NOISE

WHAT IS INVOLVED IN AN ENVIRONMENTAL NOISE IMPACT ASSESSMENT

- The Assessment is undertaken in accordance with best practice following the Institute of Acoustics Good Practice Guide (IOA GPG)
- The study area is defined
- Background noise monitoring campaign is carried out
- Noise limits are derived following this noise monitoring campaign
- This background noise data, and computer modelling, is used to inform the site layout, to ensure the project is fully compliant with noise guidelines
- Mitigation measures would be implemented where necessary to ensure compliance with noise limits
- Construction noise impacts are also assessed

STUDY AREA

- Noise sensitive locations within 35 dB LA90 contour

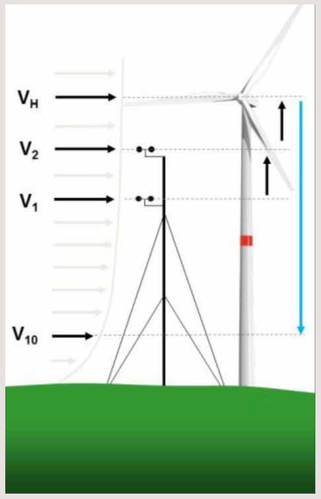
BACKGROUND NOISE SURVEYS

- 18 monitoring locations identified
- Three rounds of monitoring took place (8, 4 and 6 no. locations)
- Noise levels that were exceeded 90% of the time over 10 minute intervals were recorded
- Concurrent measurements were taken
  - Wind Speed (Met Mast or LIDAR Unit)
  - Wind Direction
  - Rainfall
- Data affected by rainfall was removed as it could give inaccurate results, (higher background noise than there may actually be)
- Noise Levels were plotted against wind speed

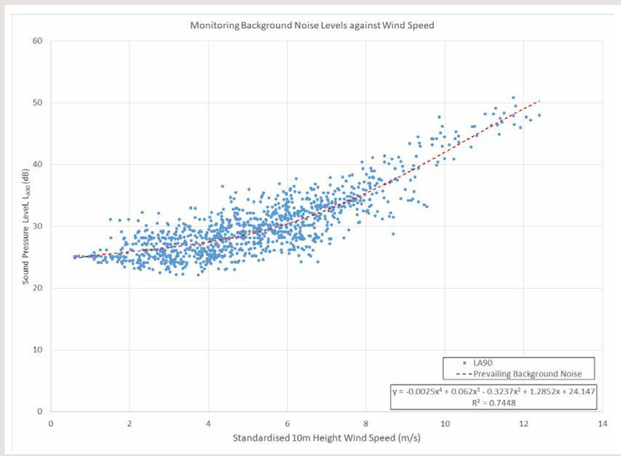
DERIVED NOISE LIMITS

- *Wind Energy Development Guidelines 2006 – Preferred Draft Approach (PDA), June 2017*
- The Wind Farm is designed to meet the latest guidelines. This allows
  - Rated Noise Limit of 5 dB(A) above background noise within the range 35 – 43 dB(A).
  - Noise restriction limits consistent with World Health Organisation standards
  - PDA requires lower noise limits than WEG 2006
  - Coom Energy Park is designed to meet PDA noise limits

