

# ACCIONA Energía

offering world class energy solutions

- ACCIONA Energía is a major player in the renewable energy market with over 30 years' experience in the sector
- ACCIONA Energía has a presence in 20 countries on five continents
- Working exclusively with renewable technologies, specifically across Wind, Solar PV, Solar Thermal, Hydro and Biomass
- ACCIONA Energía has constructed four wind farms and a 20 MW solar farm in Australia
- Construction of a fifth wind farm is underway in Mortlake South
- Once operational, this will bring ACCIONA Energía total capacity to up to 590 MW, which is enough clean energy to power 422,000 homes
- ACCIONA Energía will be building an additional 1,026 MW wind farm in Queensland with construction commencing in 2022



With over 30 years of experience in the field of renewable energy, ACCIONA Energía provides reliable and efficient solutions leveraging cutting-edge technologies. In Australia, ACCIONA Energía develops, constructs, owns and operates wind farms and locally we have delivered four wind farms and a 20 MW solar farm. Through the projects the company owns, ACCIONA Energía currently generates enough clean energy to power 280,000 households. Construction of ACCIONA Energía's fifth wind farm is almost complete and building of our sixth wind farm will commence in 2022, which will be our biggest project yet, a 1,026 MW wind farm in Queensland.

The company works exclusively with renewable technologies, specifically across wind, solar PV, solar thermal, hydro and biomass. ACCIONA Energía has 11 GW capacity in operation and under construction globally and has nearly installed 2,000MW for third parties.

## Wind Farm FAQ's

### HOW SUSTAINABLE IS WIND ENERGY?

The carbon payback period for the wind turbines at Mt Gellibrand was less than 11 months. This takes into account extraction and manufacturing of raw materials, production of the turbines, their transport, erection, operation, maintenance, dismantling and disposal, and the same for their foundation and the transmission grid. Not long! And, as turbine technology advances and turbine generation capacity increases, the payback period decreases even further (which means our Mortlake and MacIntyre wind farm payback period will be even lower)

Presence in more than 60 countries

Over 100 years of experience



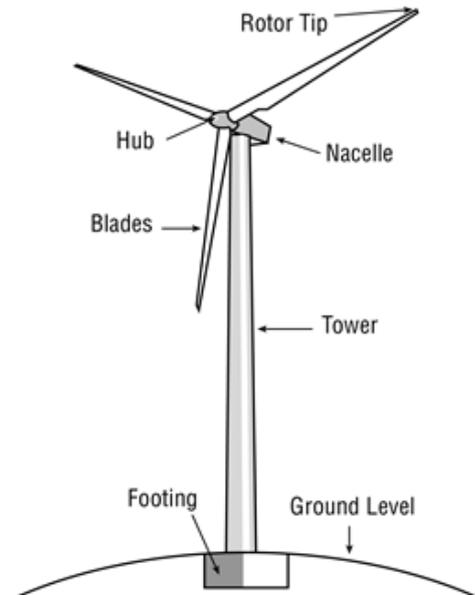
# Wind Farm FAQ's

## WIND FARM CONSTRUCTION

The time it takes to build a wind farm depends on the size of the project and weather conditions, but typically the average construction time is between 12 – 24 months;

Major construction elements include;

- **Building Access Roads:** Each wind farm site starts with building access roads for the transportation of equipment and the connection routes between the turbines. Following construction, the access roads are used for ongoing maintenance activities.
- **Preparing Foundations:** Concrete foundations are built to safely secure the wind turbines. Foundations consist of concrete, reinforced steel and bolts.
- **Assembling the Towers:** Wind Turbines are composed of a tower, a 3-blade rotor and a nacelle (which houses the gears, generators and electrical conversion equipment). Once the foundation is built, the towers will be erected in sections by a large crane and bolted into position. The nacelle is then lifted and fixed to the tower. The hub and blades are then individually attached.
- **Connecting the Turbines:** An underground electrical collection system will be installed to connect each wind turbine to an onsite substation. An overhead transmission line will connect the on-site substation to the transmission network.
- **Operations and Maintenance Building:** An Operations and Maintenance building will be constructed as a base to monitor performance on site and store spare parts for ongoing maintenance.
- **Commissioning and Operation:** Once all the turbines are fully operational, the construction phase is deemed complete and commissioned and the wind farm will then enter the operational and maintenance phase.



## HOW DOES A WIND TURBINE WORK?

Wind turbines convert the energy of the wind into electricity. Wind turns the blades which spin a shaft connected to a generator, producing electricity. This electricity travels through a transformer and into the local electricity network.

Wind turbines generally start to turn at wind speeds of three metres per second (10 km/hr). Most turbines reach maximum power output at a wind speed of around 10 metres per second (36 km/hr).

The rotor turns the blades at approximately 9 to 15 revolutions per minute at a maximum tip speed of 230km/h.

The blades of a wind turbine generally turn in a clockwise direction, and turbine rotation is maintained at a constant speed as the wind blows.

The generating unit (nacelle) contains a generator, transmission system and power transforming equipment. The nacelle is designed so that it can rotate around the shaft to face into the wind, allowing the turbine to produce electricity regardless of wind direction.

## HOW MUCH ELECTRICITY CAN A TURBINE PRODUCE?

Over the years as technology has improved, the generation capacity of turbines has increased. Modern wind turbines are capable of generating 4-5.5 megawatts of electrical energy at full power.

A single 5.5 megawatt turbine provides sufficient electricity to power around 3,500 homes and save over 15,000 tonnes of greenhouse gas emissions per year.

## HOW DOES THE ENERGY GET TO THE POWER GRID FOR USE IN HOMES AND BUSINESSES?

Once electricity is generated by a wind turbine, it travels via an underground, cabled network from the base of every turbine to collector stations. Collector substations convert the electricity from 33kV to typically 220 – 330kV.

The electricity then travels over high voltage powerlines before connecting to the National Power Grid.