

Victorian Renewable Energy Target

2019-20 Progress Report



Tabled by the Minister for Energy, Environment and Climate Change, pursuant to Section 8 of the *Renewable Energy (Jobs and Investment) Act 2017*.

Photo credit

David McArthur, Parallax Photography

Acknowledgment

We acknowledge and respect Victorian Traditional Owners as the original custodians of Victoria's land and waters, their unique ability to care for Country and deep spiritual connection to it. We honour Elders past and present whose knowledge and wisdom has ensured the continuation of culture and traditional practices.

We are committed to genuinely partner, and meaningfully engage, with Victoria's Traditional Owners and Aboriginal communities to support the protection of Country, the maintenance of spiritual and cultural practices and their broader aspirations in the 21st century and beyond.



© The State of Victoria Department of Environment, Land, Water and Planning 2020



This work is licensed under a Creative Commons Attribution 4.0 International licence. You are free to re-use the work under that licence, on the condition that you credit the State of Victoria as author. The licence does not apply to any images, photographs or branding, including the Victorian Coat of Arms, the Victorian Government logo and the

Department of Environment, Land, Water and Planning (DELWP) logo. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>

Disclaimer

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Accessibility

If you would like to receive this publication in an alternative format, please telephone the DELWP Customer Service Centre on 136186, email customer.service@delwp.vic.gov.au, or via the National Relay Service on 133 677 www.relayservice.com.au. This document is also available on the internet at www.delwp.vic.gov.au.

Contents

Minister’s foreword	2
1. Background	4
1.1 About this report.....	4
1.2 The Victorian Renewable Energy Target and market development in the renewable energy sector	4
2. Progress towards the VRET targets	5
2.1 Victoria’s current electricity generation profile.....	5
2.2 Renewable energy development.....	8
2.3 Investment and employment	10
3. Conclusion	13

Minister's foreword



I am pleased to release the third Victorian Renewable Energy Target (VRET) Progress Report to Parliament for the 2019-20 financial year. The report outlines the achievements of our commitment to a renewable energy transition driving new investment, creating jobs, reducing emissions from electricity generation, and supporting supply chain development.

The development of Victoria's renewable energy sector over the last year has meant that Victoria has stayed on track to meet the VRET target of 25 per cent renewable energy by 2020. Victoria's renewable energy generation share increased from 21.3 per cent in 2018-19 to 24.3 per cent in 2019-20. Importantly, the renewable energy sector has contributed to supporting the Victorian economy at a critical time during the coronavirus (COVID-19) pandemic.

Building on the significant achievements from the VRET policy to date, the Victorian Government commenced a market sounding process for a second VRET auction in September 2020 to test industry interest and capacity for at least 600 megawatts (MW) of new renewable energy projects. This will be an

important opportunity to accelerate investment in renewable energy, reduce carbon emissions and create jobs as a part of Victoria's green economic recovery to get the economy back on track.

Victoria is leading the way nationally by legislating an increased VRET target of 50 per cent by 2030. In October 2019, the Renewable Energy (Jobs and Investment) Amendment Bill passed the Victorian Parliament. The amended Bill received Royal Assent in November 2019.

The VRET 2030 target reaffirms our commitment to embracing the renewable energy transition and harnessing the significant economic, environmental, and social benefits for current and future generations of Victorians. Achieving the VRET 2030 target is expected to:

- create 24,400 two-year jobs in Victoria over the period to 2030;
- bring forward significant new investment in renewable energy capacity, improving the reliability of Victoria's supply;
- generate annual electricity bill savings of around \$32 for households, \$3,100 for medium businesses, and \$150,000 for large companies;
- support additional economic activity of up to \$5.8 billion in Victoria over the period to 2030; and
- reduce Victoria's emissions from electricity generation in 2030 by 2 million tonnes of carbon dioxide equivalent (Mt of CO₂e), contributing to Victoria's long-term target of net zero emissions by 2050.

Over 2019-20, the development of the successful wind and solar projects from the first VRET auction progressed significantly. For instance, Dundonnell, Mortlake South, Berrybank wind farms and the Cohuna solar farm continued through construction while the Winton solar farm commenced construction. We continue to work with the project proponents to deliver these projects and ensure that their best-practice community engagement and benefit sharing plans are fully realised for Victorian communities throughout all stages of the projects' development.