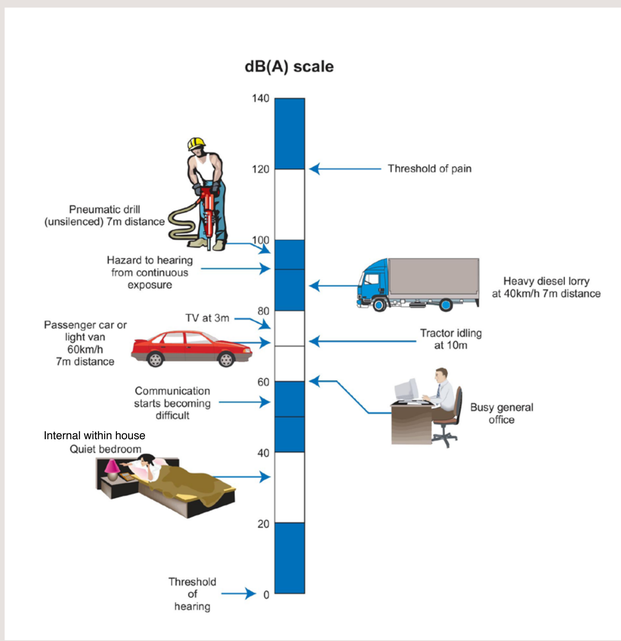
Noise Monitoring Equipment used



Wind speed measured at same time as noise



Example Noise level plot



The level of typical common sounds on the dB(A) scale (Source: NRA Guidelines for the Treatment of Noise & Vibration in National Road Schemes, 2004)

