

Welcome to

The Tormywheel Extension Public Exhibition

Today's event provides an opportunity for you to meet the Muirhall Energy team and to find out about our proposed wind energy development at Tormywheel.

The purpose of this exhibition is to involve you and:

- Introduce you to Muirhall Energy
- Explain why we have identified this site for potential wind energy development
- Describe the various studies being undertaken to assess the potential environmental effects, and how these will help shape the final design
- Display visuals of what the wind farm could look like

- Help us understand how you see the associated community benefit package for the project contributing to the community
- Present the business opportunities which could be available if the project is granted planning permission

The final details of the planning application will be submitted to West Lothian, and we will keep you updated as to the progress of the application.

Please look around and let us know if you have any questions or would like us to explain any aspect of the proposal.

Feedback forms are provided.

Thank you for taking the time to attend this exhibition.

Muirhall Energy is helping to empower local communities and deliver ambitions

MUIRHALL ENERGY
DELIVERING
AMBITIONS

In case we haven't met

Muirhall Energy is an independent renewable energy company based in rural South Lanarkshire, situated less than a mile away from our own Muirhall Wind Farm which consists of 11 turbines, including some of the tallest and most efficient onshore wind turbines built in Scotland and the UK. As a neighbour of the wind farm and part of the community, we fully appreciate the challenges and also opportunities that wind energy brings to a community first hand.

We are also mindful that Scotland needs more electricity from home grown renewable sources if we are to reduce our

reliance on energy imports and contribute to a sustainable future. We are founded by a local landowner in response to an increasingly difficult economic reality experienced by the farming sector and since 2003 we have grown to 14 employees and have a successful project portfolio.

At the heart of our business is a commitment to supporting local initiatives. Through working in partnership with landowners, suppliers and local representatives, Muirhall Energy is helping to empower local communities and deliver ambitions.



True to this beginning we are a corporate supporter of RSABI – Scotland's charity helping people who have depended on the land.

We aim to create real opportunities for individuals, businesses, groups and projects in the communities close to our developments. We believe that our renewable energy developments create positive, green legacies for future generations and have the power to unlock funding to contribute towards local economic growth and sustainability.

We aim to create real opportunities for individuals, businesses, groups and projects in the community

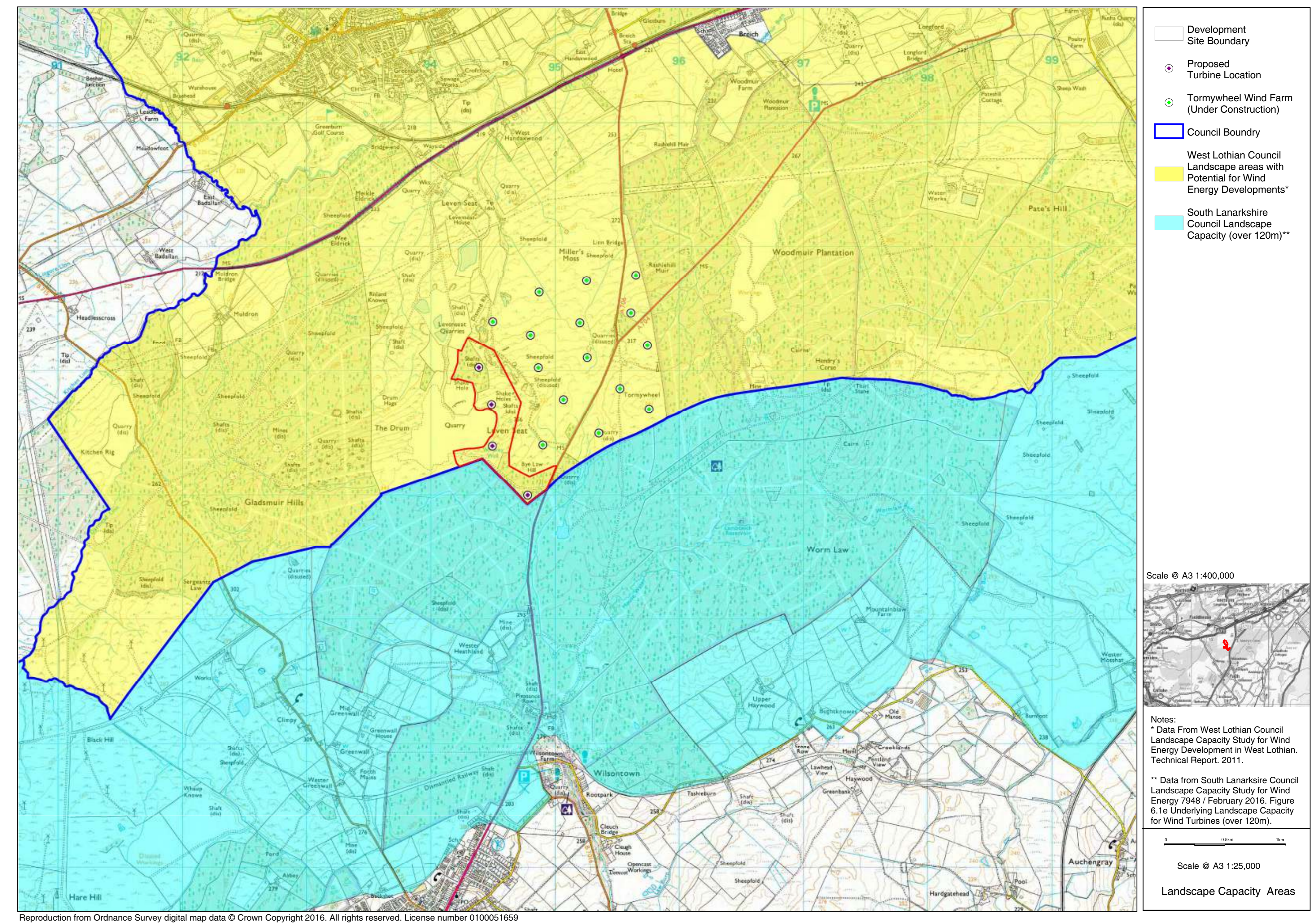


Our Proposal

Tormywheel Extension Wind Farm

Muirhall Energy is considering a potential wind energy development on land at Levenseat, approximately 2.5km south of Fauldhouse.

The proposed development is located within an area of rough grazing next to the currently under construction Tormywheel Wind Farm.



Why have we chosen this site?

