



# Dunmore 2 Wind Farm

Windyhill Road, Limavady, Co. Londonderry

**EIS Volume 3**

Non-Technical Summary

October 2013



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Computer-rendered photomontage of the view from Broad Road - adjacent to the site - showing the Dunmore 2, Dunmore and Dunbeg turbines

## introduction

**T**his non-technical summary (NTS - ES Volume 3) has been prepared by Dunmore 2 Wind farm Ltd. c/o TCI Renewables Ltd (TCIR). It accompanies the application to DoE Planning NI for planning consent to construct and operate a wind farm comprising eight wind turbines within land approximately 640 m east of Largantea Bridge (Windyhill Road/Bolea Road), Dunmore, Limavady, Co. Londonderry.

### Site Address

Dunmore 2 Wind Farm  
640m east of Largantea Bridge (Windyhill Road/Bolea Road)  
Dunmore, Limavady  
Co. Londonderry

The NTS provides a description of the Environmental Impact Assessment (EIA) and has been produced in accordance with the *Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2012*. It contains an analysis of the environmental implications of the proposal to construct, operate and decommission the Dunmore 2 wind farm.

The ES has been prepared by members of the TCIR in-house technical and development teams, with input from expert consultants and specialist contributors. The NTS is accompanied by two other volumes (1 and 2) which together form the complete Environmental Statement.

- Volume 1: Environmental Statement
- Volume 2A: General Figures
- Volume 2B: Landscape and Visual Impact Assessment Figures
- Volume 2C: Technical Appendices
- Volume 3: Non-Technical Summary

The full Statement has been submitted to DoE Planning NI Headquarters, where it can be examined by members of the public during normal working hours. Copies are also available for purchase - see Page 23 for details. Copies of the Non-technical Summary and the Environmental Statement (including figures) can also be purchased in print or CD form from:

TCI Renewables  
The Old Throne Hospital,  
244 Whitewell Road,  
Belfast BT36 7EN

A copy of the NTS can be downloaded free as a PDF file from the TCIR web site ([www.tcirenewables.com](http://www.tcirenewables.com)).

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Portstewart

Ulster Way

A2

A2

Binevenagh Mountain

B201

4

DUNMORE 2  
WIND FARM

A37

B186

Keady Mountain

Limavady

B66

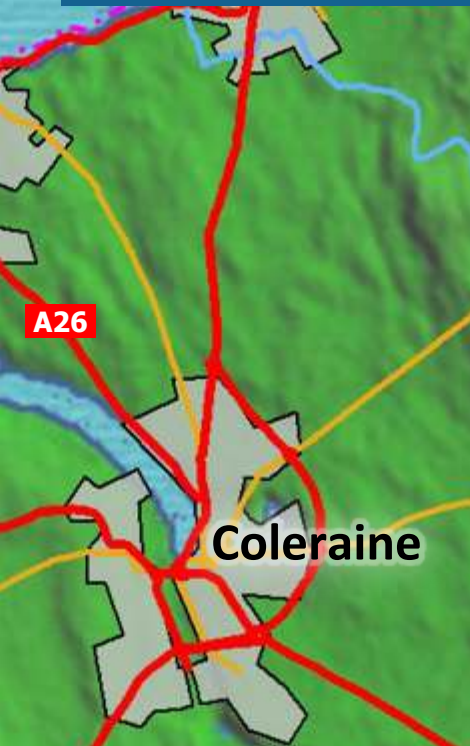
Ringsend

Craiggore

Ulster Way



# the site



The proposed development is located within the Dunmore townland, 640m east of Largantea Bridge, off the Windyhill and Bolea Roads near Limavady, Co. Londonderry. The closest large towns are Limavady and Coleraine. The site is located on an area of grassland, used for animal grazing, with evidence of historic peat extraction. While the site itself is largely open, the lands are bounded by the B201 Windyhill Road and extensive Ballyhanna Forest to the north, and by the Springwell forest to the east and south. Field boundaries are marked by wire fences. The development lands rise gently in elevation between 165 and 237 metres.

The Dunmore 2 wind farm will be accessed off the Bolea Road, via the existing entrance to the Dunmore Wind Farm and through two new dedicated site entrances. In designing the wind farm, the development team have sought to minimise potential for environmental impacts and land-take by maximising the use of existing infrastructure.

The development site is within Landscape Character Area (LCA) 36: Binevenagh, which runs generally upland, north to south, from Lough Foyle towards the Glenshane Pass. The development will extend the approved Dunmore Wind farm and be immediately adjacent to the approved Dunbeg Wind Farm. As of October 2013 these wind farms are under construction and will bring the total number of operational wind farms in the LCA to three: Rigged Hill, Dunmore and Dunbeg. Smulgedon and Upper Ballyrogan Wind Farms have also been awarded planning permission but have not yet started construction at the time of publication.

## the project

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The wind farm will consist of eight wind turbines up to 126 m high. Each turbine will generate up to 3 MW (megawatts) of electricity. Other infrastructure will include underground electric cabling, road improvement works, a substation building, turbine foundations, bases and hard-standing areas, two meteorological masts, new tracks and upgrades to existing tracks, a temporary site storage compound - for use during the construction phase - and other ancillary site works associated with a wind farm development.

The specific wind turbine model to be installed has not been agreed yet, however we can be certain that the turbine structures will be of standard design, incorporating a tower and three turbine blades. They will be coloured matt grey and be of the same or similar design to those approved on adjacent lands.

The towers will be fixed to the ground on concrete foundations, up to 21 meters in diameter, which will incorporate the tower base and foundation. Turbine switch gear will be contained either within the bases of the towers or in external kiosks adjacent to each tower. A hard-standing area/crane pad will be constructed adjacent to each turbine foundation.

Subject to the granting of planning consent and turbine procurement, it is anticipated that construction of the Dunmore 2 Wind Farm will take between nine to twelve months to complete. At the end of the wind farm's expected 25-year lifespan the turbines can be decommissioned and removed. Where practical, hard surfaces will be broken down and rehabilitated. Underground electrical cables will be de-energised and removed from the site.