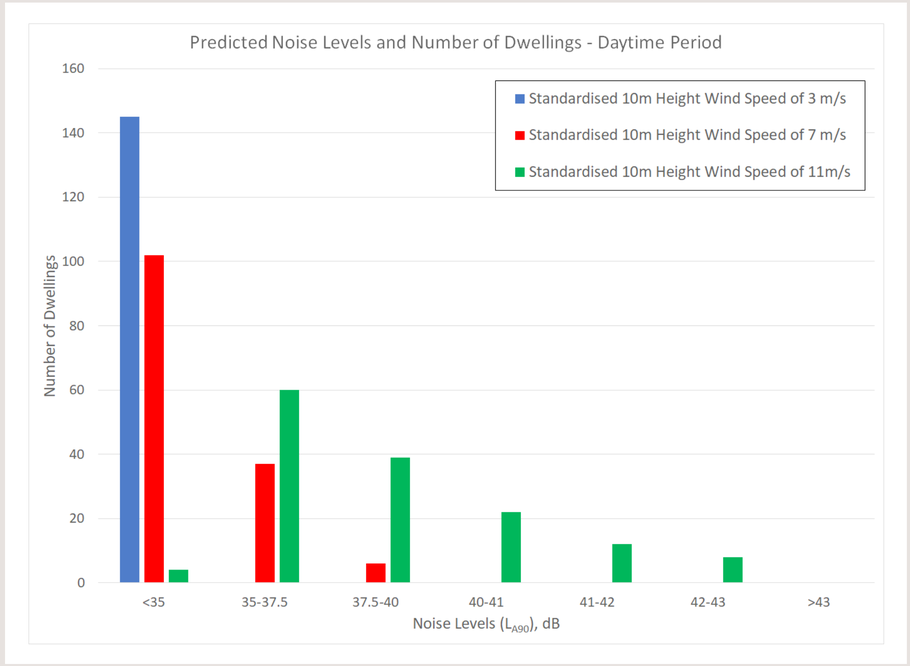
NOISE

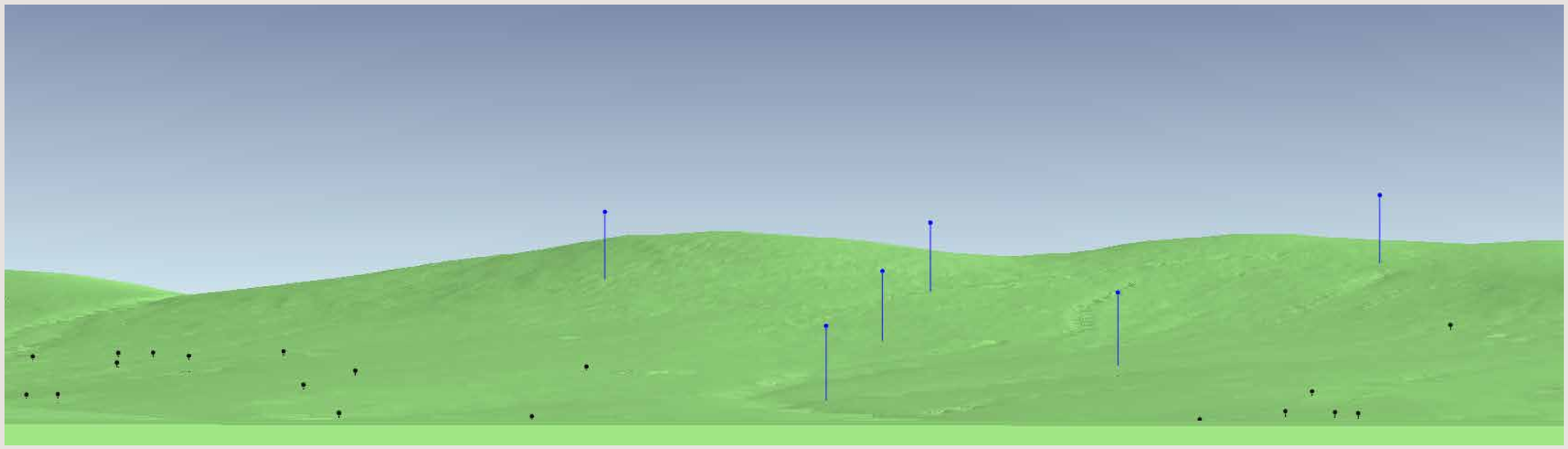
NOISE PREDICTIONS AND MITIGATION

- Undertaken in accordance with best practice
- Wind farm layout was modified and operation mitigated to ensure compliance with PDA noise limits at ALL noise sensitive locations

CONSTRUCTION NOISE

- Noise predictions using British Standard BS 5228-1:2009+A1:2014 code of practice for noise and vibration control on construction and open sites
- On site noise from construction activity including construction associated with grid connection assessed
- Compare predicted construction noise against relevant construction noise limits
- Identify mitigation measures to minimise impact





COMMUNITY BENEFIT FUND

We will commit to a community benefit fund in accordance with the government led Renewable Electricity Support Scheme (RESS) for the Coom Green Energy Park.

The community benefit fund is to support long term, sustainable local investment and projects that will aim to increase and improve the local economy and social infrastructure, in line with industry best practice principles and policy.

The community fund will prioritise projects and initiatives that support and benefit the local community in the immediate and local areas surrounding the proposed project.

Brookfield Renewable and Coillte have provided community funding in other communities around Ireland for many years and have created opportunities for local groups to enhance and sustain facilities and services in their local area.

We are keen to hear about what projects and types of community investment you believe are needed in your local area.

The Sliabh Bawn community benefit fund

SLIABH BAWN WIND FARM, CO. ROSCOMMON

The Sliabh Bawn community benefit fund has been running since construction started on the site, by Coillte, in 2015. It funds local community projects that come in under the areas of **recreation, health and wellbeing, culture, tourism, education, environment and energy efficiency.** Applications to this fund are now assessed by a stakeholder committee comprising of 8 community representatives, 2 members of the wind farm team, a representative from the local Leader Organisation and a representative from the local Public Participation Network (PPN). To date this fund has supported 96 local projects.

BALLYHOURA WIND FARM, CO. CORK

Community benefit funding from Brookfield Renewable is assisting the Buttevant Community Council with **village improvement plans** including, securing old town walls, the establishment of a river walk and a historical trail.

GALWAY WIND PARK, CO. GALWAY

Galway Wind Park is the largest on-shore wind farm in Ireland. Coillte focused on designing the community benefit fund with strong local involvement and this has resulted in four elements to the fund: a local fund (50%) aimed at **supporting local organisations**, a scholarship fund (12.5%) focusing on **supporting third level students in the local area**, a major projects fund (35%) that aims to **co-fund major initiatives in the area**, and a miscellaneous fund (2.5%) to cater for **supporting local charitable causes.**

LARBRAX WIND FARM, SCOTLAND

Brookfield Renewable has formally committed to investing in **education** and **skills training** in Stranraer. Our partnership with Dumfries College would see an upfront capital investment employed to develop a new educational energy centre at Stranraer Campus. This has the potential to deliver:

- One full time course per year
- One schools programme per year
- Over 30 college places per year
- A range of apprenticeships and courses at various levels

TRAFFIC AND TRANSPORTATION

TRAFFIC IMPACT ASSESSMENT

The traffic impacts were assessed as part of the planning application, these form part of the Environmental Impact Assessment Report.