The Victorian Government's nation-leading Solar Homes program is continuing to provide rebates on rooftop solar systems, batteries and solar hot water systems for 770,000 Victorian households over ten years. Over the 2019-20 financial year, the Solar Homes program supported 47,828 new rooftop solar photovoltaic (PV) installations in Victoria with a combined capacity of 287 MW. The Solar Homes program is expected to generate one seventh of Victoria's 40 per cent renewable energy target by 2025 and one sixth of Victoria's 50 per cent renewable energy target by 2030.

The VRET 2019-20 Progress Report found that the 3,220 MW of renewable energy projects that were either commissioned, under construction, or undergoing commissioning during 2019-20 are estimated to have resulted in capital expenditure of about \$2.24 billion and 1,472 jobs during the 2019-20 financial year. Over the period from project commencement to completion, these projects are estimated to support \$5.96 billion in capital expenditure and 3,919 jobs.

Victoria is on track to meet the 2020 VRET target of 25 per cent renewable generation. More than 1,000 MW of projects under construction or commissioning as of 30 June 2020 have been or are expected to be commissioned by the end of 2020.

Please join me in celebrating our significant achievements in renewable energy and our progress towards the VRET targets to date. Our government will continue to work with the community and renewable energy industry to lead the energy transition, seizing the benefits, while maintaining an affordable, reliable and secure energy system for all Victorians.

1. Background

1.1 About this report

Under the *Renewable Energy (Jobs and Investment) Act 2017* (REJI Act), Victoria legislated renewable energy targets of 25 per cent by 2020, 40 per cent by 2025 and 50 per cent by 2030.

Section 8 of the REJI Act requires the Minister for Energy, Environment and Climate Change (the Minister) to report to the Parliament for each financial year on:

- the progress made towards meeting the renewable energy targets;
- investment and employment in Victoria in relation to renewable electricity generation; and
- the performance of schemes to achieve targets under the REJI Act that promote the generation of electricity by large scale facilities that utilise renewable energy sources or convert renewable energy sources into electricity.

The reporting period for this report is the 2019-20 financial year.

This report presents an assessment of progress towards the targets and state-wide investment and employment in Victoria in relation to renewable energy generation.

The Department of Environment, Land, Water and Planning (DELWP) has based this report on the latest publicly available information from sources including the Australian Energy Market Operator (AEMO), the Clean Energy Regulator (CER), and project information received from renewable energy project developers.

1.2 The Victorian Renewable Energy Target and market development in the renewable energy sector

The Victorian Government introduced the VRET to provide greater policy certainty and investor confidence for the renewable energy industry in Victoria. The REJI Act is one of the key drivers contributing to the development of renewable energy projects in Victoria.

The development of Victoria's renewable energy industry should be considered in the context of the market as a whole. Other important factors affecting this sector include national renewable energy policy, the cost of energy technologies and conditions in Victoria's electricity network, outlined further below.

- **The Federal Large-Scale Renewable Energy Target (LRET):** the LRET target of 33,000 GWh of renewable energy generation by 2020¹ and the introduction of the VRET have provided significant policy certainty to the renewable energy sector to 2020. The VRET 2025 and 2030 targets will continue to provide long-term investor certainty in Victoria through to 2030. However, at the national level there is no policy certainty to support the renewable energy industry post-2020.
- **The cost of renewable energy technologies** such as wind and solar PV continues to decline, enabling new-build renewables to become more competitive in the energy market compared to existing thermal electricity generation including coal-fired power stations and gas-fired generators². New-build renewables are already significantly cheaper than new-build thermal generators in Australia³.
- Recent increases in renewable energy capacity in some technically weaker areas of **Victoria's electricity network** have created technical challenges for AEMO's operation of the Victorian network⁴. These challenges have affected Victorian renewable energy projects (including through output constraints⁵ and commissioning delays) and have contributed to a slowing in the volume of Victorian renewable energy projects achieving financial close over the past year⁶.

¹ Note that the Legislation governing the LRET is set until 2030.

² Reserve Bank of Australia, Renewable Energy Investment in Australia, RBA Bulletin, March 2020. See: <https://www.rba.gov.au/publications/bulletin/2020/mar/pdf/renewable-energy-investment-in-australia.pdf>

³ CSIRO, GenCost 2019-20, May 2020. See: <https://publications.csiro.au/publications/#publication/Plcsi:EP201952>

⁴ AEMO, Renewable Integration Study: Stage 1 report, April 2020. See: <https://aemo.com.au/-/media/files/major-publications/ris/2020/renewable-integration-study-stage-1.pdf?la=en&hash=BEF358122FD1FAD93C9511F1DD8A15F2>

⁵ See footnote 4 above.

