

Inquiry into Renewable Energy in Victoria

BZE and EV Joint Submission



December 2021

The Secretary
Legislative Council Environment and Planning Committee
Parliament House,
Spring Street EAST MELBOURNE VIC 3002
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Attention : Committee Members

Beyond Zero Emissions and Environment Victoria are pleased to be making a **joint-submission** to the parliamentary Inquiry into Renewable Energy in Victoria and thank the Committee for the extension of time granted for lodging this submission.

Beyond Zero Emissions (BZE) is an independent solutions focused think tank and has been working extensively with industry and community in fossil fuel regions across Australia. Our work is focused on developing zero-emissions industries that generate quality jobs and utilise local industry and resources.

Environment Victoria (EV), formerly known as the Conservation Council of Victoria, is an independent charity that has campaigned on environment issues in Victoria for more than 50 years. Established in 1969 as a peak body for more than 70 environment groups, EV now has more than 100,000 individual supporters. Our work focuses on campaigning to solve the climate crisis and build a thriving, sustainable society that protects and values nature.

SUMMARY STANCE

It is our broad submission that the transition to 100% renewable electricity is technically feasible, economically beneficial, socially desirable, creates thousands of direct jobs and will leave Victorian households better off. However, due to a range of barriers and bottlenecks, this transition will not be realised without significant policy and funding support, including updating the Victorian Renewable Energy Target (VRET) to reflect rapid changes in Victoria's energy context.

When the VRET was established, it set clear target goals for the energy transition. While not so ambitious as to aim for 100% renewable generated power or net-zero, its targets were an important

step in addressing the harms of climate change given Victoria’s energy context at that time. Since 2017, that context has changed rapidly – and much faster than expected. The prices of building and operating renewable generation continue to fall. More has been installed than predicted or anticipated. Grid technology improvements mean that a 100% renewable system can be operated reliably. Rapid growth and price declines in the global market for renewable technologies is driving this, creating further job and economic opportunities for Victoria. Appropriate policies and investment are all that are required.

We acknowledge that the Victorian Renewable Energy Target Auction (VRET2) request for applications recently closed as well as the efforts to develop six renewable energy zones (REZs). Importantly, in the calendar year 2020, renewable energy sources generated more than 26% of Victoria’s electricity,¹ beating the state target of 25%. The recent growth trajectory has the state on track to also surpass the current targets of 40% by 2025 and 50% by 2030.

But that trajectory is in peril. Financial commitment to new renewable projects in Victoria fell to zero in 2021 and policies play the key role. The federal Renewable Energy Target expired. Victoria’s commendable REZ ambitions of fostering an additional 10GW of new renewable generating capacity is not legislated and lacks a specified deadline to reach its target. Moreover, other jurisdictions around Australia have updated their targets and now Victoria lags behind. (See Table 1 below.)

Jurisdiction	Target 2020	Achieved?	Target 2030	Target beyond 2030	Year Updated
SA	50%		100%	500%	2021
TAS	100% (2022)		150%	200%	2020
ACT	100%	2019		>100%	2016
NSW			67%		2020
QLD			50%		2021
VIC	25%	2020	50%		2019
NT			50%		2016
Cth	17%	2019			2015
Federal ALP’s ‘Powering Australia’ Plan²			82%		2021

Table 1: Renewable electricity targets in Australia by jurisdiction.³

¹ Victoria Department of Environment, Land, Water and Planning (2021), Victorian Renewable Energy Target 2020/21 Progress Report, p.6 https://www.parliament.vic.gov.au/file_uploads/VRET_2020-21_Progress_Report_xssr5nBs.pdf

² <https://www.alp.org.au/policies/powering-australia>

³ Targets generally are generation-based. ACT’s target is consumption-based. The Commonwealth’s and NSW’s targets are for GWh of generation – the percentages are computed against average annual generation in 2020.