The assessment considers:

- Delivery of building materials, electrical components, stone, aggregates and concrete
- Staff and LGV traffic generated by the project
- Traffic impacts associated with construction of grid connection
- Impact of delivery of large turbine components
- 3 borrow pits which have been identified on site- these will allow stone found on site to be used within the wind farm and therefore reduce the construction traffic
- Potential haul routes which have been identified from surrounding quarries and their impact on the surrounding roads

It is currently estimated that the project will create c100 deliveries per day during the construction period, with approximately 60 of these on the Bottlehill side and approximately 40 on the Knockdoorty side of the site.

The construction phase is estimated to take 18-24 months from start to completion.

CONSULTATION

The Coom Green Energy Park project team has consulted with Cork County Council, in each of the affected districts and also consulted with Transport Infrastructure Ireland (TII). Direct Route has also been consulted in relation to turbine deliveries and grid connection routes and any potential impacts on the M8 motorway.

TRAFFIC MANAGEMENT PLAN

An outline Traffic Management Plan will be included in the planning application and a site-specific Traffic Management Plan will be agreed with Cork County Council before construction starts. The Traffic Management Plan will take account of the local environment and ensure that impacts in terms of traffic and safety are minimised.

ROUTE SURVEYS

Route surveys have been conducted to allow the delivery of wind turbine components.

Haul routes have been identified to highlight the potential construction traffic routes to and from the site.

TURBINE COMPONENT DELIVERY

An in-depth assessment of the delivery routes was conducted for the turbine components from the nearest suitable port to the site.

The route chosen seeks to minimise the impacts to the environment, traffic impacts and potential disruption to the public.

ABNORMAL LOAD DELIVERIES

Typical Trial Run

Prior to delivery of components to the wind farm site, a dummy run would be completed with an empty trailer.

Blade Delivery

Blades will be delivered on extended trailers. The rear axles can steer to reduce the need to widen public roads.

Turbine Tower Delivery

Turbine tower sections will be delivered in batches and will be 20-35m long.

Nacelle Delivery

The wind turbine nacelle delivery will be made on a low loader.

Stone Deliveries

Concrete Deliveries

Construction traffic to and from the site during the works will mainly consist of stone and concrete deliveries. The onsite plant will remain on site after being delivered during site establishment and removed on completion. The majority of traffic to and from the works will be the two vehicles pictured above.

ECOLOGY

BIODIVERSITY COOM GREEN ENERGY PARK

Birds - Methods

- Vantage Point (VP) surveys to record levels of flight activity spanned 4 years (2016-2019) and covered both breeding and wintering periods
- Vantage Point surveys covered the turbine layout plus a 500m buffer; VP surveys were undertaken according to Scottish Natural Heritage guidelines (2017)
- Breeding bird transects were undertaken according to standard methods (CBS) to determine general breeding bird communities on site
- Breeding Merlin surveys in 2019 followed standardised methods during breeding season in suitable breeding habitats
- Hen Harrier roost watches were undertaken during winter at dusk to identify regular sites and numbers of birds present within the hinterland of the proposed development
- Winter bird transects involved monthly wintering surveys (November to February) to record wintering bird communities
- Winter wildfowl surveys were also carried out within the hinterland of the site
- All surveys covered the Grid Connection also, where pertinent

Vantage Point Survey Results (summary, not exhaustive)

- Hen Harrier was recorded regularly throughout the year
- Goshawk – recorded in 2017 and 2018 on an occasional basis
- Peregrine – occasional winter records in all three winters (16/17, 17/18 & 18/19)
- Merlin – occasional winter records in two winters (16/17 & 17/18)
- White-tailed Eagle – one record
- Golden Plover occasional winter records

