Wind Farms Frequently Asked Questions

This guide provides general information about how Tilt Renewables develops, builds and operates wind farms.

About Tilt Renewables

Tilt Renewables is an Australian owner, operator and developer of renewable energy and storage projects in Australia, for Australians. It is one of Australia's largest owners of wind and solar generation in Australia.

We strive to be the leading investor in, and owner of, large-scale renewable generation in Australia and, in doing so, to support Australia's transition to a clean energy economy. We bring decades of experience with a demonstrated commitment to the communities where we operate, to ensure we continue to support regional Australia's prosperity through the energy transition.

We currently have nine operating assets, including seven wind farms across Queensland, New South Wales, Victoria and South Australia. We have a further seven projects in development and construction.

While our team of around 100 people is headquartered in Melbourne, you will find many of us out in the locations where our projects are proposed or operating, as we continue to build on our role as an active member of the communities and regions where we operate.

Wind energy

Wind farms generate electricity from the naturally occurring power of the wind. Wind is an inexhaustible resource that is clean, reliable and affordable. Wind power is the cheapest source of large-scale renewable energy.

Turbines capture wind energy within the area swept by their blades. The spinning blades drive an electrical generator that produces electricity.

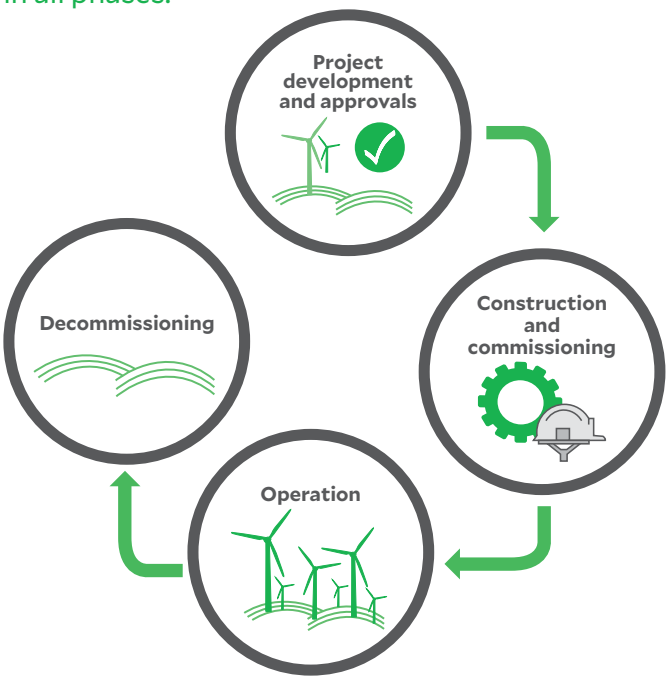
Most Australian states and territories are transitioning from traditional, emissions-intensive forms of energy generation to new, diverse renewable sources – including wind.

In 2020, renewable energy was responsible for 27.7 per cent of Australia's total electricity generation, the first time that more than a quarter of the country's energy came from renewable sources. This is more than enough to power every Australian household.

Wind continues to be Australia's leading source of clean energy, accounting for 35.9 per cent of renewable generation in 2020 and almost 10 per cent of total generation.[1]

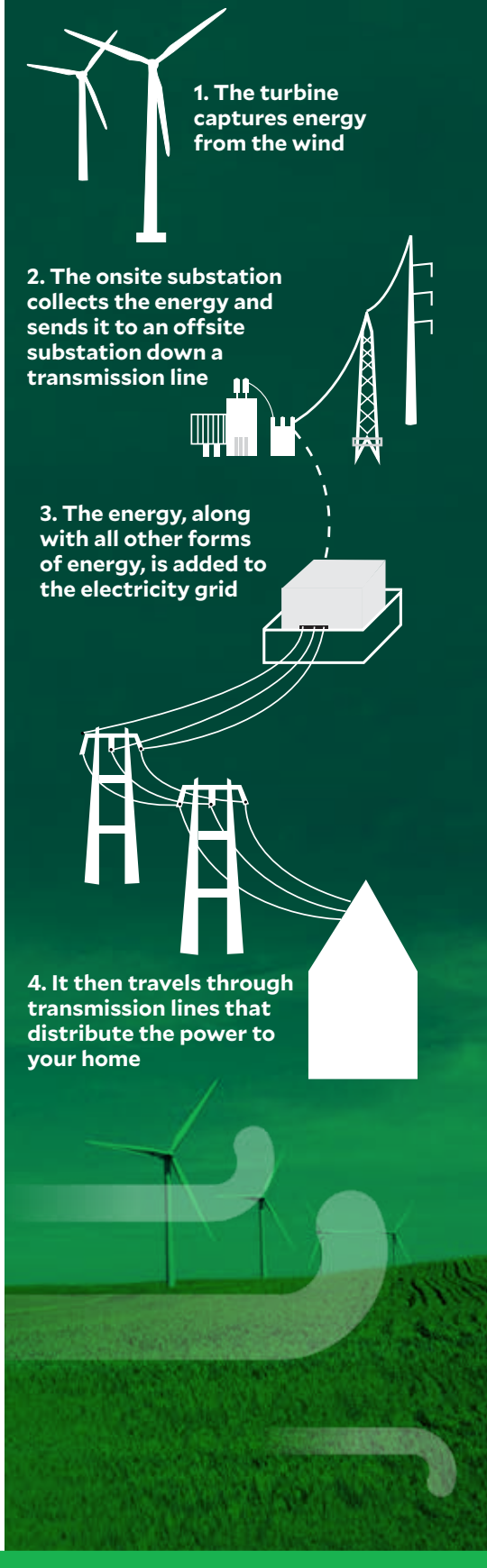
Wind farm lifecycle

There are four key phases in a wind farm's lifecycle. As a developer, owner and operator, Tilt Renewables is involved in all phases.



