

Barachander Wind Farm

Welcome

GreenPower is pleased to introduce our plans for the Barachander Wind Farm located adjacent to the Loch Nant Hydroelectric scheme, and close to GreenPower's operational wind farm at Carraig Gheal, near Kilchrenan, in Argyll.

At a time when the climate emergency demands new green energy sources, this project is proposed in a green energy zone beside other existing developments, and for a relatively modest number of turbines with high energy yield.

GreenPower

GreenPower is a leading, Scottish-owned, independent developer, owner and operator of renewable energy projects including onshore wind, hydro, hydrogen and solar.

It was founded in 2000, and has a specialist team leading development, construction, acquisitions and operation of renewable energy projects.

GreenPower's objective is to play our part in tackling the climate emergency by developing and operating commercially viable projects that directly reduce carbon emissions and deliver economic and social benefits to local communities and the wider Scottish economy.

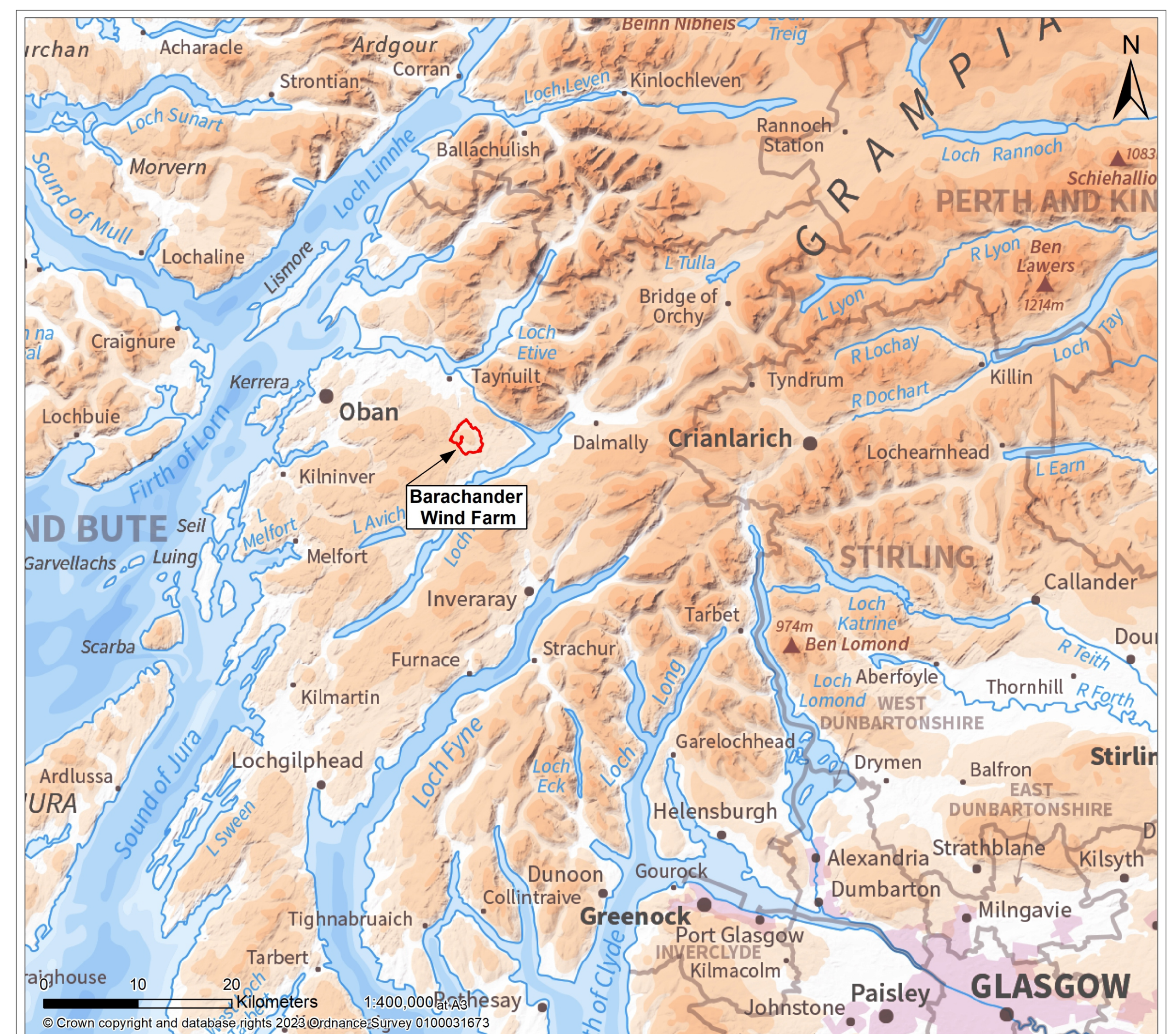
About the Site

The proposed development will be carefully constructed in an upland area which includes a major forestry plantation. Wind energy and trees will together help tackle climate change and support Argyll and Bute Council and Scottish Government Net Zero Targets.

What Stage is the Project at?

The project is in the Scoping phase and we are now seeking feedback from the key consultees and general public on the project design and survey requirements. A number of site investigations and surveys have been carried out to reach this stage and will be used in the finalised Environmental Impact Assessment produced for the proposal.

Feedback received through the Scoping phase along with the findings of these investigations will determine the final turbine locations along with turbine models.



Access

GreenPower was instrumental in funding and creating the 35km West Loch Awe Timber Haulage Route which took the Carraig Gheal Wind Farm major component traffic off the main public roads north of Kilmartin. This route delivers ongoing positive impacts for the locality by reducing timber haulage traffic on these public roads. We intend to use the same route as it runs right past the Barachander site.

For more information see:
www.greenpowerinternational.com

or contact the team to discuss further at
barachander@greenpowerinternational.com

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Proposed Development

The proposed Barachander Wind Farm is located on the Barachander Farm Estate, northeast of Kilchrenan in Argyll and Bute. The site location and boundary are detailed in the map below.

Initial surveys and design work have indicated that the site has potential to accommodate up to 11 turbines, with a potential output of 66 MW.

Consultation is an important part of the design process, and we have produced an initial indicative layout along with visualisations for feedback.

