



Community Session

Renewable energy | Victorian Context | Seymour Wind Project



Company with certified quality management system UNI EN ISO 9001:2015. certificates n. 501008849 and n. 501008850.

Acknowledgement of Country

Fera and Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work.

We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.



We are all in this together

There are many different views on climate change throughout the community.

Not many people disagree with sustainability and working to find sustainable energy solutions that are cheaper and reliable.

Across the world climate change is having a dramatic effect on the world's weather patterns and the number of extreme weather events is increasing exponentially.

Europe and the northern hemisphere experienced the hottest months the world has seen.

Temperatures in Europe exceeded 40 degs for weeks and hit the 50's in some areas.



International Action

UNESCO World Heritage Sites

Internationally governments are seeing the urgency for change.

Throughout **Europe** governments are mandating support for the application of renewable energy unitarily including world heritage sites.



High profile examples “**World Heritage Sites**” include the Vatican which now has 3500 solar panels mounted on the buildings and powering St Peters and wind energy is being pursued where there is wind resource can be connected with grid capacity.

International Action

The **Sierra Nevada** has wind is providing energy for the southern Spain region.

In Italy Fera has a strong presence having sensitively placed projects that are sympathetic with the landscape the company has built strong connections with each of the communities in which the projects are based.

In the **USA** the **EIA** is forecasting an additional **600GW** of wind, solar and battery projects across the USA by 2030.

The **Inflation Reduction Act** will see an estimated **\$1.2T** of investment this year and the return of the manufacturing industries to the USA.



International Action

China: in 2022, China spent \$1.5 Trillion on solar and wind and increased their percentage of energy derived from renewable energy from 26% to **52%** in one year. Coal fired generation has dropped below 20%. China also closed 40% of the countries coal fired power stations in 2022/23.

As countries make policy for energy and climate change, they are also imposing trade restrictions on produce for countries who continue to use carbon-based energy.

Australia's Federal, State and Local Governments all support the transition to low carbon energy and have climate policies.



Australia's transition to sustainable sourced energy

For Australia to move to carbon free energy we will need a combination of:

Solar large array
and rooftop



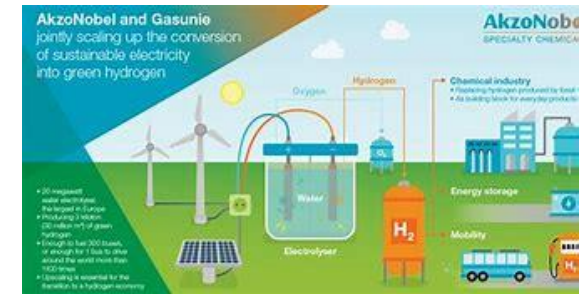
Wind (Offshore
and Onshore)



Pumped Hydro
and Batteries



Green Hydrogen.



Comparing the cost of Energy Production

Annual wholesale electricity prices fall by 59 per cent as households face surging power bills

New figures from the Australian Energy Market Operator (AEMO), which runs the national electricity market for the eastern states, show wholesale electricity prices fell to **\$108** per megawatt hour in the June quarter, compared to the **\$264** per megawatt hour average seen last year when the National Electricity Market was suspended.

The quarterly report also said renewable energy sources — specifically wind and solar — along with less volatile market conditions and improved generation ability had put [downward pressure on wholesale prices](#).

"The drivers of those changes in the prices are really threefold," Daniel Westerman, chief executive of AEMO, told RN Breakfast.

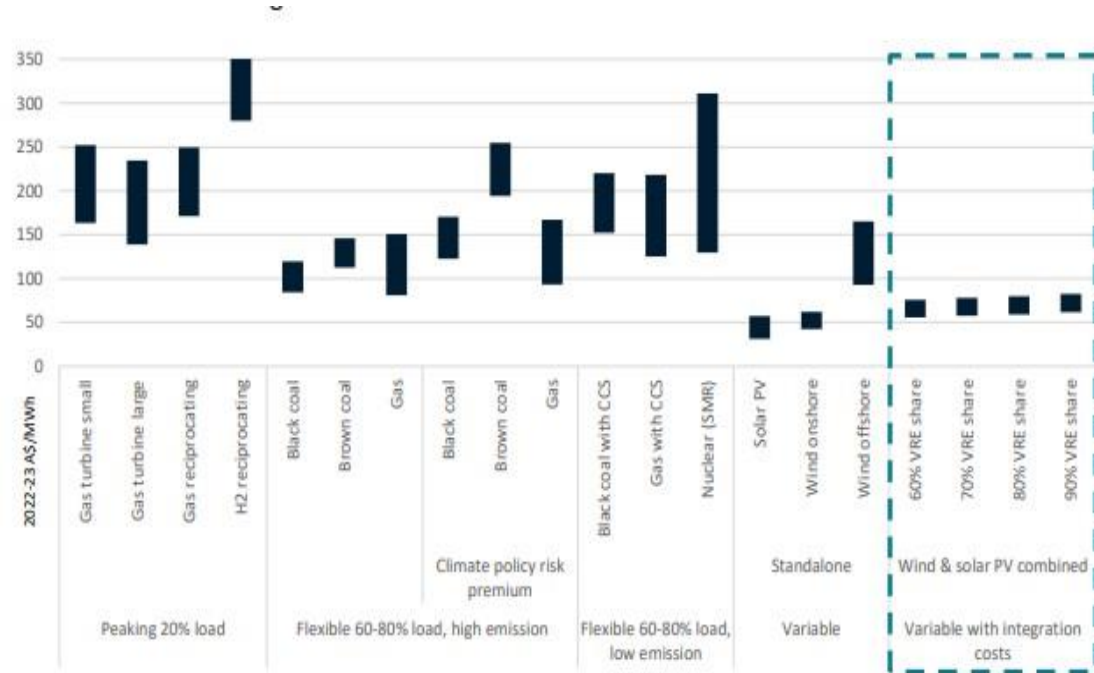
"The first is that coal-fired power stations, which still supply about 60 per cent of Australia's energy, are down because coal prices are down.