[1]Source: Clean Energy Council Australia Report: https://www.cleanenergycouncil.org.au/resources/resources-hub/clean-energy-australia-report

How wind energy works



Project development and approvals

From finding the right location to obtaining approvals and finalising a design – a lot of work goes into developing a wind farm. This can take a number of years.

Key activities in wind farm development include:

- wind monitoring
- energy modelling
- feasibility studies
- grid connection impact study
- site investigations
- consultation with government, communities and industry
- establishing agreements with landowners
- planning and environmental studies and approvals
- design of wind farm and ancillary infrastructure
- design of road upgrades
- transport route planning
- investment decision and raising equity to fund the project
- procurement of contractors and turbines

What's involved in designing a wind farm?

Designs are developed iteratively and refined over time as more information becomes available, such as from site investigations and confirmation of planning requirements.

We look at a wide range of technical, community and environmental considerations, including:

- local topography
- geotechnical (ground) conditions
- proximity and connectivity to the grid
- safety
- relevant standards, guidelines and legislation
- stakeholder and community feedback
- constructability – whether the design is practical to build
- connections to local roads
- transport routes and access to the site
- potential environmental and heritage impacts
- operations and maintenance requirements
- ongoing productivity of the land
- project cost and value for money

What planning and environmental approval process is used for a wind farm project?

Depending on the wind farm size and location, local, state and/or federal government approvals may be required.

What environmental studies do you undertake to ensure impacts are identified and avoided or minimised?

Environmental studies are undertaken by independent experts to identify possible project impacts. We use these studies to inform decisions about design, planning and construction management.

Studies typically undertaken for a wind farm project include:

- aviation
- electromagnetic interference (EMI)
- shadow flicker
- traffic and transport
- noise
- biodiversity
- heritage
- landscape and visual

Construction and commissioning

Major project construction can be disruptive at times. At Tilt Renewables, we work closely with our contractors, neighbours, local councils and communities to plan and manage construction responsibly. Depending on the size of the wind farm and weather conditions, construction can take several years.

We are committed to reducing construction impacts on communities and the environment, and keeping people safe while we work. Some of the ways we do this include:

- working during standard construction hours wherever possible
- scheduling disruptive or noisy work at times when it will have the least impact
- monitoring and actively managing construction activities
- using well-maintained equipment and facility
- meeting requirements set out in planning conditions, legislation, industry standards and guidelines
- regular communication with neighbours and the community
- listening to feedback about how impacts could be minimised
- a strong safety culture and clear procedures

How long does it take to build a wind farm?

Depending on the size of the wind farm and weather conditions, construction can take up to around three years.

How do you make sure construction is undertaken responsibly?

There are a range of requirements, standards and guidelines in place to ensure construction is well planned and effectively managed. Requirements are set by government authorities, developed as part of the planning process and built into the construction contract that Tilt Renewables has with the construction contractor.

Management plans are developed to ensure all requirements are understood and addressed.

A Construction Management Plan (CMP) provides a 'guidebook' for workers on site. It sets out the approach to managing all aspects of construction including working hours, safety and security, water and dust management, noise and vibration controls and traffic.

Other environmental management plans (e.g.an Environment Management Plan (EMP), Biodiversity Management Plan (BMP) etc) identifies potential impacts and the strategies and plans in place to manage impacts and meet requirements. It ensures that appropriate environmental management practices are followed.

We also listen to feedback and suggestions for how local impacts could be managed and minimised during construction. Input from communities and other stakeholders during a project's development can help inform construction and environmental requirements and mitigation measures.

What should I expect during construction?

Traffic and roads

Wind farm construction generates a lot of traffic when materials, machinery and turbines are being delivered to site. A Traffic Management Plan (TMP) is developed in consultation with road authorities to ensure that construction traffic is appropriately managed and uses approved roads only.

We use major highways and main roads where possible and local roads where necessary to access the construction site. Local roads may be upgraded before works begin so they are fit to carry trucks and oversize vehicles.

We work closely with our contractors to plan deliveries, coordinate with other road users and provide advance notice of any disruption. Oversize items are often moved at night to reduce traffic disruption.

Working hours

The Environment Protection Agency (EPA) in each state recommends standard construction hours. This is generally around 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays. On occasions when we need to work outside these standard hours, we provide as much advance notice as possible and put measures in place to minimise disruption.

Noise

Construction noise targets are set out in project planning approvals and guided by state or territory legislation.

If construction activities on one of our projects is expected to exceed the noise targets at any time, we put mitigation measures in place to limit the impact on local residents as much as possible. This may include scheduling works so that noisier activities occur at times when they will have the least impact.

Using well maintained equipment and machinery, minimising noise from vehicle reversing beepers, turning off machinery that is not in use and putting speed limits in place to minimise engine noise, are some other measures used to reduce noise from our sites.