Additionally, until needed system upgrades are undertaken, new projects will encounter significant cost and technical challenges to connect to the grid. It's worth noting that concerns relating to grid connection are consistently ranked the top business challenge in the CEC's Clean Energy Outlook Confidence Index. The other major concerns relate to a lack of long-term and consistent climate and energy policy, showing a clear role for government leadership.⁴

This means **the time is now** to update the VRET to target 100% renewable electricity generation by 2030 and to commit to addressing policy and investment issues that stand in the way. Acting now positions Victoria to take advantage of the mature technology, to address the climate crisis, and to benefit from and to lead the continued rapid growth in renewables.

Below we provide more detailed input and specific responses to the Inquiry's Terms of Reference. We also note that Environment Victoria is preparing a roadmap to provide legislators, policy makers, and other decision makers with more specific and detailed guidance on actions required to transition Victoria's power system to renewable energy, as well as the benefits of doing so. Environment Victoria aims to make that roadmap available in March 2022.

RESPONSES TO TERMS OF REFERENCE

In response to the **Terms of Reference** we offer the following comments:

(a) Measures to enable Victoria to transition to renewable energy

1. A just transition away from coal in the Latrobe Valley needs to be carefully managed

Decades of experience from industrial closures in Australia and around the world, and research on their impacts, identifies the critical importance of **six elements** to position a community for successfully navigating a just transition when major industries close and lead to far better employment, economic, social, and environmental outcomes. These are:

1. Dedicated transition authorities that can guide planning and implementation of transition policies.
2. Community-driven approaches that ensure impacted workers and communities are actively involved provide an important basis for creating and sustaining the social license for just and rapid decarbonisation.
3. Proactive planning well in advance to support workers finding new employment, retraining, and reskilling, as well as attracting investment in innovative new industries.
4. Comprehensive planning that accounts for other key community resources such as health, food, education, energy, services, and transport and communications infrastructure.
5. Long-term funding commitments that match the timescale required for transition
6. Mission-oriented policies, such as smart specialisation industry strategies, that build on regional strengths. As outlined below, Renewable Energy Industrial Precincts are the ideal

⁴ <https://www.cleanenergycouncil.org.au/resources/resources-hub/clean-energy-outlook-confidence-index>

mechanism for achieving positive outcomes for a broad group of stakeholders in the energy transition.

Change is inevitable and some areas such as the Latrobe Valley have been in transition for years. History, experience, and evidence demonstrate that engaged, orderly planning is essential to ensure communities and residents minimise negative impacts of transition, and that they can in fact benefit from it. Examples exist where strong strides have already been taken to provide leadership and management for planning and transitioning. With years more work required, these actions will need to be strengthened and bolstered in order to lead efforts to grow dynamic regional economies featuring a high quality of life by:

- Building on existing assets, such as physical infrastructure, skilled workforce, and tertiary education sector
- Utilising a systems-based transition design approach to transitioning, instead of ad-hoc efforts with piecemeal, short-term support of isolated projects, to create an economic “ecosystem” (economic, physical and cultural) that fosters and catalyses innovation and investment in a diverse range of new industries and businesses
- Taking an inclusive, whole-of-community-and-government approach that ensures communities have a leading voice in their future and to leverages existing capabilities while drawing new investment from a range of sources to deliver long-term economic, social, and environmental benefits for the region
- Providing planning and resourcing leadership and management for the long-haul, as transitions take years, often decades.

These core elements recognise the scope, breadth, and long-term nature of the challenge. Instead of merely offering re-training and new employment for workers directly employed in the electricity sector, although that continues to be important, a just transition recognises the need for a whole system approach seeking to create a self-sustaining environment that creates jobs downstream and laterally, connects to other markets and opportunities, and that creates economic value through environmental sustainability.

Taking a piecemeal, project-by-project approach does not foster the confidence industry requires for ongoing investment. Still, projects that are sought should be ‘catalytic’ projects, ones that leverage other sources of investment and leave a legacy of self-sustaining and successful industries.

Managing a transition well is of critical importance. The retirement of each successive power station will be influenced by how well-managed the previous closures have been from a worker and community perspective. For example, it was particularly challenging to catch up to the impacts of Hazelwood’s closure, and as such **now is the time** to lead the planning and preparation for the closure of remaining power plants and mines to ensure a bright, dynamic, and sustainable future for the state.