⁶ Clean Energy Council, Renewable energy investment falls as risks mount, August 2020. See <https://www.cleanenergycouncil.org.au/news/renewable-energy-investment-stalls-as-risks-mount>

2. Progress towards the VRET targets

Highlights

- Over the 2019-20 financial year, renewable energy sources accounted for approximately 24.3 per cent of Victoria's electricity generation, up from 21.3 per cent in 2018-19.
- As at 30 June 2020, there were 19 new renewable energy projects under construction or undergoing commissioning in Victoria. These projects have a combined capacity of 3,006 MW.
- **Victoria is on track to meet the VRET 2020 target.** DELWP estimates that increased output from renewable energy projects under commissioning throughout 2020, combined with continued growth in rooftop PV generation, will meet the 2020 VRET target of 25 per cent renewable generation.

2.1 Victoria's current electricity generation profile

Renewable energy generation

In the 2019-20 financial year, Victoria generated around 11,842 gigawatt hours (GWh) of electricity from VRET eligible renewable energy sources (Table 1). This renewable electricity generation accounted for around 24.3 per cent of the 48,719 GWh of electricity generated in Victoria in 2019-20 from all sources⁷. The major contributors to renewable generation in Victoria over the 2019-20 financial year were wind generation (about 12.2 per cent), solar power including both large-scale solar and rooftop PV (6.6 per cent) and hydroelectricity (4.5 per cent).

Table 1: Victorian electricity generation by source, 2019-20 financial year

Source	GWh	Share (%)
Brown coal	33,731	69.2
Gas	2,874	5.9
Renewable energy		
- Hydroelectricity	2,197	4.5
- Wind	5,931	12.2
- Bioenergy (renewable energy sources eligible under VRET) ⁸	518	1.1
- Solar (rooftop and large scale)	3,195	6.6
Other (renewable energy sources non-eligible under VRET)	271	0.6
Total eligible renewable energy	11,842	24.3
Total all renewable energy	12,113	24.9
Total	48,719	100.0

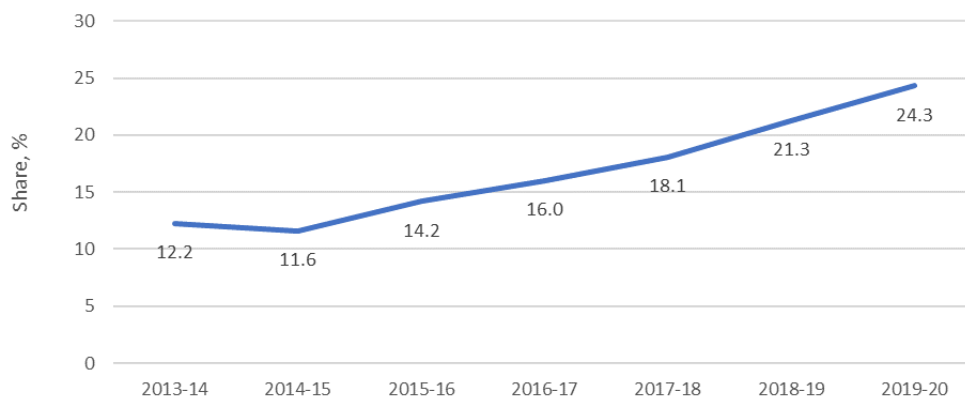
⁷ The share of renewable generation from all sources (VRET eligible and ineligible) in 2019-20 was 24.9 per cent of Victoria's total electricity generation.

⁸ Bioenergy from native forest wood waste is not included as an eligible renewable energy source under VRET, as per the Minister's declaration of renewable energy sources on 29 June 2018. Victorian Government Gazette No. S318.

Source: NEM Review, Metered generation (as generated), extracted on 2 July 2020⁹ except for bioenergy (based on Australian Government Department of Industry, Science, Energy and Resources, Australian Energy Statistics)¹⁰ and some small generators (based on Departmental estimates)¹¹. Note: Totals may not sum due to rounding.

The share of renewable energy in Victoria’s electricity generation has increased steadily in recent years from around 11.6 per cent in 2014-15 and 14.2 per cent in 2015-16 to approximately 24.3 per cent over the 2019-20 financial year (Figure 1).

Figure 1: Victorian renewable electricity generation share, 2013-14 to 2019-20



Source: Please refer to Table 1 for sources.