"The second thing is that we've had more coal plant availability, so it's been there when we need it.

"The third is that we've seen more and more renewables come into the system, and those renewables, as we know, really do push prices down."

Link to the article: [Annual wholesale electricity prices fall by 59 per cent as households face surging power bills - ABC News](#)

CSIRO's GenCost 2022-23 had the costs in a table in the reports Executive Summary



ES Figure 0-2 Calculated LCOE by technology and category for 2030

Link to the report: [CSIRO Research Publications Repository - GenCost 2022-23: Consultation draft](#)

Dramatic impact on weather and increased the frequency and severity of extreme events.

Fires in **Canada** have burnt more than 13,000,000 Ha this year.

There are still more than 350 fires burning across the western provinces of Canada.



Tornado's have hit **California** for the first time in 80 years causing major flooding with California's annual rainfall falling over 24 hours.



Australians urged to prepare for most significant bushfire season since black summer:

The Guardian, August 2023

Communities are being urged to prepare for what is likely to be the most significant bushfire season since the 2019-20 black summer fires.

Australia's longest-serving fire commissioner turned campaigner with the coalition Emergency Leaders for Climate Action, Greg Mullins, said the report reflects longer and more intense bushfire seasons due to global heating.



Health Impacts of burning fossil fuels

Air, Water pollution: According to the world health organisation 6 million people die each year because of pollution. By far the majority of global pollution is created by burning hydrocarbons. In 200 years, we have exhausted more than half of the world's hydrocarbon fuel resources.

Reduction in premature deaths (NSW CSIRO 2020 Study)

One of the deadliest pollutants from coal power stations is fine particulate matter, or PM2.5, which is known to increase the risk of heart attacks, strokes, cancer, and respiratory illnesses. ...

*... The study estimated long-term exposure to fine particle pollution caused **420** premature deaths in the state each year, attributing **45** of those to coal-fired power stations.*

--- Pollution not only causes deaths but also leads to poor health and quality of life outcomes, according to Sydney University environmental epidemiologist Geoff Morgan who was involved in the study.

"We estimated that air pollution is responsible for around 6,000 years of life lost," he said.

"Put another way, if taken as an average, it means everyone loses 50 days of life.

"And around 10 per cent of that could be attributed to the air pollution from the power stations."

Locally the Latrobe Valley coal power stations are responsible for significant health issues in east Gippsland.



Economic Impacts of Climate Change



The government could be spending three times as much responding to natural disasters, the report says. Source: AAP

Climate change to sink credit rating The Age, August 2023

Research paper “Rising Temperatures, Falling Ratings, The effect of Climate Change on Sovereign Creditworthiness.” Written by Matt Burke and Patrycja Klusac based on research from Oxford, Cambridge, Yale and East Anglia.

“Australia’s federal taxpayers and business would be among the worst affected by a credit rating downgrade caused by climate change. ...

... Australia will be amongst the 20 most hit nations...”

The researchers estimate that if the global temperatures increase is kept to 2 degrees the cost the government between US240M and US360M annually.

The impact on business is estimated at between US80M and US140M per year.

Tax changes, 'major disruptions', and an ageing Australia: Our future unpacked, SBS News August 2023

The sixth Intergenerational Report (IGR), released two years after the last one, warns of how an ageing population and sliding birth rate will hit the economy in 2063.

It also gives insight into climate change's devastating impact on the economy, why your taxes may need to change, and how our increasingly volatile region could alter the way we trade.

The impact of climate change is a key feature of this year's IGR, and it's grim reading.

"Floods, bushfires and other extreme weather events are expected to increase in frequency and severity, causing major disruptions to local economic activity and ultimately hindering overall economic output," it says.

The report outlines four key areas that will be particularly impacted by 2063 if temperatures rise above two degrees:

- Productivity, Agriculture, Tourism, Natural disaster spending

Government Policy and Subsidy

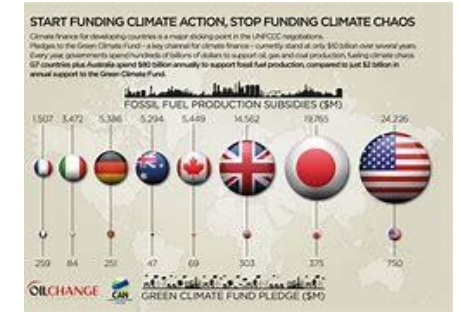
The subsidy for fossil fuels in Australia was \$11.6B in 2021 and increasing, wind projects in Australia typically are funded by private companies and do not receive any subsidy from the government.

Link re subsidies: [Australian fossil fuel subsidies surge to \\$11.6 billion in 2021-22 - The Australia Institute](#)

In the USA the government have introduced the Inflation Reduction act. This has seen a resurgence of US based manufacturing (a reversal of jobs and production going to Asia) and is accelerating the change from fossil fuel to renewable energy. In the USA and Australia, the last 30 years have seen jobs, especially in manufacturing move overseas. The USA are succeeded reversing this trend, they are moving the jobs back to the USA, even to the extent of car manufacturers from Asia setting up manufacturing plants in the USA.

