

# Victorian Renewable Energy Target

2018-19 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

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## Minister's foreword



It is my great pleasure to deliver the second Victorian Renewable Energy Target (VRET) Progress Report to Parliament. The report outlines the achievements of our renewable energy policies and programs in driving new investment in renewable energy projects, creating jobs, reducing emissions from electricity generation and supporting supply chain development over the 2018-19 financial year.

Victoria is part of a major global energy transition, with renewable energy at the centre of this change. In October 2019, the Renewable Energy (Jobs and Investment) Amendment Bill 2019 passed the Victorian Parliament, delivering on the government's 2018 election commitment to legislate an increased VRET target of 50 per cent by 2030. This 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:

- bring forward significant new investment in renewable energy capacity, increasing total electricity generation in Victoria by 9 per cent in 2030, 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;
- increase employment by up to an average of 4,067 full time jobs a year, which equates to around a total of 24,400 two-year jobs in Victoria over the period to 2030; and
- reduce Victoria's emissions from electricity generation in 2030 by 2.0 million tonnes of carbon dioxide equivalent (Mt of CO<sub>2</sub>e) to 33.9 Mt of CO<sub>2</sub>e, contributing to Victoria's long-term target of net zero emissions by 2050.

In September 2018, the government announced the six successful wind and solar projects in Australia's largest reverse auction for new renewable energy capacity, the VRET 2017 Reverse Auction (the Auction). We are now working with the successful 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 government's renewable energy policies and programs, headlined by the VRET policy and the Auction, are stimulating new renewable energy supply chain development in Victoria. For example, as a result of the Auction, the Vestas Renewable Energy Hub (VREH) has been established in Geelong, where wind turbines are being assembled in Australia for the first time in more than 10 years. The VREH will train hundreds of local staff in wind turbine maintenance and is investing \$3.5 million on a range of other initiatives including a 700 square-metre Service, Logistics and Training Centre in Grovedale that will service the growing turbine fleet across Western Victoria and house major wind turbine components.

Because of our VRET, education providers are offering new courses and accreditations to meet industry demand. Federation University TAFE recently received accreditation to deliver the Global Wind Organisation Standard Course, which provides accreditation for wind turbine technicians that allows them to work on wind turbines around the world.

The 2018-19 financial year also saw our government launch the nation-leading \$1.3 billion Solar Homes program to provide rebates on rooftop solar systems, batteries and solar hot water systems for 770,000 Victorian households over ten years. The Solar Homes program is expected to save Victorians more than \$500 million per year on electricity bills and result in over 1 million Victorian homes powered by renewable energy.

The VRET 2018-19 Progress Report found that the share of Victoria's electricity generation from renewable sources increased to 21.3 per cent, up from 18.3 per cent in 2017-18. The 3,222 MW of renewable energy projects that were either commissioned, under construction or undergoing commissioning during 2018-19 are expected to result in capital expenditure of almost \$6 billion and around 4,262 jobs during construction and operation.

This report also presents an evaluation of the performance of the Auction and found that it proved to be effective, efficient and is delivering strong economic and social development outcomes for Victoria. Highlighting its success, the projects in the Auction total 928 megawatts (MW) of new renewable energy capacity, about 45 per cent more than the 650 MW originally sought in the tender. Together, the successful projects will generate \$1.1 billion of investment, create more than 900 new jobs and produce enough electricity to power more than 645,000 Victorian households.

In December 2017, I determined via publication in the Victorian Government Gazette, that the minimum renewable energy capacity required to meet the 2020 renewable energy target is 6,341 MW. The pipeline of 2,960 MW of renewable energy projects that are under construction or undergoing commissioning is expected to bring the total Victorian renewable energy capacity to 9,058 MW during 2020. Hence, our State remains well on track to meet our target of 25 per cent renewable energy by 2020. In December 2019, I will determine the minimum renewable energy capacity required to achieve the 40 per cent by 2025 target. Progress towards this target will be presented in the VRET 2019-20 Progress Report.

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, stakeholders and industry to lead the renewable 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. The REJI Act also supports schemes to achieve the targets while encouraging investment and employment in Victoria.

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 2018-19 financial year.

This report presents an assessment of: progress towards the targets; state-wide investment and employment in Victoria in relation to renewable energy generation; and, the performance of the VRET 2017 Reverse Auction – a scheme designed to support the achievement of the targets.

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 growth of the renewable energy industry in Victoria 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 private sector investment, outlined further below.

- **The Federal Large-Scale Renewable Energy Target (LRET):** the LRET target of 33,000 GWh of renewable energy generation by 2020<sup>1</sup> and the introduction of the VRET have provided significant policy certainty to the renewable energy sector to 2020. The increased VRET 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 generators<sup>2</sup>. New-build renewables are already significantly cheaper than new-build thermal generators in Australia<sup>3</sup>.
- **Private sector investment** has increased in recent years. During 2018-19, Victorian renewable energy projects including the Dundonnell, Mount Gellibrand and Cherry Tree wind farms and the Kiamal solar farm signed new corporate power purchasing agreements<sup>4</sup>.

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<sup>1</sup> Note that the Legislation governing the LRET is set till 2030.