Installed renewable energy generation capacity

As of 30 June 2020, Victoria had 6,888 MW of installed capacity from all sources of renewable energy eligible to contribute to Victoria’s renewable energy targets – hydroelectricity, wind, solar (including both large-scale solar and rooftop PV) and bioenergy excluding native forest wood waste¹² (Figure 2). This compares to around 6,140 MW of installed capacity at 30 June 2019¹³. A key driver of this growth was Victoria’s Solar Homes program, which in 2019-20 supported 47,828 new rooftop PV installations in Victoria with a combined capacity of 287 MW. Victoria’s 6,888 MW of installed renewable energy capacity at 30 June 2020 exceeds the 6,341 MW of renewable energy capacity that the Minister for Energy, Environment and Climate Change determined in December 2017 would be required to meet the Victoria’s 2020 renewable energy target¹⁴.

⁹ NEM Review is an Australian electricity data service prepared by Global Roam and subscribed to by the Department. NEM Review’s metered generation data is based on AEMO’s actual 5-minute electricity generation data for scheduled generating units, semi-scheduled generating units and non-scheduled generating units and estimated output of rooftop solar PV systems from AEMO’s Australian Solar Energy Forecasting System. The NEM Review data captures the vast majority of Victorian electricity generation with some exceptions – see footnotes 11 and 12, below.

¹⁰ NEM Review does not include data for Victorian bioenergy generation. Estimated electricity generation from bioenergy generation is instead sourced from the Australian Energy Statistics, Table O Electricity generation by fuel type 2018-19 and 2019. Note that this update did not include data for 2019-20 so data from 2018-19 was used as a proxy for 2019-20.

¹¹ Electricity generation volumes for some small generators – Chepstowe (6.1 MW), Codrington (18.2 MW), Leonard’s Hill (4.1 MW), Toora (21 MW), Wonthaggi (12 MW), Coonooer Bridge (19.8 MW), Maroona (7.2 MW), Timboon West (7.2 MW) and Yawong (7.2 MW), Swan Hill (14.4 MW), Numurkah APSU (6.0 MW), ACEnergy Girgarre (5.0 MW), ACEnergy Echuca (5.0 MW), ACEnergy Stanhope (5.0 MW), ACEnergy Katamatite (5 MW), ACEnergy Numurkah (5 MW), Robinvale (9.2 MW), Longford (46.4 MW) and Qenos (21.0 MW) – are not reported by NEM Review. Annual output of these generators is estimated by the Department.

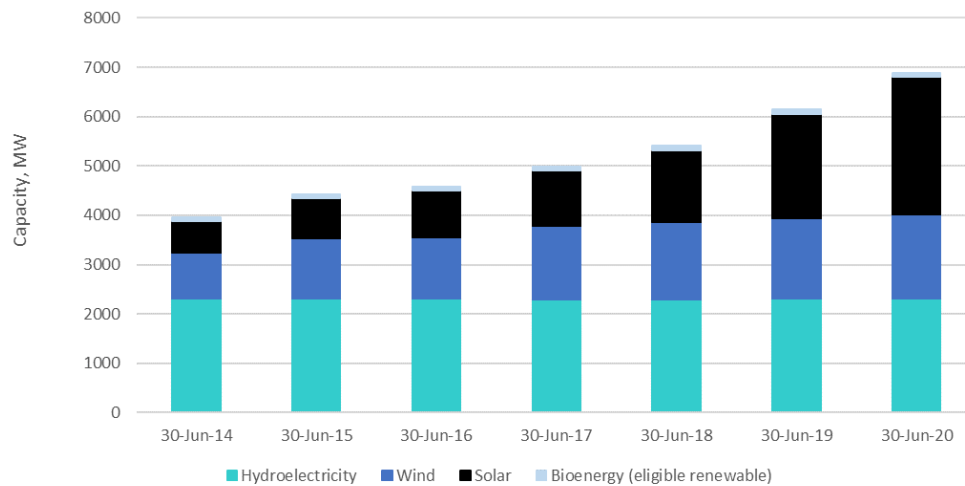
¹² Bioenergy from native forest wood waste is not an eligible renewable energy source, as per the Minister’s declaration of renewable energy sources on 29 June 2018. Victorian Government Gazette No. S318. Throughout this report, references to ‘eligible renewable generation’ should be interpreted as referring to the renewable generation sources that are eligible to contribute to VRET.

¹³ The 2018-19 VRET Progress Report reported a total installed renewable energy capacity of 6,098 MW, which was derived from the most up to date information at the time of publishing. This capacity has been updated for the 2019-20 VRET Progress Report with the most recent data for 2018-19 from AEMO Generation Information and the CER small-scale postcode data for solar installations (see footnotes 17 and 18). This change reflects updated rooftop PV data from the CER.