Link re USA policy: [Inflation Reduction Act Guidebook | Clean Energy | The White House](#)

Whilst Australia has major deposits of lithium, nickel, cobalt ... all the minerals required for battery manufacture. The mining revenue is great, Australia is currently missing a big opportunity to manufacture the minerals into batteries benefiting from the value adding industry.



Government Policy and Subsidy

Accelerating towards net zero and a fully renewable energy grid.

Victoria has strong targets for renewable energy generation. The Renewable Energy (Jobs and Investment) Act 2017 (Vic) set renewable energy targets of:

- **25%** by 2020 (achieved)
- **40%** by 2025
- **50%** by 2030 (with an increase to **65%** identified as a planned legislative amendment)
- **95%** by 2035 (planned legislative amendment).

To meet these targets, the energy market modelling undertaken by the Victorian Government indicates that significant additional renewable generation is needed; specifically, in Victoria:

- An additional 4,000 MW of large-scale capacity is required by 2030
- An additional 18,300 MW of large-scale capacity (including energy storage and large-scale renewable capacity) is required by 2040.

This is more than the currently installed capacity of wind and large-scale solar PV across the entire National Electricity Market today and is equivalent to a build rate of around 1,500 MW of new capacity per annum in Victoria alone, equivalent to multiple large-scale wind / solar plants each year.

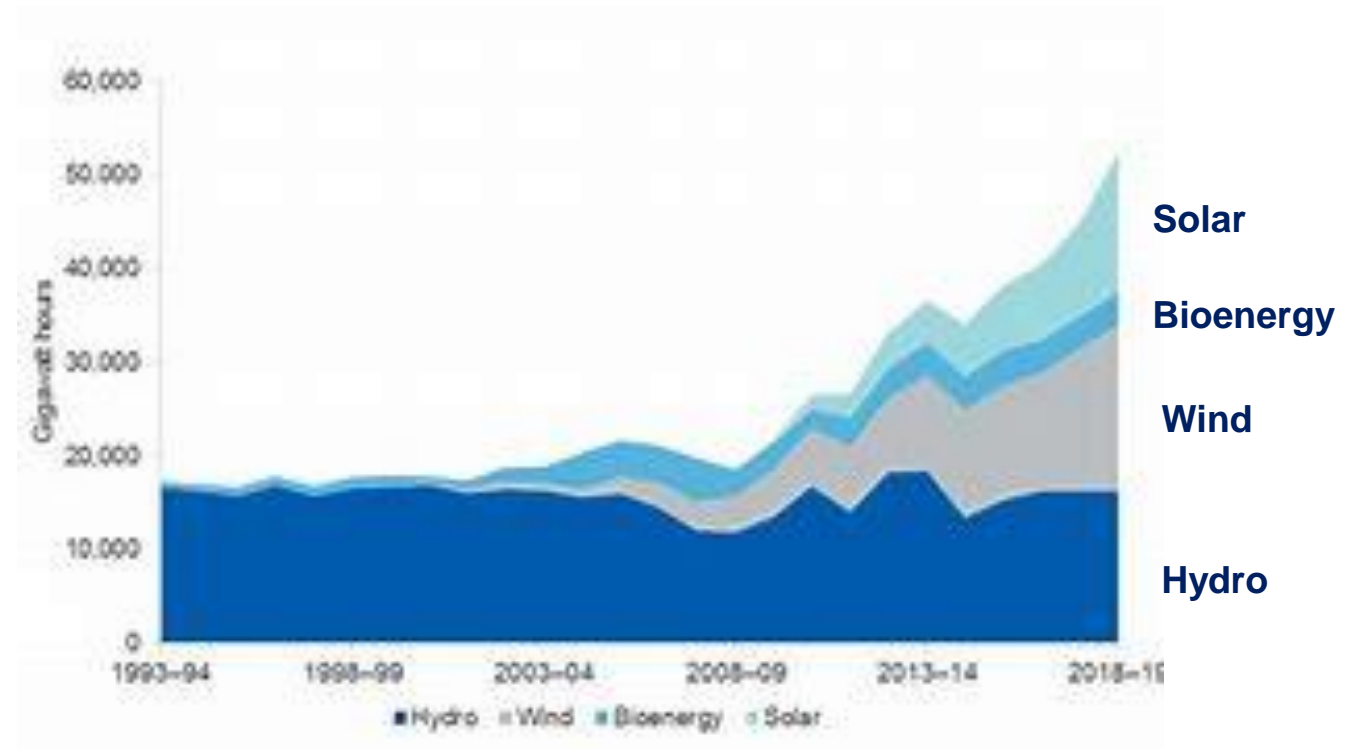


Transmission Grid and Renewable energy



Main Transmission Lines

Australia's energy market operator is proposing over **10,000 kilometers** of new transmission lines, linking major renewable precincts with the cities.



