LOMOND BANKS

Lomond Banks Sustainability Statement

by

THIRD ENERGY

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1. Introduction

As part of Lomond Banks commitment to Net Zero it has requested that energy specialists, Third Energy, identify suitable measures which can be designed into the development to decarbonise and reduce its reliance on traditional fossil fuel-based generation of heat and power.

Third Energy is a North Yorkshire based engineering company with over 27 years' experience in full life cycle energy generation. The company is currently transitioning their assets and infrastructure from fossil fuels to renewables which will save a projected 7,000 tonnes of CO2e each year. Third Energy's projects include frequency demand management using battery storage systems, photovoltaics (PV), geothermal heat and energy efficiency installations.

Third Energy, as part of the Wolfland Group, have experience in commercial energy efficiency improvements, including infrastructure surveys and the installation of energy efficiency technologies such as LED lighting and solar PV arrays.

2. Objective

The aim of this sustainability statement is to make recommendations which will support the planning permission in principle application for the proposed Lomond Banks development. Lomond Banks has the ambition to become Scotland's first "Whole Life Zero Carbon Resort". To successfully achieve this, the development will need to be designed in a way which will utilise energy resources and net zero technology.

The Third Energy team specialise in energy generation and energy efficiency services. It is our role to propose ways in which this site can reduce its dependency on fossil fuels. This statement will identify methods to generate heat and electricity using low carbon solutions, how to design efficiencies into the development and ways to engage with the community to advance carbon reductions locally.

3. Using Efficiencies to Reduce Energy Demand

Lomond Banks will be able to incorporate net zero concepts into every stage of development. A simple way to reduce carbon emissions is to reduce the demand for heat and electricity. Super-insulated buildings with the appropriate mechanical ventilation systems will ensure buildings can retain the heat they absorb while maintaining a pleasant environment.

It is recommended that where possible, natural light is captured and dispersed to reduce lighting consumption during the daylight hours and that efficient LED lighting is installed to produce appropriate levels of lighting and comfort with minimal energy consumption.

3.1 Energy efficiencies to include

- Superinsulation
- Mechanical ventilation and airflow
- LED lighting and smart controls
- Turnstile entrances to buildings
- Inert gas triple glazing
- Battery storage and energy management systems
- Electrical site vehicles and charging stations

4. Generating Power and Heat

Lomond Banks has the potential to install a district style heat network or create microgrids. Renewable energy utilising solar, wind and water sources should be used where possible to maximise the site's clean energy generation and to minimise demand for fossil fuels. Renewables at each location can be connected to create micro grids which will supply that location. Since demand is likely to be higher than the energy which can be produced from these technologies, they will require a backup power source, either through a connection to the grid or via an onsite generator.

Lomond Banks can increase its energy efficiency by installing a dual fuel combined heat and power (CHP) unit. Using 100% renewable energy, including green hydrogen, would give the site the ability to create a heat and power network which would have no reliance on fossil fuels. A consideration for the development is whether it would be more suitable and economically viable to have independent heating and electrical systems for each location or a district style network which can produce heat and electricity centrally and then distribute throughout the site.

4.1 Power generation

There is opportunity to incorporate a number of different renewable energy technologies into the design of this development.

These include:

4.1.1 Photovoltaics (PV)

The approximate annual irradiation levels on site are above 900 kWh/m², making it suitable for electricity generation from solar energy. Optimised PV arrays require a south facing roof space which is uninterrupted by shade. It is recommended that saw tooth and salt box shaped roofs are used to maximise the surface area where PV arrays can be installed. This, and the south-facing aspect, should be designed into the proposal for Pierhead, Station Square, the service building and Woodbank House. Other locations which would benefit from PV installations are The Boat House and some lodges in Woodbank. Due to shading, these areas would better suit Solar Edge technology, which is able to produce energy even when partially shaded.

4.1.2 Wind Turbines

Micro/small wind turbines (turbines producing less than 50kW) can be attached to roof spaces or, in the right locations, can be ground mounted. Wind turbines must align with the wind to prevent inefficiencies or damage due to turbulence. To determine the most efficient locations for micro/small wind turbines, monitoring systems will need to be installed and data collected on a continuous basis. Due to the comprehensive nature of the modelling and reports required, it can take up to 12 months to collect the necessary data and would need to be planned in advance.

4.1.3 Water Systems

Slow flow hydro-electric systems (such as water wheels) could be installed in the small stream in the Woodbank area or if permitted, on the River Leven. These systems would provide a 24/7 source of power; however, the cost/benefit would need to be modelled as the resulting output would not be of a significant scale. The installation

of a system like this would provide educational and/or exhibitory benefits and would contribute to the overall reduction in carbon emissions.

