Crowlands Wind Farm

Project construction information and update

PacificHydro

About the Project

Crowlands wind farm is a renewable energy project currently under construction. Located in Western Victoria's Pyrenees Shire Council, 25km north- east of Ararat (205km west of Melbourne).

The project site was chosen because it has strong, consistent winds; proximity and access to the electricity grid; and compatible existing land uses.

Pacific Hydro's Challicum Hills Wind Farm is located 40km to the south, which was the biggest wind farm in Australia when completed in 2003.

After a long period of consultation with the local community that began in 2004, the Crowlands Wind Farm project was granted planning approval in August 2010. Following pre-construction assessments, consultations and reviews, the layout (where the turbines, access tracks, and power cables will go) for the project has been refined and subsequently reduced. Development approval to construct and operate a wind energy facility at Crowlands was granted to Pacific Hydro in 2013.

The Crowlands Wind Farm project will now consist of 39 turbines that will produce clean energy equivalent to the yearly needs of around 50,000 Victorian homes. The wind turbines installed in the project will convert the energy in moving air into electricity, supplying it to the National Electricity Market.

The development of the Crowlands wind farm project will seek to reduce greenhouse gas emissions by proposing a renewable energy source for the local and surrounding community, whilst assisting in reaching greenhouse gas reduction targets in Victoria and contributing to the Renewable Energy Target.

Local Benefits

Pacific Hydro has a strong track record of delivering lasting benefits to the local communities in which our projects are located. The project will deliver a boost to the local economy with local construction jobs; local suppliers and contractors will also be engaged for the construction and delivery of the project wherever possible. From equipment hire to bakeries, a range of other local businesses will also receive a boost.

The project will help to maintain and further grow local capabilities in renewable energy project construction, diversify skills, and contribute to the prosperity of the local economy.

Number of Turbines	39
Wind Turbine Generator Model	Senvion MM92 2.05MW
Total Project Installed Capacity	79.95MW
Maximum Hub Height	100 metres
Maximum Tip Height	146.5 metres
Pollution abatement (per year)	204,800 tonnes (approx)

Wind Turbines

Overview

Wind turbine blades are designed like aeroplane wings – air moving over the surface of the blade causes a difference in pressure, which causes the rotor (hub and blades) to turn. This rotation is transferred through a driveshaft system which then drives an electrical generator, housed in the nacelle.

The wind turbines installed at Pacific Hydro's wind farms are 'smart machines' that are able to operate without human intervention. Each wind turbine uses its own internal computer system to monitor the direction and speed of the wind, with electricity production commencing automatically when the conditions are right and the wind is over a certain speed.

The amount of electricity produced continues to increase with the wind speed, until the wind generators reach their maximum or 'rated' capacity. The turbines that will be installed at Crowlands (the Senvion MM92 model) can generate up to 2.05 Megawatts each. If the wind is too strong or extreme (such as in a gale or a storm), the wind turbines are programmed to automatically shut down to avoid being damaged.

Technical Descriptors

Understanding the elements of a turbine

Blades
The turbines at Crowlands will have three blades, and are made of glass fibre reinforced plastic.

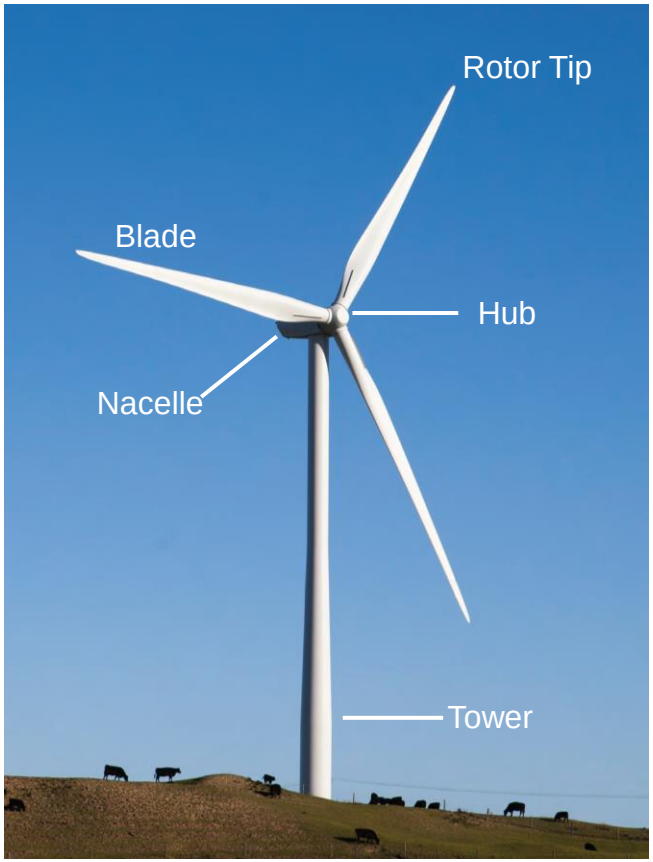
Generator
This generates electricity when it turns. The current is then sent down through the tower in large electricity cables.

