

## Renewables



Renewables

Fingleton White has been pioneering the development of renewable energy for more than 25 years

Fingleton White was set up in 1981 to service the energy sector in Ireland. Since then it has been involved in many significant projects in the development of power generation, oil and natural gas infrastructure. It is the leading company of Engineers and Project Managers in the energy sector and holds a number of patented designs. Since its inception Fingleton White have completed projects with a capital value exceeding half a billion Euros.

Fingleton White have successfully completed a 16,000MW gas station, 450 km of gas pipelines, 30 km of fibre network, 15 hydroelectric stations, 70MW CHP facilities, waste to energy projects, numerous industrial refrigeration systems and boiler house upgrades. Our R&D and feasibility studies in the use of innovative technologies in the energy sector includes aviation fuel pipeline, district heating, domestic CHP, the use of compressed natural gas as a virtual pipeline and as a future fuel for vehicles.

Fingleton White is Ireland's first independent renewable electricity generator.



Edergole Hydroelectric Power Station in Co. Donegal was developed by Fingleton White. Utilising a Vertical Pelton Wheel turbine with a gross head of 188m, this 650kW generator has been feeding electricity into the Irish electricity grid since 1990.

The water is piped some 3km from Lough Belshade using an economic mix of materials, with HDPE up to 6 bar, ductile iron for straight high pressure sections and steel pipe for high pressure sections with bends.

An innovative radio controlled valve at the lake outlet allows the flow to be modulated to maximise daytime generation and overall profitability.



# Concept to Completion

Fingleton White provides the complete range of Engineering Services from conceptual design through to final commissioning

## Services Fingleton White Provide

### Hydro Electricity

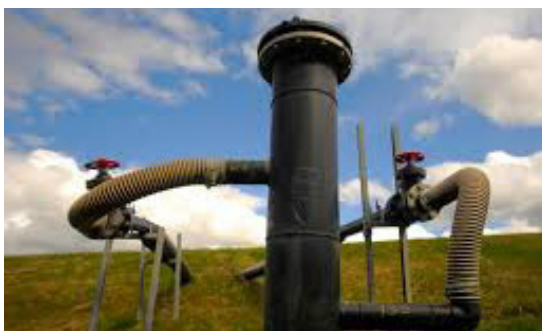
Fingleton White is Ireland's premier Hydro Electricity engineering consultant and we have been involved in the development of 15 hydro schemes in Ireland and abroad.

- *Hydro Electricity*
- *Biomass*
- *Biogas*
- *Biofuel*



### Biomass

At Munster Joinery, we have designed a waste wood chip Combined Heat and Power facility with class leading efficiency.

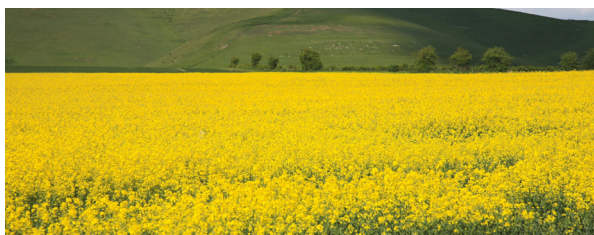


### Biogas

Fingleton White have performed a number of studies on recovery and utilisation of biogas from landfill and from animal waste for heating and for electricity generation.

### Biofuel

Our engineers have examined the economic and technical aspects of Biofuel production and this is an area that we are currently developing with our clients.





# Concept to Completion

## Services We Provide

Fingleton White provide a wide range of services to the Renewable Energy sector. These can start with technical and commercial feasibility studies and range all the way through EPC and turnkey construction to Build, Own Operate, Maintain or shared ownership.

- *Feasibility Studies*
- *Outline Design*
- *Detailed Engineering*
- *Commercial Close*
- *Planning, Regulatory & Environmental*

### Feasibility Studies.

With a Stage1 study, Fingleton White can assess the commercial and technical viability of a renewable energy project. Stage 2 involves the preparation of a budget cost estimate and a ROI model.



### Outline Design

When project viability is established, we proceed to an outline design which locks down the choice of prime mover, running regime, potential fuel and off take contracts as well as plant footprint and stack heights etc. This is used as the basis for a commercial cost estimate.

### Commercial close.

For a viable Renewable Energy project, we will set out a range of commercial options, from EPC and turnkey construction to shared ownership or a simple BOOM contract.



### Planning, Regulatory & Environmental

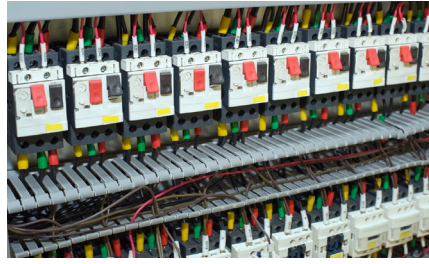
In addition to the preparation of all the necessary planning, and regulatory documents, where required Fingleton White prepare a full Environmental Impact Statement and apply for the appropriate emissions permits



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## Detailed Engineering

Our experienced design team perform all civil, mechanical, piping, electrical and automation design with a view to seamless integration of the installation into the host site with minimum disruption to ongoing operations of the site.