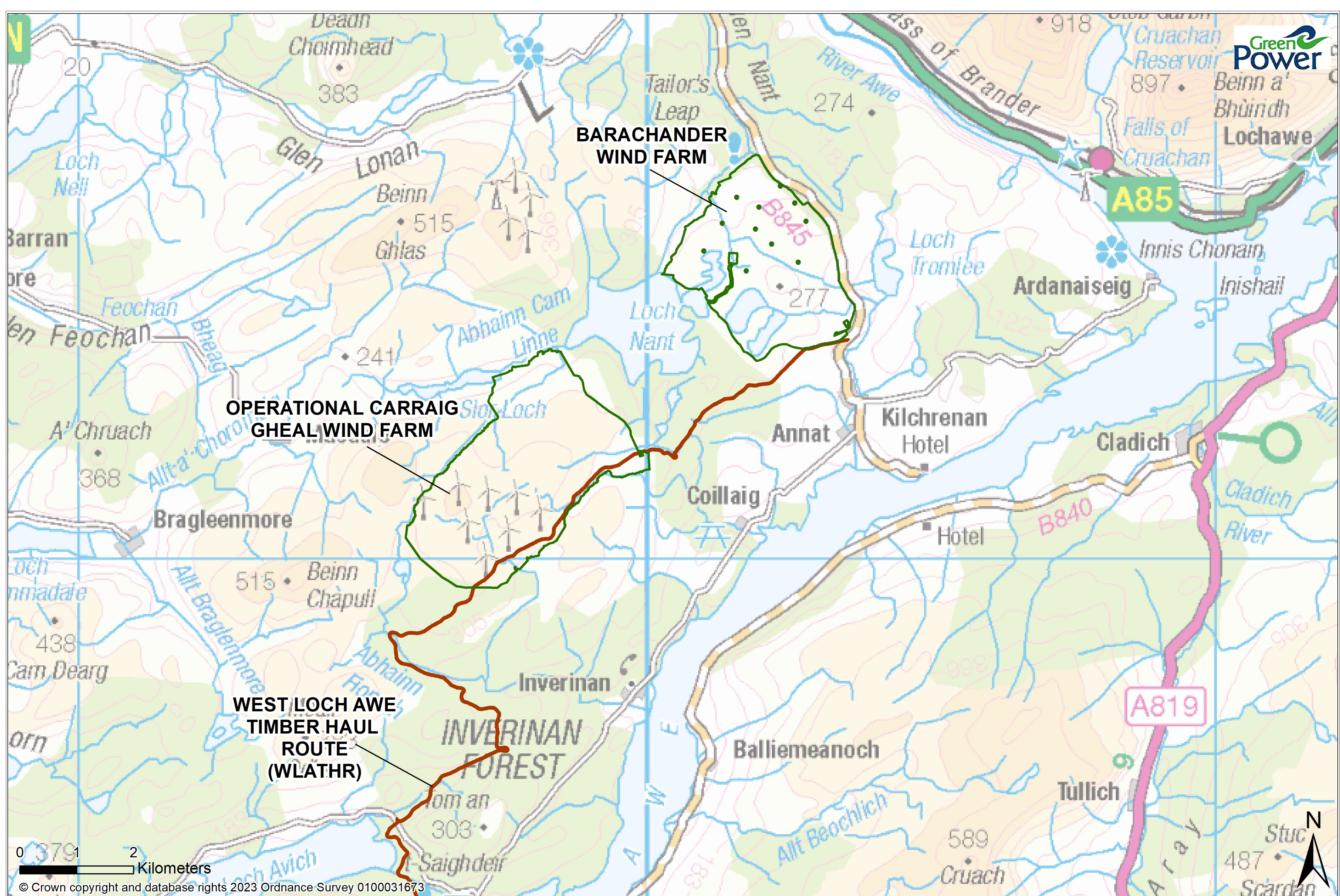
Key Facts

The site will comprise up to 11 wind turbines at up to 180 meters tall from ground level to the top of the blade tip. These are mid-ranged sizes of modern standard wind turbines, chosen for a blend of economy and performance.

Generating up to 66MW of renewable electricity, Barachander Wind Farm will provide enough power for approximately 64,000 homes¹.

The main components of the proposed development are:

- Up to 11 turbines, with a tip height up to 180m
- Turbine foundations, crane hardstandings and temporary construction area
- New and upgraded access tracks
- Energy conversion and storage facilities
- Anemometry mast for wind monitoring
- Transformers and an onsite substation
- Control building
- Borrow pits



¹ Using RenewableUK's 'Homes Powered Equivalent' Calculation and BEIS Subnational Electricity and Gas Consumption Data (2022)

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Timeline

Pre-Application and Scoping Process

This scoping and pre-application stage of renewable energy development is the process by which we agree with the consenting body which areas of environmental assessment are required under the Electricity Act Section 36 applications process. In this case, the consenting body is the Scottish Government's Energy Consents Unit.

During scoping, opinions are also gathered from a wide range of stakeholders and statutory consultees such as the local authority, NatureScot, the Scottish Environment Protection Agency, and Historic Environment Scotland. Feedback received from all stakeholders will be used to design the final project layout.

