



# Primer on renewable energy subsidies in Australia

Report to the Minerals Council of Australia

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## Summary

This paper provides an overview of the range of subsidies for renewable electricity that were applied in Australia in 2015-16. The subsidies identified here are financial transfers – from electricity customers or taxpayers to producers of renewable electricity – and are the result of government policies. The amount of these subsidies is not transparent. Almost three quarters of aggregate subsidies originate from government mandates that are paid for by electricity customers and collected by third parties. These subsidies therefore do not appear in government accounts, and can only be approximated.

Table A shows a 'best estimate' of subsidies for renewable electricity in 2015-16, who benefitted from these subsidies and who paid them:

- In aggregate, the subsidies paid to producers of renewable electricity amounted to almost \$3 billion in 2015-16. Given that we have not attempted to provide a comprehensive inventory, the true number is likely to be higher.
- The Renewable Energy Target (RET) with its large-scale and small-scale components is by far the costliest subsidy scheme. In aggregate, Australian electricity customers paid more than \$2.1 billion to subsidise large-scale power station developers and small customers with rooftop solar installations. Looking forward, and given that the RET will progressively increase until 2020 and given high prices of renewable generation credits, these subsidies are likely to increase.
- The legacy feed-in-tariff (FiT) schemes introduced by state and territory governments some years ago also represent a major cost to jurisdictional electricity customers who paid more than \$700 million in subsidies to the (then) participants of these schemes. A number of these schemes will continue to subsidise participating customers for many years to come.
- While the corresponding subsidies are currently relatively modest, the ACT, Queensland and Victorian governments have each committed to introducing a similar renewable energy mandate as the RET, whereby a specified share of electricity consumed in a jurisdiction must come from renewable energy sources. As was the case for the FiT schemes, jurisdictional governments are then subsidising new large-scale renewable generation by committing to long-term electricity purchasing agreements. Given the high cost of generating electricity from renewable sources, electricity customers in these jurisdictions will bear a significant subsidy burden for many years to come.
- Renewable energy projects are finally subsidised directly by the Australian Government and by state and territory governments and therefore taxpayers. The Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC) offer direct grants and concessionary financing, respectively, including large-scale renewable projects receiving funding by the jurisdictions. In the case of the CEFC, the amount of subsidies cannot be identified.

**Table A. Estimated renewable electricity subsidies in Australia, 2015-16**

<b>Class of subsidy</b>	<b>Jurisdiction / scheme</b>	<b>Estimated subsidy amount (\$ million)</b>	<b>Paid by whom</b>	<b>Benefitting whom</b>
<b>Renewable energy mandates</b>				
	<b>Commonwealth</b>			
	LRET	\$1,420 <sup>E</sup>	Australian electricity customers	Developers of large-scale renewable power stations
	SRES	\$726 <sup>E</sup>	Australian electricity customers	Customers with small-scale renewable installations
	<b>Jurisdictional</b>			
	ACT	\$6	ACT electricity customers (network tariffs)	Developers of large-scale renewable power stations
Subtotal		\$2,151 <sup>E</sup>		
<b>Feed-in-tariff schemes</b>				
	Queensland	\$256	Qld electricity customers	
	NSW	\$202	NSW electricity customers	
	SA	\$117	SA electricity customers	Participating households
	ACT	\$14	ACT electricity customers	
	Victoria	\$87	Victorian electricity customers	
	WA	\$31	West Australian taxpayers	
Subtotal		\$707		
<b>Direct funding</b>				
	ARENA	\$90	Australian taxpayers	Large-scale renewable developers, research institutions, individual grant recipients
	CEFC	N/a		
	Various Commonwealth and jurisdictional initiatives	\$6		
<b>Grand total</b>		<b>\$2,950</b>		

# 1 Introduction

This paper provides an overview of the range of subsidies for renewable electricity that were applied in Australia in 2015-16, who received them, and who paid them.

Almost three quarters of aggregate subsidies originate from government mandates that are paid for by electricity customers and collected by third parties. These subsidies therefore do not appear in government accounts. A number of approximations have therefore been made to derive estimates of the subsidy amounts.

## 1.1 What is a subsidy?

There is no single definition of what constitutes a subsidy. There is general agreement that subsidisation involves the government, results in a (financial) benefits for one party, and a cost to another, but there is no consistent approach when it comes to the details. In this note, the definition of a subsidy applied by the World Trade Organization (WTO 2006) is adopted. The WTO defines three types of government actions that give rise to subsidies:

1. transfers made by the government that result in (actual or potential) budgetary outlays, as well as transfers that are made by private entities, as mandated by government;
2. programs that involve the provision of goods or services below cost; and
3. regulatory policies that result in transfers from one group to another.

The WTO definition explicitly recognises that subsidies need not come from government directly. Rather, government can require private actors to pay subsidies by creating corresponding legislation. This is relevant in the Australian context, given the significant imposts mandated by governments on electricity customers via policies such as the renewable energy target (RET) and feed-in tariff (FiT) schemes.

## 1.2 About this paper

This paper considers different types of policies that give rise to renewable energy subsidies in turn:

- Section 2 considers existing and proposed renewable energy mandates set by the Australian Government and the jurisdictions;
- Section 3 describes the subsidies paid by electricity customers as a result of jurisdictional FiT schemes; and
- Section 4 considers government initiatives that directly subsidise electricity generation from renewable energy sources.