Renewable Energy by type

Materials

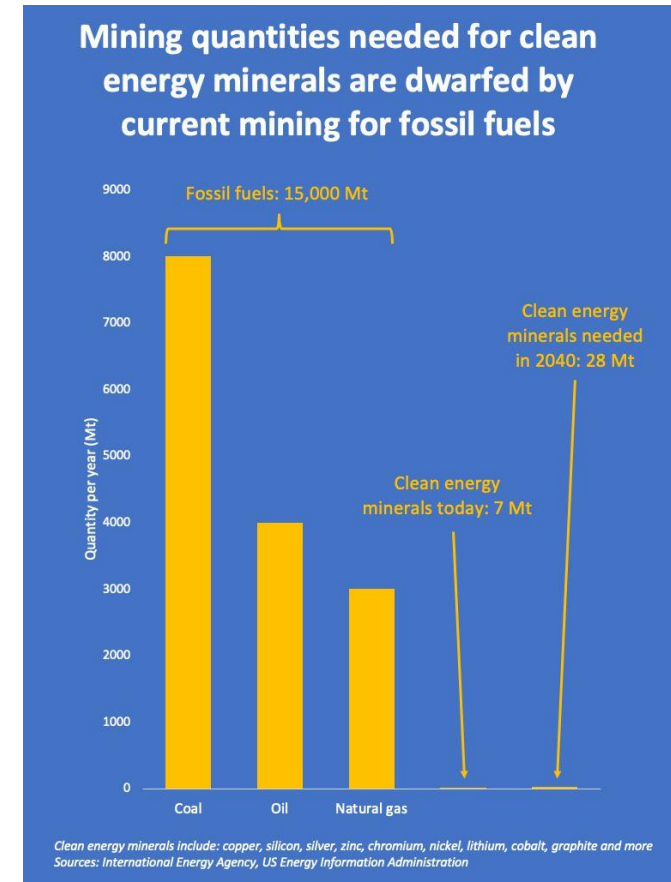
Manufacture: Nacelles are manufactured in Europe and in Asia depending on which company they are purchased from. The steel mast's are made in Asia and potentially locally, a company in Portland makes masts (although the bottom section would need to be made from concrete with this option as the diameter of the rolling machines is limited in size). The blades are all made in Asia.

December 23, 2003 [SolarAccess.com] Australia's first wind turbine manufacturing factory, built and owned by Vestas, the international wind energy company, has officially opened in Wynyard, Tasmania.

Prior to fitting out the factory, Ian MacFarlane (the then Federal Minister, attended the building opening and asked the Vestas CEO why the company was setting up in Australia? He stated that Australia was a coal country, Vestas said ok, they sold the factories and Tasmanian missed out on 1000 jobs) A very sad outcome.

Recycling: The turbines will be recycled at the end of life. The key area being developed at present is focussed on the composites and glues used in blade manufacture. These are being investigated to ensure that they can be broken down at their end of life and recycled. The nacelle and masts can be fully recycled.

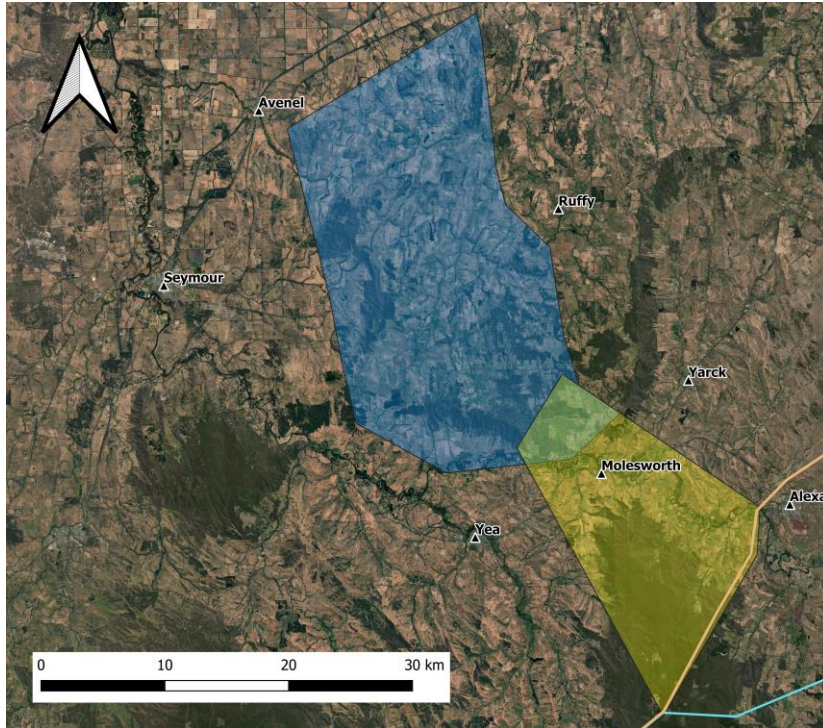
The Loy Yang power station consumes 90,000 tonnes of coal a day. In 1-2 days, Loy Yang burns the mass equivalent of the Seymour wind project which will operate for 30-40 years.