Northern Ireland Electricity (NIE) will be responsible for the planning application and design of the grid connection route. The turbines will generate electricity at between 400 volts and 690 volts. This will be stepped up to 33 kV using transformers installed within the base of the towers. Underground and overhead cables will connect the wind farm to the most suitable NIE connection point.

Operations and maintenance are the initial responsibility of the turbine supplier. After the warranty period has elapsed, a suitable company will be contracted to ensure the wind turbines and site area are appropriately managed and maintained. The turbines will be monitored via remote Internet computer links to maintain optimum efficiency.

All Northern Ireland wind farm planning applications are determined via the planning system, which is administered in Northern Ireland by Planning NI of the Department of the Environment (DoE).

Northern Ireland wind farm applications are centrally processed by the Renewable Energy Team within the Strategic Projects and Design Division of Planning NI Headquarters, Millennium House, Belfast. Planning NI have determined that the Dunmore 2 Wind Farm application should be assessed in accordance with *The Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 2012* and that it must be accompanied by an Environmental Impact Assessment.

In assessing applications, Planning NI is guided by the relevant development plan for the area and by a raft of planning strategies such as the Regional Development Strategy for Northern Ireland 2035(RDS - 2012) and the Strategic Energy Framework (SEF - 2010). The SEF outlines that Northern Ireland is committed to a legally binding renewable energy target where 40% of Northern Ireland's electricity consumption will be generated from renewable sources by 2020.

In reaching their planning decision, Planning NI must consider the degree to which a proposed development is in compliance with Planning Policy Statements (PPS). Planning Policy Statement 18:Renewable Energy, published in August 2009, sets out the DOE's requirements for all renewable energy developments and outlines factors that will be taken into consideration when reaching a planning determination. The proposed Dunmore 2 Wind Farm has been designed in full policy compliance with this document and the associated Best Practice Guidance (BPG).

A description of landscape value, landscape character descriptions and guidance on landscape and visual Impact assessment are contained within the associated Supplementary Planning Guidance (SPG) to PPS 18, published by the Department in August 2010. The requirements and recommendations outlined in these guiding documents have been considered in detail, in the siting, design and assessment of the proposed Dunmore 2 Wind Farm development.





# the need for wind energy

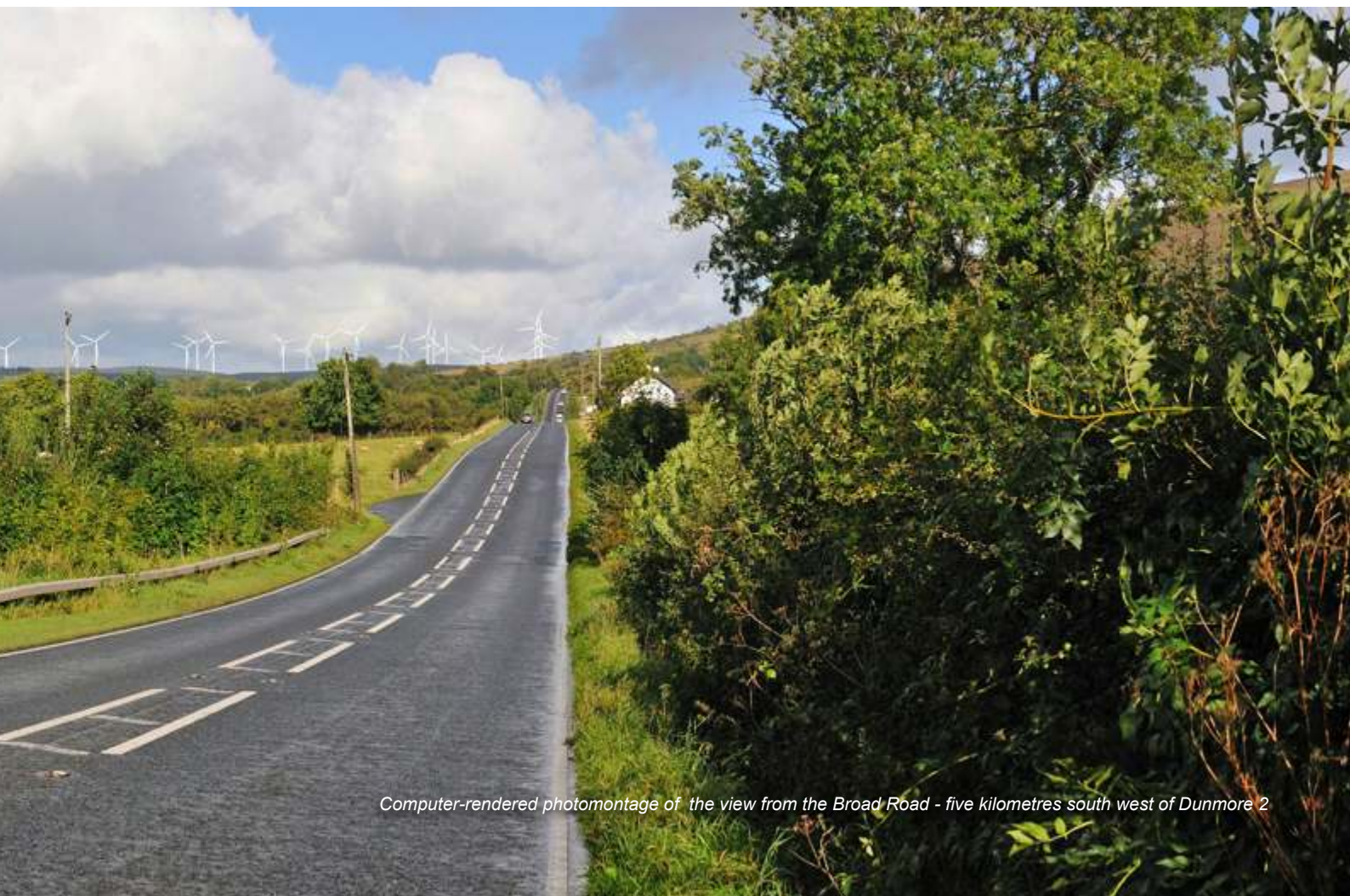
The growth of the Northern Ireland's wind energy industry is being driven by factors including the need to take immediate action to reduce Greenhouse-gas emissions and limit the effects of climate change, a requirement for increased security of energy supply, growth in energy demand and the rising profile of environmental issues. These factors have combined in many regions of the world to encourage political support for the development of the renewable energy industry and in some countries this has been associated with targeted fiscal stimulus.