<sup>2</sup> Bloomberg New Energy Finance, *New Energy Outlook 2019*. See: <https://about.bnef.com/new-energy-outlook/>

<sup>3</sup> CSIRO, *GenCost 2018*. See: <https://publications.csiro.au/rpr/download?pid=csiro:EP189502&dsid=DS1>

<sup>4</sup> See [https://issuu.com/tilt renewables/docs/tilt\\_renewables\\_annual\\_report\\_2019\\_e=33840407/62726998](https://issuu.com/tilt renewables/docs/tilt_renewables_annual_report_2019_e=33840407/62726998); <https://www.asx.com.au/asxpdf/20181218/pdf/441b9b9bzqzpw.pdf>; <http://www.iwn.org.au/news-blog/2019/4/29/intelligent-water-networks-help-launch-zero-emissions-water>

## 2. Progress towards the VRET targets

### Highlights

- Over the 2018-19 financial year, renewable energy sources accounted for approximately 21.3 per cent of Victoria's electricity generation, up from 18.3 in 2017-18.
- As at 30 June 2019, there were 16 new renewable energy projects under construction or undergoing the final stages of commissioning in Victoria. These projects are expected to add 2,960 MW to Victoria's renewable energy generation capacity.
- **Victoria is well on track to meet the VRET 2020 target.** Victorian renewable energy generation capacity is expected to exceed the minimum generation capacity of **6,341 MW** required to achieve the 2020 target. As at 30 June 2019, there was 6,098 MW of installed renewable energy generation capacity in Victoria and 2,960 MW under construction or commissioning, a total of **9,058 MW**.

The REJI Act legislates that renewable energy sources must provide 25 per cent of all Victorian electricity generation by 2020, 40 per cent by 2025, and 50 per cent by 2030.

On 28 December 2017, the Minister for Energy, Environment and Climate Change determined that the minimum renewable energy capacity required to meet the 2020 target is 6,341 MW<sup>5</sup>. This amount is the total volume of all renewable energy generation capacity that Victoria is estimated to need in order to meet its VRET 2020 target, including existing renewable energy capacity and new-build capacity.

Under the REJI Act, the Minister is required to determine the minimum capacity required to meet the 2025 target by 31 December 2019, and the minimum capacity required to meet the 2030 target by 31 December 2025.

### 2.1 Victoria's current electricity generation profile

#### Installed renewable energy generation capacity

As of 30 June 2019, Victoria had 6,098 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 waste<sup>6</sup> (Figure 1). This compares to around 5,404 MW of installed capacity at 30 June 2018<sup>7</sup>.

Victoria's installed renewable energy capacity has increased by 2,133 MW since the end of June 2014. This is mainly driven by commissioning of new solar and wind farms and installation of new rooftop solar PV systems. Specifically, solar capacity increased by 1,439 MW and wind capacity increased by 689 MW, while bioenergy capacity increased by 6 MW<sup>8</sup>.

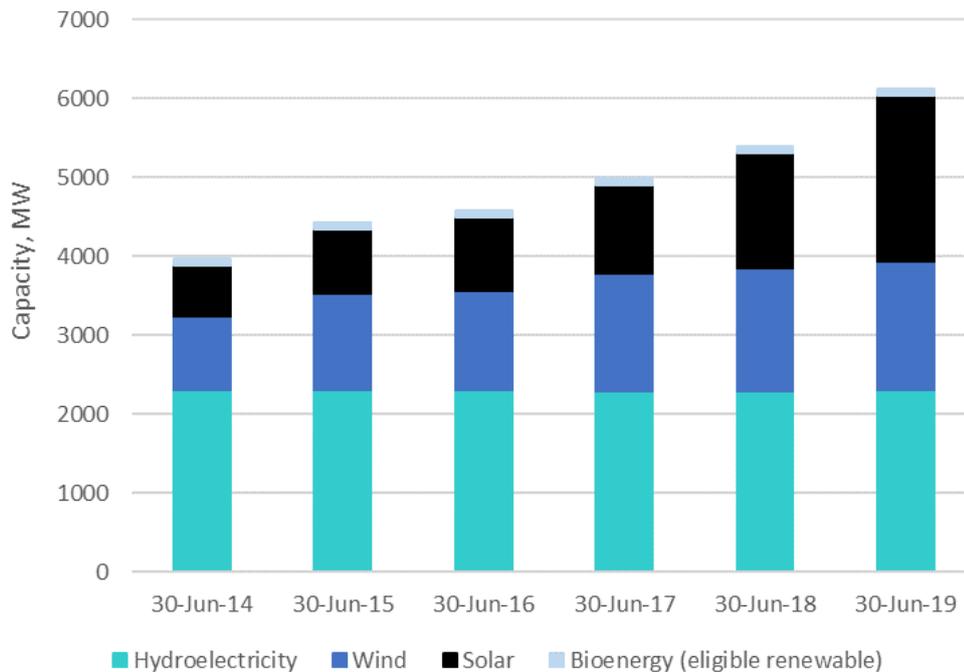
<sup>5</sup> Victorian Government Gazette No. S466. This amount was determined in December 2017 by estimating a plausible Victorian electricity generation capacity mix and associated electricity generation profile for 2020 that achieved 25 per cent renewable energy generation. For the purpose of the 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.

<sup>6</sup> 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.

<sup>7</sup> The 2017-18 VRET Progress Report reported a total installed renewable energy capacity of 5,345 MW, which was derived from the most up to date information at the time of publishing. This capacity has been updated for the 2018-19 VRET Progress Report with the most recent data for 2017-18 from AEMO Generation Information and the CER small-scale postcode data for solar installations (see footnotes 8 and 9). The majority of this change (39 MW) comes from updated rooftop PV data from the CER while the remainder (19 MW) reflects updated capacity values for Gannawarra solar farm, Oaklands Hill wind farm, Portland wind farm and some bioenergy projects.

<sup>8</sup> Solar capacity increased through continued uptake of rooftop solar systems and commissioning of large-scale solar farms at Gannawarra, Numurkah APSU, Wemen, Swan Hill and Karadoc. Wind capacity increased through commissioning of wind farms at Mt Mercer, Cape Nelson North, Chepstowe,

**Figure 1: Victorian renewable electricity generation capacity, 2014 to 2019**



Source: Based on AEMO, Generation information for Victoria<sup>9</sup>; CER, Small-scale postcode data<sup>10</sup> and Renewable Energy Certificate Registry (REC Registry) of accredited power stations<sup>11</sup> and other generation project information<sup>12</sup>.