¹⁴ Victorian Government Gazette No. S466. This amount was determined in December 2017 by estimating a plausible Victorian electricity generation capacity mix and associated electricity generation profile for 2020 that achieved 25 per cent renewable energy generation. For the purpose of the determination, it was assumed that additional large-scale renewable energy capacity under VRET would be 80 per cent wind energy and 20 per cent solar PV.

Victoria's installed renewable energy capacity has increased by 2,923 MW since the end of June 2014. This is mainly driven by the installation of rooftop solar PV systems and the commissioning of large-scale wind and solar farms. Over this period, solar capacity increased by 2,149 MW and wind capacity increased by 770 MW, while bioenergy capacity increased by 5 MW¹⁵.

Figure 2: Victorian renewable electricity generation capacity, 2014 to 2020



Source: Based on AEMO, *Generation information for Victoria*¹⁶; CER, *Small-scale postcode data*¹⁷ and CER data on accredited power stations¹⁸ and other generation project information¹⁹.

Emissions reduction

Victoria's electricity sector greenhouse gas emissions have fallen from around 60.1 million tonnes (Mt) of CO₂-e in 2014-15 to around 41.0 Mt of CO₂-e in 2019-20 (Figure 3). This reduction has been driven by both the retirement of the Hazelwood Power Station in March 2017, and the significant growth of renewable electricity generation in Victoria. Victoria's electricity sector emissions intensity over the 2019-20 financial year was 0.84 t CO₂-e per MWh generated²⁰.

¹⁵ Solar capacity increased through continued uptake of rooftop solar systems and commissioning of large-scale solar farms at Gannawarra, Numurkah APSU, Wemen, Swan Hill, Karadoc, Numurkah, ACenergy Gargarre, ACenergy Echuca, ACenergy Stanhope, ACenergy Numurkah, ACenergy Katamatite and Robinvale. Wind capacity increased through commissioning of wind farms at Mt Mercer, Cape Nelson North, Chepstowe, Coonoor Bridge, Bald Hills, Ararat, Kiata, Maroona, Yaloak South, Salt Creek, Timboon West, Yawong and Crowlands. Bioenergy capacity increased through projects at Carina West, Wollert and Drysdale.

¹⁶ AEMO Generation information spreadsheets for Victoria dated 30 May 2014, 13 August 2015, 11 August 2016, 29 December 2017, 8 August 2019 and 30 April 2020 were used in developing this data. See <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information>

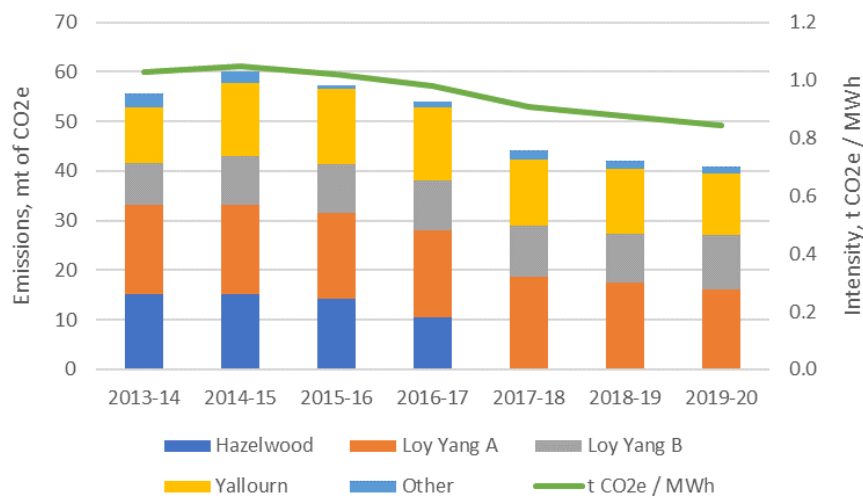
¹⁷ CER small-scale postcode data for solar installations from 2014 through to 2018 is sourced from historical data available on the CER website at <http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations/historical-postcode-data-for-small-scale-installations>. CER small-scale postcode data for solar installations from 2019 onwards is sourced from CER postcode data as at 31 August 2020 available at <http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations>

¹⁸ The CER's data on accredited power stations up to the end of 2019 is available at <http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/Large-scale-Renewable-Energy-Target-market-data/large-scale-renewable-energy-target-supply-data/historical-large-scale-renewable-energy-target-supply-data>. The CER's data on accredited power stations in 2020 is available at: <http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/Large-scale-Renewable-Energy-Target-market-data/large-scale-renewable-energy-target-supply-data>

¹⁹ This information includes publicly available information from project websites and media releases and information that DELWP has obtained directly from project proponents.