Environmental Studies

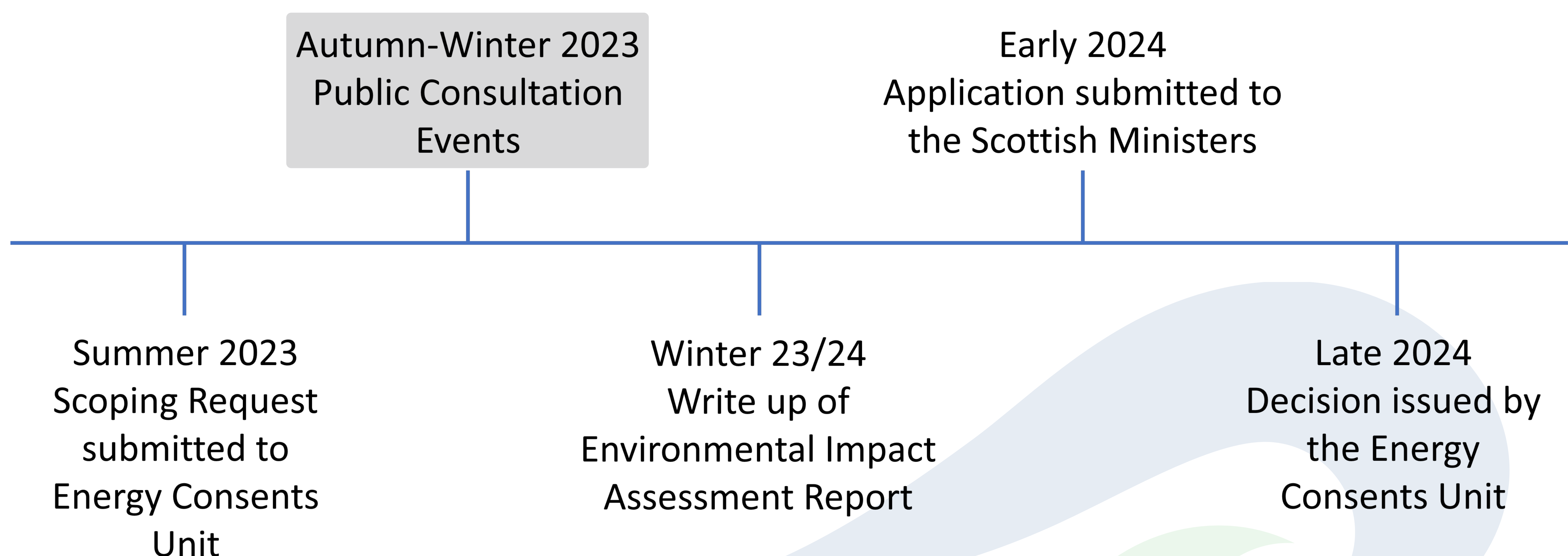
A very wide range of environmental study areas are usually required for developing projects of this kind, including: a 'carbon calculation' to show the contribution made to reduce carbon emissions over the lifetime of the project; potential effects on birds and other species; effects on hydrology; landscape & visual effects; and potential effects on aviation radar systems.

Bird monitoring, along with a wide range of other environmental assessments such as peat probing and cultural heritage have already been carried out to identify any key issues arising from the proposed development.

Consultation has been carried out with the relevant aviation and communications monitoring agencies. An environmental impact assessment report, detailing all survey findings and effects, will be completed ahead of the planned submission of the proposal in early 2024.

Connecting the Project to the Electricity Grid

At this stage a grid connection date is envisaged between 2028 and 2030. GreenPower is also developing the Argyll Hydrogen Hub – and energy generated on site may also be used to generate green hydrogen to replace fossil fuels used in heavy transport, ferries, distilleries, hospitals and other users of heavy fuel oil.



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Assessing the Effects

An Environmental Impact Assessment (EIA) is undertaken to identify and assess the potential significant effects of the proposed development. This is used to shape the design and final layout along with any potential mitigation measures. This includes, amongst others:

Landscape and Visual:

A Landscape and Visual Impact Assessment (LVIA) is carried out to consider effects on visual amenity and the wider landscape, noting any changes in the characteristics and qualities of the landscape as a result of the proposed development.

A preliminary Zone of Theoretical Visibility (ZTV) has been prepared for this exhibition. The ZTV indicates the number of turbines theoretically visible within the study area. The ZTV does not include potential screening from buildings or vegetation, which can often reduce the number of turbines visible.



Ornithology:

This assessment considers any potential effects on local and migratory birds. Extensive surveys have been carried out since 2020. These surveys have been completed in accordance with best practice guidance and consultation with NatureScot.

Extensive surveys on the birds found on site have been completed to identify adequate buffers and distancing of turbine locations. Where required, mitigation measures will be undertaken and applied throughout the project lifetime.

Ecology:

Ecology surveys have been ongoing since early 2022. The potential effects of the proposal on habitats, as well as bats, otter, badger, water vole and protected species will be assessed in the EIA.

Assessments to date have concluded that there will be no significant impacts, and mitigation will be undertaken to reduce any potential future impacts on wildlife. Guidelines and good practice measures will be followed through the construction, operation, and decommissioning period.



Cultural Heritage:

This assessment considers potential effects of the proposal on cultural heritage assets in the vicinity and wider area. The layout and proposed infrastructure have been designed to avoid direct impacts on cultural heritage assets within the site. Indirect impacts taking into consideration the setting of cultural heritage interests will also be assessed and if appropriate, will be used to inform the project design.