### Renewable energy generation

In the 2018-19 financial year, Victoria generated around 10,124 gigawatt hours (GWh) of electricity from VRET eligible renewable energy sources (Table 1). This renewable electricity generation accounted for around 21.3 per cent of the 47,455 GWh of electricity generated in Victoria in 2018-19 from all sources<sup>13</sup>. The major contributors to renewable generation in Victoria over the 2018-19 financial year were wind generation (about 10.3 per cent), hydroelectricity (5.4 per cent) and solar power including both large-scale solar and rooftop PV (4.8 per cent).

Coonoor Bridge, Chepstowe, Ararat, Kiata, Maroona, Yaloak South, Salt Creek, Timboon West and Yawong. Bioenergy capacity increased through projects at Carina West, Wollert and Drysdale.

<sup>9</sup> AEMO Generation information spreadsheets for Victoria dated 30 May 2014, 13 August 2015, 11 August 2016, 29 December 2017 and 8 August 2019 were used in developing this data. See <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Generation-information>

<sup>10</sup> CER small-scale postcode data for solar installations from 2014 through to 2017 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 2018 onwards is sourced from CER postcode data as at 30 June 2019 available at <http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations#historical-data>

<sup>11</sup> The CER's REC Registry of Accredited Power Stations is available at <https://www.rec-registry.gov.au/rec-registry/app/public/power-station-register>. This information is supplemented with information contained in the CER's list of power stations accredited in 2019 - <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> and 2018 accredited power stations data - <https://www.rec-registry.gov.au/rec-registry/app/public/power-station-register>

<sup>12</sup> Other generation project information was used to update 2017 AEMO data for project developments to June 2018. This information includes publicly available information from project websites and media releases and information that DELWP has obtained directly from project proponents.

<sup>13</sup> The share of renewable generation from all sources (VRET eligible and ineligible) in 2018-19 was 21.8 per cent of Victoria's total electricity generation.

**Table 1: Victorian electricity generation by source, 2018-19 financial year**

Source	GWh	Share (%)
Brown coal	34,588	72.9
Gas	2,513	5.3
Renewable energy		
- Hydroelectricity	2,544	5.4
- Wind	4,885	10.3
- Bioenergy (renewable energy sources eligible under VRET) <sup>14</sup>	438	0.9
- Solar (rooftop and large scale)	2,258	4.8
Other (renewable energy sources non-eligible under VRET)	229	0.5
<b>Total eligible renewable energy</b>	<b>10,124</b>	<b>21.3</b>
<b>Total all renewable energy</b>	<b>10,354</b>	<b>21.8</b>
<b>Total</b>	<b>47,455</b>	<b>100.0</b>

Source: NEM Review, Metered generation (as generated), extracted on 2 July 2019<sup>15</sup> except for bioenergy (based on Australian Government Department of the Environment and Energy, Australian Energy Statistics)<sup>16</sup> and some small wind farms (based on Departmental estimates)<sup>17</sup>. 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 11.7 per cent in 2014-15 and 14.3 per cent in 2015-16 to approximately 21.3 per cent over the 2018-19 financial year (Figure 2).

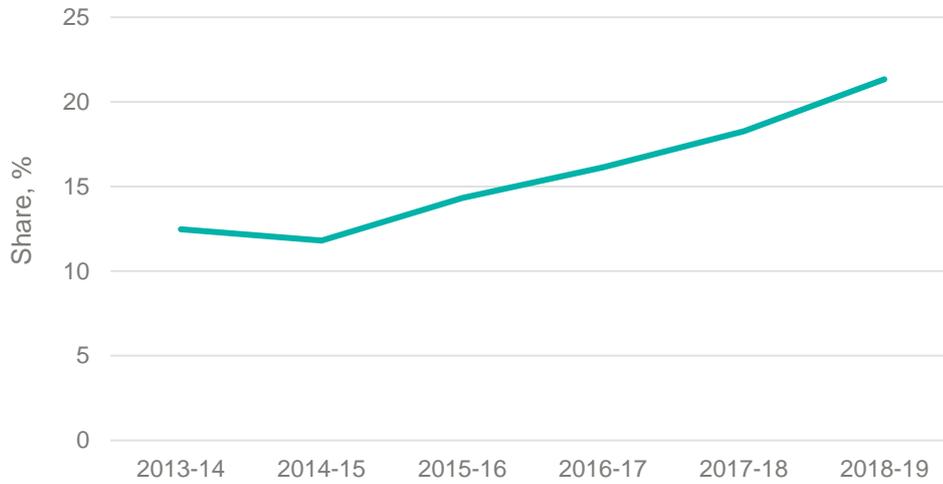
<sup>14</sup> Bioenergy from native forest wood waste is not included as an eligible renewable energy source under VRET, as per the Minister's declaration of renewable energy sources on 29 June 2018. Victorian Government Gazette No. S318.

<sup>15</sup> 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 16 and 17, below.

<sup>16</sup> NEM Review does not include data for Victorian bioenergy generation. Estimated electricity generation from bioenergy generation is instead sourced from the Australian Energy Update 2019, September 2019. Note that the September 2019 update did not include data for 2018-19 so data from 2018 was used as a proxy for 2018-19.