It is predicted that by 2030 world energy needs will be between 30% and 60% higher than current levels. The International Energy Agency (IEA) estimates that around 4,500 GW of new energy capacity needs to be installed before 2030, requiring investment of more than US\$ 13 trillion (equivalent to £8 trillion). According to figures released by BP in their Statistical Review of World Energy, energy consumption grew more sharply in 2012 than in any other year since 1973. Demand for oil, coal and gas was stronger in 2010 than it had been in almost 40 years, with global energy consumption rising by 5.6%. This was accompanied by a rise in emissions of harmful greenhouse gases, which shot up more quickly than in the previous four decades.

Just as energy demand continues to increase, the main fossil fuels used in power generation are becoming more expensive and more difficult to extract. Some of the world's major economies are forced to rely on imported fuel at unpredictable cost, sometimes from regions of the world where conflict and political instability threaten the security of that supply.

Given Northern Ireland's location on the western periphery of Europe, with few indigenous fossil fuel resources, the country has a near 100% dependence on fuel imports to meet energy needs. This dependency creates uncertainty in terms of security of supply and exposes Northern Ireland to the volatility of world energy prices. In Northern Ireland, almost uniquely, there is cross-party political consensus that we need more renewable energy. The Strategic Energy Framework 2010 has set renewable energy generation targets of 40% of energy from renewable sources by 2020. Renewable energy developments such as the Dunmore 2 Wind Farm are vital and will make meaningful contributions towards achieving this goal.

Wind power is a cost-effective technology and a reliable non-polluting source of electricity. Wind power provides considerable opportunities for benefit to the environment and economy. The Dunmore 2 Wind Farm will play an important role in diversifying Northern Ireland's mix of electricity production, contributing to renewable energy targets at both a local and national levels.



*Computer-rendered photomontage of the view from the Broad Road - five kilometres south west of Dunmore 2*



**W**ind Farms can generate public interest and debate. People often have questions about how the structures will look or how a wind farm will sound when it begins operation.

A major new poll carried out by the Department of Energy and Climate Change (DECC) shows overall support for renewables, including wind farms, has strengthened during 2012-13. Recent media reports attacking the impact of wind farms and other renewable energy projects appear to have had no discernable impact on public opinion. The survey of more than 2,000 people, completed in April 2013 found that public support for onshore wind power has reached a 12-month high and that public support for renewable energy has increased over the past year.

Research carried out by Ipsos MORI for RenewableUK in April 2012 shows that around two-thirds (67%) of respondents are in favour of wind power in the UK. One in twelve (8%) are opposed with only 3% suggesting that they are “strongly opposed.” These figures show that while there is a small but vocal anti-wind energy contingent, the public majority supports harnessing the UK’s abundant wind resources.

Information about the Dunmore 2 Wind Farm has been provided to key stakeholders from public and private bodies for advice and comment including government agencies, local councils, DoENI, NIEA, Planning NI and local community groups.

A public information day was held in advance of the the application submission. This event was hosted in the Roe Park Resort outside Limavady, on the 11th of September 2013. It provided an opportunity for local residents to comment on and gain information about the proposal. The event was advertised in the Public Notice section of The Coleraine Chronicle, The Ballymena Chronicle, The Balycastle Chronicle and The Limavady Chronicle/ Northern Constitution. Attendees included local residents, landowners and a number of people who were strongly in favour of wind energy development.

So far, the response to the Dunmore 2 Wind Farm proposal has been positive. We are confident that the level of support will grow as people learn more about the benefits the project will bring and its importance in achieving renewable energy targets of 40% by 2020.

Anyone requiring additional information is invited to contact TCI Renewables directly.



# community benefits

**W**ind Farms deliver zero-emission renewable energy, assist in securing and safeguarding Northern Ireland's energy supply and reduce our reliance on imported fossil fuels such as oil, coal and gas. Based on figures produced by Renewable UK and The Carbon Trust, the Dunmore 2 Wind Farm will produce around 62.4 gigawatt-hours-per-year of renewable electricity over its expected 25 year operational life - avoiding the generation of around 659,494 tonnes of carbon dioxide in the process (assuming the wind farm's lifetime output is off-set against coal fired generation).

Approximately £24.8 million will be spent in delivering this wind farm. As with any project incurring substantial capital costs, there will be a significant amount of expenditure in the local economy. An estimated 15% or £3.72 million of this will be spent locally on procuring services for development, financing, legal arrangements, delivery, construction works, sourcing materials, plant and auxiliary equipment. On-site works are expected to involve the employment of up to 30 people over a period of up to twelve months. A development of this type provides potential opportunities for local industries to diversify into, or build experience, in the installation, operation and maintenance of wind energy and related electrical technologies.

In recognition of the commitment by communities to embracing wind farm developments, the Northern Ireland Wind Industry strives to ensure that a proportion of the benefits delivered by these projects are realised within the communities that host them. As a responsible developer, Dunmore 2 Wind Farm Ltd welcome the opportunity to work closely with the community to help deliver real and tangible benefits at a local level. Therefore, once the wind farm becomes operational the developer will establish a dedicated community fund in line with the NIRIG Community Commitment Protocol (Jan 2013), where a minimum of £1,000 per megawatt installed will be paid annually, over the lifetime of the wind farm. The fund will be administered by an independent fund-management company in conjunction with the local community.

The Development will result in revenue generation for land owners and other financially associated parties. Each turbine installed within the Limavady Borough Council area will be liable for the payment of rates. These will be paid annually and are estimated to be worth up to £249,940 per annum, based on a rateable value of £17,000 per MW.

The operation of the wind farm presents an educational opportunity for schools, local community groups and members of the public. The development presents opportunities for local farming diversification, and in raising awareness of the value of local energy generation, energy conservation and sustainability.

The Dunmore 2 Wind Farm will have a positive socioeconomic impact on this area, boosting the local economy especially during the construction phase. The Wind Farm will generate a significant positive impact on local community development and indeed tourism if it proves to be a visitor attraction.