Barachander Wind Farm

Assessing the Effects

Noise and Shadow Flicker:

This assessment will consider the effects of both construction and operational noise on nearby sensitive receptors, as well as considering cumulative impacts with other neighbouring wind farms.

Modern turbines are much quieter than is commonly appreciated. Nevertheless, ongoing noise assessments will be used to inform the wind farm layout, ensuring turbines are adequately distanced from nearby properties. If required, appropriate mitigation will be put in place to ensure that noise limits are respected.

Source/Activity	Indicative Noise Level dB(A)
Threshold of hearing	0
Leaves rustling	10
Whisper	20
Refrigerator humming	40
Normal conversation	60
Vacuum cleaner	80
Lawn mower	90
Chain saw	110
Threshold of pain	140

Modern turbines are very quiet, to respect maximum noise limits imposed at dwellings closest to wind farms. The typical limits proposed are between the levels of 35 to 40dB.

A shadow flicker assessment will be carried out and included within the EIA. If required, mitigation will be embedded throughout the wind farm's operational period to ensure any effects at nearby sensitive receptors are at an acceptable level.

Hydrology, Geology and Hydrogeology:

This assessment considers the hydrological, geological, and hydrogeological characteristics of the proposed development site and identifies sensitive areas and buffers to include within the layout design.



Initial peat probing surveys were carried out in 2022 to identify the extent and depth of peat on the site. Peat conditions on site vary, with large sections of the site having transitioned from moorland to commercial forestry plantation.

Hydrological conditions are currently being investigated in order to identify peat restoration opportunities throughout the site. Minimising potential impacts on peat and carbon rich soil is an important part of the design process.

The presence and potential for any effects on private water supplies is fully assessed within the EIA report, and the appropriate steps required to be taken to protect them should they exist on site and within the locality is standard practice and strictly controlled by planning authorities.



Aviation and Telecommunications:

This assessment considers potential effects of the proposed development on aviation interests, both civil and military. These include consultation with the Ministry of Defence, National Air Traffic Services and the Civil Aviation Authority.

As the turbine tip heights will exceed 150m, aviation lighting will be required at the site. An assessment of any visual effects of the lighting will be included in the Landscape and Visual Impact Assessment (LVIA), which will include night-time visualisations and photomontages. If appropriate, mitigation to reduce effects of aviation lighting will be considered.

Telecommunications links through the site have been identified and the site layout has taken these into account, ensuring there are no direct impacts on existing operations.

Barachander Wind Farm

Assessing the Effects

Socioeconomics:

This assessment considers socioeconomic effects, both positive and negative, that the proposed development will deliver at a local, regional and national level. These include economic and supply chain benefits during the construction and operational period of the proposed development. Some of the potential areas in which the development may deliver local benefits are the use of local accommodation and contracting with local companies for plant hire and ground works.



The existing Carraig Gheal Wind Farm has made use of Scottish and UK companies for services including plant hire, safety systems and site maintenance, and full-time members of the service team are based locally.

Traffic and Transport:

This assessment considers the impact on the traffic and road network during construction, operation and decommissioning. Good practice techniques for wind farm construction will be followed, with most deliveries of large turbine components (towers, nacelles and blades) to site being completed very early in the morning or late at night to avoid issues during peak travel hours.



Mitigation will be implemented throughout the delivery periods with good practice procedures for wind farm construction followed.

The timber haul route built for Carraig Gheal will take heavy component delivery off the public road and is a substantial benefit of developing a project at Barachander.



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Community Benefits

GreenPower is committed to ensuring benefits for the community are delivered from our projects and has already provided over £500,000 through the Carraig Gheal Wind Farm Community Benefit Fund that is distributed within the local area. This has been used to fund a variety of projects, from upgrades to Taynuilt and Kilchrenan village halls, to purchase of equipment for local community groups, from defibrillators, to polytunnels, to rowing oars.



Kilchrenan Inverinan and Dalavich Coastal Rowing Club benefited from the Carraig Gheal Wind Farm Community Benefit Fund with a grant towards a second skiff. © Mick Atkins Photography

The Barachander project will provide an additional £5,000 per MW or equivalent of installed generating capacity to the community every year. If 66 MW is built, that would be £330,000 per year. We are always keen to hear suggestions about local priorities and our approach to community benefit, so if you have ideas, please let us know. We will ensure there is plenty of opportunity for the community to engage and to discuss what priorities and projects most need funding locally. This level of funding has the potential to be transformational and to deliver strategically important benefits to the local area.