Dust

The most common way to keep dust down during construction is by spraying water. Water trucks are used to wet down work areas and unsealed roads.

Social and economic

During construction, you may find more people and vehicles around town and on the road. Temporary accommodation such as motels and pubs may be fuller than normal. We work with local communities, councils and our contractors to reduce any inconvenience this causes and to ensure local towns get an economic boost through spending on accommodation, food and local goods and services.

Safety

Safety is our first priority. We work closely with our construction contractors and Health and Safety Management Plans are developed to drive safe construction practices and ensure that potential risks are identified, mitigated and communicated to workers. All staff and contractors undertake mandatory training in safety and emergency procedures before starting work on site.

Construction and commissioning – step by step

1. Site preparation

On the wind farm site, access tracks are built to connect turbine sites to internal and external access roads and supporting infrastructure to allow the delivery of components and servicing during the life of the wind farm.

Offsite, some local roads, highways or intersections may need to be upgraded for use by construction vehicles. Some wind farms also have an onsite quarry, concrete batching plant or other temporary construction facilities which are set up at the start of construction to supply the project. Environmental protection measures are put in place prior to construction.

2. Turbine foundations

A foundation is built to provide a secure footing for each wind turbine. On average, these are around 20 metres across and three metres deep. A temporary crane pad and assembly area, called a hardstand, are also constructed next to each foundation.

3. Turbine assembly

A wind turbine consists of a tower, a hub, three blades and a nacelle (the box housing the generator). These parts are delivered separately, laid out in the assembly area, then lifted into place by a crane. Each turbine takes around three or four days to erect.

4. Supporting infrastructure

Supporting infrastructure such as substations, monitoring masts, operations buildings and transmission lines are built to allow the wind farm to operate and export electricity to the national grid.

5. Electrical connections

Underground electrical and fibre optic cables are installed to connect the wind turbines and carry electricity and control data to the substation. Overhead transmission lines are constructed to connect the wind farm substation to the grid.

6. Commissioning

After all supporting infrastructure has been built and tested, wind turbines are commissioned individually to start supplying electricity. Temporary infrastructure including construction buildings and construction access tracks are removed and the ground is rehabilitated.

How much water is required during construction and operations and where does it generally come from?

Water supply as a key matter of consideration on any major infrastructure project. Australia has a scarce water supply, and our environment, farmers and economy depend on the sustainable and equitable sharing of this resource.

The construction of a wind farm, in comparison to many other infrastructure (including coal mining and coal-fired power plants) uses significantly less water during construction and operation. For a wind farm water usage is largely contained to the construction period including for dust suppression measures and concrete production. Water use during operations on a wind farm is largely limited to maintenance of access tracks on a regular or ad hoc basis depending on the site (compared to other infrastructure requiring significant ongoing water use during their operations).

Rainwater tanks are usually located on site to service the water needs of the operational and maintenance facility (e.g., toilets and kitchen facilities).

When developing our projects, we investigate various options in consultation with a hydrologist. These options could consider the extraction of groundwater under a water access license and/or trading of groundwater access rights from existing water access licenses. This process ensures we can adequately assess the potential source and to ensure the project will not have an adverse impact on local water supply. A detailed sourcing strategy is developed once we have a contractor on board and are progressing the project to construction.

We hold social licence to operate in high regard and therefore always look to implement a strategy with the least impact on local water supplies.

Operation

Wind farms have an operational life of around 30 years. A small team based on site or in the region undertakes regular maintenance and monitoring.

Will I be able to hear the turbines?

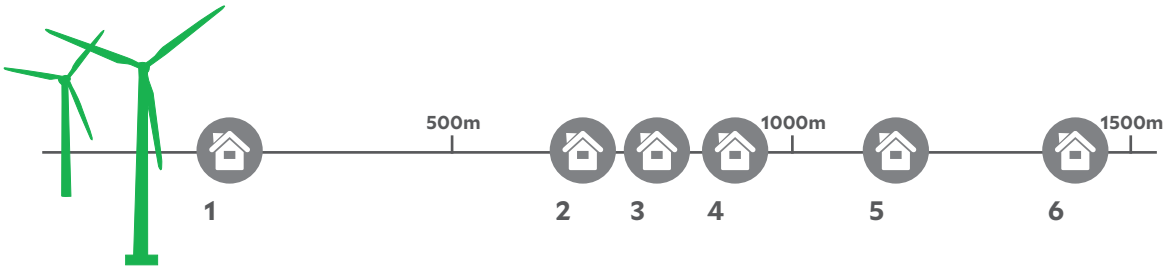
Like almost anything that moves – the ocean, tractors, cars, the wind itself – wind turbines do create sound. The sound they make can be described as a cyclic whooshing or swishing sound. In most cases, it is possible to carry on a conversation at the base of a wind turbine without having to raise your voice.

Noise can vary depending on the shape of the land, the position of the listener and the speed and direction of the wind.

Detailed noise studies are undertaken by specialist consultants who apply authorised environmental noise guidelines to measure noise levels during project development and post construction to ensure that noise will not negatively impact on local residents.

We are required to meet strict noise requirements which are put in place through the planning process. We also monitor noise to ensure we are meeting our requirements during operation of the wind farm.