Hen Harrier Winter Roost watches

- Two regularly used roosts were found within the survey area with 2-3 birds recorded wintering

Winter Bird Transects Results

- Birds recorded were typical of survey area and habitats
- Teal recorded occasionally
- Meadow pipit commonly recorded

Breeding Bird Transect Results

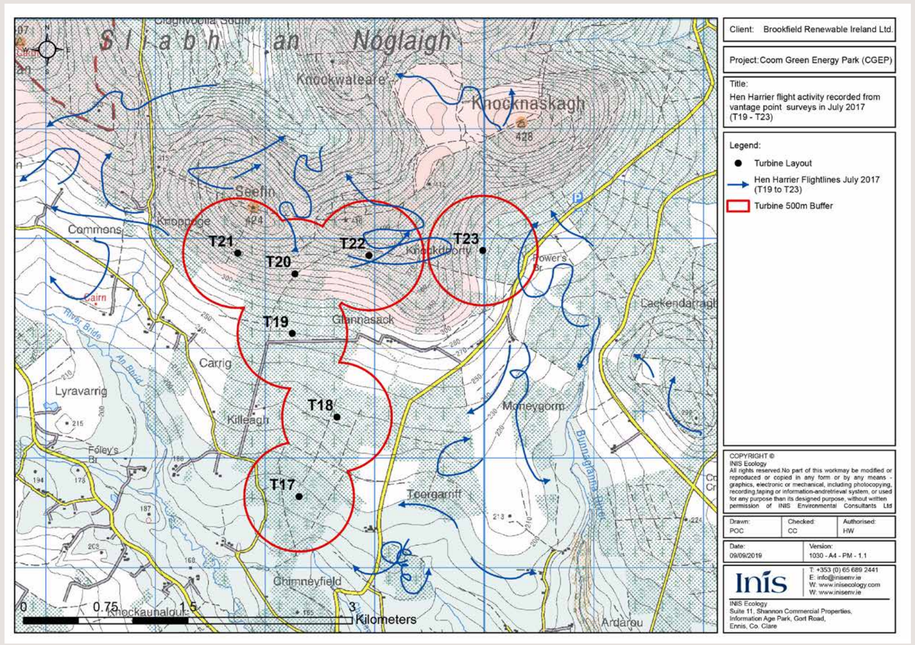
- Birds recorded were typical of the area and habitats; Wren, Willow Warbler and Chaffinch were amongst the commonest species

Breeding Merlin Survey Results

- No breeding Merlin were recorded in suitable habitat surveyed

Number of confirmed nesting Hen Harrier pairs recorded per year (based on project data collected)

- 2015 (3)
- 2016 (1)
- 2017 (1)
- 2018 (1)
- 2019 (2)



Typical example of Hen Harrier flightlines recorded from vantage point surveys

Female Hen Harrier

ECOLOGY

HABITATS

Methods

- Habitats were recorded within a minimum of 50 metres from all proposed turbine bases, substations, access roads and grid connection. Habitats were classified as per Fossitt *et al.* (2000) habitat codes.

Results

- Typical habitats recorded at proposed turbine bases included; Conifer plantation, Wet Grassland, Wet Heath, Dry Siliceous Heath and Scrub.