Community Investment

GreenPower is open to engaging with the community for the potential of shared ownership. There are sources of finance available to communities - organisations like Local Energy Scotland can support local people to do this.

Local Jobs and Services

Wherever we work we look to build genuine long-standing relationships with our neighbours and to invest in these communities. For example, at our Carraig Gheal Wind Farm we used turbine towers manufactured locally, and many Scottish contractors to provide engineering and environmental advisory services, construction, survey work, IT support, materials, accommodation, civils infrastructure maintenance, including tracks, culverts, bridges, hardstandings and drainage to name just some.

As part of the planning application process GreenPower is required to analyse the potential social and economic benefits which can be achieved. These details will be included within the EIA.

Ahead of construction we will work collaboratively with Argyll and Bute Council, Highlands and Islands Enterprise and local business groups to promote local contract opportunities. We will operate a services and contractor register for local businesses so they can be identified and encouraged to get involved. If you are or know any local contractors then please get in touch at barachander@greenpowerinternational.com.



North Argyll Volunteer Car Scheme (NAVCS) have benefited with grants and donations from the Carraig Gheal Wind Farm Community Benefit Fund

Benefits to Biodiversity

GreenPower will not only ensure effects are mitigated where they may occur on site, but we welcome suggestions from local people and stakeholders on where opportunities may exist locally to improve biodiversity.

Argyll Hydrogen Hub

Introduction

Alongside the proposals shown here for the Barachander Wind Farm, GreenPower is also submitting a planning application for Argyll's first major hydrogen distribution facility – the Argyll Hydrogen Hub. This is planned to be located on the Glenshellach Industrial Estate, Oban.

What is the Argyll Hydrogen Hub?

The Argyll Hydrogen Hub will be used to produce and store 'green' hydrogen and deliver it to local consumers, including a refuelling station. The refuelling station will be similar in design to the successfully operating Kittybrewster facility in Aberdeen, pictured below.

