated by the Council.

Self-generation sites are best described as energy assets. Operated correctly they can demonstrate significant cost-saving benefits to the Council.

In order to maximise the benefit, dedicated resource is required for monitoring and maintenance. This will ensure assets operate at optimum efficiency at all times. All costs associated with the operation of energy asset should be included within the cost savings demonstrated, allowing assets to be fully self-funded. When installed with individual property, the carbon saving will directly reduce the carbon footprint within the specific building. This type of installation is relatively quick, and the cost-saving benefits are realised immediately.

Several factors can impact the general performance when considering this type of investment. Orientation, roof pitch and roof space must be considered when assessing the suitability of individual properties.

5.2 Next Steps

Assets have been deployed over a period of time and are in various conditions of operational efficiency. The current model has seen installations adopted into individual properties as business as usual, resulting in variances in understanding around the maintenance and performance of assets in maximising the whole life performance.

The Council have an extensive set of energy assets which need be utilised at an optimum level of performance to deliver the best possible level of cost-saving benefits.

The Energy team is currently:-

- working with Zurich (Insurance Company) to establish operational parameters based on Micro-generation Certification scheme (MCS) guidelines;
- establishing a specification for annual maintenance;
- establishing a detailed specification for future developments; and
- developing a programme of work to deliver a portfolio of energy assets operating to their full potential.

Proposed change in operation:-

- consideration of the option for the Energy Team to assume the client role in the day-to day operation of all installations identified as energy assets and leads on the following activities: (Defined as sites where on-site generation provides long-term cost-saving benefits for the Council);
- monitor and manage performance;
- monitor annual maintenance and report on operational repair;
- make recommendations for any potential for improved efficiency;
- capture and report on the cost-saving benefits to the Council on an annual basis;
- identify and develop new energy assets across the estate. Funding would be expected initially through the Salix fund. However, future development could be created utilising identified cost savings from existing assets through a continual increase in savings secured; and
- additional resources may be required within the Energy Team to allow full-time management of assets. This will be funded from the operational control of the assets and reported within the annual reporting of captured cost savings.

5.3 **Commercial**

The Council own a number of commercial properties which are available for rent. This provides an opportunity to develop a commercial onsite Power Purchase Agreement (PPA) model across tenanted properties within the Council's commercial estate.

Through the development of a PPA agreement, the Council could develop, and operate a solar array on the tenanted building in return for the agreed purchase of all energy generated.

Benefits to the Council:-

- added value to our property portfolio;
- additional revenue stream for the Council; and
- encourage significant carbon reduction across the commercial estate (this does not directly impact the Council's carbon footprint, but it does help to support an area-wide reduction).

Benefits to the tenant:-

- Solar is fitted for free and owned by the Council;
- immediate financial savings for the tenant on their energy bills;
- Solar panels reduce emissions in a highly visible way, adding more renewable capacity and assisting area-wide sustainability goals; and
- monitoring, maintenance, and remedial works would be the responsibility of the Council.

5.4 **Next steps**

The Energy Team will work with Estates Management to identify suitable properties to develop a pilot proposal. The scope of work will include:-

- desktop survey of the properties identified;
- assess market potential for rollout across the managed estate;
- understand operational models, thoroughly assessing the benefits and risks to the Council ; and

- develop a business case for the development of on-site commercial solar generation.

This will allow the Council to identify the potential within the property portfolio the Council manages. External resources will be required to develop a commercial business model that maximises the identified potential in the portfolio.

5.5 Utility Scale Ground Mount (Solar Farm)

It is widely recognised that a major proportion of Scotland's solar development will need to come from the ground mounted, utility-scale sector. To achieve a projected requirement of 6.0GW by 2035, solar farms would have to account for 3.5GW to understand the scale, this would equate to 14,000 acres of solar of the 10.7 million acres available with identifiable potential.