Communities in other states, and around the world, also face the daunting task of transitioning from dying industries to vibrant, growing ones. Victoria has a unique opportunity to provide a world-leading example of how to plan and implement an effective and timely just transition. Doing so will contribute significantly to the urgent worldwide task of transitioning away from fossil fuels while ensuring affected communities are not left behind.

2. Renewable Energy Industrial Precincts will boost jobs in key regional areas

Finally, in order to promote a faster and equitable transition to renewables it will be necessary to underwrite renewable energy industrial zones. In the past, energy-intensive manufacturing, such as aluminium smelters, came to Australia because cheap electricity was already available. In a decarbonising world, Victoria can again follow this strategy to attract new industries. The Victorian Government should designate industrial locations in the Latrobe Valley, Geelong and Portland as the state's first 'Renewable Energy Industrial Precincts'. The clusters of industry and manufacturers powered by 100% renewable energy will attract investment, create jobs and underpin demand for higher volumes of renewable energy construction in Victoria.

[Independent analysis by ACIL Allen](#) found that establishing a REIPs in the Hunter Valley and Gladstone would create 45,000 new ongoing jobs, generate an extra \$13 billion in annual, and attract tens of billions of investment dollars into regional areas. The benefits for Victoria are likely just as big and offer a pathway to creating a strong manufacturing industrial future for the state again.

Abundant renewable energy underpinned by long-term fixed price offtakes will establish Victoria as a top destination for energy-intensive clean industry such as green hydrogen, advanced manufacturing and commodity processing.

It follows that up to a third of renewable energy jobs can be in manufacturing. In return for underwriting renewable energy development, the Victorian government should require local production of equipment. The biggest potential employers are wind turbine and battery manufacturing, with further opportunities from making transmission components.

(b) Jobs and economic benefits and implications of the transition

There is a long list of potential benefits that will flow from a transition to renewable energy. These are outlined below:

1. Renewable energy means more affordable power

Renewable energy has proven in the National Energy Market to be able to sell at very low prices whilst still being profitable. Coal-fired power plants have a high baseline cost to operate due to maintenance and personnel while renewable energy requires far less maintenance and incurs essentially nil fuel costs because the sun shines for free and the wind blows for nothing.

As the AEMC has reported each year for the past several years, increasing generation from renewable energy continues to reduce the price of power for households and businesses. As the amount of renewably generated power increases, this continues to create a downward cost trajectory reducing the cost of living.⁵ The 2021 price trends report found an influx of renewables and battery storage is expected to reduce wholesale electricity prices by around 39% or \$207 in Victoria by 2024.

⁵ Australian Energy Market Commission, Residential Electricity Price Trends 2021.

As gas supplies dwindle and costs experience volatile increases, households and businesses can continue to reduce energy costs through 'fuel switching' to electric appliances, in addition to the climate and other environmental benefits of switching cars, appliances, and other devices to renewably generated electricity. A recent report from Environment Victoria and Renew found Melbourne families could save \$700 per year on energy bills by choosing a new home that doesn't have a gas connection and opting for all-electric appliances instead. Adding solar and efficiency upgrades can reduce household energy bills by 80%.⁶

2. Accelerating deployment of large-scale renewable energy will create jobs

Australia's renewable energy sector is a major employer, with 26,850 (6,090 in Victoria) full-time workers in 2019. This skilled workforce of engineers, technicians, construction workers and consultants is the foundation for a far larger industry. Unleashing the full potential of Victorian renewables would create many thousands more jobs. Investors have already identified a vast pipeline of clean energy projects in Australia. Unblocking barriers in this pipeline will accelerate construction of many of these projects.

Beyond Zero Emissions' [Million Jobs Plan \(2021\)](#) plan proposes building 90 gigawatts of renewable energy over the next five years, with a build rate of 15 gigawatts per year for the first two years and then 20 gigawatts per year for the following three years.

Constructing this renewable infrastructure in Victoria would potentially employ **28,411** in construction and a further **5,948** in operations over the next five years. This new energy infrastructure will be connected by new transmission lines, creating up to **16,536** more jobs. Further employment opportunities will arise in professional services, such as engineering and finance skills.