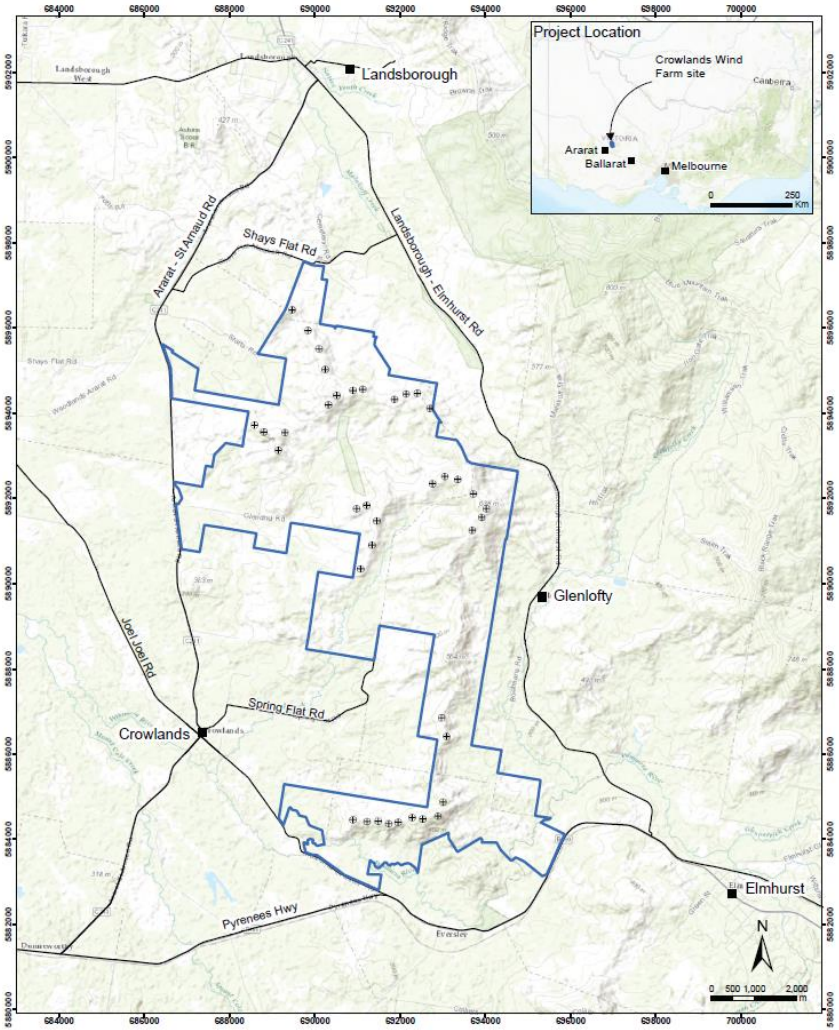
Nacelle
The rotor attaches to the nacelle, which sits on top of the tower and includes the gear box, generator, and brake.

Rotor
The blades and the hub together are called the rotor. The rotor is bolted on to the big main drive shaft, which connects to the generator.

Tower
It's a lot more windy high up in the sky, so taller towers mean turbines can capture more energy and generate more electricity. Wind turbine towers are made from steel.

Hub
The hub is the part of a turbine into which all 3 blades are bolted.





Wind Turbine
(Shows location only – not drawn to scale.
Layout date 17/05/17)

Site Boundary

Town / location

PROJECT: Crowlands Wind Farm, Victoria, Australia		COORDINATE SYSTEM: MGA94 (54S)
TITLE: Project Overview		SCALE: 1:100,000 A4
FOR EXTERNAL DISTRIBUTION		DATE: 01/11/17
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Planning and development

Wind Energy

Wind is one of the oldest sources of power harnessed by humans, and a clean, efficient way to generate electricity from a renewable energy source.

Australia has some of the best wind resources in the world, including many sites in Victoria both along the southern coastline and in select inland areas such as Crowlands.