The site benefits from:

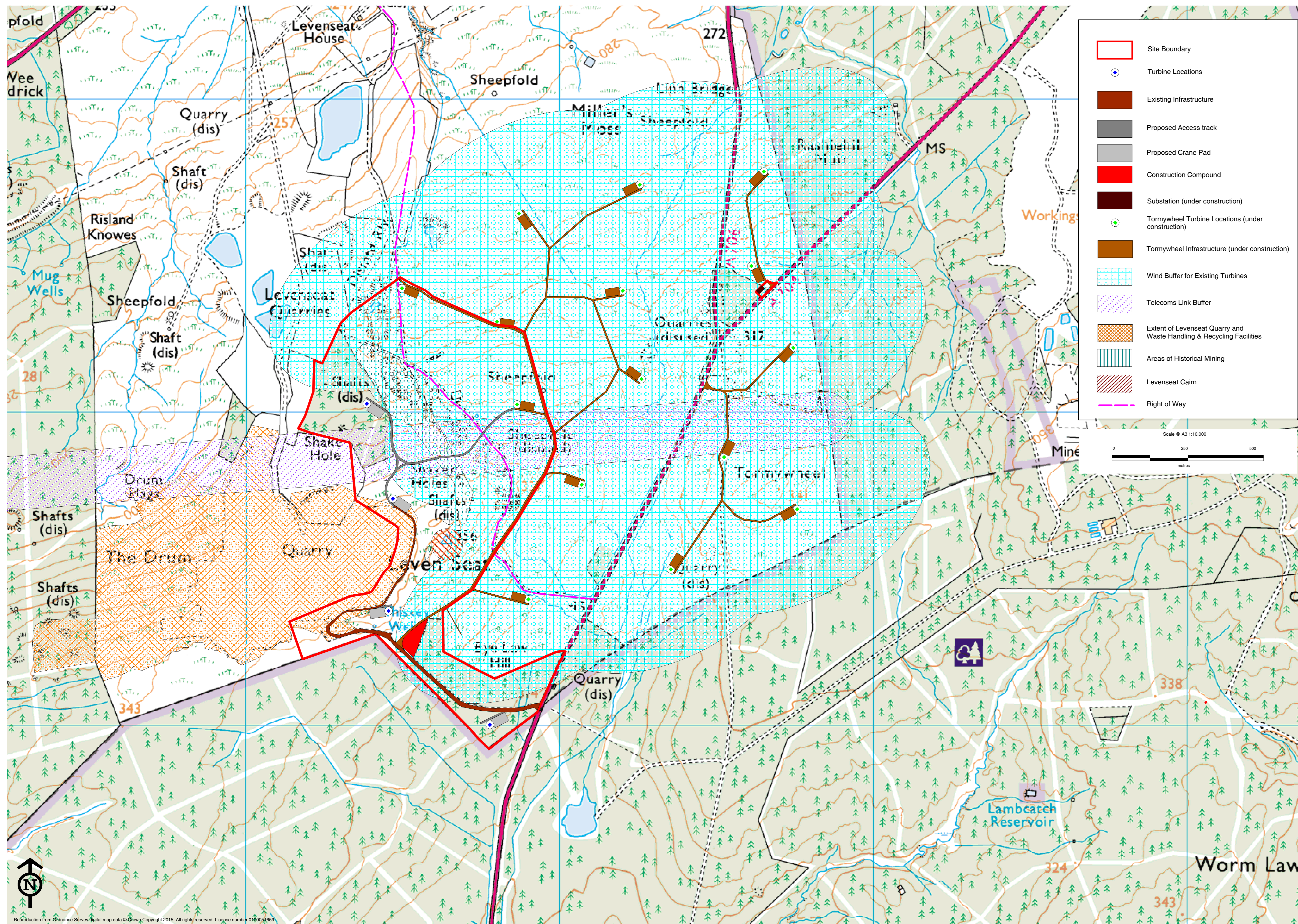
- Good wind resource
- Would make a significant contribution to Scotland's renewable energy ambitions
- Will be designed as a modest extension to Tormywheel Wind Farm
- Outwith any environmental designations at a local, regional or national level
- Few on site environmental sensitivities
- Grid connection already in place, so there will be no additional work

Project benefits

- Provide green electricity
- Contribute significantly to community investment opportunities
- Generate opportunities for the local supply chain
- Help further secure home grown energy for the UK

Tormywheel Extension Wind Farm

FACTS AND FIGURES



Site layout plan with initial constraints



4
Number of turbines



126.5m
Tip height



2 MW
Turbine capacity



8 MW
Maximum total output



4,735
Homes supplied ¹



£5.24m
Spent within the Scottish economy ²



£1.74m
Spent through local contractors and suppliers ²

¹ This is calculated by multiplying the installed capacity in MW by the number of hours in a year (8760) and then multiplying this by the Department of Energy and Climate Change (DECC) long-term average capacity factor for wind (27.8%). Source for capacity factors is Digest of United Kingdom Energy Statistics (DUKES) published annually by DECC. Using the most recent statistics from DECC showing that annual UK average domestic household consumption is 4,115kWh. Figures are approximate and calculated on the basis of the current Renewable UK methodologies (04.07.2016) as explained on their website. See more at: <http://www.renewableuk.com/page/UKWEDexplained>