<sup>17</sup> Electricity generation volumes for some small wind farms – Chepstowe (6.1 MW), Codrington (18.2 MW), Leonard's Hill (4.1 MW), Toora (21 MW), Wonthaggi (12 MW), Coonoor Bridge (19.8 MW), Maroona (7.2 MW), Timboon West (7.2 MW) and Yawong (7.2 MW) – are not reported by NEM Review. Annual output of these wind farms is estimated by the Department by applying a 30 per cent capacity factor to each wind farm. This capacity factor is based on the historical performance of Victorian wind farms.

**Figure 2: Victorian renewable electricity generation share, 2013-14 to 2018-19**

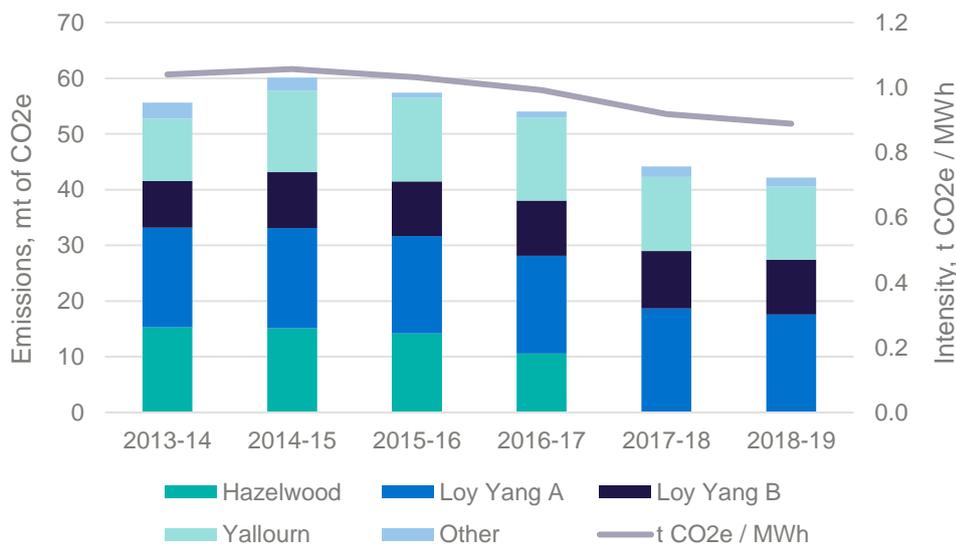


Source: Please refer to Table 1 sources

### Emissions reduction

Victoria’s electricity sector greenhouse gas emissions have fallen from around 60.1 million tonnes (Mt) of CO<sub>2</sub>-e in 2014-15 to around 42.2 Mt of CO<sub>2</sub>-e in 2018-19 (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 2018-19 financial year was 0.89 t CO<sub>2</sub>-e per MWh generated<sup>18</sup>.

**Figure 3: Emissions and emissions intensity of Victorian electricity generation, 2013-14 to 2018-19**



Source: NEM Review, Greenhouse emissions, extracted 2 July 2019 and Victorian electricity generation data (refer to Table 1 sources).

<sup>18</sup> 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 2 July 2019. The electricity generation data used in this calculation is described in the sources for Table 1.

## 2.2 Renewable energy development

### Renewable energy generation projects commissioned in 2018-19

In the 2018-19 financial year, Victoria's renewable energy capacity increased by 694 MW (Table 2). This growth was driven by the:

- commissioning of wind farms in Salt Creek, Timboon West and Yawong;
- commissioning of solar farms at Karadoc, Numurkah APSU, and Wemen;
- installation of 423 MW of rooftop solar panels by Victorian homes and businesses; and
- small increases in hydroelectricity and bioenergy capacities in Victoria<sup>19</sup>.

Table 2: Change in Victorian renewable electricity generation capacity in 2018-19

Project	Technology	Capacity (MW)	Location	Commissioned
Salt Creek	Wind	54	10 km north of Mortlake	Jul-18
Timboon West	Wind	7	8 km north of Peterborough	Nov-18
Yawong	Wind	7	15 km north east of St Arnaud	Jan-19
<b>Subtotal - wind</b>		<b>68</b>		
Karadoc	Large-scale solar	90	Birkins Road, Iraak	Nov-18
Numurkah APSU	Large-scale solar	6	Allens Road, Numurkah	Dec-18
Wemen	Large-scale solar	98	Booth Road, Liparoo	May-19
Rooftop PV (a)	Rooftop PV	423	State wide	Year round
<b>Subtotal – solar</b>		<b>617</b>		
<b>Subtotal - hydroelectricity</b>		<b>7</b>		
<b>Subtotal - bioenergy</b>		<b>2</b>		
<b>Total</b>		<b>694</b>		

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

Sources: Information on the Salt Creek, Timboon West, Yawong, Karadoc, Numurkah APSU, and Wemen projects was obtained from public and private sources<sup>20</sup>. Small-scale rooftop PV capacity is sourced from CER, Small-scale postcode data<sup>21</sup> while commercial scale rooftop PV capacity is sourced from CER, REC Registry of accredited power stations<sup>22</sup>. Project capacities are presented in nameplate capacity as reported by AEMO Generation Information spreadsheet dated 7 August 2019.

### Renewable energy generation projects under construction or undergoing commissioning

As at 30 June 2019, there were 2,960 MW of renewable energy projects under construction or undergoing commissioning in Victoria (Table 3). This comprises eleven wind farms projects with a combined capacity of around 2,444 MW and five solar farms with a combined capacity of around 516 MW.

<sup>19</sup> The change to hydroelectricity capacity between 2017-18 and 2018-19 mainly reflects an increase in the capacity of West Kiewa hydroelectricity station reported by AEMO. The change to bioenergy capacity between 2017-18 and 2018-19 mainly reflects the completion of a landfill gas processing facility at Drysdale.