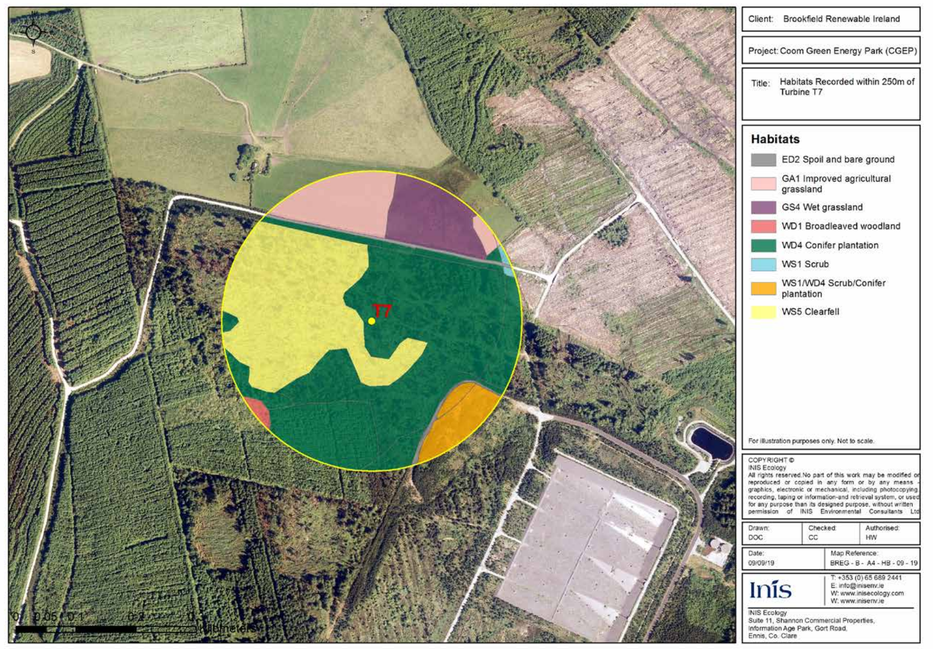
Wet heath and wet grassland mosaic at proposed location of Turbine T4

Scrub habitat at the proposed location of Turbine T2

Wet grassland recorded at proposed location of Turbine T7

Conifer Plantation recorded at proposed location of Turbine T18

TYPICAL HABITAT MAPPING RESULTS



AQUATIC ECOLOGY

Methods

- Streams and rivers were classified based on their suitability for fisheries. Electrofishing was undertaken to survey fish species.

Results

- Brown Trout, Eel and Salmon were recorded in streams and rivers on and around the area.
- No Freshwater pearl mussel were recorded within the surveyed rivers or streams.
- Otter are present in some watercourses

Macroinvertebrate sampling being undertaken

ECOLOGY

BATS

Methods

- Buildings within and surrounding the proposed site boundary were categorised based on their suitability for roosting bats.
- Bat activity surveys were undertaken within habitats by recording bat species along transect survey routes. Bat activity surveys including roost surveys were undertaken to record species of bats using buildings, and to identify important roosts.
- Static electronic bat detectors where deployed at 14 of the proposed turbine locations in spring and summer 2019 as per changes to Best Practice Guidance by Scottish Natural Heritage (2019).
- Bat surveys also covered the Grid Connection.

Results

- The most common bat species recorded was the Common Pipistrelle.
- Bats were recorded using a number of buildings, both modern and old. Some buildings were used throughout the year by a bat species called the Natterer's Bat, whilst other Bat species used these buildings seasonally.
- Other species recorded include; Soprano Pipistrelle, Brown Long-eared Bat and Leisler's Bat.
- The spring recordings from the static electronic bat detectors showed that the majority of recordings were from common pipistrelle bats, with Leisler's bats as the second-most abundant species.

MAMMALS

- Lands were walked to determine the presence or absence of various mammal species such as Deer, Otter, Badger and Red Squirrel.
- Mammal surveys were conducted within a 50 metre buffer of the turbine bases and access roads.
- Mammals were also remotely surveyed using trail cameras.
- Records of squirrel feeding remains, squirrel resting places and badger foot prints were recorded.
- Two outlier badger setts were recorded. These setts were not active at the time of survey.

Red Fox photographed on remote camera

Red Squirrel photographed on remote camera

INVERTEBRATES - MARSH FRITILLARY BUTTERFLY

Methods

- Suitable habitat for Marsh Fritillary were surveyed for the presence of larvae or adult Marsh Fritillary butterflies.

Results

- Marsh Fritillary larvae and adults were found at one location outside the development boundary.

