Item: 9

College Management Council Sub-committee: 7 February 2022.

Vertical Farm Project.

Report by Executive Director of Education, Leisure and Housing.

1. Purpose of Report

To provide an update on development of the Vertical Farm project.

2. Recommendations

The Sub-committee is invited to note:

2.1.

That the Vertical Farm project, a constituent element of the Islands Growth Deal, proposes testing a vertical farm unit in an island context using renewable energy, a summary of which is attached as Appendix 1 to this report.

2.2.

That a Strategic Outline Case has been developed in respect of the Vertical Farm project, and subsequently submitted and accepted by the Scottish and UK Governments, with funding of £2 million provisionally approved towards the set-up costs of the project.

2.3.

That work has commenced on the next step in the process for Islands Growth Deal projects, namely development of an Outline Business Case.

2.4.

That the deadline for submission of the Outline Business Case for the project to the Scottish and UK Governments has been extended, and an action plan to meet this has been proposed.

2.5.

That the project Lead Group includes representatives from Orkney College, the University of the Highlands and Islands, the Council, Highlands and Islands Enterprise and the James Hutton Institute, who currently provide all time from existing staff resources.

2.6.

That, notwithstanding paragraph 2.5 above, there is a need to identify ongoing additional support for development of the Vertical Farm project and the Outline Business Case.

3. Background

3.1.

The Orkney Vertical Farm project, a summary of which is attached as Appendix 1 to this report, proposes testing a vertical farm unit in an island context using renewable energy.

3.2.

The project was a late addition to the Islands Growth Deal, with most other projects having benefited from a significantly longer lead in period. Nonetheless, a Strategic Outline Case (SOC) was developed and submitted by the required deadline in the Islands Growth Deal, and received favourable comments from both the Scottish Government and the UK Government. There was no request for further information for the project from either government in the feedback.

3.3.

An early part of the next step in the Islands Growth Deal, development of an Outline Business Case (OBC), was to undertake a series of stakeholder engagement meetings and following this, a consultation. However, due to staff absence this did not occur. Consultants, Biggar Economics, were appointed to undertake the OBC, but paused work, for a number of reasons, amongst them the difficulty in obtaining stakeholder support.

4. Next Steps

4.1.

The project lead has analysed the feedback from Biggar Economics and worked to develop an amended work plan for delivery of the OBC by March 2022. The work plan consists of two key strands:

- Development of the technical specification, with a range of options, including costings for the development and identification of suitable renewable sites as a source of power in order to fulfil the brief.
- Stakeholder engagement to inform and assess potential demand.

4.1.1.

Work on the first strand is now ongoing with a technical partners group, who will have costed potential models available by February 2022. Contact with renewables partners indicates that there is at least one potential and viable site, with others to be explored.

4.2.

The second strand relates to undertaking an information and engagement exercise with potential stakeholders, to ensure that there is clarity on the project, on what a vertical farm can offer, to then take consultation comments and to seek demand statements.

4.3.

A Lead Group has been established including representatives of Highlands and Islands Enterprise (HIE), The James Hutton Institute, University of the Highlands and Islands (UHI), the Council and Orkney College. The group has met several times prior to Christmas and will continue to meet regularly to support, advise on, and drive the project.

4.4.

A meeting has been held with players from across the UK Government and Scottish Government, which have been positive, critical, and have supported development of the approach being taken.

4.5.

Two meetings have been undertaken with the consultants, who have confirmed that they are reassured on the direction of the project, comfortable with the brief for their input to the OBC, can meet the new deadline set, and that the remaining budget for their contract is currently sufficient.

4.6.

Resources are a significant issue, with the Lead Group currently providing all time from existing resources as development of the project is not separately funded. The College has limited in-house technical knowledge or staff resource to undertake this work and complete it. The restart of the work by Biggar Economics is significant to the project's success. The James Hutton Institute and technical experts have indicated they will support, on an in-kind basis, both the technical development issues and be involved in stakeholder meetings. A request has been made to HIE for any support that they can offer. A request has also been made to UHI to access staff involved in preparation of the other OBCs, who have previous experience in the preparation of OBCs for City Deals. If the College can access any further support, to project manage and drive the production of the OBC, this would increase the likelihood of success.

4.7.

A working timeline for completion of the OBC is being developed, and discussed by the Lead Group with the following key milestones:

Anticipated Date	Proposed Activity
December 2021	• Lead Group established. • 2 Work Streams established for technical and stakeholder engagement. • Meetings to discuss re-engagement of the consultants. • Initial scoping work on Vertical Farm technical model. • Draft plan for stakeholder information and engagement. • Produce briefing report to College Management Committee.
January 2022	• Undertake stakeholder information sessions and respond to any follow up questions, to be completed by 28 January. • Draft vertical models, with costings for capital and potential revenue implications produced. • Consultants to work with Lead Group to gather data and input into OBC.
February 2022	• Complete second round of stakeholder engagement to establish interest and likely involvement in the vertical farm. Gather any demand statements. • Detailed work on vertical farm models and achievability alongside potential renewable providers. • Consultant to continue to develop OBC, and assess feasibility of successful completion by March. • Check point by Lead Group on likelihood of OBC being completed and feasibility of success of project – stop/continue decision.
March 2022	Final detailed work on OBC, drawing upon technical and stakeholder streams work and submission.

5. Links to Council Plan

5.1.

The proposals in this report support and contribute to improved outcomes for communities as outlined in the Council Plan strategic priority theme of Enterprising Communities.

5.2.

The proposals in this report relate directly to Priority 4.9. to work in partnership with the two other Islands Councils to finalise the Islands Deal.