The following figure is taken from the *NSW Planning and Environment Wind Energy Assessment Bulletin* and demonstrates the distance at which the NSW noise criteria are typically achieved by the operation of wind turbines. It also demonstrates that the criteria are some of the most stringent in the world when assessing the noise from wind farms.



KEY

1. Europe WHO Night Guidelines interim goal 55 dB(A)
2. UK night wind farm base criteria 43 dB(A)
3. Netherlands wind farm night time 41 dB(A)
4. Vic, SA, NZ, UK upper base, US (typical), Europe night 40 dB(A)
5. Denmark 37 - 44 dB(A)
6. NSW & UK lower daytime base 35 dB(A)

Figure 1. Conceptual diagram showing representative distances at which a range of noise objectives may be achieved[2] (modelled using ISO 9613.2 algorithm for 3 typical turbines directly upwind of receivers).

[2] Source: NSW Planning and Environment Wind Energy Assessment Bulletin

What about infrasound?

Numerous studies have been conducted into the level of infrasound produced by wind turbines. These studies confirm that the level of infrasound from wind turbines is no greater than the noise encountered from other natural and non-natural noise sources on a daily basis.

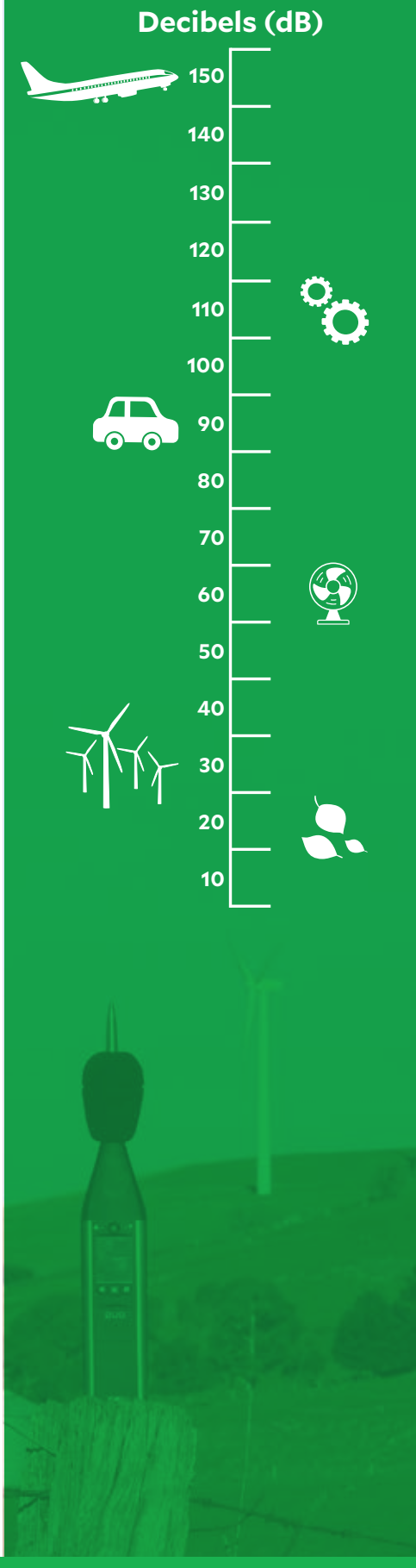
A study by the South Australian Environment Protection Authority into infrasound (Infrasound levels near wind farms and in other environments, January 2013) provided findings which were consistent with the studies conducted by consultants we use, including:

- the measured levels of infrasound from wind farms are well below the threshold of perception; and
- the measured infrasound levels around wind farms are no higher than levels measured at other locations where people live, work and sleep; and
- the characteristics of noise produced by wind farms are not unique and are common in everyday life.

Do turbines get quieter or noisier the taller they go?

An increase in blade tip height, power output and rotor diameter of contemporary turbines does not translate into an increase in noise output. Indeed, most contemporary turbines are quieter than their predecessors due to improvements in blade design and the more efficient conversion of wind power into electrical energy (as distinct to conversion into noise).

Ultimately, the final arrangement of turbines must remain below the applicable noise limits set by the relevant legislation and guidelines throughout the entire operational life of a project when assessed at each individual residence. The environmental noise assessment achieves this by considering the noise output of each turbine, the cumulative effect of multiple turbines, their location relative to residences and the topographical and meteorological conditions, to arrive at a layout which is compliant with the noise limits.



Will the electromagnetic interference (EMI) affect my TV reception?

All television broadcasts in Australia are now digital. Digital TV signals are generally much less susceptible to interference from wind farms than analogue signals, however, it is possible in areas of low signal strength.

Before construction, we study the existing television and radio reception strength in the area so that if a concern is raised, we can assess whether the wind farm is causing any issues.

We are happy to help any residents who experience TV reception issues after construction of the wind farm. There are solutions available to resolve any issues.

Do wind farms cause health problems?

The National Health and Medical Research Council (NHMRC) Statement: Evidence on Wind Farms and Human Health was released on 11 February 2015. The Statement provides advice to the community and to policy makers on this issue. After careful consideration and deliberation, NHMRC concludes that there is currently no consistent evidence that wind farms cause adverse health effects in humans.

What if there is no wind or extreme weather stops the turbines from spinning?