<sup>20</sup> See footnote 9 above. This information also includes information obtained directly from project proponents.

<sup>21</sup> See footnote 10 above.

<sup>22</sup> See footnote 11 above.

**Table 3: Victorian renewable energy projects under construction or commissioning as at 30 June 2019**

Project	Technology	Capacity (MW)	Location	Estimated commissioning <sup>23</sup>
Berrybank	Wind	180	60 km south west of Ballarat	2020
Bulgana	Wind	194	20 km north of Ararat	2020
Cherry Tree	Wind	58	15 km south east of Seymour	Q3 2020
Crowlands	Wind	80	20 km north east of Ararat	Q4 2019
Dundonnell	Wind	336	23 km north east of Mortlake	2020
Mount Gellibrand	Wind	132	25 km east of Colac	2020
Murra Warra Stage 1	Wind	226	25 km north of Horsham	Q1 2020
Lal Lal	Wind	228	25 km south of Ballarat	Q4 2019
Moorabool	Wind	321	25 km south east of Ballarat	Q4 2020
Mortlake South	Wind	158	5 km south of Mortlake	2020
Stockyard Hill	Wind	532	35 km west of Ballarat	Q2 2020
<b>Subtotal – wind</b>		<b>2,444</b>		
Bannerton	Large-scale solar	88	Knight Rd & Wewak Rd, Bannerton	2019
Cohuna	Large-scale solar	34	Kerang-Leitchville Rd, Horfield	Q1 2020
Kiamal	Large-scale solar	200	Calder Highway, Ouyen	Q1 2020
Numurkah	Large-scale solar	100	Sellicks Rd, Drumanure	2019
Yatpool	Large-scale solar	94	Doering Rd, Carwarp	Q4 2019
<b>Subtotal – solar</b>		<b>516</b>		
<b>Total – wind and solar</b>		<b>2,960</b>		

Note: Projects are reported by nameplate capacity as reported by AEMO Generation Information spreadsheet dated 7 August 2019<sup>24</sup>.

Sources: Information on all projects was obtained from public and private sources<sup>25</sup>.

## Renewable energy generation capacity to 2020

Victoria is on track to meet the VRET 2020 target. Victorian renewable energy generation capacity is expected to exceed the minimum generation capacity of **6,341 MW** required to achieve the 2020 target.

<sup>23</sup> Estimated commissioning dates are based on the best available information to the Department at the time of reporting. These dates are estimates only and subject to change.

<sup>24</sup> 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 7 August 2019 have been used. See <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Generation-information>

<sup>25</sup> See footnote 9 above. This information also includes information obtained directly from project proponents.

As at 30 June 2019, there was 6,098 MW of installed renewable energy generation capacity in Victoria, and 2,960 MW of renewable energy generation capacity in Victoria under construction or undergoing commissioning, and expected to commence operation before the end of 2020.

In total, this represents **9,058 MW** of renewable energy generation capacity in Victoria in operation or coming online before the end of 2020, exceeding the minimum generation capacity of **6,341 MW** required to achieve the 2020 target.

## 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.
- **Completed large-scale renewable projects** (262 MW) in Victoria during the 2018-19 financial year involved around \$495 million in capital expenditure and around 968 jobs.
- **Large-scale renewable projects under construction** (2,960 MW) in Victoria as of 30 June 2019 are expected to result in capital expenditure of \$5.5 billion and around 3,294 jobs.
- Projects in the above categories combined are expected to result in capital expenditure of almost \$6 billion and around 4,262 jobs.
- In addition to the jobs supported through the construction of large-scale renewable energy projects, rooftop solar PV installations completed in 2018-19 are estimated to have supported a further 2,047 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 2018-19.

Investment and employment from large-scale renewable energy projects commissioned or under construction in Victoria during 2018-19 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 investment in Victoria. DELWP has estimated that Victoria's rooftop solar PV industry would have supported approximately 2,047 jobs in 2018-19<sup>26</sup>.

### Investment and employment from large-scale renewable generation projects

Based on information available to DELWP<sup>27</sup>, it is estimated that the large-scale renewable generation projects completed in Victoria during the financial year 2018-19 generated \$495 million in capital expenditure, 945 jobs in construction and at least 23 ongoing jobs (Table 4).

<sup>26</sup> Based on data from the Clean Energy Regulator and an employment multiplier used in Australian Bureau of Statistics, 4631.0 – Employment in renewable energy activities, Australia, 2017-18.

<sup>27</sup> This information includes publicly available project information from websites and media articles, and information obtained by DELWP from project proponents. Note that renewable energy project jobs figures are reported here in the same terms as they were provided by the proponents.

**Table 4: Estimated capital expenditure and jobs associated with Victorian large-scale renewable energy projects, commissioned in 2018-19**

	Capacity (MW)	Capex (\$m)	Jobs
Wind	68	145	240
Solar	193	350	728
<b>Total</b>	<b>262</b>	<b>495</b>	<b>968</b>

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

### Investment and employment from projects under construction or undergoing commissioning

A total of 2,960 MW of large-scale renewable electricity generation projects under construction or undergoing commissioning in Victoria as of 30 June 2019 is expected to result in capital expenditure of up to \$5.5 billion and around 3,294 jobs (Table 5).

Project information available to DELWP shows that around 95 per cent of large-scale renewable generation jobs are expected to occur in construction activities (over the life of the projects), while the remaining jobs are ongoing positions associated with operating the facilities once they have been commissioned.

Wind farm projects under construction or undergoing commissioning are expected to account for around \$4.55 billion in capital expenditure and 2,146 jobs, while solar projects in these categories are expected to account for around \$945 million in capital expenditure and 1,148 jobs (including both construction and ongoing jobs).