Fingleton  
White



## Our Experience

End User/Project	Year	Description
Croagh Gorm	2014	Operation, maintenance and improvements of three hydro schemes, 465 kW, 344kW and 495kW
Munster Joinery	2009	Design and construction of a 3.0MW sawdust and wood chip fuelled Combined Heat and Power facility.
Vartry Reservoir Hydro	2007	Pressure Reduction Hydro Generation. 90 kW Turbine Generator to utilise the level difference between the storage lake and the Water Treatment works
Tawnawully Hydro	2001	Design of a 1.2MW hydro electric station with associated dam and 1.2km of 1.4m diameter pipeline.
Edergole Energy	1990	Design, Build, Own & Operate 650kW Hydroelectric Power Station
Kylemore Abbey	1992	Install replacement pipeline for 700 meter hill section
Kylemore Abbey	1983	uPVC Pipeline replaced and refurbish 15kW Turbine generator
Castletown	1981	35kW Hydro scheme and Weir
Ballyellen Lime Works	1983	River Barrow -Refurb of 35kW Hydro Station



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# Hydroelectric Power Station Co. Donegal.

This project is a "high head" project. The gross head is 188m. The intake incorporates a self cleaning trash rack and stone trap. The pipeline is approx. 1300m long x 500mm diameter.

The pipeline has 3 sections:

- HDPE up to 6 bar.
- Ductile iron for straight high pressure sections.
- Steel pipe for high pressure sections with bends (horizontal and vertical).

The water from Lough Belshade (a 15 hectare lake) approx. 3km upstream from the intake is operated by an automatic control valve which operates to ensure full power during day hours and reduced power at other times (dependent on availability of water).

Main Suppliers

- The turbine is a 3 Jet Vertical Pelton Wheel supplied by Atelier Bouvier, France 660kw @ 500L/S.
- The generator is a vertical shaft induction generator supplied by Reliance, Germany. 650KW 600V 3 phase.
- The control system was designed and installed by NeoDyne Ltd.
- The civil contractor was Aodh O'Donnell who built the intake and turbine house.
- The pipeline was laid by local workforce



## Edergole Hydro



### Scope

Design, Build, Own & Operate  
650kW Hydroelectric  
Power Station

### Client

Edergole Energy Ltd

### Commissioned

1990

### Services Provided

Route Selection  
Preliminary Routing /  
Feasibility Report  
Conceptual Design  
Budget Estimate  
Detailed Design  
Material Tendering and  
Procurement  
Wayleaves and Site  
Acquisition  
Planning and Statutory  
Approvals

# Wind Power Installation in Co. Cork.

As part of the ongoing engineering and environmental consultancy agreement with Munster Joinery, Fingleton White were appointed to oversee the technical and commercial integration of 2 X 2 MW wind turbines into the existing Ballydesmond manufacturing and onsite generation infrastructure.



The Fingleton White site team was designated to liaise with, and represent the interests of the manufacturing operations to ensure the undisturbed operation of the facility. This included coordinating the delivery of the turbine sections along the local roads within 2kms of the facility, and the task of planning the routes to the designated areas on site through the working plant. The brief also covered the design and construction supervision of crane working platforms ahead of turbine erection.



Design scope included routing and installation of electrical cabling between the turbines and the MV switchroom. Design of all the medium voltage modifications and upgrades necessary to facilitate the integration of the wind turbines with the existing generator and site demand bus. This included the specification of the additional switchgear and revisions to the metering, CTS and control arrangements for the synchronisation of the new generators, and their integration into the existing site SCADA system.

Fingleton White also processed the regulatory applications necessary for revisions to the existing IPPC Licence. In addition, the head office electricity market support team provided consultancy services regarding the changes to the grid connection and the integration of the wind turbines into the existing SEM market arrangements.

## Design, Build, Own & Operate



### Scope

Design and construction of a 3.0MW sawdust and wood chip fueled Combined Heat and Power facility and integration of 4MW of Wind Power.

### Client

Munster Joinery Ltd.

### Commissioned

Phase I - December 2005  
Phase II - November 2008  
Phase III - May 2009

### Services Provided

Feasibility Study  
Conceptual Design  
Boiler Selection Turbine Selection  
Mechanical Design  
Civil Design  
Electrical and C&I Design  
Project Management  
Construction Supervision





# Hydroelectric Power Station Co. Wicklow, Ireland.

Dublin City Council awarded the project management of a small hydro project to Fingleton White in December 2003.

The project is located at the Vartry Water Treatment works in Roundwood, Co. Wicklow. Due to the elevation difference between the Lower Vartry Reservoir and the waterworks, a water turbine was installed to recover some of the energy that would otherwise have been dissipated across a throttling valve.