# strategic benefits

**B**ased on Renewable UK figures for average UK household electricity consumption of 4,700 per kilowatt-hour (kWh), the Dunmore 2 Wind Farm is projected to provide the equivalent annual electricity for up to 13,752 homes.

Electricity generated by the proposed development will feed into the national grid and displace conventional forms of electricity generation. Using the electricity-to-carbon dioxide conversion factors from DEFRA and the Carbon Trust we can predict the volume of carbon dioxide offset by the wind energy generated.

The proposed Dunmore 2 Wind Farm development is projected to avoid annual equivalent carbon dioxide emissions of approximately 26,940 tonnes (based on offsetting coal fired generation - see footnote).

Onshore wind is competitive in cost terms with coal fired plant and higher carbon prices will help to strengthen this position. As fossil-fuel prices began to rise and turbine costs begin to fall the competitive position of wind will improve greatly. Currently, wind-energy generation costs (£1,300-£1,600/kW- see footnote) are more expensive when compared with gas costs (£650/kW). However because of volatility in the price of gas, future gas-fired generation costs are uncertain.

In addition to these strategic environmental benefits, up to an estimated 15% or £3.72 million of the total development cost will be spent in the local economy on; development, financing, legal arrangements, delivery, construction, materials, plant and auxiliary equipment. One of the largest forms of local benefit relates to the awarding of civil engineering contracts. Local contractors are well placed to tender for this work. The development will result in specific direct benefits to the local economy, including,

- Direct and indirect employment opportunities for local people during the construction phase of the development - and a small number of jobs during the operation of the wind farm and local maintenance contracts.
- Opportunities for local businesses to supply goods, services and accommodation during the wind farm construction period.
- An opportunity for local industries to diversify into, or build experience in the installation, operation and maintenance of wind energy and related electrical technologies or construction requirements.
- Revenue for the landowners and other parties financially associated with the wind farm development.
- Revenue to local businesses from the purchase of construction materials and the hire of plant and equipment.
- The contribution to local government revenue via business rates.
- The potential increase in the number of visitors to the area from those tourists interested in wind farm development and the subsequent potential for increased use of local facilities and accommodation.
- Additional benefits to other areas of the local economy (hotels, retailers and other businesses) arising from the temporary concentration of labour resources during wind farm construction and operation.

According to DECC, during in the 2011-12 financial year in Northern Ireland, £180 million was invested and 767 jobs created by the renewables industry and related professions.

(Guidelines to DEFRA's GHG conversion factors for company reporting, DEFRA 2007. [www.defra.gov.uk/environment/business/envrp/pfd/conversion-factors.pdf](http://www.defra.gov.uk/environment/business/envrp/pfd/conversion-factors.pdf)). Renewable UK;

Wind Energy Generation Costs <http://windcrop.co.uk/wp-content/uploads/2012/12/Wind-Energy-Generation-Costs.pdf>





The design of the proposed Dunmore 2 Wind Farm has been undertaken with full knowledge of the habitats and species present on the site. Development constraints have been applied to ensure avoidance of areas of greatest conservation value and where construction works could result in adverse impacts to the environment.

Ecological studies and project development advice has been led by Dave Allen of Allen and Mellon Environmental Ltd. Dave is one of Northern Ireland's most experienced ecologists and field naturalists since moving to Northern Ireland from England in 1979, to work for the RSPB. During the Spring, Summer and Autumn of 2013, Allen and Mellon Environmental Ltd. undertook detailed assessment of local habitats, flora and fauna. This was accompanied by scoping discussions and meetings with the Northern Ireland Environment Agency. The proposed wind farm has been designed such that no significant or adverse impacts will result to habitats or species of note or conservation value.

## Habitats : Flora and Fauna

Habitat mapping and assessment was undertaken over the course of the spring and summer of 2013. Habitats across the proposed development area were identified using JNCC Phase 1 classifications. During the course of the assessment field workers recorded all priority habitats and species, with special care to identify evidence of badger, otter, Irish hare, pine marten, Marsh Fritillary, Argent and Sable or Smooth Newt. The proposed wind farm has been designed to avoid habitat areas of ecological importance or conservation value.

PPS 18: Renewable Energy (August 2009) states, "*any development on active peatland will not be permitted unless there are imperative reasons of overriding public interest.*" Areas of remnant and cut-over Blanket Bog have been identified and avoided in the design of the proposed development. The proposed mitigation measures will minimise impacts, assist in the compensation for habitat lost under the footprint of the development. Hydrological mitigation, Habitat management and restoration plans will integrate and enhance what has been agreed as part of the approved Dunmore Wind Farm.

## Birds

Results from detailed bird surveys completed during 2009, 2010 as part of the Environmental Impact Assessments and planning compliance works for Dunmore and Dunbeg wind farms have indicated that this is not a particularly sensitive area for birds. In 2012, discussions with the Northern Ireland Environment Agency (NIEA) determined the requirements for bird surveys. These were undertaken between April and August 2013. The ornithological study comprised a breeding bird survey plus vantage point watches in accordance with requirements and guidance. The most significant bird encountered at the site was red grouse, which was recorded on the basis of a single pile of droppings found on an initial visit. Disturbance and displacement are not considered to be relevant factors in this assessment due to the rarity of this species at the site. None the less, mitigation is proposed with the suggested provision of medicated grit piles. Following the implementation of mitigation measures, the development is highly unlikely to result in any notable or significant impacts on the local bird population.

## Bats

The proposed development has been designed with the application of bat separation buffers to all features of potential habitat value to bats. A detailed bat survey was undertaken during the summer and autumn period of 2013. All survey work was carried out according to Bat Conservation Trust 'Bat Surveys Good Practice Guidelines' (2012) and NIEA Guidelines (2011). Reference was also made to a variety of best practice documents for wind farm bat surveys in Northern Ireland and Europe. Static monitoring using two SM2+BAT detectors was undertaken on 3 occasions for a minimum of five nights per session from 5 different locations around the site between June 2nd and September 18th. For the transect work both surveyors used Bat Box Detectors wired to Zoom Recorders.