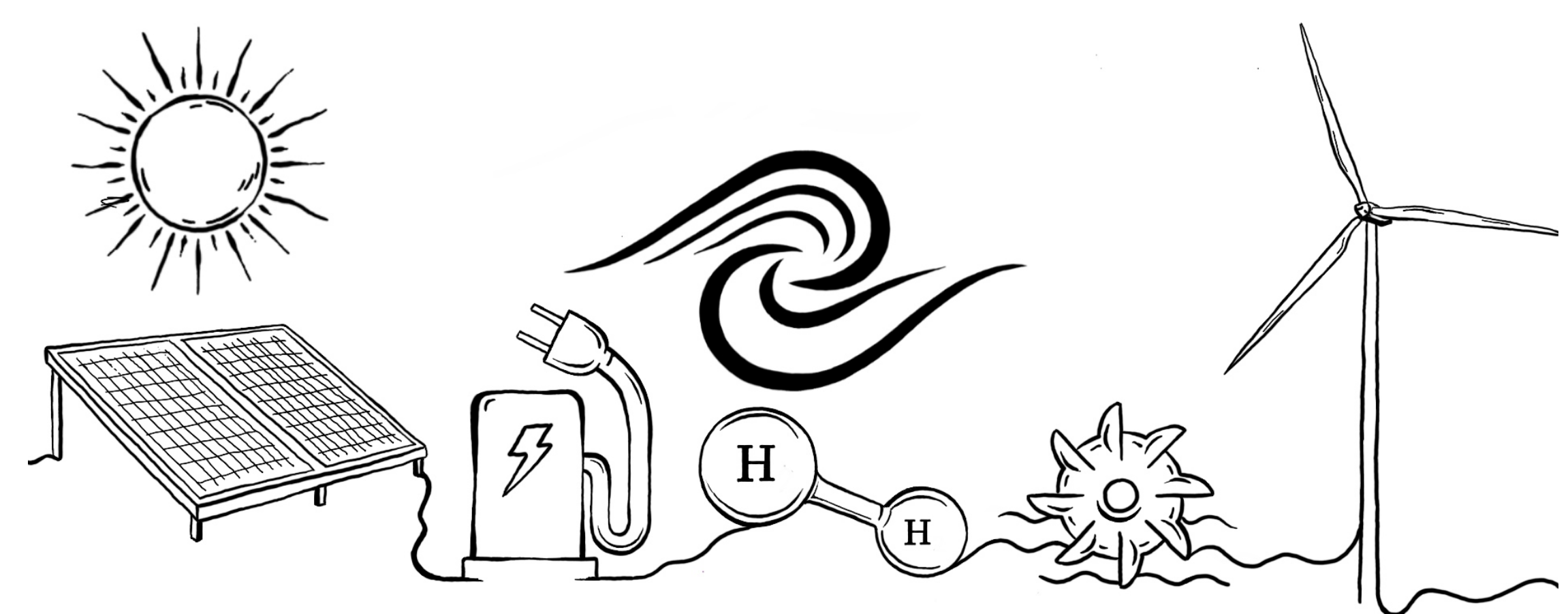


The Kittybrewster hydrogen refuelling station was opened in Aberdeen in 2015. It provides the local bus fleet, cars and vans with hydrogen fuel, which is produced in the electrolysers on site, as shown in the top two images. The design on the Argyll Hydrogen Hub will be similar to this.

Our vision is that the Argyll Hydrogen Hub will be used to service transport fleets in the local area, including the local buses and waste collection vehicles. In the future, we will look to expand the delivery of green hydrogen to wider markets, including industrial consumers and heat networks, to maximise its emissions-saving impacts. The use of hydrogen for the whisky industry, for trains and for shipping is also a major opportunity in the region.

Why Oban?

Oban is the ideal location for the Argyll Hydrogen Hub, as a key transport hub servicing North Argyll and the Islands. With this and Oban's widely renowned tourism industry comes a range of opportunities to deliver hydrogen as a fuel for the diverse transport sector, including to local buses, tour coaches, trains, heavy goods vehicles and boats. Crucially, it is also close to GreenPower's existing Carraig Gheal Wind Farm and proposed Barachander Wind Farm, meaning that the green hydrogen would be delivered to consumers only a few miles from the source of the green electricity it is made from – a truly local fuel.



GreenPower wants to see Oban at the centre of Argyll and Bute's Net Zero Transition. The Argyll Hydrogen Hub will be central to delivering this, and a low-emissions environment for future generations. This is just the start of GreenPower's hydrogen ambitions – we are developing projects right across the country and proposing to co-locate hydrogen production at our renewable energy sites where it is appropriate.

When?

The Glenshellach Hydrogen Depot will be submitted for planning approval to Argyll and Bute Council in September 2023.