In addition to helping achieve climate change goals, increased solar development will develop a range of other crucial benefits:-

- support a just transition - creates resilient, long-term, sustainable jobs. Deploying 6GW of Solar could support at least 3,000 FTE skilled and high-quality jobs directly, with a wider economic impact across the supply chain;
- expanding industrial base - supply chain development across a wide range of companies, including those involved in design, manufacture and distribution, project development and management, operations, maintenance and cleaning, software development, civil, infrastructure and landscape engineering, along with legal, financial and administrative services; and
- reduce pressure on the grid - the investment and engineering work required to transmit the increase in demand for electricity expected as a result of decarbonisation in heat and transport will require a move to a smarter, more decentralised approach to power generation and use. Localised generation of renewable energy will require a mix of technologies to limit the intermittent challenges faced in the transition to green energy.

Initial sites with development potential have been identified and detailed within **Appendix 1**. Work to date is anchored within stage one of a five-stage process in the development of commercial solar. The steps are:-

- i. **Project Potential:** Data Collection and Opportunity Assessment;
- ii. **Project Options:** Strategic and Detailed appraisal of site viability;
- iii. **Project Refinement:** Planning and Development;
- iv. **Project Implementation:** Finance and construction; and
- v. **Project Operation and Maintenance:** Asset Management and Development.

Work undertaken to date has provided insight into land owned by Council, and this has helped develop a high-level understanding of the potential generation which could be achieved from each location.

While there is recognition by Distribution Network Operators (DNOs) that the development of grid-connected solar is essential, there is generally bias towards wind solutions, often placing an unfair burden on solar projects to fund future infrastructure costs.

5.6 **Next Steps**

To progress work on the proposed sites, the required work can be split into two phases:-

Phase 1:

- Resource is required to engage external support to complete an independent grid analysis to identify localised capacity and constraints for each site and identify levels of potential and prioritise potential between generation and storage.
- Carry out a detailed analysis of potential connection costs and time constraints for connection.
- Site may be discounted after the first pass, any sites progressing through both stages will incur costs of approximately £2,000 per location.

For the development of a full business case, sites would have to be deemed viable on completion of Phase 1 before the development of:-

Phase 2:

- Engagement across services to identify any issues likely to be encountered in the development of the proposed use of each site.
- Resource external support to complete ground and environmental assessments of the site.
- Resource external support to deliver a detailed plan and specification for the development.
- Internal resource to assess the potential business models outlining the benefits and risks of each development.
- Develop a fully costed business plan to present to the Re-design Board and thereafter Council for review and Investment Decision.

6 Battery Energy Storage Systems

Battery storage in the UK totals around 1.2GW. This is expected to double bi-annually over the next ten years. The value associated with addressing the imbalance between electricity supply and demand caused by intermittent renewable energy production has accelerated the interest of developers, owner-operators, and traders. This is an emerging market.

For the National Grid Electricity System Operator (ESO) to successfully balance the increased demand for energy produced from intermittent generation sources, energy storage will be required at scale.

The industry has moved at a pace which has highlighted challenges. Current legislation for grid connections views the large-scale storage sites as a competing demand for consumption despite being designed to support grid balancing during peak demand. This has resulted in challenges in achieving grid connection across the UK. Recent interest in developing utility storage in the Highlands has been driven by Scottish and Southern Energy (SSE), offering potentially faster connections than those currently available in other parts of the UK.

6.1 **Next Steps**

All sites are still being assessed for optimum potential use. This is likely to see viable sites best suited to a combination of Solar and Storage. It is recommended that the potential for Battery Storage is developed in conjunction with the steps for developing a business case for utility-scale Solar.

Designation: Interim Depute Chief Executive

Date: 16 May 2023

Authors: Neil Osborne, Climate Change and Energy Team Manager

Investment In Renewable Technologies

Tasgadh ann an teicneòlasan ath-nuadhachail

Generation:

Intermittent:

- Wind
- Solar
- Tidal
- Wave

Continuous

- Hydro
- Geothermal
- Biomass

Storage:

Battery:



Hydrogen:





Investment Self Consumption:

Capture of Demonstrable Cost Savings from Business Operations:

- Hydro
- Solar PV
- Micro Wind
- Data Centres (Micro)

Investment New technology:

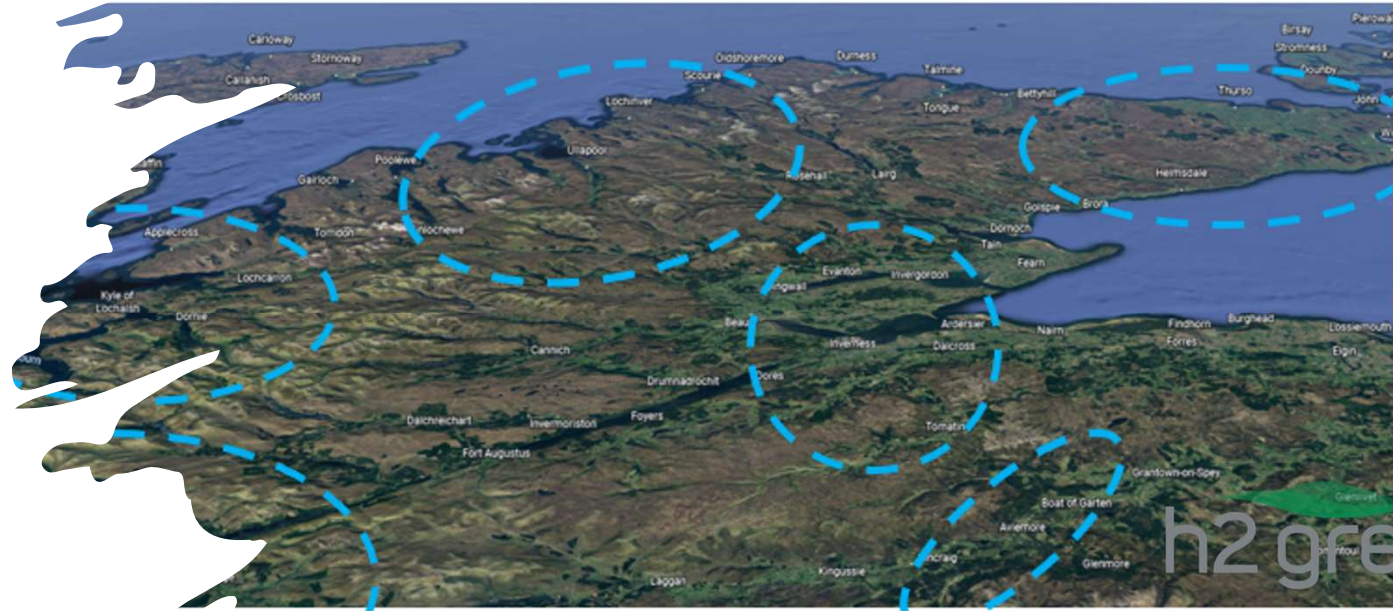
Ensure the Region is at the forefront of technology advancement for Future Development.