There is a lack of features, such as hedge lines, of feeding or roosting interest to bats within the proposed wind farm area. The nearest hedge line and forest edge is more than 100 metres from the nearest proposed turbines (T13, T14 and T15). Therefore there is no focus for commuting bats to use for navigation in the vicinity of these turbines.

Bats were recorded across the site in small numbers, the most frequently encountered species were the common and soprano pipistrelles. A single Nathusius's pipistrelle was detected in the conifers to the north-west, presumed to be a migrant. In total, 62 Leisler passes were recorded by static detectors with only a very small number over open ground, with most contacts being associated with forest edge or the bushes along the Curly river. There was no consistency in activity and no commuting routes were evident for this species. In conclusion, based on the results of surveys at the site and current knowledge this would appear to be a site posing little risk to bats.





# Landscape & visual assessment

To many people a wind farm is a positive sight, representing function and sustainable energy in an attractive form; a complementary addition to the landscape and views. Nevertheless, wind turbines are large, visible structures and detailed consideration of their impact on views and on the receiving landscape is a necessary inclusion in any comprehensive impact assessment. In many cases the visual impact of a wind farm is a subjective response to its shape and form in the context of the landscape where it is situated. Visual and landscape impacts are not necessarily negative given that wind farms are viewed by many as positive additions.

The Landscape and Visual Assessments are separate but linked procedures. Landscape impacts describe changes in the physical character of the environment and how this is experienced. Visual impacts relate to the actual views and visual effects of the turbines when they are in place. Belfast-based RPS Planning and Environment were commissioned to complete a Landscape and Visual Impact Assessment (LVIA) of the proposed Dunmore 2 Wind Farm. This was undertaken by Raymond Holbeach BSc, MLA, MLI. Raymond is a Chartered Landscape Architect and Regional Director of RPS with over 20 years' experience including multiple LVIAs for wind farm projects in Northern Ireland.

To establish a thorough understanding of what the development will look like when built, a series of ZTV maps (Zones of Theoretical Visibility), wire frames and photomontage illustrations have been produced to simulate views of the approved and proposed wind farms in the landscape.

The ZTV maps are used to identify viewpoints from where the wind farm might theoretically be visible. Using turbine geometry and digital terrain data, a wire frame image of the surrounding terrain and the wind turbines is generated from each viewpoint using a standard proprietary software package. The wire frame and rendered model of the turbine is combined with a technically-verified baseline photograph from each location to produce a representative photomontage of what the viewer would potentially see of the development from that vantage point. All the maps and images are reproduced to scale and published as part of the LVIA in Volume 2B of the Environmental Statement.

## Landscape Character Assessment

The starting point for the assessment is to gain a detailed appreciation of the existing landscape with reference to the Supplementary Planning Guidance PPS 18, published by the Northern Ireland Environment Agency. The locality proposed for development is described with reference to specific elements of the Landscape Character Area (LCA) in which it is located - in the north central portion of LCA 36: Binevenagh. According to the SPG, LCA 36 has a high-to-medium sensitivity to change from wind farm development. This area is characterised by rounded hills and mountains. It predominantly consists of open moorland, interspersed with coniferous forestry. Visibility of the development will be limited by the large forestry blocks of Ballyhanna Forest to the north and Springwell Forest to the east and south, along with other large blocks of forestry in the wider landscape at Binevenagh, Cam and Gortnamoyagh.

Wind farms are already an integral component of the local landscape. The approved Dunmore and Dunbeg wind farms (21 turbines in all) characterise the immediate receiving landscape as one of wind energy generation, thus the sensitivity to change by the introduction of the proposed eight additional turbines on adjacent lands is much reduced. In many views, the proposed Dunmore 2 turbines appear to mesh with the approved Dunmore and Dunbeg turbines. In no case will the proposed development introduce a new wind turbine element to the view.

## Visual Impact Assessment

A total of 28 viewpoints have been assessed. Substantial visual impacts are predicted to occur for four of these, due to their close proximity to the proposed turbines. However, views from these locations are already changed by the consented Dunmore and Dunbeg wind farms and no significant additional visual impact will result from the proposed Dunmore 2 Wind Farm.

In this landscape and wind farm setting, the most notable visual impacts from the proposed development will be perceived within the context of the already-approved wind turbines at Dunmore and Dunbeg. Though significant landscape and visual impacts will occur at close proximity to the proposed wind farm, the assessment establishes that with distance from the wind farm there is a greatly decreased level of landscape and visual impact. Because of the intervening topography and existing turbines, the visual impact for the wider area of this extensive LCA (Open Upland Hills and Mountains) will be of limited significance.

A detailed cumulative visual impact assessment has determined that the proposed non-permanent wind farm can be built without undue negative or lasting impact to the landscape and visual amenities of the area. The broader landscape character area and local visual resource are judged to have the capacity to absorb a wind farm development of this scale. Whether these predicted changes are seen as negative or positive will depend on the perceptions and opinions of the individual experiencing the view. Overall, the proposal is considered to be acceptable in terms of significance of visual impact.

**W**ind energy is a non-polluting source of electricity and will therefore have no direct negative impacts on the composition of the atmosphere. By displacing energy which would otherwise be generated through the burning of fossil fuels, the wind farm would in fact make a significant positive contribution to lowering harmful emissions to the atmosphere.

Although the turbine model has not been selected yet it is assumed that the proposed Dunmore 2 Wind Farm could result in the annual production of approximately 24 MW of energy by renewable means, resulting in a carbon saving of around 26,940 tonnes of CO<sub>2</sub> for each year it operates. Over the 25-year life of the wind farm it would displace the production of approximately 673,504 tonnes of CO<sub>2</sub>, at current comparisons.

The combined installed capacity of the proposed 8 no. wind turbines could be enough renewable energy to meet the domestic needs of at least 13,752 houses (based on RenewableUK's figure of average domestic energy use of 4,700 kilowatt hours (kWh) electricity per year).

The energy generated by the proposed installation will help to displace energy generated by traditional unsustainable means, such as by the combustion of fossil fuels. The energy generated will reduce requirements for imported fossil fuels and operation of the wind farm will make a significant positive contribution to lowering harmful gaseous emissions to the atmosphere.

The proposal will not result in adverse impacts to local air quality. No fumes or other air and climate-related emissions will be emitted by the operational wind farm.