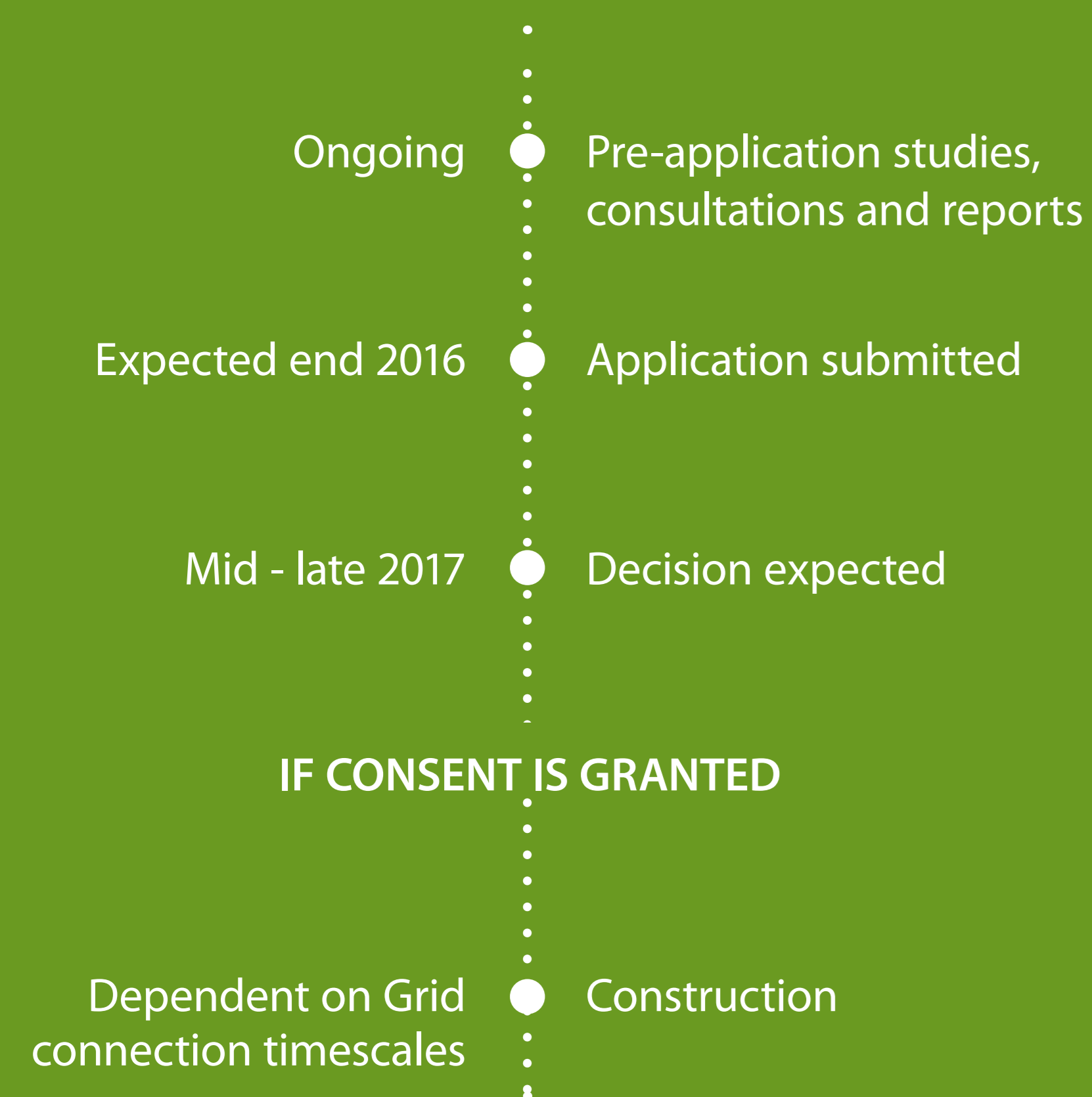
² Figures estimated from combined weighted Development and Construction Costs published in - 'RenewableUK Onshore Wind: Economic Impacts in 2014'.

The Planning Process and Environmental Impact Assessment

As the installed capacity of the project will be less than 50 Megawatts, planning consent will be required from West Lothian Council under the Town and Country Planning (Scotland) Act 1997, therefore an application for Tormywheel Extension will be submitted to the council accordingly.

A Scoping opinion to agree the methodology of the assessment was submitted to West Lothian Council in August 2016, and we are awaiting a response.

Indicative Timeline



The development is expected to take up to 2 years to build and will be designed to have an operational life of 25 years, after which the site would be decommissioned or a new application to re-power the site may be sought.

The findings of these surveys will inform the final development design and will form part of the Environmental Statement to accompany the application has been submitted to West Lothian Council, both on the council website and at a number of locations surrounding the proposed developments such as the local village halls.

The Environmental Statement will include assessments on the following:

Landscape and Visual Amenity – An assessment will be undertaken to consider the potential impact of the proposed development on the surrounding area including views from settlements, routes, recreational and scenic areas.

Photomontages will be presented in the landscape and visual impact assessment that provide a realistic impression of how the proposed development will appear from the viewpoints in and around the local area. A number of photomontages are displayed today. In addition to this, a residential amenity assessment will be carried out in order to determine the effect on local residences.

Ornithology (birds) – 12 months of ornithological surveys were undertaken at this site from December 2010 to November 2011, and a further visit in July 2013. In addition to this, updated breeding bird surveys and vantage point surveys have been carried out since April 2016. To date the survey work has suggested that the areas is of a low sensitivity for bird species.

The final results of these surveys will be presented in the Ornithology assessment to be submitted with the application. By incorporating the results of the surveys into the evolution of the wind farm layout design, we expect that no significant impact on birds would result from the development.

Ecology (habitats and species) – Field surveys were conducted for bats, otter, badger and water vole, from June – September 2011, August 2013 and June – September 2016. There is very low activity or no activity for all species at this site. And it is anticipated that the development will not have a significant impact. Recommendations for prevention and mitigation measures will be included in a construction Environmental Management Plan.

Hydrology and Geology – Studies are underway to establish the water environment and associated drainage networks on site. This information will be used to ensure appropriate exclusion zones will be maintained between watercourses and turbines. Initial peat probing has been undertaken across the site and surveys indicate that in general, peat depths across the site are less than 1m deep. The site design has taken this in to account to avoid the deep areas.

Noise assessments – Modern turbines are generally quiet in operation and compared to the noise from road traffic for instance, the level of noise produced is very low. Consultation is currently underway with the Environmental Health Officer at West Lothian Council to establish where, if any, background noise monitoring will be required at residential properties surrounding the site. Given the close proximity of consented and operational wind farms, such as the Tormywheel and Blacklaw Extension Wind Farms, a cumulative noise assessment will also be undertaken to ensure the wind farm is designed such that noise limits will not be breached in accordance with industry standards.

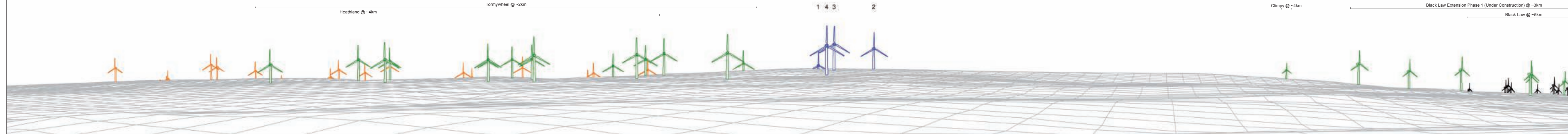
Cultural Heritage and Archaeology – A desk study and an archaeological walkover survey of the propose wind farm development area has been undertaken to collate the known historic records and identify any previously unknown remains. In addition, the study will include an assessment of potential effect on the setting of designated site within the development site boundary. There are a number of identified mine works in the area, and consultation is ongoing on how best to avoid any impact on these sites.