SEYMOUR WIND FARM



Initial areas under investigation for the Seymour Wind Farm



Legend

Turbines

Potential Connection Area

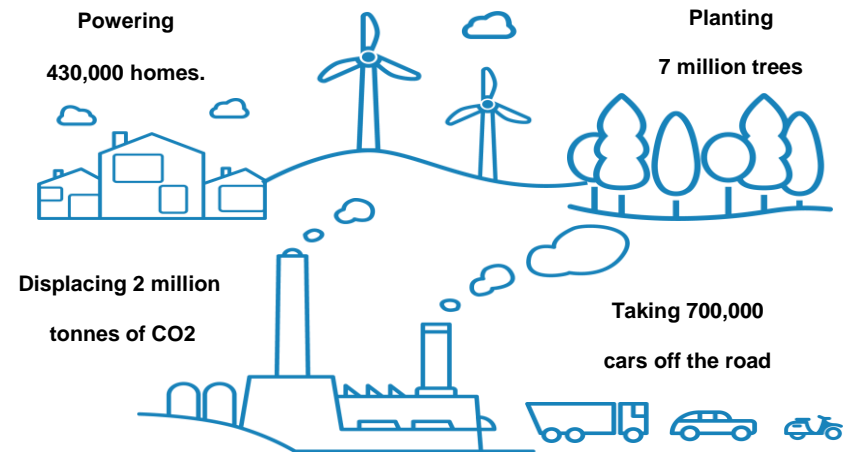
The Seymour Wind Farm investigation area is bounded by Avenel, Longwood, Ruffly, Highlands and Tarcombe. The project represents an opportunity for Australia and Victoria in the transition from coal power sources in accordance with Victoria's renewable energy targets of 40 % by 2025 and 50 % by 2030.

We are focusing on this region due to its strong wind resource and proximity to the main transmission line between Melbourne and Sydney.

Estimated production of the Seymour wind Farm:

2 Million MWh per year

This is equivalent to:



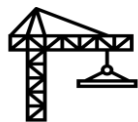
Phase 1:
Preliminary Investigations
(2020-2023)



Phase 3:
Construction and commissioning
(2025-2026)



Phase 2:
Planning & Design
(2023-2025)



Phase 4:
Operation
(2026-2056)

Seymour Environmental Benefits

Environmental Benefits calculations and source information references

Household Energy

- Annual electricity consumption per household
- 4.628 MWh

Number of homes powered = 432,152 houses. (2M MWh)

Reference

<https://www.esc.vic.gov.au/sites/default/files/documents/victorian-energy-usage-profiles-report.pdf>

CO₂ displacement

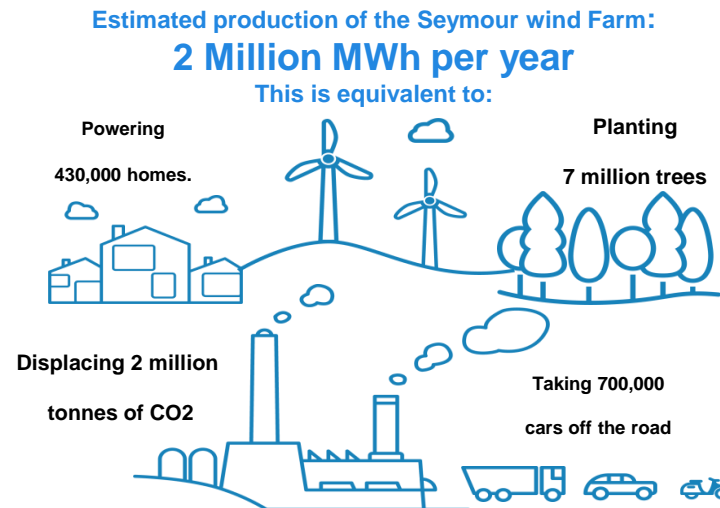
Coal fired power station CO₂ / MWh

- 1.52 tonnes/MWh, Brown Coal (Victoria)
- 0.9 tonnes/MWh, Black Coal (NSW)

Range: 1.8 to 3.04 million tonnes of CO₂ per year

Reference

https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Coal_fired_power_stations/Final%20Report/c02



Tree equivalent

Average tree consumes 268 kg Carbon per year.

Equivalent trees range: 6,716,417 to 11,343,283 trees

Reference

https://15trees.com.au/faq/#:~:text=carbon%20per%20year,-_Over%20its%20lifetime%2C%20the%20average%20tree%20captures%20268kg%20of%20carbon,are%20reducing%20our%20carbon%20footprint.

Estimated equivalent number of cars

Average Victorian drives 13818 km per year

Emission average = 180 g/km

Hence 2487 kg per year of CO₂, 2.487 tonnes per annum

Thus the offset for number of cars is between 723,768 and 1,223,356 cars

Reference

<https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>

Seymour Project Timeline



2022/
2023

- AEMO Initial Connection Enquiry submitted, and response received.
- Investigate site and land for wind farm infrastructure
- Wind Monitoring, 1 Mast / 3 Sodar (variable locations)

- **Project Name**– investigation of the projects name with the intention to rename the project by December 2023
- Ecology** – Desktop Flora & Fauna Assessment completed by Biosis. Next steps – targeted seasonal surveys to commence in Spring 2023.

Cultural Heritage – Cultural Heritage Assessment being developed, with Biosis / Taungurung Land & Waters Council.

Transport and Traffic– investigation of roads and paths for transport of turbine components and construction

Noise, Shadow Flicker...– following preliminary siting locations of turbines, investgate noise and shadow flicker

Finalise Substation location – Grid Connection route / Easement agreements

Impact assessment reports, e.g. Ecological and Heritage investigations / reporting

2024/
2026

- Civil / Electrical preliminary design investigations, Geotech, planning of access roadways, electrical easements... Ongoing monitoring programs

- Finalise Planning Submission (Submission 2024) 12 – 18 month process in DEECA / EPBC Referral.

2026/27+

CONSTRUCTION & COMMISSIONING

Environmental Impacts,

Noise monitoring will ensure that impact from noise for the project is minimised and meets all Victorian guidelines.



Noise Impacts

Turbines continue to increase in size and reduce their noise levels.