The water turbine is located between the existing Valve-House and the Stilling Basin and captures some of the energy contained in the outflow water from the Lower Vartry Reservoir as it is being piped by an existing 33" pipe to the Stilling Basin in the water treatment works. The water at this point is not potable as it has not yet reached the treatment plant.



The turbine selected utilises water lubricated bearings to remove the risk of oil / grease contamination of the water. The waterworks at Vartry are of major importance and will at all times take precedence over the turbine operations. A bypass was installed to ensure that water is available to the treatment works at all times. The water turbine operates in parallel with the existing ESB supplies to the waterworks.



All electricity generated by the water turbine is used on site. The design, construction and operation of the Vartry Small Hydro project complies with the local government planning development acts and with all requirements of the health and safety authority.



## Vartry Hydro



Comhairle Cathrach  
Bhaile Átha Cliath  
Dublin City Council

### Scope

Pressure Reduction Hydro Generation. 90kW Turbine Generator to utilise the level difference between the storage lake and the treatment works

### Client

Dublin City Council

### Commissioned

2007

### Services Provided

- Conceptual Design
- Budget Estimate
- Detailed Design
- Material Procurement
- Planning and Statutory Approvals
- Placement of scheme to public tender



# Hydro Scheme in Co. Donegal

Cragh Gorm is made up of three hydro power stations purchased in 2014. Fingleton White are responsible for the day to day operations and performance improvements.



Lowerymore is a "low head project". The Gross head is 18.5m. The pipeline is approx. 175m long by 1.4m diameter made from polyethylene.

Fingleton White have reviewed the site and believe there can be a number of changes made that will impact reliability and output.

Installation details:

- Kaplan Turbine supplied by VA Tech Bouvier Hydro:  
495kW @3,000 l/s

Generator is Leroy Somer horizontal induction:  
600kVA, 750 rpm.

The upgrades work that are ongoing are:

- Redesign of automatic intake screen operation

- Redesign of fish pass in conjunction with the local fisheries.

- Increased water storage capacity.

- Implementation of a routine maintenance management system.



## Lowerymore Hydro



### Scope

Operation, Maintenance and performance improvement.

### Client

Coragh Gorm Ltd

### Commissioned

2000  
2015 Improvements

### Services Provided

Site evaluation  
Feasibility Study of existing project  
Upgrades & modifications design & implementation  
Day to day operations management





# Hydro Scheme in Co. Donegal

Croagh Gorm owns three hydro power schemes which were purchased in 2014. Fingleton White are responsible for the day to day operations and performance improvement.

The Barnesbridge Hydro scheme has a gross head of 61.5m. The pipeline is approx. 1.2km long x 750mm diameter. The higher sections of the pipeline are made from Polyethylene and the lower sections GRP (glass reinforced fibre).



Installation details:

The turbine is a Horizontal Francis type supplied by Ganz Energetics Ltd., 465kW @ 850 L/s

The generator provided by Cummins Stamford has a rating of 505kVA, 400V and 1,500rpm.

Fingleton White is responsible for the day to day operations of the hydro scheme and have identified scheme upgrades and proposed modifications works. These upgrades works are ongoing.



Project works:

- Redesign of the intake screens to reduce level of blockages and facilitate effective blockage cleaning
- Increased water storage capacity and regulation to maximise day operations
- Pipeline structural evaluation
- Implementation of a routine maintenance management system



## Barnesbridge Hydro



### Scope

Operation, Maintenance and performance improvement.

### Client

Croagh Gorm

### Commissioned

2000, Improvements  
2015

### Services Provided

Site evaluation  
Feasibility Study of existing project  
Upgrades & modifications design & implementation  
Day to day operations & management



# Hydro Scheme in Co. Donegal

Croagh Gorm owns three hydro power schemes which were purchased in 2014. Fingleton White are responsible for the day to day operations and performance improvement.

Doorian hydro scheme was commissioned in 2000 and has a gross head of 105m. The pipeline is approx. 995m long x 500mm diameter. The upper sections of the pipeline are comprised of polyethylene pipe and the lower ductile iron pipe.

Installation details:

- The turbine is a Pelton type supplied by Canyon Industries Inc., 344kW @ 380 L/s
- The generator is supplied by Cummins Stamford and rated for 450kVA, 400V and 1,500rpm.
- The gearbox is supplied by Flender with an input speed of 535rpm and a output speed of 1500rpm



Fingleton White is responsible for the day to day operations of the hydro scheme. In addition Fingleton White have identified scheme upgrades and proposed modifications works. These upgrades works are on-going.

Project works:

- Increased water storage capacity and regulation to maximise daytime power output
- Extension of current rainfall catchment area
- Implementation of a routine maintenance management system



## Doorian Hydro



### Scope

Operation, Maintenance and performance improvement.

### Client

Croagh Gorm

### Commissioned

2000, Improvements  
2015

### Services Provided

Site evaluation  
Feasibility Study of existing project  
Upgrades & modifications design & implementation  
Day to day operations & management