- Hydrogen
- Tidal
- Wave
- Carbon Capture



Hydrogen Infrastructure

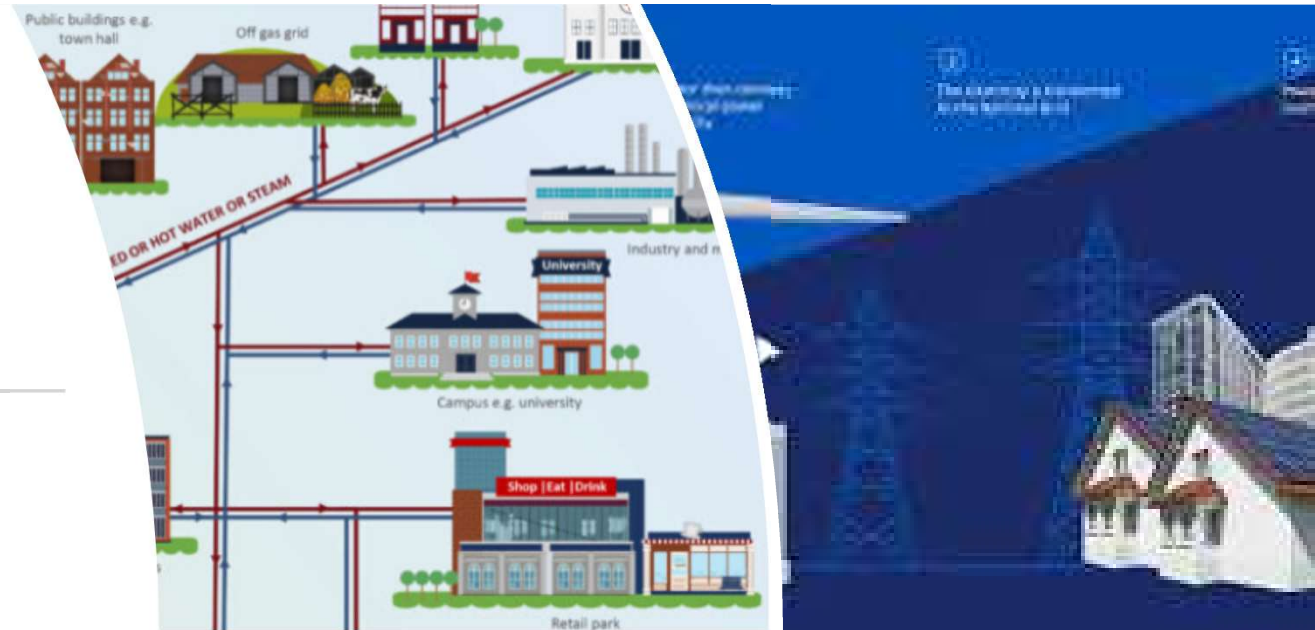
- Delivering Region wide Infrastructure.
- Transitioning Transport to Low Carbon fuel.
- Developing pathways for future Heat decarbonisation.



Investment Income Generation:

The development of commercial opportunities providing additional income streams for the future.

- Solar PV
- Battery Storage
- Heat Networks
- Wind



Solar PV:

On Roof:



Solar Farm:



On Roof: Commercial

Large Commercial Portfolio

- Provide Low-Cost Energy to Commercial Tennants
- Solar Assets Owned and Operated by Highland Council.
- Potential to Develop to Other Commercial Property Through a PPA Agreement.



Solar Farm:

Initial Sites Identified:

- Wick.
- Brora.
- Tain.
- Inverness.
 - Torvean
 - Longman



Wick Solar Array

Potential long-term for Co-Location with Hydrogen Production or Battery Storage which could improve ROI.

5.0mW Array



Projections:	Values:
Development Cost - £	4,752,430
Lifetime Operational Cost - £ (Estimated).	£2,082,295
Projected Lifetime Income – (Gross)	19,133,731
Annual return On Investment	14%
CO2 Savings (kg) p.a.	2,676,341