Blades rotate at 5-10 revolutions per minute

- Noise levels at 300m, ~ 40-50 dbA
- Noise levels at 500m, ~ 30-45 dbA
- Noise levels at 1000m, ~ 25-40 dbA

(example: leaves rustling in trees is 30-40 dbA)

Noise Monitoring:

A Background Noise Monitoring Report and Environmental Noise Assessment will be conducted for the project in accordance with the requirements Clause 52.32-4 of the Planning Scheme.

The process for the noise assessment has the following steps:

- Assess the background noise levels at residential properties
- Establishing the background noise levels
- Model the level of noise expected to result from the wind farm infrastructure and compare it to the background noise monitoring.
- Ensure the project is below the noise requirements and complies with all guidelines and legislation.
- Background noise monitoring is expected to commence in 4Q 2023 or early in 2024.

Environmental Impacts,

Access roads, traffic Assessment.



Traffic Management:

Detailed planning goes into the routes for wind farm infrastructure and construction access for each of the turbine locations.

Inputs include:

- Review of each turbine location and the options for access to each turbine locations.
 - Important considerations include the existing trees and vegetation along existing roads, the options for access into each turbine locations, local traffic and farm operations, cultural heritage and the investigation of sensitive vegetation within 100 meters of each access road.
 - With the above elements understood the project will review the transport routes from Geelong port to the Project site;
 - Over-dimensional swept path assessments will be conducted on all access roads to minimize access mitigation measures and including native vegetation removal requirements (subject to detailed design); and
 - Consultation with VicRoads, Mitchell, Strathbogie and Murrindindi Shire Councils.
- The review and site investigations has commenced and will continue through to December 2023. As ecology and other investigations are completed the plans will be subject to review and the final alignments updated to the project plan.

Community and Stakeholder Activities

Key Activities

- Ongoing meetings with the local community, On site meetings with all community members who have registered their details via the project website, phone calls and the sign on sheets
- Initial meeting with Hughes Creek Landcare. We are working to have a project wide session with all Landcare and environmental groups as part of the ecological assessment for the project.
- Project Name: Land council and have a series of follow-on discussions – we have asked that they provide suggestions for a new name for the project that is representative of the area
- We met with Ruffy CFA and are schedule meetings with each of the CFA area commands and the District commanders.
- Meeting with Annabelle Cleeland, and Cindy McLeish to brief them on the project
- Meetings the Euroa Environment groups to discuss and investigate Energy Security in Euroa.
- Presentation for Yea Community Energy on August 17
- Inka Velthheim (Biosis PM) update ecology and the proposed studies.
- The project website continues to be updated with reports as they are available.
- Development of project social media content and information.

Connecting the wind farm to the National Grid

With the transmission Fera are investigating a number of options, Fera have broadened out the initial investigation, the connection of the project via a single high voltage 330kv tower connection between a substation and the national transmission line with a second option that groups the turbines in clusters of 15-20 turbines and connects them to the national network via 132 single pole HV lines.

The second approach is more complex, but it has been supported as the preferred local solution based on feedback from our discussion with landowners.

In reviewing the single pole approach, we will look to use existing alignments for local transmission along road reserves and on private land.

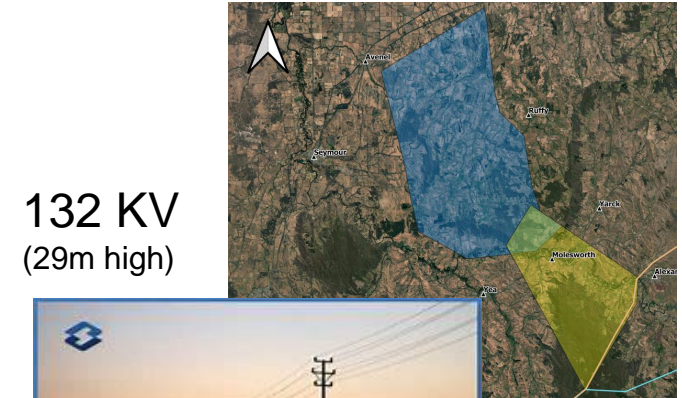
The single high voltage transmission line the easement would be circa 60 meters wide, largely through private land.

The single transmission line alignment is a simpler solution for connection of the project to the grid. Multiple connections that are required under the cluster approach, each will need detailed planning to determine the potential routes.

Between turbines the transmission lines will be underground.

All options will be investigated, including battery storage and connection with the Eldon Hydro 220KV.

Improved Energy Security is also a key benefit of a new integrated energy project.



132 KV
(29m high)



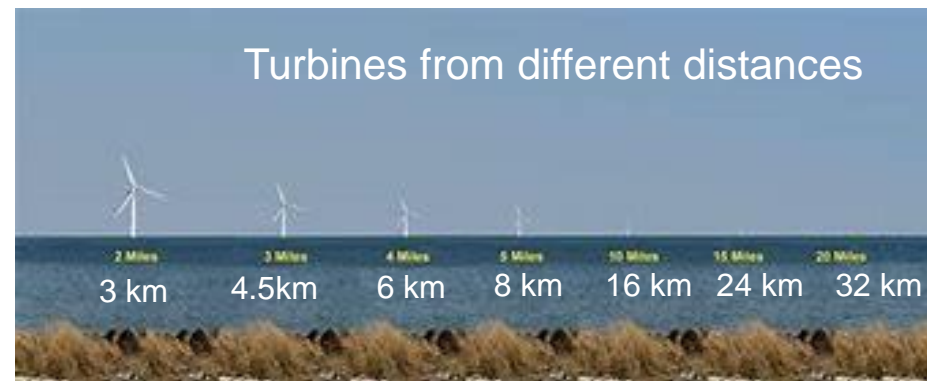
Duel 330KV
National Grid near
Molesworth
(35-40m high)