3. A resurgence in Australian manufacturing means thousands of quality jobs in regional Victoria

Renewable Energy Industrial Precincts (REIP)

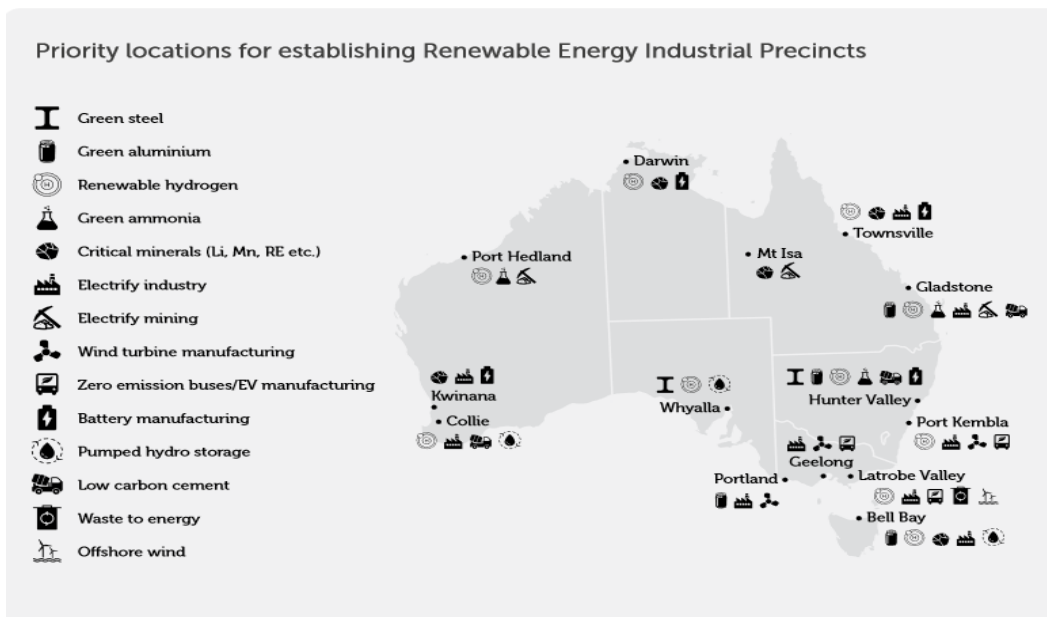
Renewable Energy Industrial Precincts (REIPs) support a cluster of manufacturers powered by 100% renewable energy. These precincts are either located within Renewable Energy Zones or connected to renewable energy generation through high-voltage transmission lines. They also have access to clean heat and renewable hydrogen production, skills development and export infrastructure, including good transport links.

BZE has undertaken significant research and conducted extensive engagement (community, industry, government and investor) to establish that REIPs present a national opportunity for Australian manufacturing to thrive. REIPs are the mechanism through which Australian industry can capitalise on our exceptional potential to generate renewable energy.

⁶ Environment Victoria (2021), Creating Victoria's First Gas-Free Suburbs. <https://environmentvictoria.org.au/2021/10/27/creating-victorias-first-gas-free-suburbs/>

REIPs will enable Australia's regions to adapt to a changing energy landscape. They will:

- Increase the likelihood that energy intensive manufacturers will remain in Australia.
- Provide access to cheaper infrastructure and energy (electricity and heat) that will be shared across multiple large energy users lowering energy bills and production costs.
- Provide access to a skilled workforce that can be trained in the development and operation of efficient, zero-emissions industrial processes.
- Attract businesses and investors, support local industries, secure existing jobs and create new jobs.
- Provide an opportunity to commercialise new technologies and solutions onshore, by attracting start-ups to co-locate with established industry players.
- Become hubs for the development of innovative zero-emissions and circular-economy technologies and solutions that Australia can sell to the world.



This map shows priority locations for establishing Renewable Energy Industrial Precincts.