Brora Solar Array

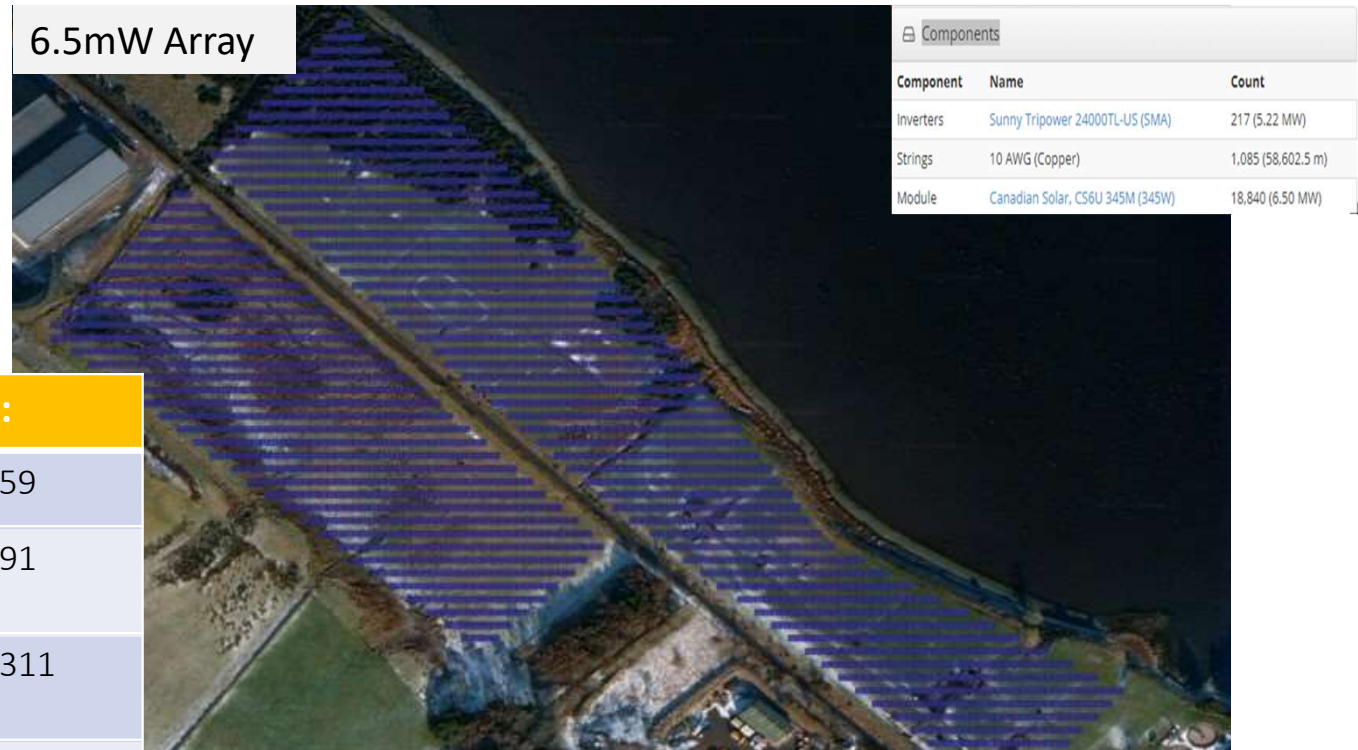
Site offers the potential for continued let for Grazing or the opportunity for enhanced biodiversity measures being integrated into the site.



Projections:	Values:
Development Cost - £	1,568,302
Lifetime Operational Cost - £ (Estimated).	9,88,314
Projected Lifetime Income – (Gross)	6,258,629
Annual return On Investment	15%
CO2 Savings (kg) p.a.	882,757

Tain Solar Array

Site offers the potential for Grazing or the opportunity for enhanced biodiversity measures being integrated into the site. Possible PPA could be achieved with Glenmorangie, delivering an enhanced ROI,



Projections:	Values:
Development Cost - £	6,178,159
Lifetime Operational Cost - £ (Estimated).	2,174,291
Projected Lifetime Income – (Gross)	25,964,311
Annual return On Investment	16%
CO2 Savings (kg) p.a.	3,479,317

Torvean Solar Array

The site has shading issues. May be better suited to servicing high energy users within the Estate. Charleston Academy and HLH site at Bught are within Range. A PPA arrangement with potential Battery Storage project at Torvean Quarry may offer an improved ROI.



Projections:	Values:
Development Cost - £	1,815,428
Lifetime Operational Cost - £ (Estimated).	1,047,613
Projected Lifetime Income – (Gross)	7,337,679
Annual return On Investment	15%
CO2 Savings (kg) p.a.	1,024,404