Cherry Tree Wind Farm

Turbines:

- 93m to Nacelle , 73m blades

Close spacing minimum 300-400 meters



Initial Photo Montage Images



Initial Photo Montage Images



Initial Photo Montage Images



Initial Photo Montage Images



Existing Transmission Lines



66 KV (25m high)
Goulburn Valley Hwy

Connecting the wind farm to the National Grid



Duel 330KV
National Grid near Molesworth
(35-40m high)

Examples of overhead transmission lines



132 KV (29m high)



22 KV Distribution line

6500 km of transmission lines in Victoria



Simon Tickner, Wallup, calls on constructive engagement over transmission lines

Stock and Land, August 2023.

Simon is one of many currently farming under the 6500km of existing transmission in Victoria. He has noticed "minimal operational impact" on his grazing farm.

"There are thousands of kilometres of transmission lines across the country running through dozens if not hundreds of farms, and every one of those is an example of how transmission lines and farms interact, so it's not a new concept."

Read more: bit.ly/WimmeraTx



Article in Financial Review, 19 August 2023

The article highlights concerns over the potential impacts by the Seymour project on the local ecology and hydrology. The planning process and the detailed environmental regulations in place ensure that these elements are investigated and protected.

The key issue is the SRRCG concerns over visual impact. Whilst the visual impacts can be reduced the wind farm infrastructure will still be seen.

The members of the SRRCG would prefer that the project was somewhere else.

As project managers Fera's is committed to minimise all impacts of the project, however in building a project in the area it is not possible to satisfy the SRRCG's preference for the project to be elsewhere.

Sensitive Ecology and Visual Impact

Ecology: Being farmed since the 1840's a significant percentage of the project area has had extensive changed from the original ecology of the area. As noted in the emails Biosis is starting the survey work to detail the flora and Fauna of the road reserves, farm-based nature corridors and the forest areas. This work will be used as we plan the final locations of the turbines together with the other studies and feedback from landowners.

Visual Impact: The landscape has changed extensively from when the first farmers made their selections in the area. Farming has seen extensive clearing to support sheep and cow grazing.

Farms were located in the area to take advantage of the natural resources of the land. The area has a strong natural wind resource.

The farms have the potential to add energy production whilst maintaining all farm activities.

Alan Finkel (Ex Chief Scientist), Author of Getting to Zero, Australia's Energy Transition highlights, and I agree, it is critical to minimise visual impact. When done well the biodiversity and nature can be preserved.

It will require a careful balancing act and it won't be easy. But he's clear that it must be done – greenhouse gas emissions have to be controlled.

"There's another visual here, of wildfires destroying crops and homes, droughts drying up rivers and floods ravaging communities.

Extreme weather events driven by climate change are punishing communities across the planet, he notes. "We know what to do. We need to replace fossil fuels with zero emission electricity. Our ambition must be to usher in the Electric Age to replace the Industrial Age."

**CRAZY BRAVE WORLD OF GREEN POWER
The Australian June 10, 2023**





Achieving these renewable energy targets will require significant investment. Importantly, in addition to the avoidance of greenhouse gas emissions, the transition to a net zero carbon economy will also deliver strong benefits in the form of local investment and jobs.

Between 2023 and 2030 a recent report to the Victoria Government, “**Victoria electricity sector renewable energy transition, October 2022**” estimated 7800 (average 2 year) jobs in construction and 1200 (long term) jobs in operation would be created.

With respect to the Seymour project, the estimated construction jobs are 700 jobs and in operations 50-60 new long-term jobs. These are the direct jobs, the flow on effect in the local community will be 2 to 3 times these numbers.

Local Jobs: We are working with the 3 shires to hire and buy local and ensure that the workforce is beneficial to the local economy. The project will bring in strong revenues for the traders, add kids to the schools and flow on employment for the local towns.

Each of the municipalities have different housing policies which are a good starting point. The project also delivers strong rate revenue to each of the shires.

Investment in Victoria

- 5 Year forecast investment into Regional Victoria
- \$1.5

Local Jobs

- 50 – 60 full time local staff
- 500 – 700 Construction
- 1000 – 1500 indirect local jobs



COMMUNITY

We want to hear from you

At Fera we place significant importance on an open and honest relationship with the local community. We will provide a platform for all community and stakeholders to voice their thoughts and concerns, and welcome any and all feedback.

We are looking for community members to establish a Community Consultative Committee (CCC). Part of the revenue earned by the project will be dedicated to a wide-ranging community fund. Determined by the community, each project will create community value and an ongoing legacy.

We would love to have an in-person conversation or meeting, so please reach out to us at your convenience. Otherwise, email or call, and we are happy to answer any questions you may have.

Benefits include

- Upgrades to existing road infrastructure
- Upgrades to telecommunication
- Significant investments in regional Victoria
- Local jobs and services
- Support for bushfire services, bushfire compatible turbines
- CO₂ displacement
- Community fund



CONTACT INFO

Get involved

Phone: 0481 234 229

Email: seymour@feraaustralia.com.au

feraaustralia.com.au





A photo of Fera's recent Olive picking day below in Upton Hill. The background to this weekend was to replicate a tradition in the Fera company.