“It has been a pleasure working with Muirhall Energy. It is fantastic to work with a developer who recognises the importance of ecological information and considers wildlife ranging from birds to reptiles to butterflies”

Chris Cathrine, Caledonian Conservation Ltd



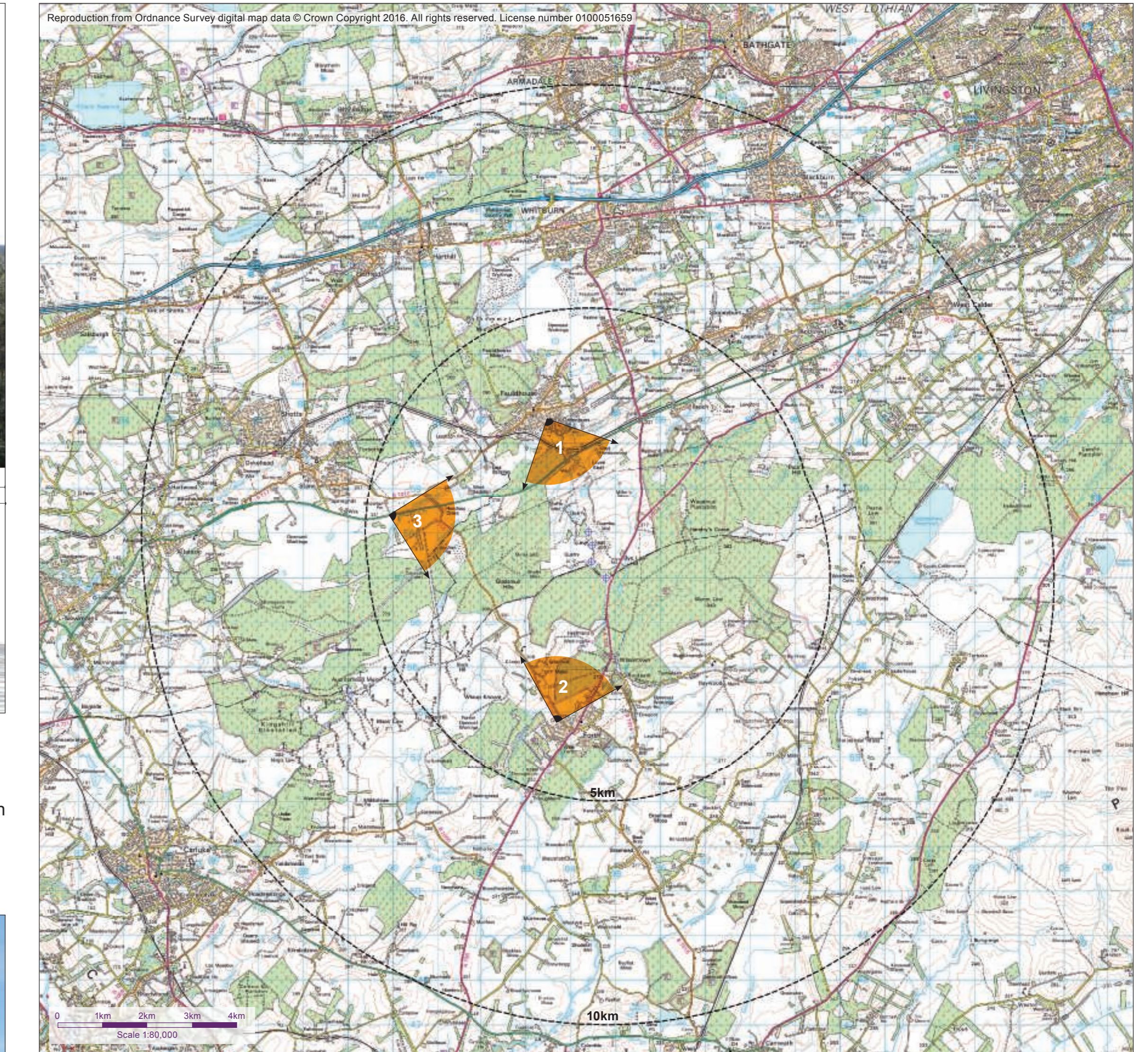
Photomontage showing Tormywheel and Tormywheel Extension



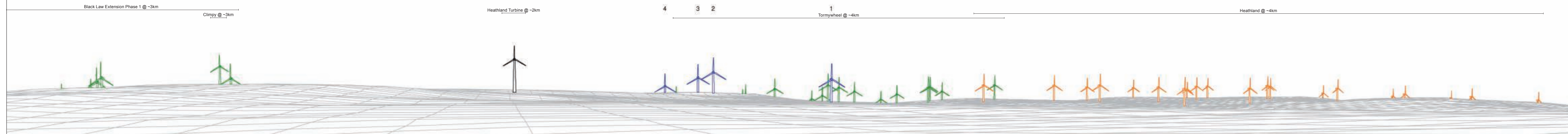
Viewpoint 1: Fauldhouse, Burnside Terrace, Greenburn

Grid reference: E293 525, N660 487
 Horizontal field of view: 90° (cylindrical projection)
 Ground Level: 220m
 Principal Distance: 505mm
 Nearest Turbine: 2,641m
 Lens: EF50mm f1.4 USM
 Camera height: 1.5m AGL
 Date and time: 24/08/2016 15:00

Wire Frame Key:
 Tormywheel Extension
 Existing
 Consented or Under Construction
 Application