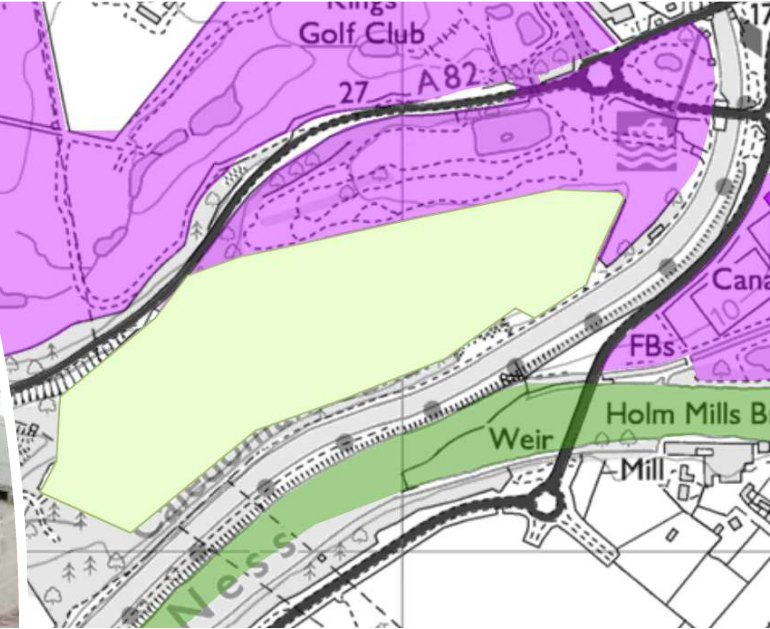
Longman Solar Array

Potential around the site to increase generation to 30gW. While calculations have been carried out using a Generation to Grid model the potential for co-location with Hydrogen Production could deliver an increased ROI.

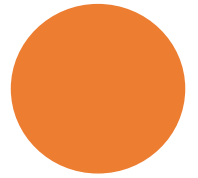


Projections:	Values:
Development Cost - £	14,257,290
Lifetime Operational Cost - £ (Estimated).	£3,953,256
Projected Lifetime Income – (Gross)	60,718,006
Annual return On Investment	16%
CO2 Savings (kg) p.a.	8,029,022