Hydrogen: An Introduction

What is Hydrogen?

Hydrogen is the most abundant, and the simplest molecule in the universe, being present in everything from the Sun and other stars, to the water which we drink every day. It can be compressed into storage containers and used as a zero-carbon alternative to petrol, diesel and other fossil fuels.

How is it Made?

Hydrogen is most commonly found bonded together with oxygen to form water; however, we can only use it as a fuel source when it is separated to pure hydrogen.

Our hydrogen production process will use renewable electricity generated by wind turbines, including from GreenPower's Carraig Gheal Wind Farm and proposed Barachander Wind Farm near Oban to power an electrochemical process called **electrolysis**.

The green electricity is used to break down **water** into pure **hydrogen** and **oxygen**.

What Happens Next?

The hydrogen is then collected, compressed, and stored in storage tanks. In Oban we are building a hydrogen refuelling station, allowing hydrogen powered vehicles to refuel.

The hydrogen is fed into a fuel cell, where it reacts with oxygen, generating electricity and producing water as a by-product. The electricity from the hydrogen fuel cell powers the vehicle. You will notice that this is almost an exact reversal of the electrolysis process detailed earlier, this time releasing energy rather than absorbing it.

Green Hydrogen

The hydrogen used at the Argyll Hydrogen Hub will be 'green' because it has been produced using renewable electricity and water, all sourced locally. This hydrogen production process does not produce any carbon dioxide so provides us with transport fuels that do not contribute to climate change. This differs from production processes which produce 'blue' and 'grey' hydrogen, both of which use fossil fuel-derived gases such as methane to make the hydrogen.