Australia has always relied on a competitive advantage of affordable and reliable energy but today our intensive manufacturers are at a global disadvantage due to high energy prices and the high emissions intensity of our electricity production.

As shown in the above diagram, we have highlighted three potential REIP locations in Victoria alone: Latrobe Valley, Geelong and Portland.

Manufacturing wind turbines

Most of the cost of wind farm development relates to the purchase of wind turbines. Turbine manufacture is labour intensive, requiring approximately 150 people to make the main components of a 100MW wind farm. Large turbine manufacturers prefer to make

components locally once a market reaches sufficient size. Australia and Victoria currently have little capacity to manufacture wind turbines, so we miss out on much of the profit and employment opportunities from wind farm developments.

By bringing wind manufacturing on-shore to Victoria, we would create many factory jobs with medium to low skills requirements.

A quick way to do this is to convert Australia's disused factories. This has already happened in Geelong where part of the old Ford factory has been used to make components for Victorian wind farms, to meet a local content requirement of the Victorian Renewable Energy Target Auction Scheme (VREAS). The old Ford factory has also been proposed as a key hydrogen facility.

Leading turbine-maker Vestas has indicated that, given sufficient demand, it would expand manufacturing in Australia. But it has also flagged pulling out of Australia's energy market without sufficient investment in and policy support for transmission lines,⁷ highlighting the crucial role of government in unlocking clean energy jobs.

We have also conducted some initial high level modelling of job creation if wind turbine manufacturing is fast tracked. This has found the potential to create around **9,879 jobs** over the next five years. This number is only set to increase with the recent passing of the Offshore Electricity Infrastructure Act 2021.

More batteries means more jobs

Batteries will play a central role in an energy system based on renewables. Batteries increase the amount of rooftop solar energy that Victorian households can use at home, and large-scale batteries help balance the variable output of solar and wind energy. In the near future, batteries will also replace petrol and diesel for most land transport.

Victoria is already a global pioneer in integrating small and large-scale batteries into the grid. Despite this, Victoria currently has very little capacity to manufacture batteries. However, there is a window of opportunity to employ thousands of people and establish a globally-competitive battery industry.

The [Million Jobs Plan \(2021\)](#) presents several proposals that rely on rapid growth in the use of batteries. Implementing these proposals in the transport, electricity and building sectors would create demand for over 70 GWh (Australia wide) of battery capacity in the next five years.

This demand could underpin a significant new domestic industry. Installing batteries in Victorian homes would require over **5,421 jobs** in the next five years. The number of jobs in manufacturing would depend on how much of the battery supply chain is located in Australia. If the batteries are manufactured in Victoria it would create around **2,455 jobs** over the next five years. Most of these new positions would be for semi-skilled professionals who can be trained in just months.

⁷ <https://reneweconomy.com.au/too-difficult-vestas-says-wind-projects-will-stop-if-australia-doesnt-invest-in-grid/>

Electrifying industry

Most industrial processes could eliminate fossil fuels by switching to renewable electricity. This would improve efficiency, productivity and marketability. A five-year program to electrify Victorian industry would create around **15,783 jobs** over the next five years.

Most manufacturing processes require heat, which is usually generated by burning fossil fuel. Beyond Zero Emissions' 2018 report, [Electrifying Industry](#), shows how almost any industrial heat process can be fully electrified. The full electrification of manufacturing, powered by renewable energy, would bring many benefits to Victorian manufacturers, including:

- Improving energy-efficiency and reducing energy costs.
- Eliminating emissions and increasing marketability.
- Productivity
- Control and digitisation
- Safety
- Modularity
- Reduced price and supply risk

Fast-tracking transmission

Transmission lines are the arteries of the electricity system. But in recent years there has been a lack of investment in new transmission causing bottlenecks. According to AEMO “*without further grid development ... consumers will pay more for less reliable energy*”.

New transmission infrastructure will facilitate the rollout of renewable energy, increase energy security and reduce power prices. Victoria should act to fast-track new transmission projects. Beyond Zero Emissions estimates that this could create around **15,000 jobs** over the next five years in Victoria.