²⁰ Emissions intensity is calculated as the total carbon dioxide equivalent emissions produced by Victorian electricity generators over the reporting period divided by total Victorian electricity generation (measured on an as generated basis which includes generators' own consumption of electricity) over the period. The electricity sector greenhouse gas emissions data used in this calculation is sourced from NEM Review, *Greenhouse emissions*, extracted on 9 July 2020. The electricity generation data used in this calculation is described in the sources for Table 1.

Figure 3: Emissions and emissions intensity of Victorian electricity generation, 2013-14 to 2019-20



Source: NEM Review, Greenhouse emissions, extracted 9 July 2020 and Victorian electricity generation data (refer to Table 1 sources).

2.2 Renewable energy development

Renewable energy generation projects commissioned in 2019-20

In the 2019-20 financial year, Victoria's renewable energy capacity increased by 748 MW (Table 2). This growth was driven by the:

- commissioning of the Crowlands wind farm;
- commissioning of solar farms at Girgarre, Echuca, Stanhope, Numurkah, Katamatite and Robinvale;
- installation of 535 MW of rooftop solar panels by Victorian homes and businesses²¹.

Table 2: Change in Victorian renewable electricity generation capacity in 2019-20

Project	Technology	Capacity (MW)	Location	Commissioned
Crowlands	Wind	80	20 km north east of Ararat	Q2 2020
Subtotal – wind		80		
ACEnergy Girgarre	Large-scale solar	5	Henderson Rd, Girgarre	Q4 2019
ACEnergy Stanhope	Large-scale solar	5	Hadfield Rd, Stanhope	Q4 2019
ACEnergy Echuca	Large-scale solar	5	Anderson Rd, Echuca	Q4 2019
ACEnergy Numurkah	Large-scale solar	5	Numurkah Rd, Numurkah	Q2 2020
ACEnergy Katamatite	Large-scale solar	5	Benalla-Tocumwal Rd, Katamatite	Q2 2020
Numurkah	Large-scale solar	100	Sellicks Road, Drumanure	2019
Robinvale	Large-scale solar	9	Pethard Rd, Robinvale	Q2 2020
Rooftop PV (a)	Rooftop PV	535	State wide	Year round

²¹ There was a 2 MW reduction in Victoria's hydroelectricity capacity between 2018-19 and 2019-20 because of a decrease in the capacity of Bogong/Mackay hydroelectricity station reported by AEMO.

Project	Technology	Capacity (MW)	Location	Commissioned
Subtotal – solar		669		
Subtotal – hydroelectricity²¹		-2		
Total		748		

Note: (a) includes both small-scale rooftop PV installations and commercial scale rooftop PV installations.

Sources: Information on the large-scale solar projects was obtained from public and private sources²². Small-scale rooftop PV capacity is sourced from CER, Small-scale postcode data²³ while commercial scale rooftop PV capacity is sourced from CER data on accredited power stations²⁴.

Renewable energy generation projects under construction or undergoing commissioning

As at 30 June 2020, there were 3,006 MW of renewable energy projects under construction or undergoing commissioning in Victoria (Table 3). This comprises thirteen wind farms projects with a combined capacity of around 2,381 MW and six solar farms with a combined capacity of around 625 MW.

Table 3: Victorian renewable energy projects under construction or commissioning as at 30 June 2020

Project	Technology	Capacity (MW)	Location	Estimated commissioning ²⁵
Berrybank	Wind	180	60 km south west of Ballarat	2021
Bulgana	Wind	204	20 km north of Ararat	2021
Cherry Tree	Wind	58	15 km south east of Seymour	Q3 2020
Diapur	Wind	7	19 km west of Nhill	Q2 2021
Dundonnell	Wind	336	23 km north east of Mortlake	2020
Ferguson	Wind	9	9 km north of Princetown	Q4 2020
Lal Lal (Elaine)	Wind	84	25 km south of Ballarat	Q4 2020
Lal Lal (Yendon)	Wind	144	25 km south of Ballarat	Q4 2020
Mount Gellibrand	Wind	132	25 km east of Colac	2021
Murra Warra Stage 1	Wind	226	25 km north of Horsham	Q3 2020
Moorabool	Wind	312	25 km south east of Ballarat	Q3 2021
Mortlake South	Wind	158	5 km south of Mortlake	2021
Stockyard Hill	Wind	532	35 km west of Ballarat	Q2 2021
Subtotal – wind		2,381		
Bannerton	Large-scale solar	88	Knight Rd & Wewak Rd, Bannerton	2020
Cohuna	Large-scale solar	34	Kerang-Leitchville Rd, Horfield	2021
Glenrowan West	Large-scale solar	110	Chivers Rd, Glenrowan West	Q2 2021

²² See footnotes 17 and 20 above.