The Dunmore 2 Wind Farm will make a significant contribution towards the improvement of air quality and contribute towards achieving national targets set out in the Strategic Energy Framework 2010, of 40% of electricity consumption to come from renewable energy sources by 2020. The development will lower Northern Ireland's reliance on imported fossil fuels.

The overall impact of the wind farm in relation to national and international air quality and climate concerns is notably significant and positive.





# archaeology and cultural heritage

Northern Archaeological Consultants (NAC) were commissioned to assess the potential significance of impacts from the proposed development on archaeology and on the settings of archaeological monuments and features of cultural heritage in the wider area. The assessment takes into account the original use of the monuments, significant orientations, and modern land-use and the effect of the development on the original setting and public enjoyment of the monuments. NAC engaged in early discussions with Northern Ireland Environment Agency (NIEA) to agree assessment methodology. Archaeological assessment started with an initial desk-top survey to identify sites of importance within the local area.

A site inspection was made to identify previously unknown or unrecorded upstanding archaeological sites. A single SMR site (Sites and Monuments Record) is mapped within the land ownership area, close to the northern boundary - a cup and ring marked standing stone (LDY 006:043). However, this monument could not be verified during site investigations. No other archaeological heritage was indicated by NIEA to be within the site boundaries, or within potential topple distance of the turbines, and no new features of archaeological significance were identified close to, or within the footprint of the proposed wind farm. Therefore, no direct physical impact is predicted to result on sites of archaeological importance. A study area of 2 km around the proposed development boundary identified thirty-eight distinct archaeological sites and monuments mapped by the SMR. None of these will be directly impacted by the development.

With the approval of the Dunmore and Dunbeg wind farms on adjacent lands, wind turbines are not a new feature in the local landscape. Together these developments will see the eventual construction of 21 turbines of up to 125 m height. The presence of these developments characterises this locale. Thus the local landscape is not pristine but rather functions as a working, modern landscape featuring commercial forestry, agriculture, wind energy generation, housing, wooded field boundaries, electricity lines and roads.

Impacts to the cultural heritage sites will be of a visual nature only, relevant during the operational phase of the project. From many monuments, no more than marginal visibility of the proposed turbines will be possible, due to the shielding influence of topography and intervening vegetation or because the proposed additional turbines will appear within the spread of adjacent wind farms. Given both the large distances present between the monuments and the proposed development site, as well as the presence of modern interventions on the landscape in this area, the significance of effect on these sites is deemed moderate-to-slight.

For sites and monuments of any regional importance within the wider area, where the proposed Dunmore 2 turbines would simply extend the spread of turbines at Dunmore and Dunbeg wind farms, the overall visual impact and significance of the proposed development is shown to be nil.

In conclusion, the archaeological settings analysis has determined that the Dunmore 2 turbines will not result in significant impacts on archaeological heritage. Should any archaeological remains be discovered during monitoring, these would be subject to full excavation/preservation in-situ as appropriate (in agreement with the NIEA:HMU). Ultimately, all potential impacts are reversible with the decommissioning of the turbines at the end of their operational life (around 25 years).



## Hydrology and Drainage

The assessment of soils, existing ground conditions, hydrology, geology and hydrogeology was undertaken by McCloy Consulting, an independent environmental consultancy specialising in the water environment, with expertise in hydrological and hydro-geological assessments, Sustainable Drainage Systems (SuDS), drainage assessment, mapping and management, watercourse modelling, and flood-risk assessment.

The site occupies an area on the southern and western slopes of Windyhill and Formoyle Hill. The land holding area generally falls from north east to south west from an elevation of approximately 240 m to 170 m above sea level over a distance of 2 km. Gradients are similar across the site with typical slopes of around 3.5%. Land-use is non-intensive agricultural grazing and wind energy generation and there are signs of historic peat cutting. Man-made drainage is evident in the south east and north west corners of the site.

The hydrogeological study area includes the site surface context and extends to the underlying aquifer catchments and the extents of geological units. For purposes of the assessment the hydrological setting of the site, as defined by the Water Framework Directive, comprises the water-body catchments of the Curly River, Macosquin River and Articlave River.

A desk-top study and detailed site-walkover survey were conducted. Works included consideration of ground stability issues, local hydrology and underlying geology. NIEA, the Met Office, Water Service of Northern Ireland and the GSNi were all consulted.

A full assessment of water quality, and hydrological processes was carried. It identified aspects of the design, construction and operation of the wind farm with potential for adverse impacts on the receiving geological and water environment. Site-specific impact avoidance and mitigation measures are proposed, including:

- avoidance using baseline constraints mapping in the design stage.
- design of individual site elements to minimise impact on the geological and water environment.
- implementation of a robust surface water management plan comprising the use of SuDS (drainage) and silt management
- integration with plans already in place as part of the approved Dunmore Wind Farm development.
- comprehensive pollution prevention procedures during the construction phase.

The SuDS drainage methodology designed by McCloy Consulting has been used at many wind farms throughout Northern Ireland and has been extremely successful in the prevention of silt migration and pollution of watercourses during wind farm construction, operation and decommissioning. Mitigation methods will be checked through physico-chemical and biological monitoring. Implementation of the mitigation proposed will eliminate or reduce the potential significance of any impacts to slight or neutral. Therefore, in terms of its potential impact on the receiving geological, hydrological, and hydrogeological environments, the Dunmore 2 Wind Farm is considered acceptable as proposed.

## Peat Slide Risk Assessment

Attention to ground stability is essential where construction will take place on peat substrates. Independent geotechnical experts Whiteford Geoservices Ltd. were commissioned to map peat depth and structure, assess the potential for peat slide hazard and risk and advise in relation to ground stability within the development footprint. Their leading consultant, John Whiteford, has more than 17 years of experience in the field of earth sciences, geotechnical engineering and management.

Investigations were carried out in accordance with best practice methodology defined by the Scottish Executive guidance - Peat Slide Hazard and Risk Assessment - Best Practice Guide for Proposed Electricity Generation Developments of December 2006.

Detailed surveys were carried out between March and September 2013, with peat-depth probing at each turbine base, hard-standing area, met-mast location and along the routes of planned access tracks and site entrances. The average soil peat depth encountered was 0.60m. The development area is characterised by shallow peat and low slope gradients.