Our wind farms connect into the National Electricity Grid. This is an interconnected system that covers Queensland, New South Wales, Australian Capital Territory, Victoria, Tasmania and South Australia. The grid is supplied by electricity from a large number of geographically and technologically diverse generators.

The Australian Energy Market Operator (AEMO) manages the system to ensure that a mix of generators and storage technologies are available to meet demand. If the wind is not blowing at one wind farm, generators in other regions or using other technologies will be available to meet demand.

What if a wind turbine catches fire?

Fortunately, no bushfire has ever been started as a result of a wind turbine catching fire. The risk of fire at wind farms is very low due to:

- the location of turbines in relation to cleared construction pads which reduce available fuel load
- lightning protection devices are installed on every turbine, which in turn reduce ground strikes that might otherwise have started fires
- monitoring systems are installed in turbines to detect temperature increases and will automatically slow or shut down the turbine if the temperature or wind speed exceeds an assigned threshold
- any flammable elements are located high above the ground

Could wind farms make fighting a bushfire harder?

Wind farms are not considered to increase fire risk. In fact, in most cases wind farms benefit the community via their large access track network, which also act as fire breaks, additional personnel on site during construction and operation, additional water access points and tanks, and the fire mitigation measures required by the responsible authority. Wind farms are planned and constructed in consultation with the appropriate fire authorities.

Furthermore, wind farms are not considered to pose any hazards for fighting bushfires from the air as turbine coordinates are logged with airspace authorities. Pilots view turbines as no different to other tall structures and hazards such as power lines, transmission towers, radio masts, mountains and valleys. Wind farms are just another piece of infrastructure in the environment that need to be managed on a risk basis when fighting fires. Wind turbines are not expected to pose increased risks due to wind turbulence or moving blades.

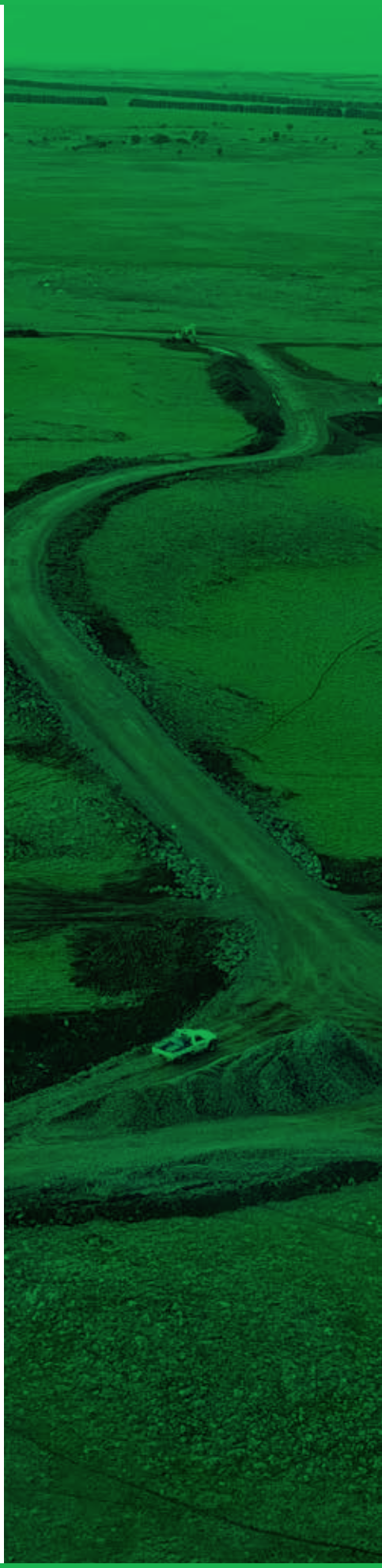
What is the carbon payback period for a wind farm, taking into account the energy and resources used for materials, manufacture and the construction of supporting infrastructure?

The carbon payback period is the length of time it takes a turbine to produce enough clean electricity to make up for the carbon pollution generated during manufacture. There are numerous studies that state that the payback time is between six to twelve months, which is not bad considering the typical 25-year lifespan of a wind turbine.

What does maximum output mean?

A maximum power rating generally indicates the maximum amount of power that can be safely sustained without resulting in failure. Manufacturers measure the maximum, or rated, capacity of their wind turbines to produce electric power in megawatts (MW). One MW is equivalent to one million watts.

The production of power over time is measured in megawatt-hours (MWh) or kilowatt-hours (kWh) of energy. A kilowatt is one thousand watts. Production of power at the rate of 1 MW for 1 hour equals 1 MWh of energy.



Decommissioning

When a wind farm reaches the end of its life the site can be decommissioned, restoring the impacted area to its original condition. The wind farm operator may look to work with government and landowners to repower or upgrade the equipment and continue operating.

What is involved in the decommissioning phase?

Decommissioning a wind farm involves:

- dismantling and removing the wind turbines
- removing related infrastructure, such as buildings and overhead power lines
- covering and revegetating roads and foundations.

Landowners can request that parts of the wind farm that continue to serve a purpose, such as buildings or access tracks, remain in place.

Repowering (or upgrading the equipment) usually requires new planning and environmental approvals and new agreements with landowners.

Who is responsible for decommissioning?

The wind farm owner is responsible for decommissioning. Requirements for decommissioning – such as reinstating the land – are set out in contracts with landowners and in planning approvals.