Habitat in which Marsh Fritillary Butterfly was recorded

Marsh Fritillary caterpillars recorded outside of the site boundary

INTERPRETATION OF DATA

- Biological surveys of river quality: Q-values were recorded within watercourses to assess the water quality at these watercourses.
- Collision Risk Modelling – Hen Harrier flight lines recorded from vantage point bird surveys were used to determine the likelihood of a bird colliding with a turbine rotor.
- Bat activity recorded on static electronic bat detectors at proposed turbine location was interpreted. Measures to avoid harmful effects on bats will be implemented.

PROPOSED MITIGATION

- Timing works to avoid disturbing or displacing a protected species (mammal or bird) during key periods of their life cycle (daily and on a seasonal basis) and avoidance of sensitive habitats and nesting locations.
- Creation of "bat buffers" as per Scottish Natural Heritage (2019), to ensure no suitable habitats are within 50 metres of proposed rotor tips.

GRID CONNECTION AND ENERGY STORAGE

HOW COOM GREEN ENERGY PARK WILL CONNECT TO THE NATIONAL GRID

The preferred grid connection arrangement for Coom Green Energy Park is to the existing Barrymore 110kV substation near Rathcormac via a 110kV underground cable in public roads and private lands.

- All cables will be buried underground.
- Two onsite substations.
- Onsite substations will be screened from view.

BATTERY ENERGY STORAGE SYSTEM (BESS)

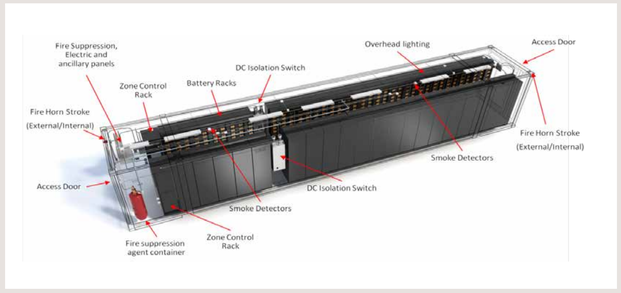
- At Coom Green Energy Park, a BESS array shall be located next to the main onsite substation at Lackendarragh.
- The BESS compound shall consist of approximately 0.5Ha of compound space for 50MW of battery storage containers. This area includes some space for internal access roads or buildings for ancillary equipment, etc.
- Each BESS unit shall have the capacity to store approximately 2.5MW of electricity.
- BESS is a system that stores electrical energy via the use of battery technology for it to be used at a later time and provide additional control services to the electricity grid.

WHAT BESS LOOKS LIKE

Hybrid plant for storing electricity in batteries that is part of a grid-connected wind farm in Spain

- High quality galvanised metal containers, approximately 16m long x 2.6m wide x 3m high.
- They are fitted out inside with racks of battery modules and control systems, as well as internal electrical cabling and a fire suppression system.
- No waste will be produced during the operational phase of the battery facility.

BATTERY STORAGE SAFETY CONSIDERATIONS



Example of a battery storage fire protection system

- In the very unlikely event of a fire, each container is fitted with their own fire suppression system.
- Battery racks are sealed within containers where they are monitored and controlled for performance, temperature and other safety factors.
- Containers are sealed, fireproof and house all the necessary control and safety systems and each container comprises an individual fire suppression system.
- Measures for fire detection and warning systems will be implemented as part of the facility's construction and operational design.

WHY ENERGY STORAGE IS IMPORTANT

It facilitates the transition to a low-carbon economy. For example:

- Enabling higher share of Renewable Energy Systems in the energy mix.
- Supporting electrification of the heating, cooling, and transport sectors.
- Supporting the secure, cost-effective, and efficient operation of the grid by providing key services at all levels of the energy system.
- Ensuring security of supply: avoiding wind curtailment avoids importing fuels.
- It is an economic imperative that Ireland maximises the potential of its indigenous renewable resources. BESS will help Ireland achieve this goal.
- The technology is used across the UK, Europe, the United States and Australia.