Job type	Jobs over 5 years
Renewable construction	28,411
Renewable operations	5,948
Wind manufacture	9,879
Battery manufacture	2,455
Battery installation	5,421
Transmission (Construction)	15,135
Transmission (Operations)	1,401
Electrifying Industry	15,783
Total Job Allocation	87,176

This Table summarises potential job numbers (outlined above) in Victoria from a transition to 100% renewable energy.

(c) Investment required to achieve 100 per cent renewable energy generation

In addition to the need to invest in new renewable generating assets, several other components of the power grid are also important. Research and the experience of market participants point to the need for two broad categories of investments: 1) power system upgrades to ensure the power grid is fully compatible with 100% renewable energy and 2) those that seek to embed social license into the transition, especially supporting a just transition for workers and communities most impacted by the ongoing shift to renewable energy.

System upgrades

The NEM's grid, including Victoria's portions, are aging and already in need of upgrades. Many upgrades are already underway, *and* being undertaken in a way to allow 100% renewable penetration. In support of this, AEMO is already at work to engineer the full NEM, including Victoria, to operate at 100% instantaneous penetration of renewables by 2025. This is important for enabling a power system that actually does operate at 100% renewable generation by 2030, and will require investment in several components, most notably:

- Transmission
- Batteries
- Grid-forming and other technologies that coordinate the growing number of distributed power resources

While the Federal Government has made contributions and some portion of the costs will be borne by ratepayers, it is important for Victoria to support these efforts, including by continuing to commit to an appropriate level of cost sharing. Public support continues to send strong market signals, leading and guiding private investment. Moreover, making smart investments now to upgrade the system will enable cost savings as greater interconnection and a modernised grid allow for a more efficient power system, one where the best and lowest cost can be readily accessed allowing for competition in the wholesale market that lowers prices. That also lowers requirements for storage capacity and dispatchable generation, further enabling a transition to 100% renewable generation and again lowering system costs. Modelling from Reputex released in December 2021 forecasts that system upgrade investments across the NEM could lower residential prices by as much as 18% by 2025 and 26% by 2030.⁸

⁸ Reputex Energy (2021), The Economic Impact of the ALP's Powering Australia Plan, page 9.

(d) further opportunities for Victoria to reduce emissions

Electrification: electrify every Victorian home

In addition to supporting electrification in industry, continued efforts to electrify homes will provide a clear path for further emissions reductions. Modern electrical appliances for cooking, heating and hot water production are superior to gas equivalents in terms of health and safety, running costs and ease of use. Mandating new buildings to be all-electric has gained momentum around the world as it is the most straightforward path to zero-carbon-ready buildings⁹ since those buildings require no changes to the shell or appliances to become net-zero once the power system transitions to 100% renewable supply. Further, beyond climate mitigation, all-electric buildings have gained momentum due to other advantages over dual-fuel homes. Energy costs in all-electric homes are lower than in households connected to the gas grid,¹⁰ and recent reports continue to show that gas appliances negatively impact human health for residents, with the impact of gas cooking on childhood asthma being comparable to those of a smoking household.¹¹

Currently new gas connections in Victoria are continuing to increase, even though this locks new homes into a more polluting and expensive energy source. This is being driven by outdated planning rules that mandate connecting to the gas network where a connection is available. There is an urgent need to update our planning schemes, building codes and plumbing regulations so these are consistent with our long-term and interim emissions targets and can play a facilitating role in reducing emissions in the transition away from gas.

Specifically:

- Victoria's Planning Provisions and Plumbing regulations to be updated urgently so no new development is forced to connect to the gas network and no Victorian is forced to use gas appliances.
- The Victorian government should commit to building all-electric social housing, as it will yield the greatest benefits for residents, the energy system and for the development of the industry.
- A plan to require new buildings to be all-electric, or at least strongly incentivise it, should be developed to ensure that virtually all, if not all, new buildings in Victoria are fully powered by electricity by 2023.