6. Links to Local Outcomes Improvement Plan

The proposals in this report support and contribute to improved outcomes for communities as outlined in the Local Outcomes Improvement Plan priority of Sustainable Recovery.

7. Financial Implications

There are no significant financial implications arising directly from this report.

8. Legal Aspects

There are no legal implications arising directly from this report.

9. Contact Officers

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9. Appendix

Appendix 1: Orkney Vertical Farm Project Summary.

Orkney Vertical Farm - Project Summary

Background

Every community needs a sustainable and secure supply of fresh, affordable and nutritious food. Around the world, much greater emphasis is being placed on food security, sustainability and provenance; with increased scrutiny across the whole food ecosystem that is highlighted by the current pandemic. Growing food supplies even more locally, at community level, and as close to the point of consumption or production as possible, provides economic gain, minimises waste, contributes towards Scotland's climate targets and offers health benefits.

Traditionally, island communities such as Orkney have been limited in the range of food can be grown locally as open field agriculture is constrained by the climate conditions to which the islands are subject, low average temperatures, adverse weather, exposed sites etc, and are highly seasonal. Indoor agricultural environments such as glasshouses, polytunnels and the more robust polycrubs have helped address this, but all have their limitations.

The advent of vertical farming provides a step change in indoor farming; enabling Total Control Environment Agriculture (TCEA) to be deployed to grow a wide range of vegetables, herbs and other crops at a scale which was not viable previously.

Vertical farming is a relatively new form of indoor farming. Early vertical farms were primarily designed for monoculture, growing one crop continuously. These are suitable for areas of large population density but lack flexibility. The latest developments in vertical farming harness many of the technologies that underpin the fourth industrial revolution, including data, AI and IoT, to create much more sophisticated growing environments.

Leading edge vertical farms deploy a growing system with fully controlled lighting, heating, ventilation and irrigation; providing the ideal conditions for growth, known as totally controlled environment agriculture (TCEA). Plants are grown in growth trays, which are suspended vertically one above the other in 'growth towers'. This system enables a range of crops to be grown in parallel, offering significant flexibility and allowing for justin- time growing and year-round delivery. This form of farming is also environmentally beneficial, removing the need for pesticides, phosphate-based fertilisers and insecticides, at the same time as ensuring zero emissions and highly efficient fresh-water use.

Vertical Farm, Invergowrie

The Orkney Community Vertical Farm Project

As part of the Islands Growth Deal, Orkney College is working with partners to develop the Orkney Vertical Farm project, focused on agricultural innovation with research and development laboratories and business incubation facilities based at the University of the Highlands and Islands Agronomy Institute in Orkney. The project will be supported with joint investment of up to £2 million from the Scottish Government and UK Government. We expect it to create significant benefits for Orkney.

The production of local food and ingredients from plants grown in the vertical farm will help overcome the natural constraints on the land due to climate and supply chains to remote regions. Vertical farming and traditional farming are companions and not competitors. Food produced in vertical farms cannot otherwise be produced locally. The proposed vertical farm would enable local growing of plant ingredients that complement existing authentic local foods, eg botanicals for spirits; and herbs for fish and meat. This would provide food and drink processors with an increased range of locally produced ingredients to enhance their current product offerings.

Whilst vertical farms are highly efficient, they do require considerable amounts of power. The ability to utilise excess renewable energy generated in Orkney as an integral part of an energy systems approach that balances local supply and demand would make the vertical farm highly competitive. This would minimise the waste from excess generation and thereby contribute to lowering agricultural carbon impacts more systemically, along with generating wider community benefit. The farm can also be used to help with load balancing across the Grid, as the power can be turned off instantaneously with minimal impact on the crops. This is a unique opportunity to develop a model that could be transferrable to other islands with renewable energy supplies, and present a transformational change for Scotland's Island communities.

The proposed project would contribute to the Islands Deal's shared vision and objectives by inputting to a low carbon future, delivering inclusive and sustainable economic growth, providing communities with new skills and attracting talent, and supporting innovation.

The proposed project would:

- Complement the Orkney Sustainable Energy Strategy 2017- 2025's aim of creating a secure, sustainable low carbon island economy, and specifically address an opportunity to use surplus renewable energy on the island using novel energy management systems that can flex with the suppliers from different renewable sources.
- Support the Orkney Tourism Strategy 2020-2025 by enabling the hospitality sector to provide even higher quality catering through increasing the supply of fresh, top quality ingredients grown locally all year round; and at lower risk by being less dependent on long range food supply chains.
- Create new jobs, and develop new skills, and become the pilot for a hub and spoke model for local horticulture; acting as the propagation centre for crops that are then grown on in polycrubs and glasshouses around the islands. By Year 10 of operation, job creation in Orkney is estimated to total 19 additional FTEs (full-time equivalent jobs), with associated income of c£475,000 per annum – potentially c£8 million in aggregate over twenty years. Around 7 of these 19 FTEs could be created in relatively remote and fragile areas.
- Foster innovation, working with the Agronomy Institute and the James Hutton Institute, adding to the authentic food and drinks developed on the island.
- Enhance the Islands' quality of life through an improved and extended range of fresh food; helping to improve diets not by just improving supply but, through the community model, by improving appreciation of plant-based foods where active involvement increases "ownership" of the produce.
- Contribute to economic growth, with no negative impact on the Islands' exceptional natural environment and air quality.
- Integrate within the Islands' 'living lab' concept; enabling collaboration with the Agronomy Institute, James Hutton Institute and the wider community to develop new crop products that take advantage of lower energy costs from using surplus renewable energy.
- Potentially generate fresh produce exports from Orkney, for example to other Island communities, and the North of Scotland.
- Foster comparable developments in Shetland, the Outer Hebrides, and other parts of the Highlands and Islands.