In Italy the company comes together and picks olives that are crushed and turned into oil. The oil is then given out as Christmas gifts.

On a weekend late in May the team came together and had a day picking olives. The olives were crushed locally in Yea and the oil is going through a settling period and then will be bottled and shared.

Questions

Next Community session will be at the
Cherry Tree Wind Farm
Saturday November 25th 10:00am

Please register on
Seymour@feraaustralia.com.au

Thank You

Andrew Lawson
FERA Australia Ltd
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Tel. +61 412299678



Attachment 1

First half 2023 Community consultation contact summary



Victoria Wide Population				2021 Census						
Victoria	6,503,491	1,718,771	2,805,661	Seymour	6,601	1,532	2,913			
Greater Melbourne	4,485,211	1,161,643	1,832,043	Euroa	3,508	943	1,785			
Regional Victoria	2,018,280	557,128	973,618	Alexandra	2,480	662	1,294			
				Yea	1,789	471	930			
				Avenel	1,112	328	533			
				Whiteheads						
				Creek	348	100	161	348	100	161
				Longwood	263	79	133			
				Yarck	194	58	110			
				Ruffy	164	48	96	164	48	96
				Highlands	151	40	95	151	40	95
				Terip Terip	72	19	50	72	19	50
				Kanumbra	53	18	39			
				Tarcombe	42	7	19	42	7	19
				Upton Hill	29	4	24	29	4	24
				Dropmore	19	9	12	19	9	12
				Total	16,240	4,318	8,194	825	227	457

Private Dwelling proximity to Wind farm infrastructure

1-3 km	277
3-5km	91
>5km	136

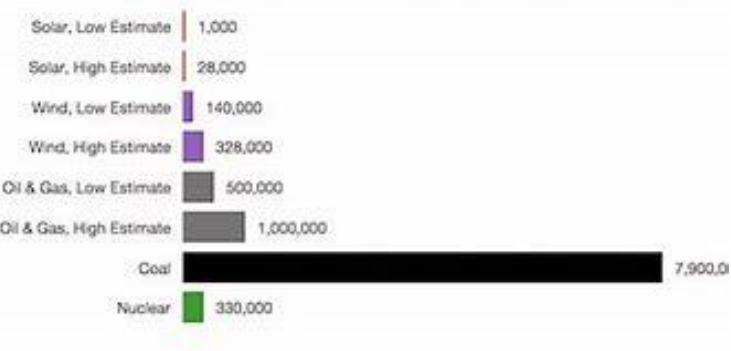
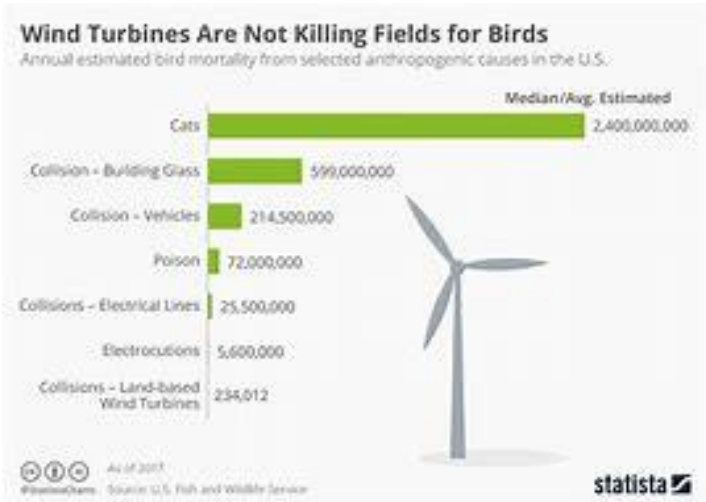
Population within the project boundary

January to June 2023 Public Consultation

People who attended information session February	112	14%	Compared with the number of people living in the area
People who attended information session May	76	9%	Compared with the number of people living in the area
Site Visits (Private Dwellings)	110	24%	Compared with the number of private households in the area
Letter Drop to private letterboxes	130	28%	Compared with the number of private households in the area
Post Office Box Flyers	2140	100%	Of post office boxes in the surrounding towns

Attachment 2, Environmental Impacts,

We are working on detailed ecology investigations that ensure that the wind farm project minimises impacts on the local bird and bat populations.



Science, Sept. 2019

The first-ever comprehensive assessment of net population changes in the U.S. and Canada reveals across-the-board declines that scientists call “staggering.” All told, the North American bird population is down by 2.9 billion breeding adults, with devastating losses among birds in every biome.

Forests alone have lost 1 billion birds. Grassland bird populations collectively have declined by 53%, or another 720 million birds.

New Audubon Science: Two-Thirds of North American Birds at Risk of Extinction Due to Climate Change Oct 2019

“Two-thirds of America’s birds are threatened with extinction from climate change, but keeping global temperatures down will help up to 76 percent of them. There’s hope in this report, but first, it’ll break your heart if you care about birds and what they tell us about the ecosystems we share with them. It’s a bird emergency,” said David Yarnold, (@david_yarnold), CEO and president of Audubon.

Janet Gardner, CSIRO and Suzanne Prober, CSIRO September 29, 2022

Heatwaves linked to climate change have already led to mass deaths of birds and other wildlife around the world.

Predictions:

- 1 Deg increase, survival rate 43%
- 3.7 Deg increase, survival rate 11%

Bird deaths – by energy source

For every 10,000 bird deaths caused by humans less than one is caused by wind turbines.