Energy from the wind is harnessed by a ‘wind turbine generator’, which is another name for the tower, blades, nacelle, and other parts taken together. This large mechanical device ‘harvests’ some of the energy in the wind, and converts it into electricity, which is then fed into the electricity grid.

Planning and development

Development

A wind farm is a big project that requires several different specialists to handle all of the aspects, including planning, technical, environmental, cultural heritage, and community engagement staff.

When a a potential site is found, we engage with the local community to build support for the project, and with landholders to secure their agreement to host the wind farm.

More detailed environmental planning and surveying is also conducted. This enables a greater understanding the project in relation to the environment and ocal community, and how any potential impacts can be mitigated or avoided.

Wind resources

Weather and wind monitoring equipment is installed, on a “met mast”. This gathers data about the specific profile of the wind at the site, which helps with weather predicting and electricity generation forecasts.

When selecting a potential site, a range of environmental, social, and technical factors must be considered.

Wind turbines are best placed at a site with a good, steady, and strong wind resource all year round; ideally in a place with powerlines nearby.

Construction

Early works

After the site sheds and office have been established, the construction team and equipment is mobilised on site. Civil works (earthmoving) will normally be conducted first, including establishing access tracks, hardstands next to the turbines, trenches for cables, electrical design and cable installation, and preparing for the concrete foundations.

Wind Turbine Bases

The foundations for each wind turbine are large steel-reinforced concrete bases, weighing many hundreds of tons.

Pouring of these bases involves many truck deliveries of concrete to site. Concrete truck movements are usually completed by the mid-afternoon and are coordinated to avoid impacts on local traffic wherever possible.

Given the size of each foundation, temperature and weather conditions on any particular day may affect the time taken for the concrete to cure. Workers may need to stay on site and apply large material covers to the fresh pour to ensure that the concrete cures in a stable and even manner. Once the pouring process has commenced, it cannot be interrupted.

Construction

Delivering components

Blade and turbine components are delivered to site by road. Many of these components are large, and may travel in delivery runs with escort vehicles and up to three trucks.

Large ‘over-dimensional’ movements are escorted by a Pilot vehicle, which drives ahead of the load to warn oncoming traffic of the large vehicle. These large movements are often only able to travel at night and via approved roads.

The crane to assemble and install all of these parts must also be brought in by road.

To meet VicRoads requirements, some deliveries occur outside standard construction hours, including the early hours of the morning. Deliveries are also managed to avoid interference with the passage of school buses, and allow safe management of livestock in coordination with local farmers.

The turbine components are stored on the hardstand areas next to where they will be installed.

Delivering components

Assembling a wind turbine

Assembly takes several steps.

First, the tower sections are lifted and attached to each other. The towers used at Crowlands will have up to four sections.

Then the nacelle (where the electrical generator is located) is lifted and fitted to the top of the tower.

The blades and hub are then assembled (together, called the rotor), which is then lifted into place and fixed to the front of the nacelle.

The duration of each lift depends on the weather conditions at the time and can be quite a challenge. While conditions may be still on the ground, it can be windy 100 metres up at the ‘hub’ height.

For technical, logistical, and safety reasons we seek to take advantage of any calm weather periods, so some works out of standard construction hours may be required.

By using these calmer weather conditions, we hope to complete construction sooner.

Construction Update

Construction progress

Most of the civil works to establish roads and hardstands are now complete. Eight concrete foundations are now complete. These have been constructed using concrete from the on-site batching plant, and quarry products sourced from local suppliers. Each foundation used over 750 tonnes of concrete, which is more than 50 truckloads.

The first turbine foundation being poured
The majority of these concrete truck movements will use the internal access tracks on site; however, later this year some movements may use public main roads to access the turbines in the southern section (access via Pyrenees Highway).

Construction Update

Spring Flat Road

Please be aware that Spring Flat Road may see short-term closures of a few hours at a time, during July and August. This is to enable delivery of large components connected with the establishment of the electrical substation. Advance notice will be provided to residents along this road prior to these movements.

These vehicles will move very slowly and it may not be possible to pass the convoy as it travels along Spring Flat Road.

Movement of Large Components

In the coming weeks, major components (blades, hubs, and nacelles) will begin to arrive at the Port of Portland. This will be a major milestone for the project.

Between now and the end of this year, there will be some large “over-dimensional” truck movements on local roads accompanied by escort vehicles to deliver these components. Some short delays may be expected as these vehicles travel to the project site.

We will endeavour to provide notice of these movements to the community in advance – particularly if they will require short-term road closures – and are working to minimise any local impacts by scheduling these movements to less busy times.

The first of the turbine blades and a hub arrive at the Port of Portland