Battery Storage Torvean Quarry



Next Steps



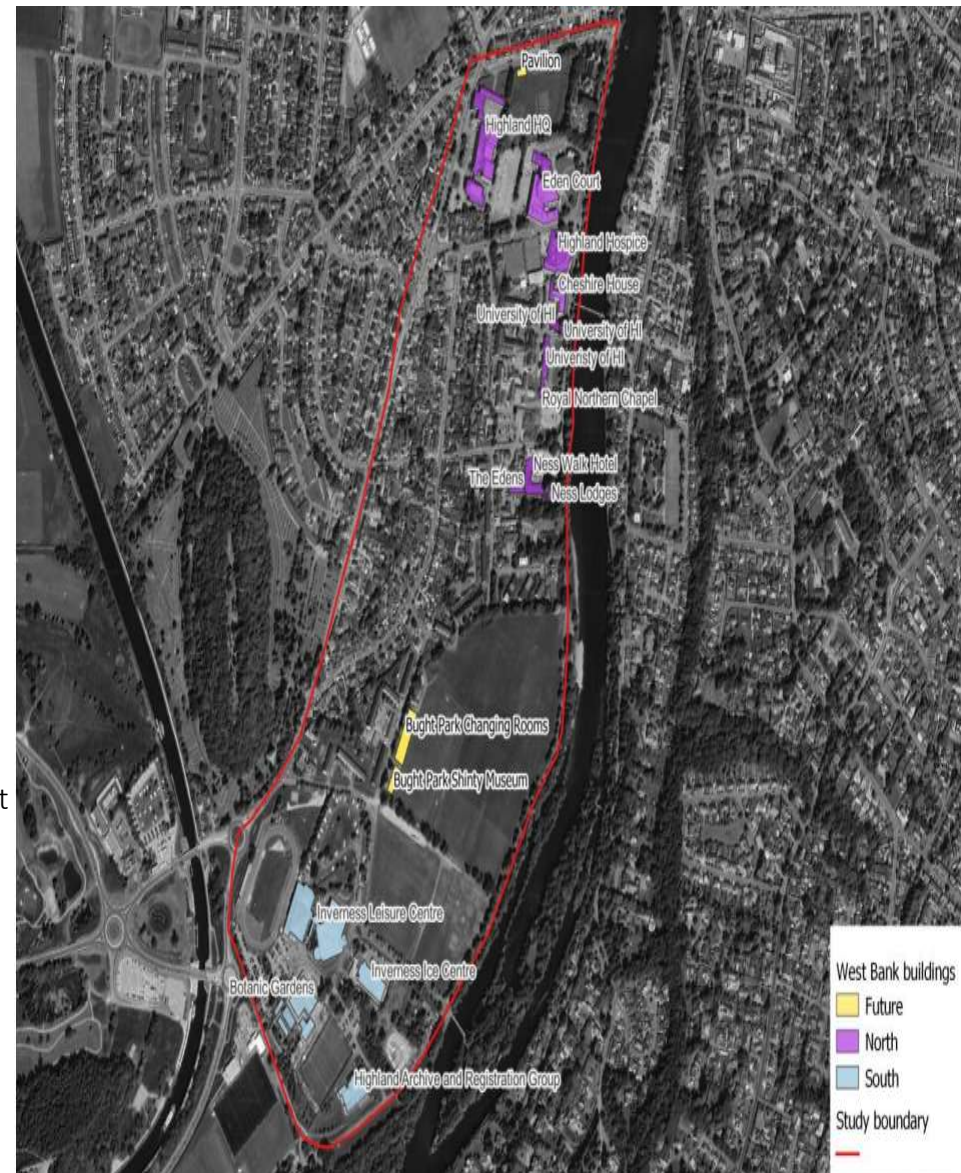
Inverness Castle Heat Network

- Inverness Castle
- North Tower
- Inverness Town House
- New proposed development on the main street (retail, office, and residential space)
- New proposed museum and art gallery adjacent to the castle



Heat Network - West Bank

- Inverness Leisure Centre
- Highland Council HQ
- Botanic Gardens
- Highland Archive and Registration Centre
- Inverness Ice Centre
- Highland Hospice
- Eden Court
- Cheshire House
- University of Highlands and Islands
- Royal Northern Infirmary
- Ness Walk Hotel
- The Edens Hotel
- Ness Lodges
- Northern Meeting Park Development
- Bught Park Shinty
- Bught Park Changing Rooms