4.2 Heat Generation

The site is suitable for utilisation of natural heat sources and installation of heat extraction technology, with multiple technologies able to work together where necessary.

4.2.1 Passive Solar

Buildings should be designed to utilise the sites geography and climate to minimise the reliance on heating and lighting technology. Natural light and passive solar heating will reduce the energy consumption for electricity and heat. In a super-insulated building, the sun should be used to capture and retain heat throughout the day to provide a level which is comfortable at night but can be topped up via the buildings designated heating systems.

4.2.2 Ground Source Heat Pumps

A renewable low carbon heat source whereby low temperature fluids are extracted from the ground and flowed through a heat exchanger to provide heating and hot water all year round. This system will require embedded design and planning in order to accommodate the subsurface area to install pipe networks.

4.2.3 Air Source Heat Pumps

Working in the same way as ground source heat pumps but the initial source of heat is ambient air. Air source heat pumps are easier to install and may be more suitable in areas where it is not possible to lay underground piping. The drawback of air source heat pumps is that they can be slightly less efficient over the course of the year and may not be as effective at temperatures below -5°C

4.2.3 Water source heat pumps

Water source heat pumps may also be an option, depending on environmental legislation and the restrictions set by the national park. Water source heat pumps are typically more efficient than ground source heat pumps.

5. Circular Economy

The circular economy model aims to increase material productivity and minimise waste. Businesses who are adopting this model are viewed as being progressive and environmentally minded. It is also a way to add value to processes which contribute to environmental sustainability.

5.1 Energy Waste

Waste heat recovery and energy recovery ventilation technology can be utilised to transfer heat to areas which need it and to ensure a comfortable environment is provided. The correct systems will ensure moisture and heat levels are managed to maintain a healthy environment while maximising the use of heat which would otherwise be wasted.

5.2 Carbon Capture

To be carbon-zero, emissions need to be eliminated or captured. A CHP unit, for example, may be fuelled via natural gas or biogas, but the emissions can be captured from this process. Capturing CO2 in a way which it can then be used as a commodity elsewhere will add value to the process. CO2 is vital to greenhouses, vertical farming, distribution networks etc. Carbon capture on this scale may not be a profitable operation but, when the aim is to be zero carbon, any extra costs that can be recouped from this process will be beneficial.

5.3 Organic Waste

To create a circular process from organic waste, the waste can be collected and used as a feed stock for Anaerobic Digestion (AD). AD produces high quality fertiliser and biogas which can be used as a source of fuel for the CHP unit.

5.4 Water Systems

Although Scotland is known for having an abundance of fresh water, having circular practices in place for Lomond Banks will minimise the developmental impact on local resources.

5.4.1 Rainwater Harvesting

The development will require vast quantities of water to run its operations and using harvested rainwater will reduce the demand for water from the national supplier. Rainwater harvesting can reduce the running cost of facilities as well as show that Lomond Banks has the circular economy model in mind. Rainwater is ideal for cleaning facilities, vehicle, and bike washes, and with the right treatment can be used for swimming pools. Rainwater can be easily captured from roof spaces and PV arrays.

5.4.2 Grey Water Systems

Grey water in new developments will distribute water which has already been used in sinks, showers and washing facilities. The water would require some treatment and would be best used for irrigation around the site.

6. Sustainable Transport – Reducing Scope 2 Emissions

To reduce Scope 2 emissions, vehicles which use fossil fuels should be removed from operations and limited where possible. Active travel options which are accessible to all, and electric vehicles (EV) should be used instead. The site's design can facilitate low emissions vehicles by having infrastructure which easily enables active travel and EVs. Active travel routes and EV chargers which are powered by renewables, will make significant savings to scope two and three emissions.

6.1 Staff

Having an active mindset in the workplace will reduce Lomond Banks emissions caused by vehicle use during operations and via commuting.

Staff should be encouraged to walk or have access to non-motorised vehicles to move around the site for example, bicycles, cargo bikes and assisted/electric bikes/trikes. It is advised that active travel training for workplaces be carried out and government schemes for employees be available, such as the Cycle to Work Scheme.

Commuters who are unable to walk or cycle should be encouraged to use public transport or car share. EV charging rewards can be used as an incentive to car share and use electric vehicles to commute. Employees who depend on motor vehicles, on site or for commuting, should partake in an energy efficient driving module, this could easily be included in new start training booklets and annual training.

All vehicles used for the operations of the site should be electric and charged during periods of low energy demand where possible.

6.2 Visitors

To encourage visitors to use zero emission transport it is advised to promote active travel through bike, trike and handcycle hire offers. It will be important to include accessible modes of transport for visitors who are less mobile by having handcycles, electric scooters and buggies. Implementing measures to provide for those less mobile will give visitors a better sense of inclusivity and make active travel options more attractive.