Decommissioning is accounted for during the wind farm's planning to ensure sufficient funding is available to cover the costs.

What happens to wind turbines at the end of their life / after decommissioning?

There is a handful of wind farms in Australia that will soon come to the end of their operating life, and while decommissioning is something that must be factored into every wind farm, what happens to the components once they've been taken out of the ground is critical to demonstrating best practice management.

It is widely understood that landfilling giant blades is an unacceptable end-of life solution, and the industry needs to develop processes that are in line with circular economy principles: cradle-to-cradle design, achieving 100% recyclability, designing out waste and using recycled inputs. Five main methods for recycling composite materials currently exist, including mechanical, thermal, oxidation, chemical and cement kiln route processes.

Turbine manufacturer, Vestas, has calculated the average recyclability across the components of a V126-3.3 MW wind turbine to be approximately 87.5%. For estimation purposes this breakdown is representative of the Vestas V126 3.6MW wind turbine generator models.[3]

Material breakdown of V126-3.3MW turbine only (%mass):

- Steel and iron materials (88%)
- Aluminium and alloys (1%)
- Copper and alloys (<1%)
- Polymer materials (4%)
- Carbon / glass composites (5%)
- Concrete (0%)
- Electronics / electrics (<1%)
- Fuels and fluids (<1%)
- Not specified (<0.2%)

All large metal components that are primarily single material (e.g. tower sections, cast iron frame in nacelle, etc.) are assumed to be 98% recycled, 2% landfilled. Other major components, such as generator, gearbox, cables and yaw system parts are 95% recycled, 5% landfilled.

[3] Source: **Vestas have done a detailed analysis in 2017:** https://www.vestas.com/~/media/vestas/about/sustainability/pdfs/v1123%2045mw_mk3a_iso_lca_final_31072017.pdf **and in 2006:** https://www.vestas.com/~/media/vestas/about/sustainability/pdfs/lca_v90_june_2006.ashx

Can blades be recycled?

Wind turbine blades are constructed from composite materials including glass fibre, carbon fibre, polyester and epoxy resins.

Current technologies for wind turbine generator blades require a complex recycling process for recovery due to their materials. The purpose is to separate the polymer (resin) and fibre composites. Once separated, the resins are usually used for energy production while the fibre composites can be reused or recycled. Currently, Germany has the world's only industrial-scale factory for reprocessing wind turbine blades. The blades are sawn and chopped into chunks then shredded and hammered into 5cm long fragments.

These are mixed with other wet waste material and used as fuel in a cement kiln.

Examples of how turbine blades could be recycled / repurposed include:

- sound barriers
- shredded fibreglass filling in cement production
- pedestrian bridges
- playground equipment
- geotechnical blocks for road strengthening
- use of resin to separate bonded composites to return materials' integrity for new applications

It is noted that the technology in wind turbine generator manufacture as well as in recycling processes evolves quickly and the market is expected to expand in Australia as wind farms reach the end of their life expectancy in coming years.

Wind turbines

Blades

Wind turbines typically have three blades which are connected to a central hub and rotate the direct drive generator. Each blade has its own automated pitch control system which adjusts the angle of the blade to optimise energy output and protect the turbine in a storm event.

Generator

There are two types of wind turbine generator technologies, direct drive and generator/gearbox combinations. The advantage of direct drive technology is that no gearbox is required. The generator's rotor is mounted on the outside of the generator and can be seen located between the hub and nacelle.

Nacelle

The nacelle is the housing at the top of the tower which contains the turbine's electrical, control and cooling equipment.

Towers

The tower of a wind turbine comes in a number of sections which are bolted together on site. The towers are tubular steel and are painted with a marine standard paint to protect the towers from the harsh weather conditions. The base tower is fixed to a reinforced concrete foundation which is designed to ensure the turbines can withstand very strong wind speeds and seismic events.

How fast do blades turn?

The blades (rotor) rotate at anything between 12 to 25 metres per second (cut out speed). An increasing number of machines operate at variable speed, where the rotor speed increases and decreases according to the wind speed.

How significantly is birdlife impacted by wind turbines?

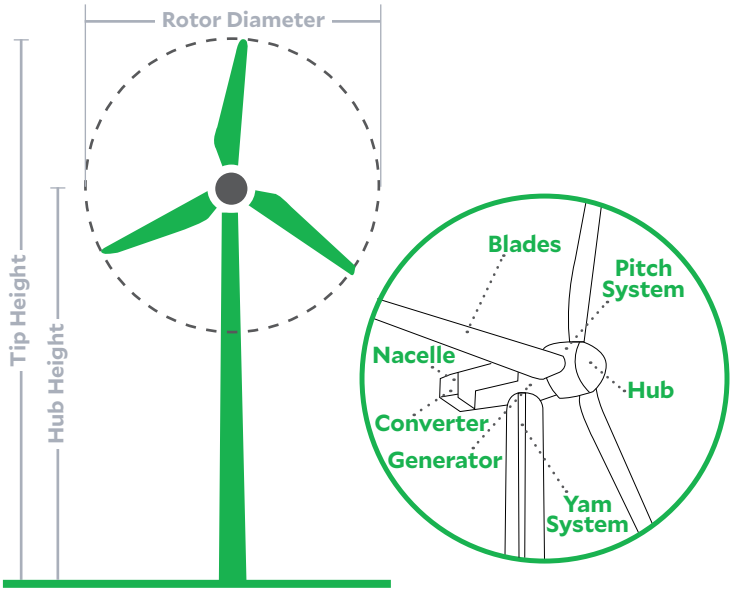
Environmental and nature conservation groups like Birdlife, WWF, Greenpeace, Friends of the Earth, and Birdlife support wind energy. Birdlife recently stated that climate change was the single largest threat to birds and renewables were a clear solution to mitigating the effects of anthropogenic climate change.