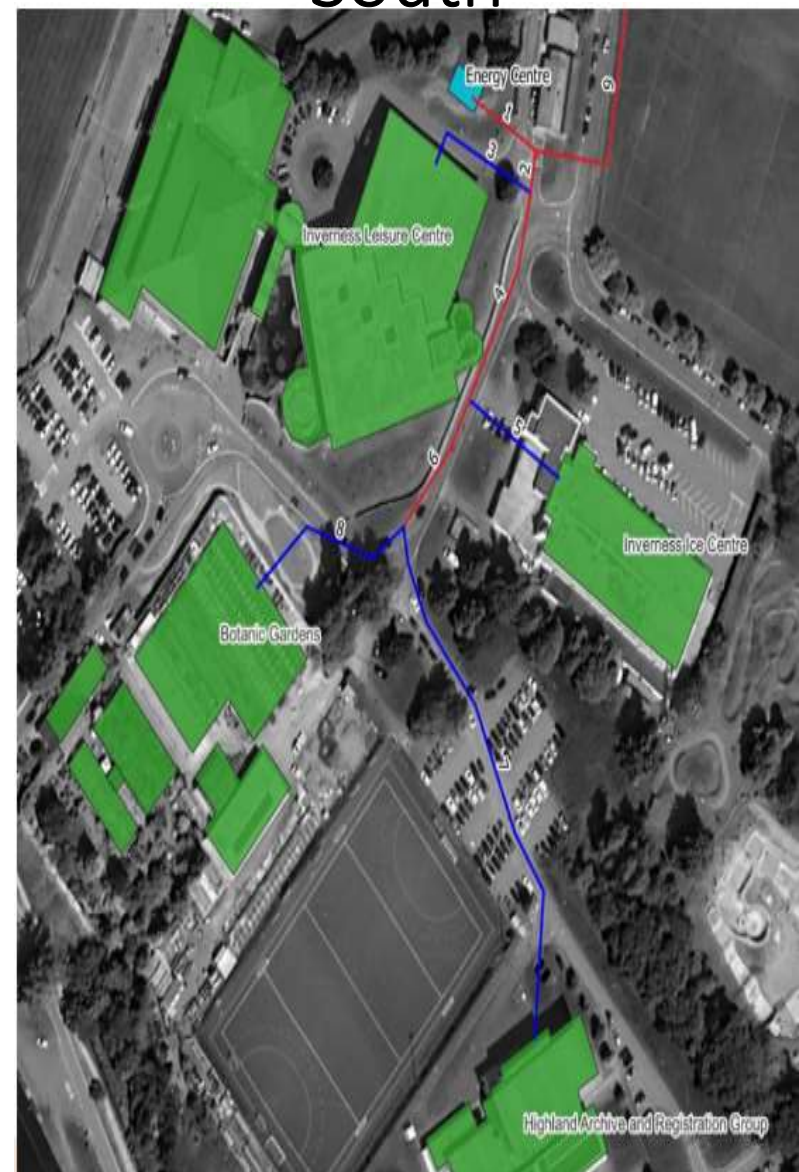
North



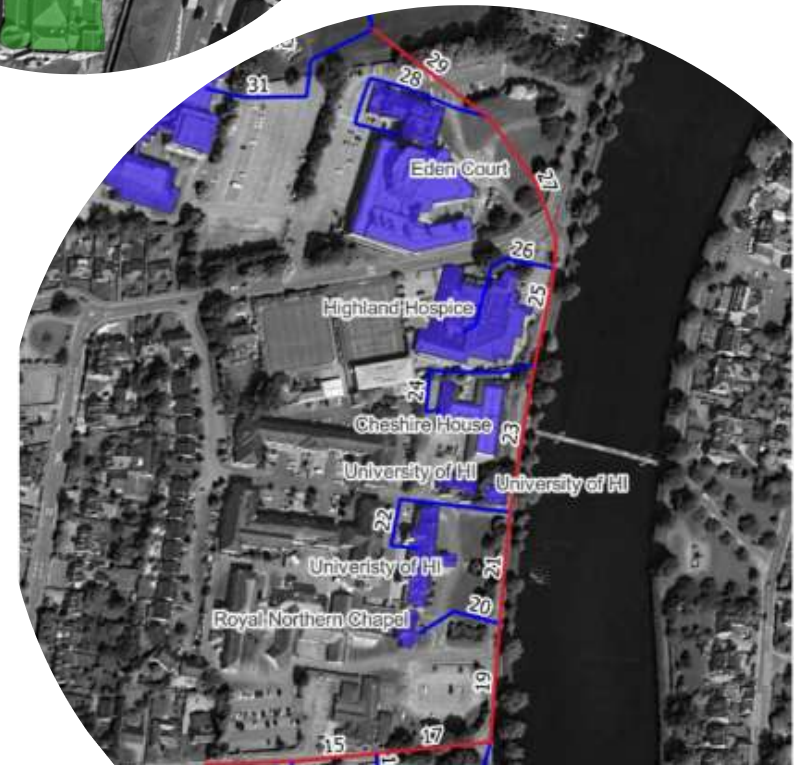
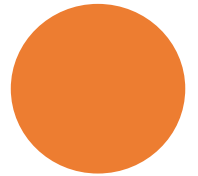
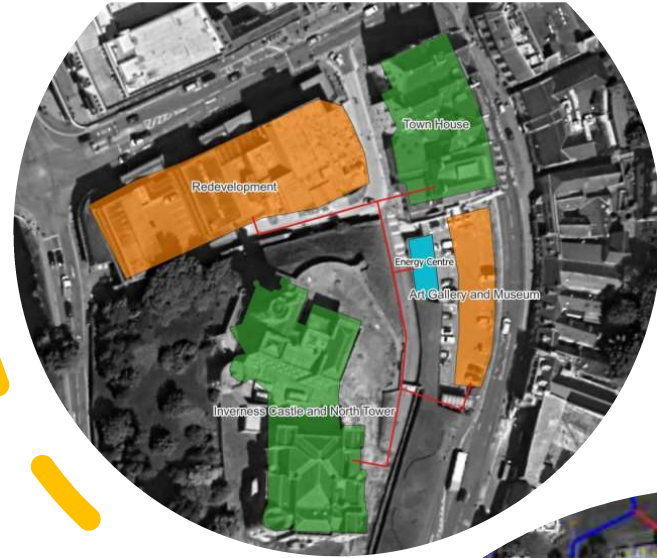
Central



South



Next Steps



Wind

- Developer Contributions.
- Community Benefit.
- Regional Benefit.
- Co-Ownership.
- NPF 4.