For existing buildings, we recommend the Victorian Government undertake an ambitious program to upgrade every single residential gas appliance to a superior, safer and more efficient electric appliance. Along with saving households money, this would significantly reduce peak winter gas

⁹ A zero- carbon- ready building is highly energy efficient and either uses renewable energy directly, or uses an energy supply that will be fully decarbonised by 2050, such as electricity or district heat. IEA (2021) https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroBy2050-ARoadmapfortheGlobalEnergySector_CORR.pdf

¹⁰ https://renew.org.au/wp-content/uploads/2018/08/Household_fuel_choice_in_the_NEM_Revised_June_2018.pdf

¹¹ <https://www.climatecouncil.org.au/wp-content/uploads/2021/05/Kicking-the-Gas-Habit-How-Gas-is-Harming-our-Health.pdf>

demand,¹² avoiding any looming gas shortfalls and removing the need for destructive new gas supply projects.

Electrifying industry offers additional potential to reduce emissions through electrification. According to recent analysis from consulting firm McKinsey, almost 50% of energy consumed by industry could be already electrified.¹³ As a reference, according to Beyond Zero Emissions' Electrifying Industry report, Australia could reduce our greenhouse gas emissions by up to 8% by electrifying industry's heat uses.¹⁴

Improving energy efficiency

Improving energy efficiency can help decrease energy demand, making it even easier for Victoria to shift to all renewable power by 2030. But Australia, including Victoria, has much work to do. According to the American Council for an Energy-Efficient Economy (ACEEE) Australia ranks as the worst-performing major developed economy among the 25 largest energy users in the world.¹⁵ The upside of this reality is that there is vast room for improvement and for households and businesses to reap the benefits of consuming energy in a smart way.

Victoria is ahead of other states since it has already taken a broad approach to improving household and commercial energy efficiency through the Victorian Energy Upgrades program. The program's new targets through to 2025 are a welcome start, as is the revision of emissions factors that will mean the VEU will no longer incentivise gas appliances. However, to be maximally effective, the program should become compulsory for the largest consumers of energy, much like the Environment and Resource Efficiency Plans Program that was administered by the EPA until its early sunset in 2013. A key element was mandatory implementation of efficiency measures that have a payback period of three years or less. An interim review of the program found that many facilities would not have implemented any efficiency measures were it not for the assistance of the EPA through the program.

Another easy and affordable action is to insulate and weatherproof 1.5 million 2-star rated homes in five years. Victorian homes are cold, unsealed and costly to heat, but this can be easily fixed. We recommend a comfortable homes program to rapidly improve the thermal performance of Victorian homes. Comfortable homes, better health, lower bills, and lower demand for gas and electricity.

Integration of household energy infrastructure in energy transition

Households will increasingly own energy assets that can perform a range of energy services. Planned well, the aggregated integration of household energy assets would create major energy

¹² Northmore Gordon (2020), Victorian Gas Market – Demand Side Measures to Avoid Forecast Supply Shortfall. <https://environmentvictoria.org.au/2020/06/03/victorian-gas-market-demand-side-measures-to-avoid-forecast-supply-shortfall/>

¹³ <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/plugging-in-what-electrification-can-do-for-industry>

¹⁴ <https://bze.org.au/wp-content/uploads/2020/12/electrifying-industry-bze-report-2018.pdf>

¹⁵ Fernando Castro-Alvarez, Shruti Vaidyanathan, Hannah Bastian, and Jen King (2018), The 2018 International Energy Efficiency Scorecard (ACEEE).

assets in the form of Virtual Power Plants and Virtual Transmission Lines. An all-electric housing stock with integrated EV storage could boast a combined storage of 185 GWh.

(e) Government action that would be needed to support workers in impacted industries

As detailed in Environment Victoria's submission to the Inquiry into the Closure of Hazelwood and Yallourn Power Stations, change is inevitable and the power system continues to transform rapidly. While the changes will continue to bring overall society-wide benefits, those benefits and the impacts of transitioning fall differently on different communities, especially communities largely dependent on declining industries.