Wind farms are always subject to an Environmental Impact Assessment to ensure that their potential effect on the immediate surroundings, including fauna and flora, are carefully considered before construction is allowed to start. Deaths from birds flying into wind turbines represent only a fraction of those caused by other human-related sources such as vehicles and buildings.

During operations trained observation groups and detection dogs are used to find birds and bats near turbines. Bird carcasses from elsewhere are left and monitored at wind farms to see how quickly scavengers remove remains. The technique is used to develop an estimate of the impact of the turbines during the early phases of operation.

How much does a wind turbine cost?

These days a single wind turbine generator (WTG) costs approx. $7 million (for supply and install only). Cost increases as turbine size increases, though there are benefits to using fewer, larger turbines – complexity and construction of the overall farm site is greatly reduced with fewer and larger turbines.



Transmission lines

Transmission lines carry electricity from a wind farm to the electricity grid.

What influences the design of a transmission line?

There are many considerations which influence the design of a transmission line, including the size and location of the poles. Key factors include:

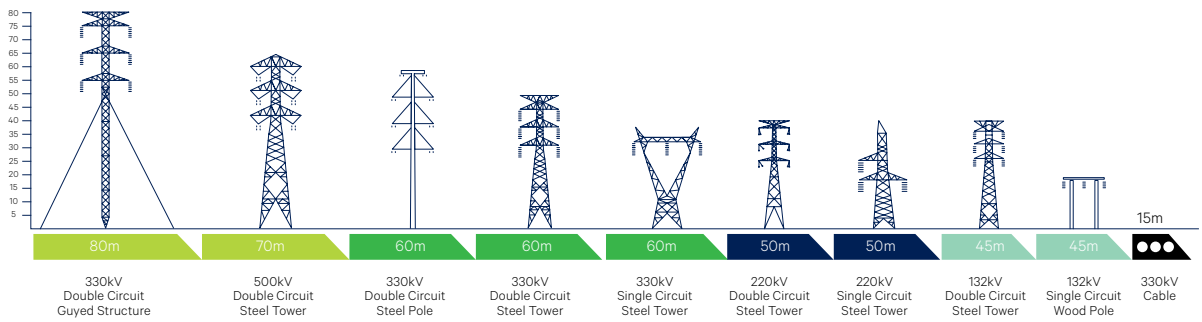
- voltage (e.g. 66kV, 132kV, 220kV), number of circuits, conductor (the wires) type/size, security level and design life requirements
- line length, spans between poles, changes in direction
- topography
- structural loads due to the weight, wind, earthquake risk, groundwater and other environmental factors
- electrical safety requirements
- communication and earthing requirements
- temperature limits and fluctuations
- existing infrastructure constraints
- land ownership and access (both public and private)
- native vegetation
- planning requirements
- areas of cultural heritage significance
- property configurations and dwelling locations
- road and traffic safety
- drainage
- fire safety

During the project development and approval phase, several transmission line routes may be investigated. This includes reviewing each option against potential environmental, planning, safety and social impacts, and consultation with landowners who could be affected by the routes.

What do the transmission towers and power poles look like?

There are different types of poles and towers on a wind farm site to connect the wind farm with the electricity grid. The type and size of the structure used depends on the powerline's voltage and the location of the wind farm in the electrical network.

Transmission towers are large steel structures used to carry high voltage power lines. Power poles are single steel-reinforced concrete poles used to carry lower voltage power lines.



Examples of transmission lines (source: TransGrid)

Can wind farm transmission lines go underground?

Underground transmission lines have a much larger construction footprint than overhead lines. Laying underground cables requires digging wide and deep trenches throughout the entire route, and still requires above-ground infrastructure. They also require much more significant excavation and truck movements during construction compared to overhead lines. This results in significantly more land disturbance, resulting in a much greater environmental, cultural heritage and land use impact, along with resulting in higher costs and a much less flexible alignment.

There are also several temperature and electrical performance, ongoing maintenance, fault identification and resolution issues associated with underground trenching. Most importantly, and different to the 33 kV underground cabling within a wind farm, if there is a fault along a 330 kV (or higher) underground line, the entire wind farm is unable to export electricity to the grid, which would cause significant disruption to consumers, whereas a fault internal to the wind farm on 33 kV lines would only affect that particular turbine cluster.

Furthermore, above ground lines can be easily accessed for maintenance.

Can more than one wind farm share the same transmission line?

Yes, they can however for this to happen there needs to be significant coordination between developers upfront. There are many commercial, technical and regulatory considerations that require both wind farm operators to be fully committed to construction of the projects at or around the same time to allow full coordination and agreement on the transmission line contractor, design, construction and operational contracts.

Who builds, owns and maintains the transmission lines?

Transmission Network Service Providers (e.g. AusNet Services in Victoria and TransGrid in New South Wales) are usually responsible for transmission lines. In some instances, the transmission lines can be privately owned and operated.