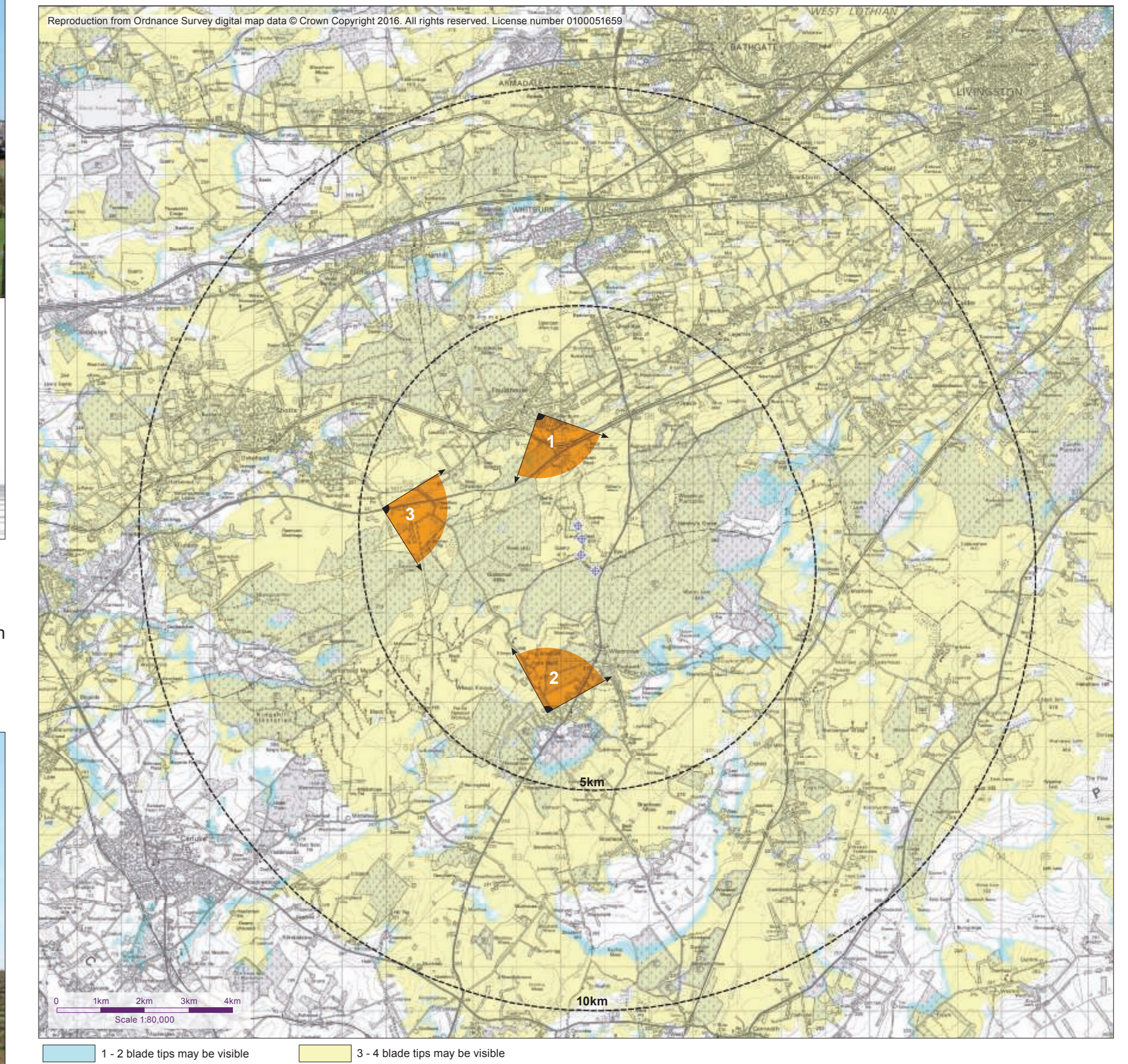
Photomontage showing Tormywheel and Tormywheel Extension



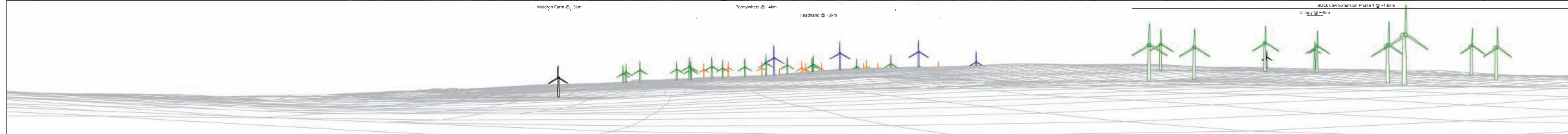
Viewpoint 2: Forth

Grid reference: E293 708, N653 841
 Horizontal field of view: 90° (cylindrical projection)
 Ground Level: 281m
 Principal Distance: 505mm
 Nearest Turbine: 3,334m
 Lens: EF50mm f1.4 USM
 Camera height: 1.5m AGL
 Date and time: 24/08/2016 12:10

Wire Frame Key:
 Tormywheel Extension
 Existing
 Consented or Under Construction
 Application



Photomontage showing Tormywheel, Black Law Extension Phase 1 and Tormywheel Extension



Viewpoint 3: Stane Turn Off

Grid reference: E290 025, N658 397
 Horizontal field of view: 90° (cylindrical projection)
 Ground Level: 235m
 Principal Distance: 505mm
 Nearest Turbine: 4,375m
 Lens: EF50mm f1.4 USM
 Camera height: 1.5m AGL
 Date and time: 25/08/2016 14:00

Wire Frame Key:
 Tormywheel Extension
 Existing
 Consented or Under Construction
 Application

Notes:
 i) The ZTV was calculated using ReSoft WindFarm computer software to produce an area of potential visibility of any part of the proposed wind project calculated to turbine blade-tip only. The ZTV however, does not take account of built development and vegetation, which can significantly reduce the area and extent of actual visibility in the field.
 ii) The photomontages aim to provide a realistic representation of the proposed development, however the viewer should be aware that these images cannot substitute for viewing the actual development in the landscape at the viewpoint location, please refer to Annex A of the SNH guidance "Visual Representation of Wind Farms, Version 2" 2014 which is on display at this exhibition.