Consequently, investing in a dedicated transition authority or authorities, such as the Latrobe Valley Authority, is of critical importance for supporting a just transition to renewable energy. Other critical investments include support for:

- Community-driven approaches that ensure impacted workers and communities are actively involved, providing an important basis for creating and sustaining the social license for just and rapid decarbonisation;
- Proactive planning to support workers finding new employment, retraining, and reskilling;
- Comprehensive planning that accounts for other key community resources such as health, food, education, energy, services, and transport and communications infrastructure; and
- Long-term funding commitments that match the timescale required for transition.

Since most generating and transmission assets will be sited in regional Victoria, investing for collaborative engagement with communities and individuals is critical. Such engagement and investment should include local industries, employers, plus education and training. Doing so will help ensure that as many Victorians as possible are included in and directly benefit from the transition. This will help to embed social licence into planning and implementation, further enabling a transition to a fully renewable power system.

(f) the economic risks of not urgently reducing emissions by transitioning to renewable energy

We wish to highlight the two most apparent risks of lagging on the transition to renewable energy as:

1. Increasing severity and cost of climate change impacts

As the 2019/2020 bushfires, recent flooding, and ongoing coral bleaching in the Great Barrier Reef clearly show, Australia will continue to be impacted more frequently and more severely by climate change, and with greater costs. As but one example, the Department of Treasury and Finance estimated that the 2019/2020 bushfires cost Victorians about \$2.1 billion.¹⁶ Accounting for health effects, loss of income, loss to tourism, forestry, and other industries, ecosystem loss, and other harms puts national estimates at as much as \$100 billion.¹⁷ Increasing bushfire frequency and severity have been definitively linked to climate change,¹⁸ as have increasing frequency and severity of droughts¹⁹ and tropical cyclones.²⁰

In the global race to limit future climate change, emissions cuts now matter a lot more than emissions cuts in the future - and Victoria needs to do its part.

2. Risking being left behind on the rapidly growing global markets for cleantech products and renewable energy exports.

A key factor in the falling prices of renewable power generation is the expansion of global manufacturing and markets of those technologies. As described above, Victoria stands to benefit from a significant expansion of jobs and industry as the global industry expands at even faster rates. Not acting to take advantage of that opportunity would be very costly for Victorians.

BZE's most recent report, [Export Powerhouse](#), outlines how Australia's export profile is highly exposed to demand collapse as the world rapidly pivots to a zero-emissions future. Current climate targets of Australia's key trading partners will wipe \$128 billion a year off Australia's exports unless we invest in alternatives. Currently 39% of Australia's total commodity exports are fossil fuels in the form of thermal coal, metallurgical coal, crude oil and LNG. However, Australia's top five export markets (China, Japan, South Korea, US and the EU) have all set net zero targets and are implementing ambitious policy settings that will drive down demand faster.

Australia is well positioned to pivot our export strategy and capitalise on these emerging green export market trends. Beyond Zero Emissions research shows that Australia can grow its revenue from new green exports to \$333 billion by 2050. But we have to move quickly. The global race has started and our competitors are already moving fast to attract investment and secure market share.

¹⁶ <https://www.dtf.vic.gov.au/victorias-economic-bulletin-volume-5/economic-impacts-2019-20-bushfires-victoria>

¹⁷ <https://edition.cnn.com/2020/01/10/perspectives/australia-fires-cost/index.html>

¹⁸ <https://www.csiro.au/en/news/News-releases/2021/New-research-links-Australias-forest-fires-to-climate-change>

¹⁹ <https://www.climatecouncil.org.au/resources/climate-change-and-drought-factsheet/>

²⁰ <https://news.sciencebrief.org/cyclones-mar2021/>

Moreover, by not taking measures to ensure that Victoria's power supply comes from renewables will expose exports to carbon border tariffs. The European Union has recently passed a border tax to come into effect in 2023 and the Biden Administration in the United States has made serious motions to push for one, too. At their current carbon intensity, exports from Victoria would suffer under these policies.

Increasing penetration of renewables to 100% would position Victorian industry to benefit instead, being well positioned to compete against carbon-intensive competitors such as China.

Thank you for the opportunity to contribute to this inquiry and we are more than happy to share in more detail our joint experiences engaging with community and industry about the transition to renewable energy in Victoria.

Kind regards,

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