**Table 5: Estimated capital expenditure and jobs associated with Victorian large-scale renewable energy projects under construction or undergoing commissioning as at 30 June 2019**

	Capacity (MW)	Capex (\$m)	Jobs
Wind	2,444	4,551	2,146
Solar	516	945	1,148
<b>Total</b>	<b>2,960</b>	<b>5,496</b>	<b>3,294</b>

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

### 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 wind farm construction and commissioning activity in Victoria over the financial year 2018-19 (Table 6). As north and north western Victoria have higher levels of solar irradiation than most of the rest of Victoria, the Mallee and Goulburn regions attracted all the solar project construction and commissioning in Victoria over the 2018-19 financial year.

**Table 6: Overview of renewable energy construction activity in Victoria either completed during 2018-19 (Table 4) or under construction as at 30 June 2019 (Table 5), by region<sup>28</sup>**

	Capacity (MW)		Capex (\$m)		Jobs	
	Wind	Solar	Wind	Solar	Wind	Solar
Central Highlands	1,161	0	2,339	0	963	0
Barwon	132	0	258	0	160	0
Great South Coast	735	0	1,236	0	756	0
Mallee	7	604	20	1,097	23	1,562
Wimmera Southern Mallee	420	0	733	0	399	0
Goulburn	58	106	110	198	85	314
<b>Total</b>	<b>2,513</b>	<b>710</b>	<b>4,696</b>	<b>1,295</b>	<b>2,386</b>	<b>1,876</b>

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

<sup>28</sup> Regional definitions in this table are based on Regional Development Victoria's Regional Partnerships classifications at: <https://www.rdv.vic.gov.au/regional-partnerships/partnerships>

## 3. Performance of the VRET 2017 Reverse Auction

The REJI Act requires the Minister for Energy, Environment and Climate Change to report on the performance of schemes to achieve the VRET targets that promote the generation of electricity by large scale facilities that utilise renewable energy sources or convert renewable energy sources into electricity.

This section of the report presents an assessment of the performance of the VRET 2017 Reverse Auction following the Department of Treasury and Finance Performance Management Framework<sup>29</sup>. The results of the Auction were released in the 2018-19 financial year.

### 3.1 About the VRET 2017 Reverse Auction

The VRET 2017 Reverse Auction (the Auction) was designed to support investment in Victoria's renewable energy industry by providing revenue certainty to new renewable energy projects and to support the achievement of the VRET targets. The Auction also aimed to deliver the objectives of the REJI Act, which are namely to:

- increase the proportion of Victoria's electricity generated by renewable energy sources;
- support the development of projects and initiatives to encourage investment, employment and technology development in Victoria in relation to renewable energy generation;
- contribute to the reduction of greenhouse gas emissions in Victoria;
- promote the transition of Victoria to a clean energy economy; and
- contribute to the security of supply in Victoria.

The Auction was a competitive tender process to ensure it would deliver value for money for the State. The Auction sought bids for up to 650 MW of new renewable energy generation capacity and provided 15-year Support Agreements with the Victorian Government. The Support Agreements featured a hybrid payment mechanism, including a contract for difference (CfD) component, a fixed-payment (FP) component and a payment cap<sup>30</sup>.

On 11 September 2018, the government announced the six-successful wind and solar projects in the Auction, which total **928 MW** of new renewable capacity. The successful projects are:

- Berrybank Wind Farm, west of Geelong (180 MW)
- Carwarp Solar Farm, south of Mildura (121.6 MW)
- Cohuna Solar Farm, north-west of Echuca (34.2 MW)
- Dundonnell Wind Farm, north-east of Warrnambool (336 MW)
- Mortlake South Wind Farm, south of Mortlake (157.5 MW)
- Winton Solar Farm, near Benalla (98.8 MW)

### 3.2 Auction Performance Evaluation Framework

The performance of the Auction is assessed following the Department of Treasury and Finance Performance Management Framework, which sets out key requirements and guidance on departmental performance reporting, including accountability reporting to Parliament and annual reports<sup>31</sup>.

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<sup>29</sup> State of Victoria 2017. Performance Management Framework for Victorian Government Departments March 2016. Updated June 2017. Available online.

<sup>30</sup> The CfD mechanism is based around a 'strike price' set by the State. When the electricity price received by the project in the wholesale market is below the strike price, the government will pay the project the difference between the strike price and the market price of that electricity. When the market price is above the strike price, the project will refund the difference to the State. Proponents bid for a fixed payment in \$/MW/year which is additional to the CfD payment. The payment cap reflects the maximum net payment that the project could require from the State over the life of the Support Agreement.

<sup>31</sup> See footnote 29.

The main purpose of reporting performance is to ensure the expenditure of public funds is efficient, effective, and is delivering value for money outcomes for Victoria. Effectiveness and efficiency of the scheme can be measured across a range of metrics (e.g. quantity, quality, timeliness), while value for money (cost) is typically measured in monetary terms.

The performance of the Auction is measured in terms of the Auction's overall outcomes and value for money, and the Auction's contribution towards the objectives of the core REJI Act (e.g. increasing Victorian renewable energy generation shares and attracting investment and jobs in the renewable energy sector).