Tormywheel Extension Wind Farm



Why Wind Works

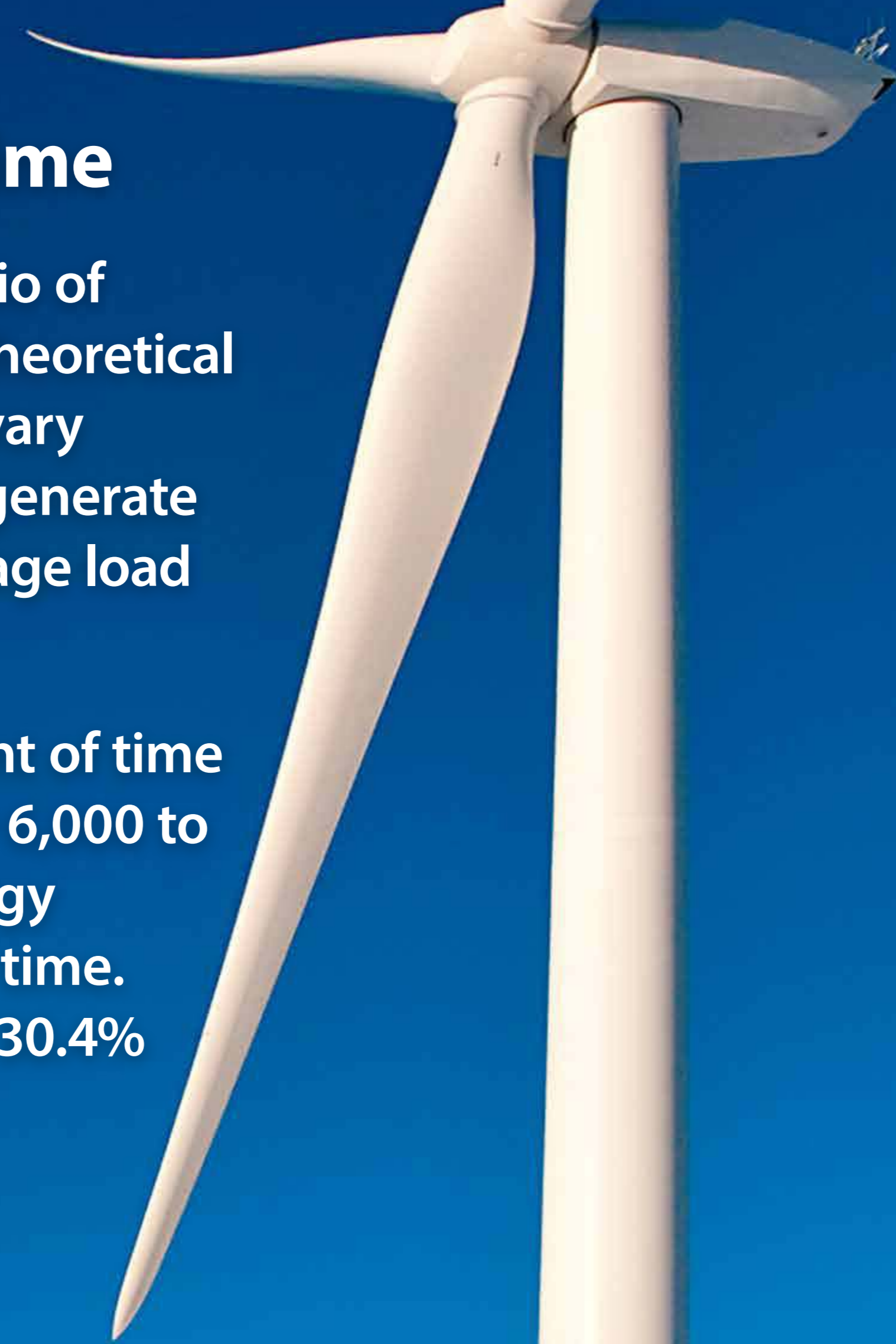
Significant contribution to renewables targets

The Scottish Government has set an ambitious target of delivering the equivalent of 100% of our electricity needs from renewable sources by 2020. Total renewable generation in Scotland for 2015 rose by 8% on the previous year, to 21,984 GWh. This is equivalent to 57.7% of Scotland's gross electricity consumption. Onshore wind currently makes up by far the largest proportion of renewable energy generation in Scotland with 14,136 GWh of electricity output in 2015.

Turbines generate power 70-85% of the time

The capacity factor or load factor of a wind turbine is the ratio of actual energy produced in a given time, compared with its theoretical potential. Over a year, the output from a single turbine will vary depending on wind speed. A typical turbine is expected to generate approximately 20-40% of its theoretical maximum. The average load factor for wind turbines in Scotland for 2015 was 27.8%.

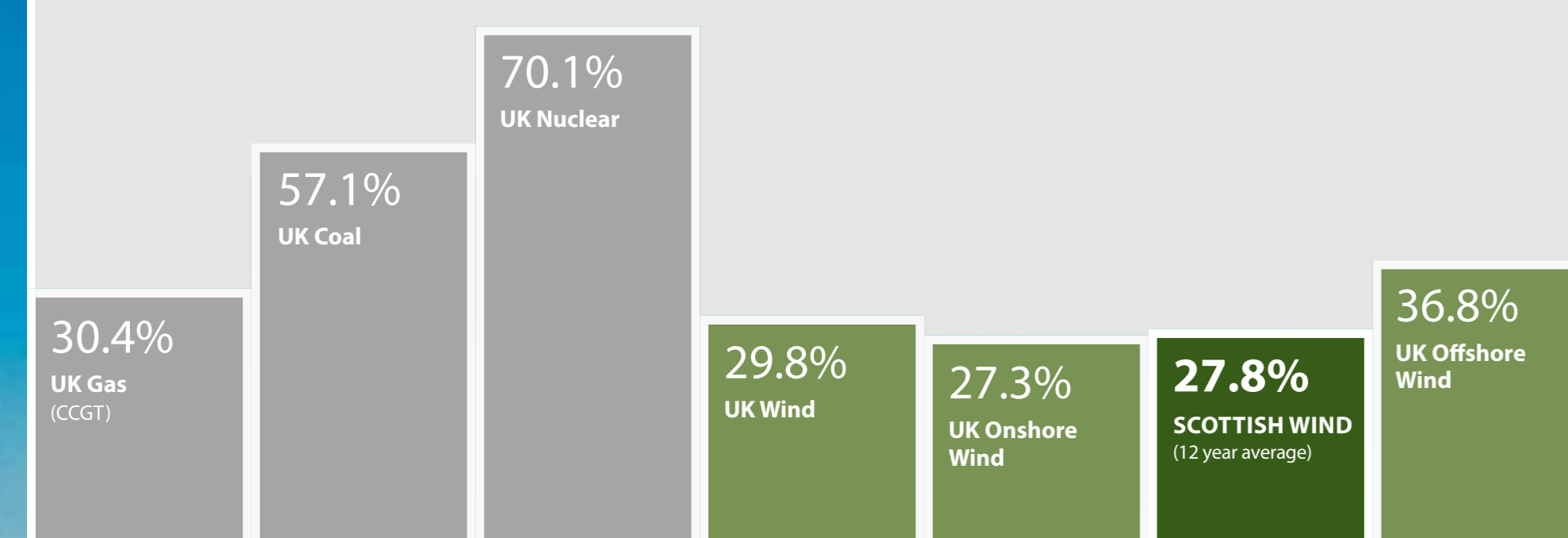
It is important not to confuse the load factor with the amount of time which wind turbines produce power which is approximately 6,000 to 7,000 hours each year, or about 70-85% of the time. No energy generation technology works at 100% capacity 100% of the time. For example in 2012, the load factor for coal was 57.1%; gas, 30.4% and for nuclear 70.1%.



Latest public opinion data from the Department of Energy and Climate Change finds over 66% of people support onshore wind, in contrast with 11% who don't.