The detailed report concludes that all proposed turbines, access tracks and associated infrastructure offer “insignificant” risk of peat-slip or ground failure during construction and operation. No substantial hazards were identified within the proposed development area and the project can proceed, with adherence to the recommended mitigation measures allowing a minimum level of risk to be attained.





**W**ind turbines generate sound as they rotate - caused mainly by the turbine blades passing through the air and, to a lesser extent, the working of the generator inside the turbine. Modern wind turbines are designed to minimise sound emissions and the nacelle, which houses the mechanical equipment at the top of the turbine tower, is sound insulated. Today's turbines are so quiet it is possible to carry out a normal conversation while standing at the base of a turbine.

TCI Renewables commissioned Hayes McKenzie Partnership Ltd (HMPL) to complete a cumulative noise assessment considering the sound levels from the proposed Dunmore 2 scheme, in conjunction with the nearby consented wind farms. The potential effects have been assessed in accordance with the best practice methodology as set out in government planning guidance.

Predictions of worst-case sound levels were carried out based on the proposed site layout and the maximum warranted sound level emitted by turbines of the type proposed. The predicted sound levels were then compared with the sound limits defined in the guidance document, *ETSU-R-97 Assessment and Rating of Noise from Wind Farms*, as referred to in PPS18, Renewable Energy. It also takes into account the recommendations of the Institute of Acoustics, *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*. The assessment shows that the predicted typical downwind turbine noise levels, at the nearest residential locations to the site, are below the night-time and day-time noise limits under all wind speed and direction conditions.

Sound from construction activities and traffic movements will be limited to the 9-to-12-month construction period and will be within normal guidelines, having minimal affect. Significant adverse noise impacts are not anticipated to result from the proposed development.

## 18 shadow flicker

**S**hadow flicker occurs when a particular combination of weather conditions arise at specific locations at particular times of the day and year - usually when the sun is low in a clear sky and shines through the rotating blades, casting a moving shadow on a nearby building or location. When it passes across a window, doorway or narrow space the shadow from each blade causes the light to appear to flick on and off. This change in light intensity can have an adverse impact on very close-by properties.

By computing data on the geometry, location and latitude of the turbines and nearby properties - known as receptors in the analysis - the WindFarm software programme can predict a worst-case-scenario on the extent and duration of potential shadow flicker effects.

The analysis includes assessment of potential cumulative impacts at all properties within a 10 rotor diameter distance of the proposed Dunmore 2 site and the adjacent Dunmore and Dunbeg wind farms. No significant shadow flicker impacts are anticipated from the operation of the proposed Dunmore 2 wind farm. It is not considered that shadow flicker will present any problems of annoyance or nuisance.

The PPS 18 Planning Policy Best Practice Guidance states that where the overall duration of shadow flicker falls below 30 hours per year it is not considered to be of a significant impact. With regard to the flicker effect, the The UK Updated Shadow Flicker Evidence Base, prepared by Parsons Brinkerhoff on behalf of the Department of Energy and Climate Change, concludes that "*the frequency of the flickering caused by wind turbine rotation is such that it should not cause a significant risk to health*".

In the event the wind farm is constructed and residents experience shadow flicker, the developer will implement appropriate mitigation measures in agreement with householders to remove any such adverse impacts.





An individual's reaction to views of wind turbines is a subjective matter. In any area where tourism plays a role in the economy a wind farm application can raise questions about potential impacts on tourism. Independent UK studies have consistently shown that fears about the negative impact of wind farms on tourism are unfounded. Surveys addressing this issue in the UK between 1992 and 2013 show that visitors are unlikely to be put off by the presence of a wind farm. While some people may be concerned, fears are generally eased when the development begins operation. In general, public reaction to these developments is tempered by knowledge of the value of wind energy in reducing emissions of greenhouse gases, improving diversity and security of energy supply.

In August 2011, the Northern Ireland Tourist Board published a paper exploring visitor attitudes towards Wind Farms. Responses from tourists, both domestic and from the Republic of Ireland (RoI), illustrated that wind farms do not have a negative impact on tourism. The survey demonstrated that 52% of domestic tourists would be happy to visit an area which has wind farms, while 40% of RoI tourists also agree with this statement. It also found that only 5% of domestic tourists and 3% of RoI tourists to Northern Ireland would avoid returning to an area that has wind farms.

The Northern Ireland Tourist Board concluded that the impact of wind farm development on tourism may not be as severe as previously thought and that tourists on the whole seem generally positive or neutral to the prospect of wind farm development. To date, there is no published evidence to indicate wind farms have a negative effect on tourism. The Altahullion wind farm, north of Dungiven, features a dedicated tourist turbine, signposted from the main A6 Dungiven-to-Derry road by the Northern Ireland Tourist Board (NITB) using brown tourism signs.

The effects on tourism from the Dunmore 2 Wind Farm are difficult to quantify. However, it is considered that the eight turbines will not make a significant difference to tourist attitudes and may even attract visitors to the area.

## transport & haulage

Because of their unusual dimensions and weight, the turbine components (blades, turbine hub and tower sections) are classified as abnormal loads by DRD Road Service. It is intended that the Dunmore 2 turbine components will be delivered to the Lisahally port, outside Derry and transported along public roads to the site.

The same route used for the transportation of the Dunmore turbines (being constructed at the time of publication) will be used again to deliver the materials for the proposed Dunmore 2 wind farm. Detailed road surveys and liaisons with the turbine component hauliers have confirmed this as a suitable route and it has been agreed as acceptable by Roads Service.

A relatively small number of oversized loads will be needed to transport the blades, towers and heavy turbine components. Locations on the public roads have already been identified where minor, temporary road works will be required. Other construction materials, including stone and concrete, will be sourced where possible from the local area and delivered in standard stone lorries and cement trucks. These vehicles will take a more circuitous route to and from the site and will not normally require special traffic provisions on public roads.

The Environmental Statement provides a detailed description of the delivery routes, outlines the traffic-management procedures for local roads and details the breakdown and schedule of the number and size of vehicles associated with the construction, operation and decommissioning phases of the development. The haulage route and traffic assessment report concluded that the local transport network will be able to absorb these additional traffic movements.