Auction Performance Evaluation Framework – Assessment Criteria	
<b>Effectiveness</b>	the extent to which successful renewable energy projects deliver on the objective of achieving the VRET targets – this will be measured against the 650 MW sought in the tender, and the level of investor confidence generated by the tender process.
<b>Efficiency</b>	the extent to which the renewable energy projects supported deliver value for money by achieving the State's targets for new renewable energy capacity, local employment, investment and community engagement in a cost effective manner. This will be measured by comparing the costs of successful projects in the Auction to the costs of unsuccessful projects and other recently financed renewable energy projects.
<b>Contribution to Victoria's economic and social development</b>	<p>i) <b>jobs, investment, local content and supply chain development:</b> the extent to which successful renewable energy projects contribute to the State's economy by supporting investment and jobs associated with renewable energy generation, particularly in regional areas, and support local content and supply chain development</p> <p>ii) <b>Community engagement and benefit sharing:</b> the extent to which successful renewable energy projects contribute to the State's economic and social development by committing to adequately involving and engaging local community stakeholders throughout all stages of project development, and committing to benefit sharing initiatives with the local community</p>

For the purpose of this evaluation, outcomes are measured qualitatively against the above assessment criteria, with a rating system of 'exceeded', 'achieved', 'partially achieved', 'in progress' and 'not achieved'.

For each assessment criteria, the rating system is applied by comparing the outcomes of the Auction to the expectations set by the State in the Auction design.

### 3.3 Auction performance evaluation outcomes

#### Highlights

- Overall, the Auction 'exceeded' or 'achieved' against all the assessment criteria in the Auction performance evaluation framework.
- The Auction is delivering a total of 928 MW of new renewable energy capacity in Victoria, significantly more than the 650 MW sought in the competitive tender process. This demonstrates the highly successful outcomes from the Auction design.

- The Auction achieved excellent value for money for Victoria when compared to similar tender processes in both the public and private sectors in Australia.
- Successful projects are expected to produce enough electricity to power more than 645,000 Victorian households. Together, these projects will generate \$1.1 billion of economic investment in regional Victoria, create more than 900 jobs including over 200 apprenticeships and traineeships, and retain a further 600 existing jobs.
- Successful projects committed to involve community stakeholders throughout all stages of the development of the renewable energy projects and committed to extensive benefit sharing initiatives with local communities.

### Assessment criteria: Effectiveness

The Auction performance in terms of effectiveness will be assessed against two key measures:

- Progress towards the targets – Did the Auction deliver new cost-effective renewable energy generating capacity that will, if built, contribute to the achievement of the legislated renewable energy targets in the REJI Act?
- Investor confidence – Did the number, size and competitiveness of bids reflect investor confidence in the Auction?

**Assessment:** The 928 MW of new renewable energy capacity supported by the Auction is significantly more than the 650 MW sought through the competitive tender process. It will also make a significant contribution towards the achievement of the VRET targets.

The Auction generated strong interest from the industry. DELWP received 15 eligible proposals from a diverse range of project proponents accounting for over 3,500 MW of new wind and solar capacity. The significant oversubscription of the Auction process, and the competitiveness of the successful proposals together reflect strong investor confidence in the Auction.

The effectiveness of the Auction was rated as **exceeded**.

### Assessment criteria: Efficiency

The efficiency of the 2017 VRET Reverse Auction will be assessed:

- By comparing the costs of successful projects in the Auction to the costs of unsuccessful projects and other recently financed renewable energy projects.

#### Assessment:

While the overall bid price was one element of the value-for-money assessment undertaken by the State in evaluating bids made in the Auction<sup>32</sup>, the successful projects were generally among the lowest cost projects to bid in the auction. On average, the total bid costs (consisting of the strike price plus the fixed payment bids) of projects that were successful in the Auction were 25 per cent lower than the total bid costs of projects that were not successful. The strike price offered by government under the Auction – \$56.52/MWh for wind and \$56.85/MWh for solar – provided a solid foundation for project bids, with the total bid costs of successful projects being competitive in comparison to past corporate PPAs, including the AGL contracted

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32. The Auction assessed value for money in terms of projects' bid price, contribution to economic and social development, technical and financial viability, community engagement and benefit sharing commitments and network impacts.

Silverton Wind Farm (\$65/MWh) and Origin contracted Stockyard Hill Wind Farm (<\$60/MWh), and wind project prices in the Australian Capital Territory's Renewable Energy Reverse Auctions (\$73-92/MWh).

The bid prices, which are settled over the life of the Support Agreements between the Victorian Government and project developers, are also well below current average wholesale energy prices in Victoria, which in 2018-19 were \$109/MWh. Under the Auction, the government will also receive the Large-scale Generation Certificates (LGCs) from all six projects over the life of the agreements. Any value recouped from LGCs sold by the government will further contribute to the State's revenue. Furthermore, in the event that future wholesale prices are low (below the strike price offered) the State has limited its maximum financial exposure through the application of a payment cap for each successful project.

The efficiency of the Auction was rated as **exceeded**.

### **Assessment criteria: Contribution to economic and social development – jobs, investment, local content and supply chain development**

The Auction performance in terms of its contribution to jobs, investment, local content and supply chain development will be assessed on:

- b. Did the Auction meet the targets under the Major Projects Skills Guarantee and the Local Jobs First Policy<sup>33</sup>?

**Assessment:** The successful VRET 2017 Auction projects were able to achieve low bid prices while also meeting high standards for employment and local content set under the Major Projects Skills Guarantee and the Local Jobs First Policy Strategic Project Framework, under the *Local Jobs First Act 2003*.

Under the Local Jobs First Policy, contracted projects under the Auction achieved an average local content target of 64 per cent and committed to using about 94 per cent of Australian manufactured steel and delivering 93 per cent of their operating expenditure locally. Information available to DELWP in developing the Auction indicates this local content requirement is higher than the 40-50 per cent local content attained by a number of renewable energy projects developed in Victoria and elsewhere in Australia at that time. Under the Major Projects Skills Guarantee, Victoria's major publicly funded works must use local apprentices, trainees or engineering cadets for at least 10 per cent of the project's total labour hours<sup>34</sup>. Successful projects in the Auction have committed to achieving or exceeding this requirement.