²³ See footnote 18 above.

²⁴ See footnote 19 above.

²⁵ Estimated commissioning dates are based on the best available information to the Department at the time of reporting. This includes information available from AEMO and project proponents. These dates are estimates only and subject to change.

Project	Technology	Capacity (MW)	Location	Estimated commissioning ²⁵
Kiamal	Large-scale solar	200	Calder Highway, Ouyen	Q4 2020
Winton	Large-scale solar	99	Winton-Glenrowan Rd, Winton	2021
Yatpool	Large-scale solar	94	Doering Rd, Carwarp	Q1 2021
Subtotal – solar		625		
Total – wind and solar		3,006		

Note: Projects are reported by nameplate capacity as reported by AEMO Generation Information spreadsheet dated 30 April 2020²⁶. Sources: Information on all projects was obtained from public and private sources²⁷.

Tracking Victorian renewable energy generation to 2020

1,145 MW of Victorian renewable energy projects under construction or commissioning as at 30 June 2020 are expected to complete commissioning by the end of 2020. Victoria is on track to meet the 2020 VRET target of 25 per cent renewable generation. In 2019-20 renewable sources accounted for 24.3 per cent of Victoria's electricity generation. DELWP expects that increased output from renewable projects under commissioning throughout 2020, combined with continued growth in generation from Victorian rooftop solar systems, will be sufficient to increase Victoria's renewable generation share to above 25 per cent for the 2020 calendar year.

2.3 Investment and employment

Highlights

- Development of new renewable energy generation projects is expected to grow the sector in coming years and build upon the existing contribution of the renewables sector to the Victorian economy.
- Large-scale renewable projects in development (3,220 MW) in Victoria over the 2019-20 financial year are estimated to support around \$2.24 billion in capital expenditure and around 1,472 jobs in the 2019-20 financial year.
- Over the whole period from project commencement to completion, these projects are estimated to support \$5.96 billion in capital expenditure and 3,919 jobs.
- In addition to the jobs supported through the construction of large-scale renewable energy projects, rooftop solar PV installations completed in 2019-20 are estimated to have supported a further 3,105 jobs.

The installation and operation of renewable energy facilities attracts investment to the State, contributing to jobs growth and economic activity in Victoria. This section of the report discusses the investment and employment outcomes for Victoria's renewable energy sector in 2019-20.

Investment and employment from large-scale renewable energy projects commissioned or under construction in Victoria during 2019-20 are based primarily on information provided to DELWP by renewable energy project proponents. Victoria's small-scale solar industry is also an important driver of jobs and

²⁶ Projects contracted with the Victorian Government are reported by the capacity as reported by the project proponents, to ensure consistency across the government's reporting of these projects. For other projects, nameplate capacities from AEMO's Generation Information spreadsheet dated 30 April 2020 have been used. See <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Generation-information>

²⁷ See footnotes 17 and 20 above.

investment in Victoria. DELWP has estimated that Victoria's rooftop solar PV industry would have supported approximately 3,105 jobs in 2019-20²⁸.

Investment and employment from large-scale renewable generation projects

Based on information available to DELWP²⁹, it is estimated that the large-scale renewable generation projects in development in Victoria during the financial year 2019-20 generated \$2.24 billion in capital expenditure and 1,472 jobs over the 2019-20 financial year (Table 4)³⁰. Over the whole period from project commencement to completion, these projects are estimated to support \$5.96 billion in capital expenditure and 3,919 jobs³¹. Projects in development during 2019-20 include projects that were commissioned during 2019-20 or were under construction or undergoing commissioning as at 30 June 2020.

Table 4: Estimated capital expenditure and jobs associated with Victorian large-scale renewable energy projects in development in 2019-20

	Capacity (MW)	Capex (\$m)		Jobs	
		In 2019-20	Over project life	In 2019-20	Over project life
Wind	2,461	1,769	4,616	828	2,221
Solar	759	469	1,348	644	1,698
Total	3,220	2,238	5,964	1,472	3,919

Source: Information sourced directly from project proponents and publicly available information from project websites and media articles. Note the capex and jobs figures for 2019-20 are an estimate of the proportion of the total capex and jobs from project commencement to completion that occurred in the 2019-20 financial year.