Load factors

Load factors measure how intensively each type of plant has been generating – the load factor is the average output of electricity supplied during the year, expressed as a percentage of the maximum output.



All references available on request

Renewables will help reduce electricity bill costs against future rises

"We are now the cheapest form of new generation in Britain. That means there are onshore wind plants we can build which are cheaper than new gas."

Hugh McNeal, Chief Executive of RenewableUK, 2016

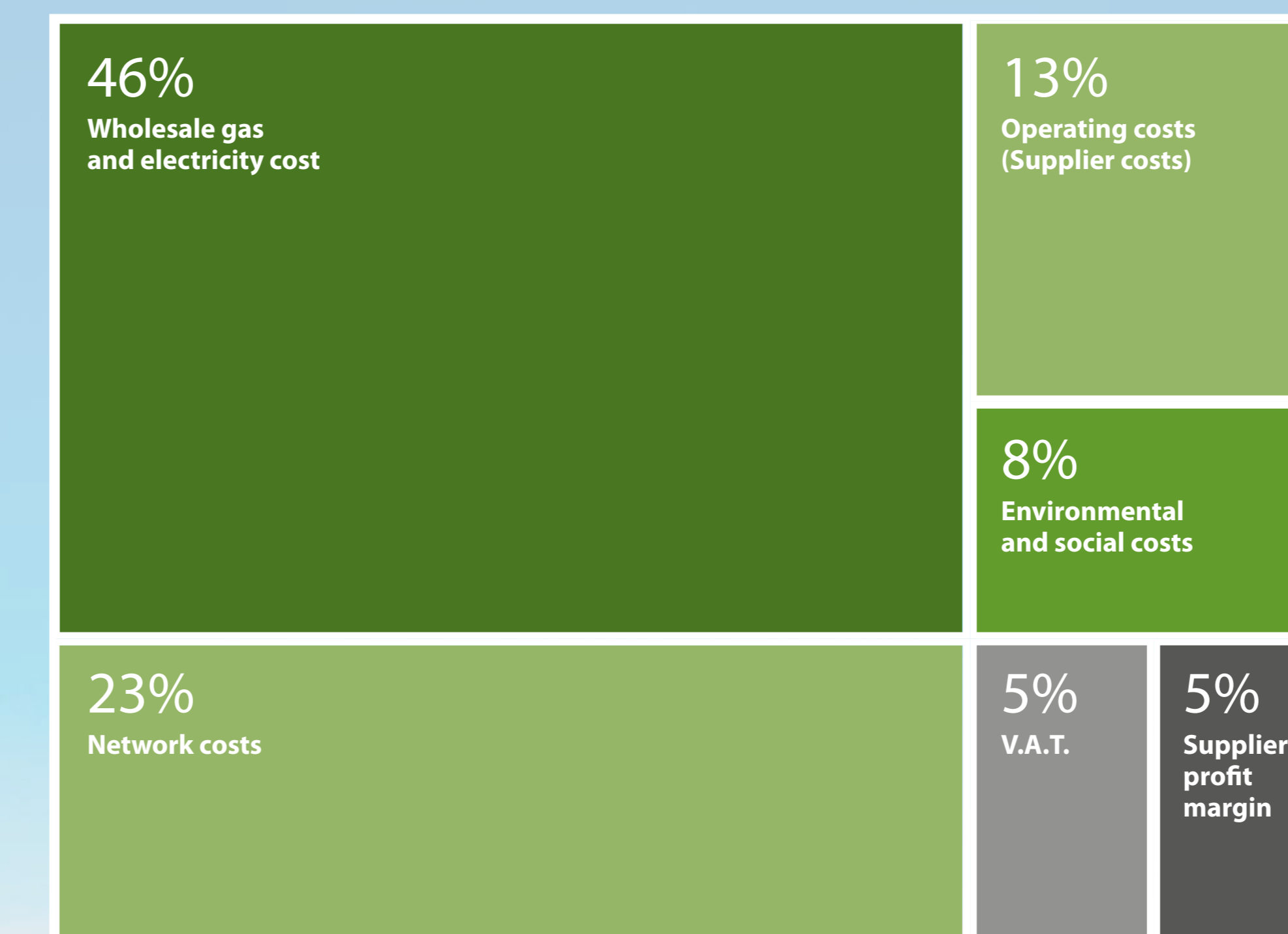
Where does the UK's energy come from?

In total, more than 20 other countries are providing us with the power we need to keep the lights on – with fuel travelling an average of 2,650 miles to get here.

We're buying coal from Russia, shipping uranium from Kazakhstan and piping in gas from Norway.

Our dependency on just a few countries is on the up, with our fuel requirements for over 55% of our electricity coming from just eight countries. Eight!

We're always going to need electricity. But do we need to endanger our energy security by relying on burning imported fossil fuels which damage our climate?



Breakdown of typical dual fuel bill

Carbon payback

Carbon payback on wind turbines is around 3–10 months. This 'payback' is the initial environmental cost of creating the components and the concrete poured for the base. After this point, the turbines do not take from the environment.