Can transmission lines pose a safety risk?

All transmission lines are designed to meet or exceed design and safety standards.

Bushfires from powerlines and other incidents causing the lines to fall are major concerns and critical risks for network operators. While these risks cannot be eliminated entirely, the powerlines are equipped with fast-acting protection systems designed to prevent injury to people, damage to property and grass or bush fire.

The transmission network service provider will apply electricity industry best practice to the maintenance of the transmission line (e.g. clearing vegetation under the transmission line) and ensure all electricity safety and bushfire mitigation regulations are met.

Once the transmission line is built, it will be managed in accordance with the relevant electricity safety standards.

Employment

Construction in the renewable energy sector creates hundreds of jobs on site and thousands of jobs in businesses that supply the project, directly or indirectly.

What kind of jobs do wind farms create during construction?

Construction and operation provides an economic boost for regional communities by increasing demand for local goods and services, such as accommodation, hotels, restaurants and cafes.

The types of jobs created during construction include:

- Domestic scale electricians
- Transport operators
- Competent machine operators
- General labourers
- Quarries
- Concrete suppliers
- Accommodation providers
- Local dairies, pubs, hotels, food service providers

Is there work for local people and businesses?

We are committed to employing local people and buying local wherever possible. We're always on the look out to build new working relationships in the industry and encourage you to register your services / business on our Goods & Services Register.

Tilt Renewables, as the owner of the wind farm project, will not typically be directly employing workers, this will be done by our delivery partners and contractors (and their sub-contractors).

You can contact them directly, or we are happy to pass details onto the appropriate delivery partner or contractor when appropriate.

How many jobs are created during operation?

This varies by the size and location of the wind farm. There is usually a small team based on site or in the region who are responsible for day-to-day management of the site and regular maintenance.

Working with communities

As the ultimate owner and operator of our development projects we have a long-term vision for every project and work hard to build strong relationships with residents, businesses and organisations.

What economic benefits can a wind farm create for the local community?

Local community benefits can include:

- boost to the local and regional economy and local businesses
- jobs during construction and operation
- training, skills development and education programs
- creation of community funds for local initiatives
- direct payments to landowners and neighbours
- provision of a drought-proof and post-retirement income stream for farmers

Do wind farms impact the value of land?

Several studies have been completed in recent years on property prices on land surrounding wind farms. These studies indicate that there is insufficient data to have a conclusive answer, though wind farms are unlikely to negatively impact on the value of surrounding land in an agricultural setting.

A 2016 Urbis study commissioned by the NSW Office of Environment and Heritage had similar findings and states that for rural properties used for primary production, there is no direct loss of productivity resulting from wind farms; therefore, they are unlikely to negatively impact the value of such properties. Likewise, a review of property resale analysis indicated that all of the properties examined demonstrated capital growth that aligned with the broader property market of the time.[4]

[4] Source: https://www.environment.nsw.gov.au/resources/communities/wind-farm-value-impacts-report.pdf

How do wind farms benefit the environment and community?

No greenhouse gas emissions during operation.

Renewable energy source – no mining, extraction or burning of fossil fuels required.

New jobs in construction, operation, and the manufacturing of turbine components.

Local community benefits can include an economic boost by increasing the demand for local goods and services, including accommodation, restaurants and food, labour, materials and transport and creation of community funds for local initiatives. New jobs in construction, operation, and the manufacturing of turbine components.

Limited environmental impacts from construction compared to traditional energy generation, with emissions generated from a turbine's manufacture, installation, operation, maintenance and decommissioning offset within the first year of operation. Additionally, much smaller development footprints are required and agricultural land can continue to operate business as usual.

How do you share benefits with local communities?

We are committed to being a positive contributor to the communities where we work and are proud of our record of providing support to communities that makes a real difference.

Through partnerships with councils and local groups, and consultation with the community, we develop benefit sharing programs that address important social, economic and environmental needs in the region. Some of our current benefit sharing programs include:

- training and skills development programs
- scholarships and other education programs
- community funds to support social and environmental initiatives
- conservation programs
- mental health and social inclusion programs
- employee volunteering
- neighbour benefit programs
- local jobs and procurement of local goods and services

How do you involve communities in planning for, and decisions about, the wind farm?

We are committed to positive engagement practices and ongoing engagement throughout all stages of a project's life – from site selection through to decommissioning.

We engage with local councils, landowners, neighbours and surrounding communities as early as possible, keeping people informed and involving people in decisions that they are able to influence.

We also encourage our community stakeholders to sign up to our project newsletters to make sure they stay up to date with projects as they progress.

How do I raise concerns or ideas about the wind farm?

Feedback is always welcome. If you have any concerns or local knowledge that could help, please get in contact. We have a dedicated 1800 number and dedicated project email addresses so you can get in touch with us anytime.

You can find our Complaints Handling Procedure on our website, or we can send you a copy on request.

How do you keep people informed about construction activities?

Depending on the wind farm location, community and community preferences, we use a range of different tools to keep people up to date. These include:

- website – dedicated project page
- meetings, phone calls, emails and/or letters to anyone directly affected
- regular newsletters
- construction updates – via email or text message
- fact sheets
- information displays in nearby towns – community noticeboards
- drop-in information sessions
- webinars
- presentations to community groups and organisations

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