Wind farm projects in development during 2019-20 are expected to account for around \$1.769 billion in capital expenditure and 828 jobs over 2019-20, while solar projects in development during 2019-20 are expected to account for around \$469 million in capital expenditure and 644 jobs in 2019-20.

Investment and employment by region

As Victoria's renewable energy facilities are being constructed in parts of the state with very strong renewable energy resources, the economic activity associated with renewable energy construction will benefit these regions. The areas of western Victoria, including the Central Highlands, Wimmera Southern Mallee, Barwon and the Great South Coast have particularly good wind resources and have attracted much of the recent wind farm construction activity in Victoria (Table 5). In the same vein, large-scale solar project development has occurred in Victoria's north to capture the higher levels of solar irradiation in that part of Victoria relative to the rest of Victoria.

Table 5: Overview of renewable energy project development activity in Victoria during 2019-20, by region³²

	Capacity (MW)		Capex (\$m)		Jobs	
	Wind	Solar	Wind	Solar	Wind	Solar
Barwon and Great South Coast	815	0	717	0	372	0

²⁸ Based on data from the Clean Energy Regulator and the employment multiplier for rooftop PV reported in Rutovitz, J., et al. (2020) *Renewable Energy Employment in Australia: Methodology*. Prepared for the Clean Energy Council by the Institute for Sustainable Futures, University of Technology Sydney.

²⁹ This information includes publicly available project information from websites and media articles, and information obtained by DELWP from project proponents. Note that whole-of-project renewable energy project jobs figures are reported here in the same terms as they were provided by the proponents.

³⁰ Construction jobs for 2019-20 have been estimated by apportioning the construction jobs figure reported by project proponents by the number of months in 2019-20 that the project was under construction relative to the project's total construction period. Operational jobs for 2019-20 have been estimated by apportioning the operational jobs figure reported by project proponents by the number of months in 2019-20 that the project was generating. DELWP notes that jobs figures are difficult to define and that this approach is an approximation.

³¹ Investment and jobs outcomes in previous VRET Progress Reports were reported on this basis as total values from project commencement to completion.

³² Regional definitions in this table are based on Regional Development Victoria's Regional Partnerships classifications at: <https://www.rdv.vic.gov.au/regional-partnerships>

	Capacity (MW)		Capex (\$m)		Jobs	
Central Highlands	1,152	0	786	0	299	0
Goulburn	58	110	73	17	54	64
Loddon Campaspe	0	15	0	23	0	83
Mallee	0	425	0	301	0	390
Ovens Murray	0	209	0	128	0	107
Wimmera Southern Mallee	437	0	193	0	103	0
Total	2,461	759	1,769	469	828	644

Source: Information sourced directly from project proponents and publicly available information from project websites and media articles.

3. Conclusion

The VRET 2019-20 Progress Report provides a review of data and key statistics on the status and trends of the development of the renewable energy sector in Victoria, with a focus on outcomes achieved over the 2019-20 financial year.

Overall, 2019-20 saw high levels of activity in Victoria’s renewable energy industry as households and businesses continued to embrace rooftop solar generation and as large-scale renewable energy projects commenced in previous years proceeded through construction and into commissioning. As a result, employment in Victoria’s renewable energy industry in 2019-20 remained high and electricity generation from renewable sources continued to grow.

A synthesis of the key findings with respect to the reporting requirements under the REJI Act are set out in Table 6 below.

Table 6: VRET 2019-20 Progress Report – synthesis of findings

Reporting requirements	Financial year 2019-20	Section with further detail
Progress made towards meeting the renewable energy targets	<p>Renewable energy generation accounted for 24.3 per cent of Victoria’s electricity generation over the financial year.</p> <p>Victoria is on track to meet the 2020 VRET target. More than 1,000 MW of renewable energy projects under construction or commissioning as of 30 June 2020 have been or are expected to be commissioned by the end of 2020.</p>	Section 2.1
Investment and employment in Victoria in relation to renewable electricity generation	<p>Victoria’s installed small and large-scale renewable energy capacity increased by around 748 MW.</p> <p>Victoria is developing a significant amount of large-scale renewable energy generation capacity as follows:</p> <ul style="list-style-type: none"> • Commissioned projects amounting to 214 MW capacity from seven solar farms and one wind farm. • Projects under construction or undergoing commissioning as at 30 June 2020 have reached 3,006 MW from thirteen wind farms and six solar farms. 	Section 2.2
	<p>Projects commissioned during 2019-20 or under construction or undergoing commissioning as at 30 June 2020 are estimated to result in capital expenditure of almost \$2.24 billion and around 1,472 jobs in 2019-20.</p>	Section 2.3