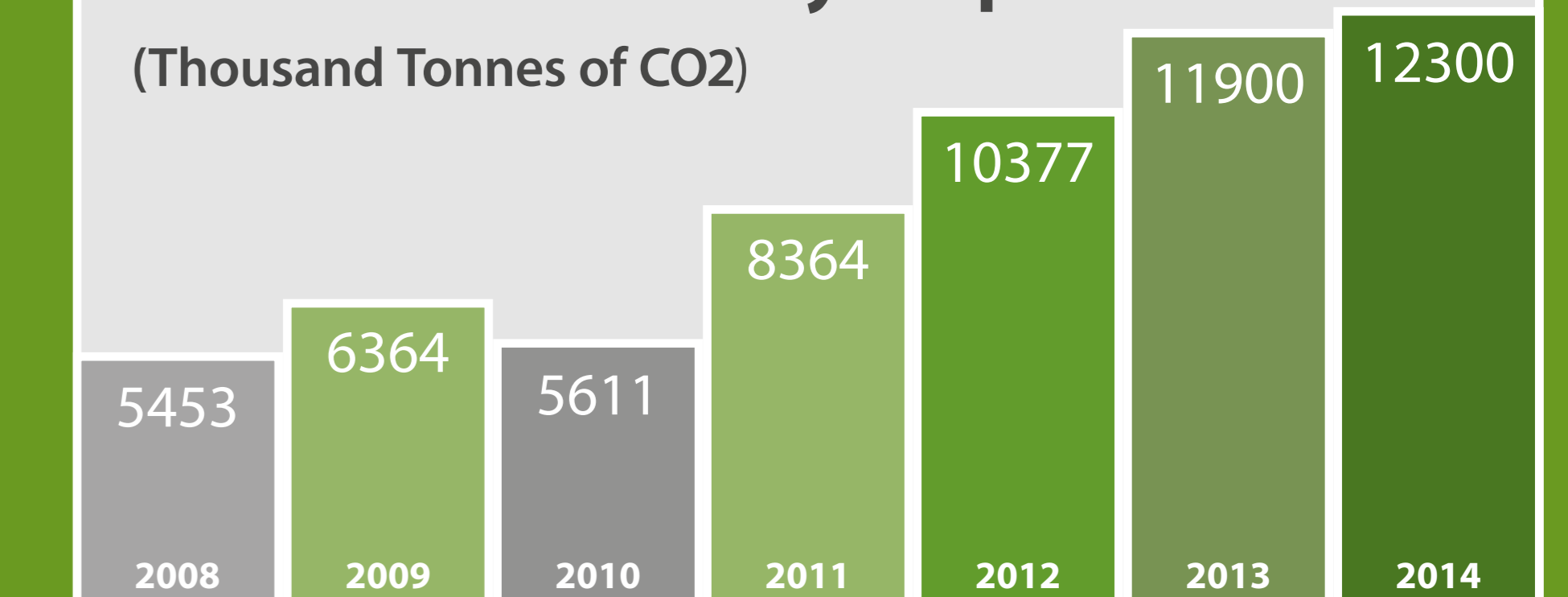
Nuclear payback is estimated to be a minimum of 4 months depending on whether the study includes construction costs or the nuclear load, mining for minerals and heavy water production.

Carbon footprints

Large wind	~12 gCO ₂ eq/kWh
Nuclear	~21 gCO ₂ eq/kWh
Coal	~850 gCO ₂ eq/kWh
Coal CCS	~200 gCO ₂ eq/kWh
Gas	~475 gCO ₂ eq/kWh
Gas CCS	~150 gCO ₂ eq/kWh

Emissions reduced by Scotland's renewable electricity output

(Thousand Tonnes of CO₂)



Cost of nuclear energy

Nuclear decommissioning can be billions of pounds (Sellafield is currently estimated at costing £67.5bn to decommission). The Nuclear Decommissioning Authority (the government agency tasked with overseeing nuclear power plant closures) spent £7.3 billion for the 2013 financial year (April – March).

The 3260MW Hinkley Point C Nuclear Power station received planning permission in 2014. Under the new government subsidy it will receive a guaranteed annual income for 35 years. Hinkley C will be owned by French and Chinese State utilities. **The annual cost of the electricity will be about £1.75 billion for this single new nuclear power station alone! This makes the 35 year lifetime cost of the electricity to be about £61 billion.**

Empowering Local Communities



At the heart of our business is a commitment to supporting local initiatives. With your support, our proposed development will create real opportunities for local businesses, groups and projects in the communities close to the wind farm.

We are keen to benefit the local community by providing financial support to promote shared ambitions. Renewable energy developments create positive, green legacies for future generations and have the power to unlock funding to contribute towards local economic growth and sustainability.



Community Benefit Fund

An anticipated Community Benefit Fund of £5,000 per megawatt (MW) of installed capacity will be offered in association with the development. Although the installed capacity may change as part of the design evolution and the turbine procurement process, at present the total annual community benefit fund could be:

£40,000

(Based on 4 x 2 MW turbines)

The fund will be managed in a fair, transparent and equitable manner to benefit the communities that are affected by the wind farm.

It is envisaged that the local communities will suggest priorities for spending and that this will be confirmed under agreed criteria for use of the funding.

The fund will be managed by an Advisory Panel consisting of local residents, community representatives and other stakeholders and will be set up to assess applications in each area.

We are interested to hear your thoughts on how the benefits from Tormywheel Extension Wind Farm could be used in your area.

How could your community funding package be spent? Please fill in a questionnaire.

Muirhall Wind Farm – A Case Study

Communities already benefit from our developments.

Our office is located less than a mile from the 28MW Muirhall Wind Farm and over the 25 year lifetime of the Muirhall Wind Farm projects we will contribute more than £4.75 million (over £190,000 per annum) to a broad range of local projects and initiatives.

Our Muirhall Windfarm projects already distribute community benefit through a trust fund set up by local residents in the immediate vicinity of Muirhall Wind Farm to manage funds and coordinate local project activity.

Examples of other contributions in the local area, including:

- £15,000 donation to Carnwath Community Council for the refurbishment of a local public park
- £18,258 to Forth Royal British Legion for internal and external upgrades to their hall
- £88,000 donation to The Haven, a local charity providing support to people affected by life limiting illness.



"It is an absolute pleasure to welcome Muirhall Energy Ltd as our new official partner and we look forward to a successful relationship with them"

Livingston Football Club



Local supply chain

We see local supply chain development as a key part of how we work.

We have a supplier charter and through this we will engage with a wide ranging group of stakeholders to ensure that we are aware of the full range of services available locally and also that local firms are aware of our projects and how to get on our tender list.

"As an ambitious and growing business, Muirhall Energy is passionate about working with communities and businesses to create and sustain jobs, provide meaningful training opportunities and support the economy."

"Our Muirhall Energy Supplier Charter sends a clear message that we are committed to working with a diverse range of individuals and companies that can respond positively to Muirhall Energy opportunities."

"We will use our best endeavours to seek out local suppliers who share our ambitions, bring innovation and with whom we can collaborate and share best practice. We look forward to working with you."

Chris Walker
Managing Director and Founder of Muirhall Energy Ltd.



If this project is awarded consent, the range of services that will be needed locally will include:

- Construction companies
- Electrical contractors
- Plant hire – excavators, wagons
- Concrete producers
- Reinforced steel manufacturers
- Local stone quarries and aggregates (if applicable)
- Site Managers and Ecological Clerk of Works
- Fencing
- Drainage
- Accommodation
- General supplies
- Catering
- Cleaning and waste solutions

Analysis of figures produced by the Department for Energy and Climate Change (DECC) identified that investment in Scotland's renewable energy sector was £9.1 billion in 2015. Onshore wind accounted for £4.4 billion of the total invested.

More than £15 million worth of contracts have been awarded to companies local to the Muirhall Wind Farm and Extensions



If you have a business which you think could provide support to the development, then please fill in one of our supplier registration forms.