Overall, successful renewable energy projects under the Auction will support the creation of 900 direct jobs, including over 200 apprenticeships/traineeships. The Auction will also support the retention of a further 600 existing jobs. The successful projects will attract approximately \$1.1 billion in capital investment and \$711 million in operating expenditure over the life of the projects<sup>35</sup>. A large proportion of the jobs in this sector will be realised through the construction and commissioning of the facilities and will be situated throughout regional Victoria.

In their proposals in the Auction, projects were also asked to outline their commitments to supporting the development of the renewable energy industry in Victoria, including the supply chain, in a Local Investment Plan. Commitments to local industry development made by successful proposals under this part of the Auction design are supporting industry development initiatives such as the Vestas Renewable Energy Hub (VREH).

The VREH, now established in Geelong, is delivering wind turbine assembly in Australia for the first time in more than 10 years, and will train hundreds of local staff in wind turbine maintenance in a partnership with Federation University. The assembly of turbine hubs and drive trains is supporting two successful projects in the Auction, the Dundonnell Wind Farm and the Berrybank Wind Farm, to meet their local content commitments under the Auction.

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<sup>33</sup> Defined under the *Local Jobs First Act 2003*

<sup>34</sup> See: <https://jobs.vic.gov.au/about-jobs-victoria/major-projects-skills-guarantee>

<sup>35</sup> The auction investment and jobs figures are provided by project proponents through the tender process.

Proponents are held to their commitments in their Local Investment Plans by terms in the Support Agreement with the State.

The Auction's contribution to economic development was rated as **achieved**.

### **Assessment criteria: Contribution to economic and social development – community engagement and benefit sharing**

The Auction performance in terms of community engagement and benefit sharing will be assessed on:

- a. Did the level of community engagement in the successful proposals satisfy the standards of the 'involve' spectrum level of engagement as described in the *Community Engagement and Benefit Sharing in Renewable Energy Development* guide (Victoria)<sup>36</sup>?

**Assessment:** The Auction asked proponents to submit a community engagement and benefit sharing plan with their proposals, detailing how they will apply best practice community engagement standards and outlining benefit sharing initiatives they will implement in the local community.

The level of community engagement proposed by the successful proponents satisfies the standard of the 'involve' spectrum, the minimum standard set by the State in the Request for Proposal. This means that renewable energy project proponents have committed to work directly with the community throughout all stages of the project to ensure community concerns and aspirations are consistently understood and considered. It also means project proponents will provide feedback to the community on how input from the community influenced relevant project decisions. Projects that committed to higher standards of community engagement were scored higher during the formal Auction evaluation process.

Examples of benefit-sharing initiatives committed to by successful projects in the Auction include: supporting community solar installations, creating local traineeships, subsidising solar and battery installations, establishing community development funds and higher education scholarships programs.

For example, through the Dundonnell Wind Farm's benefit sharing plan, developer Tilt Renewables has partnered with two local not-for-profit organisations to establish a new Safe Housing Program. The program will enable greater access to housing specifically for women and children from south-west Victoria who are at risk of homelessness due to family violence by providing guaranteed placements in new accommodation.

Proponents are held to their commitments to community engagement and benefit sharing by terms in the Support Agreement with the State.

Community engagement and benefit sharing commitments under the Auction are rated as **achieved**.

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<sup>36</sup> Lane, T. and J. Hicks (2017) *Community Engagement and Benefit Sharing in Renewable Energy Development: A Guide for Applicants to the Victorian Renewable Energy Target Auction*. Department of Environment, Land, Water and Planning, Victorian Government, Melbourne.

## 4. Closing statement

The VRET 2018-19 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 focus on achievements recorded over the 2018-19 financial year.

Overall, the Victorian Government's policies and programs have increased market confidence and driven unprecedented new investment in renewable energy in Victoria, ensuring Victoria is on track to meet the VRET 2020 target. Underpinning this success in 2018-19 includes delivering cost competitive renewable energy projects through the VRET 2017 Reverse Auction; whilst attracting billions of dollars in investment and creating thousands of jobs in the State.

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

Table 7: VRET 2018-19 Progress Report – synthesis of findings

Reporting requirements	Financial year 2017-18	Section with further detail
Progress made towards meeting the renewable energy targets	<p>Renewable energy generation accounted for 21.3 per cent of Victoria's electricity generation over the financial year.</p> <p>Victoria is <b>on track</b> to meet the 2020 VRET target. Victorian renewable energy generation capacity is expected to significantly exceed the minimum generation capacity of <b>6,341 MW</b> required to achieve the 2020 target. As at 30 June 2019, there was 6,098 MW of installed renewable energy generation capacity in Victoria and 2,960 MW under construction or undergoing commissioning, a total of <b>9,058 MW</b>.</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 694 MW.</p>	Section 2.2
	<p>Victoria is developing a significant amount of large-scale renewable energy generation capacity as follows:</p> <ul style="list-style-type: none"> <li>• Commissioned projects amounting to 262 MW capacity from three wind farms and three solar farms.</li> <li>• Projects under construction or undergoing commissioning have reached 2,960 MW from eleven wind farms and five solar farms as at 30 June 2019.</li> </ul> <p>Projects commissioned, under construction or undergoing commissioning are expected to result in capital expenditure of almost \$6 billion and around 4,262 jobs (to be realised over the next two years).</p>	Section 2.3
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.	<p>The six successful projects in the Auction total 928 MW of new renewable capacity, significantly more than the 650 MW initially sought in the Auction. The successful projects will generate \$1.1 billion of economic investment in Victoria, create more than 900 jobs including over 200 apprenticeships and traineeships, and retain a further 600 existing jobs.</p>	Section 2.4