Transportation will be undertaken in association with traffic-management procedures, agreed with Roads Service in advance of construction, to ensure maximum safety and minimise potential impact on local residents and road users.



# electromagnetic interference & aviation

As with any large structures, wind turbines have the potential to interfere with electromagnetic signals, such as television, civil and military aviation activities, communication, microwave links and radar. The turbine construction phase must include provisions for safeguarding existing aviation and ground based telecommunication infrastructure.

TCIR has consulted extensively with public and private telecommunication operators to establish the electromagnetic environment within and around the Dunmore 2 development. Each turbine location has been carefully selected to avoid potential interference with existing and future planned radio broadcast communication equipment. Details of the currently proposed Dunmore 2 Wind Farm have been communicated to and agreed with telecommunication operators, such that adverse impacts are not anticipated.

In the unlikely event that impact to residential television reception occurs once the turbines begin operating, the wind farm owner will put remediation measures in place to restore normal service. Remediation measures may include the restoration (or even improvement) of TV reception by the redirection / replacement of domestic TV aerials or installation of alternate service provision facilities.

## Aviation

Belfast International Airport, George Best Belfast City Airport, Civil Aviation Authority and the Ministry of Defence were consulted in relation to the wind farm proposal. The operator for each airport has confirmed the proposed Dunmore 2 development poses no risk to management or Air Traffic Safety or Control.

Through detailed meetings and discussions with CODA, a solution has been agreed in principal, to address issues which may arise in the event CoDA install planned Radar at the airport. This solution agreement is currently subject to legal discussion.





# safety assessment

**T**here are a number of potential hazards and risks that might be associated with the construction and operation of any wind farm. All statutory health and safety requirements and planning conditions will be adhered to during the construction, operational and decommissioning phases of the project.

Fencing will be erected at potentially hazardous zones within the wind farm construction area, machinery stored on site will be within an enclosed compound. All unattended machinery will be immobilised to prevent unauthorised use. All potentially hazardous materials will be managed in accordance with The Environmental Protection (Duty of Care) Regulations 1991. Access into turbine towers will be locked at all times, except when in use by authorised operation or maintenance personnel. Temporary construction safety signs will be erected in the most appropriate locations. The lands on which the wind turbines will be sited are privately owned and unauthorised access to the wind farm site will not be permitted. Public access to the site will be strictly regulated. All site users, including staff, visitors, working personnel and the landowner, will be inducted with the necessary health and safety provisions.

The wind turbines will be equipped to operate automatically. The turbines will be installed with sensors to detect potential operation or generation issues including faults and voltage irregularities. Should a significant irregularity or technical fault be diagnosed, the individual turbine or wind farm will be halted until the issue can be addressed and resolved.

The construction, operation and decommissioning of the development will be completed in accordance with all relevant health and safety legislation and guidelines and by regulating public access.

## Decommissioning

**W**ind turbines have an operational life time of approximately 25 years. At the end of that period, the site will be reinstated in accordance with a site decommissioning and reinstatement method statement which will be prepared for agreement with the Planning Service at least six months prior to decommissioning.

Turbine blades and towers will be dismantled and removed from the site. Where practical, hard surfaces will be broken down and rehabilitated. Hard-standing areas and any tracks that are to not to be utilised by the landowner, will be covered by topsoil and re-seeded. Underground electrical cables will be de-energised and removed from the site. All works will be carried out in accordance with the agreed decommissioning plan



# conclusion

**T**his non technical summary has outlined the findings of the Environmental Impact Assessment for the proposed eight-turbine Dunmore 2 Wind Farm development. Full details are set out in the Environmental Statement and accompanying technical appendices.

The Dunmore 2 site was selected for its reliable wind resource, accessibility, suitable topography and land area, compliance with noise requirements and distances from dwellings. A rational and rigorous assessment of the strengths, weaknesses and visual impacts of various alternative options has produced a design which is in full compliance with environmental planning policies and requirements and which makes optimal use of the available lands and wind energy resource, while minimizing potential for adverse environmental impacts.

The Environmental Impact Statement has demonstrated that lasting social, economic and environmental benefits will arise from this development. Visual and landscape impacts of the Dunmore 2 Wind Farm will be non-permanent, almost entirely reversible and associated with the medium-term, 25-year projected life span of the proposal. Wind farms are viewed by many, as positive additions to the landscape. Potential adverse effects of the wind farm can be managed through the application of appropriate mitigation measures, best practice management, training and construction techniques.

Comprehensive assessments of potential environmental impacts, carried out by respected experts in their fields, have concluded that the benefits to the environment and the local community of the Dunmore 2 Wind Farm will far out-weigh any potential perceived temporary changes to views and landscape character. A wind farm of this size offers tangible local financial contributions and provides much-needed rural diversification. It reduces our reliance on imported fossil fuels, increases the security of our energy supply and helps towards the meeting of renewable obligations.

Permitting this development is therefore an imperative. The Dunmore 2 Wind Farm presents an opportunity to generate energy from an infinitely renewable source, in a non-polluting manner, in a suitable landscape, generating financial and environmental gains which are considered to be of over-riding public interest in the current economic climate.

The development has been designed in full compliance with planning and environmental requirements, as primarily laid out in Planning Policy Statement (PPS) 18: Renewable Energy, as well as UK and EU Energy Policies. In planning and environmental terms, the Dunmore 2 Wind Farm is judged to be acceptable at this location.





# further information

**T**he Environmental Statement can be purchased from the TCI Renewables office and the Library in Limavady:

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**Limavady Library**  
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Purchase prices for the Environmental Statement:

	Price Excl. P&P	Price Inc. P&P
Fully bound paper copy of Volumes 1, 2 and 3	£150.00	£160.00
Paper copy of Volume 1 (Environmental Statement)	£60.00	£70.00
Paper copy of Volume 2 (Appendices A & B A3 Full Colour)	£78.00	£88.00
Non-Technical Summary - Volume 3	£6.40	£7.00
Electronic copies - Full Environmental Statement on CD	£5.00	£6.00

The full Environmental Statement can also be inspected free of charge at:

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