To capitalise from EVs, EV charging units should be made available for visitors in all car parks and some accommodation, with foresight to include more as demand increases. Government grants are currently available to assist with the installation costs of charging units. Charging credits can be given as incentive to travel by EV and a low emission zone (clean air zone) within select areas of the site can be created to eliminate fossil fuel vehicles from accessing it.

7. Offsetting

Although offsetting should be seen at the last resort for reducing carbon emissions it is inevitable at this stage that it will be required. There are a number of ways which Lomond Banks could do this.

7.1 Tree Planting

Tree planting can be done on land owned by the company or via donations to reputable offsetting schemes. In this case the preferable solution would be to plant trees locally, this may require more land to be purchased solely for the purpose of woodland restoration and biodiversity projects. Alternatively, it could be done in collaboration with local landowners or organisations, such as the Loch Lomond and The Trossachs National Park, to whom Lomond Banks can provide resources to. Financial support and volunteering staff for tree planting would contribute to offsetting targets.

7.2 Biodiversity and Restoration Projects

Investing in restoration projects such as peatland restoration and habitat restoration is a great way to contribute to Scotland's climate change mitigation strategies. More than 20% of Scotland is covered by peatlands which hold an estimated 140 years' worth of Scotland's total annual greenhouse gas emissions. 80% of Scotland's peatland is damaged in some way therefore contributing to peatland restoration will offset emissions and contribute to the protection of one of Scotland's largest long-term carbon sinks.

7.3 Investing in Renewables

Offsetting can be calculated by the carbon emissions saved through renewable energy technology. By investing in renewable energy projects, Lomond Banks will be reducing the demand for fossil fuels and the emissions they produce.

Examples of UK technologies to invest in,

- ✓ Solar farms
- ✓ Geothermal
- ✓ Green hydrogen development
- ✓ Wind turbines

7.4 Funding opportunities

Funding and incentives are available for the following:

- Low carbon heat networks
- Renewals energy installations such as solar and heat pumps
- EV charging units
- Active travel schemes
- Biodiversity creation

8. Community Projects

Lomond Banks has a number of opportunities to embed itself into the local community and offset their carbon at the same time.

8.1 Loch Lomond and the Trossachs National Park (LLTNP)

LLTNP organises volunteer activities which are essential to the upkeep of the national parks landscape and allows the LLTNP to engage with the wider community by facilitating experiences which the average visitor would not be able to have.

Lomond Banks is eager to develop productive collaborations with the community and national park with the aim of accelerating actions in the LLTNP Mission Zero plan. Giving employees an optional paid volunteer day dedicated to the national park would broaden their volunteer base. It would also be part of Lomond Banks strategy to create a rewarding and progressive work environment for staff members. Through discussions with the LLTNP, Lomond Banks could be a promoter of the LLTNP's volunteer network and experiences, and a contributor to offsetting through tree planting and biodiversity projects. Working together to drive the change needed to motivate positive climate action in the local area.

8.2 Sustrans

Sustrans are the custodians of the UK's national cycling network, they are an organisation who promote active travel and have a network of volunteers.

To achieve net zero credentials, active travel on site and the promotion of active travel to get to the site will be essential. Having a partnership with Sustrans will boost credibility and help identify ways to improve cycling networks to the site and Lomond Banks are keen to explore opportunities to partner with Sustrans to deliver this.

9. Behavioural change

As part of Lomond Banks' aim to create a "Whole Life Zero Carbon Resort" it will need to influence behavioural change in its staff and visitors and cultivate an environment where it is the social norm to be environmentally conscious and promote the personal and community benefits. Providing educational material which will provoke an interest in sustainable energy practices and provide a foundation for that knowledge absorbed by both visitors and site teams and to be propagated externally.

Promoting behavioural change will not only illustrate the sites environmental awareness, but it will also provide transparency into technologies which many may not fully understand or appreciate, in the hope that such approaches are adopted by more users.

10. Moving Forward

This Sustainability Statement makes recommendations as to what Lomond Banks can do to meet the aim of becoming a "Whole Life Zero Carbon Resort" focusing on driving down emissions and contributing to economic growth in the local community.

Should planning permission in principle be granted, Lomond Banks intends to use nature-based solutions and the appropriate renewable energy technologies to decarbonise the resorts energy systems, such solutions can be incorporated at detailed design stage.

Once operational, the sustainable practices and circular economy principles discussed in this statement can be embedded into the day to day running of the facilities. Lomond Banks intends to work with local businesses throughout construction and operation to keep the supply chain as local as possible, to stimulate the local economy and reduce emissions generated through the movement and transport of goods. Lomond Banks would be a key contributor to LLTNP's Mission Zero Plan and local enterprise.