## 2 Renewable energy mandates

Renewable energy mandates such as the RET require that a share of wholesale electricity be generated from renewable energy sources, such as wind or solar. Electricity generated from renewable sources is generally more costly than electricity generated from 'conventional' sources, and is generally not commercially viable. All renewable energy mandates therefore establish subsidy mechanisms that provide payments to the owners of the renewable generation capacity. The sums involved are generally not transparent and must be compiled or estimated from various sources.

### 2.1 Renewable energy target

The RET is by far the largest and the most costly renewable energy subsidy scheme created in Australia to date. In its current form, the RET has two components:

- the Large-scale Renewable Energy Target (the LRET), which requires increasing annual amounts of electricity to be produced from large-scale renewable generation sources, up to the target of 33,000 gigawatt hours (GWh) by 2020; and
- the Small-scale Renewable Energy Scheme (the SRES), which supports the installation of small-scale scale technologies, such as rooftop solar systems, by small customers.

These two components of the RET operate by placing a requirement on large customers and retailers (on behalf of small customers) that a percentage of the electricity sold and consumed in any given year must come from renewable energy sources. The subsidies paid to the owners of renewable power stations and customers with small-scale installations are recovered from electricity consumers in the form of a surcharge on electricity prices.

#### 2.1.1 LRET and SRES

The LRET mandates increasing annual fixed GWh targets of electricity that must be generated from large-scale renewable resources. In 2016, the LRET was set at 21,431 GWh. The target will rise to 33,000 GWh by 2020. The responsible regulator – the Clean Energy Regulator (CER) – estimates an annual 'renewable power percentage' (RPP) that equates to the share of electricity consumption across Australia that must come from large-scale renewable sources. In 2016, the RPP (corresponding to the LRET of 21,431 GWh) was set at 12.75 per cent. Electricity retailers (and large customers) must then ensure that 12.75 per cent of electricity sold to customers comes from renewable sources. Retailers and large customers are able to meet their renewable energy obligation by purchasing 'large-scale generation certificates' (LGCs) from renewable electricity generators, and surrendering these to CER. One LGC corresponds to one megawatt-hour (MWh) of renewable electricity. In this way, large-scale renewable generators receive a subsidy for each MWh of electricity they generate.

The SRES functions along the same lines as the LRET, but unlike the LRET, the SRES is not capped. The SRES target is instead adjusted each year to approximate the number of small-scale renewable electricity installations that are expected to be put in place by households. CER accordingly determines the small-scale technology percentage (STP), set at 9.68 per cent in 2016. Electricity retailers and large customers are then required to purchase a corresponding number of small-scale technology certificates' (STCs), and surrendering these to CER. Households and small businesses with renewable installations receive a corresponding subsidy for each MWh of electricity they are deemed to generate. This subsidy is also recovered from electricity customers as a whole via higher electricity prices.

### 2.1.2 Subsidy costs of the RET

The key implication of how the LRET and the SRES are designed is that while the subsidies paid through these schemes originate from a government mandate, they are generally collected from electricity consumers by third parties (electricity retailers). These subsidies therefore do not appear in government accounts and their magnitude is not transparent.

Estimates of total subsidies must instead be inferred from LGC and STC prices published by proprietary trading platforms and the limited information provided by CER. In the 2016 calendar year, for instance:

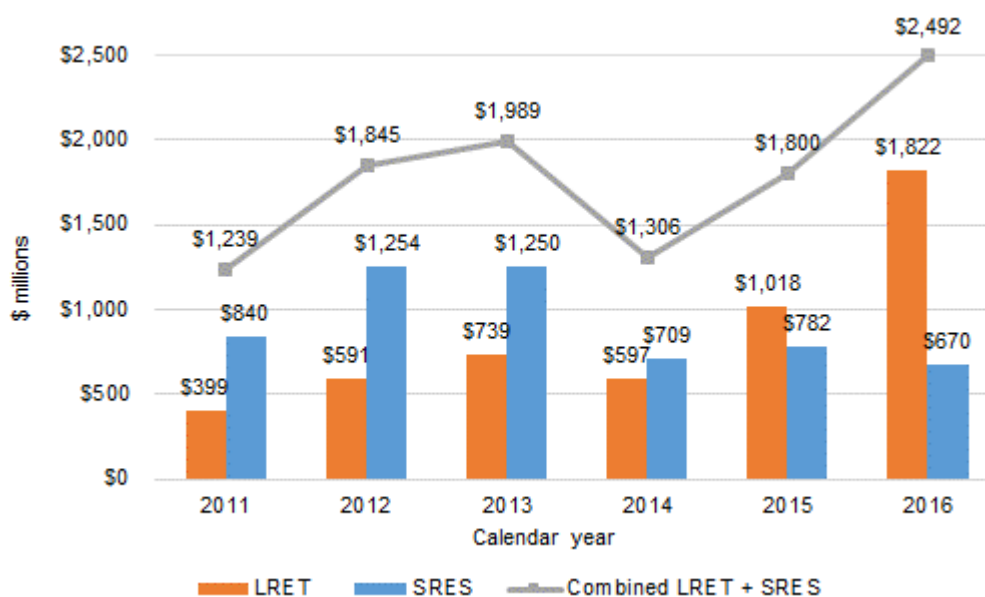
- LGCs traded below \$75/MWh for a short time, rose above \$80/MWh from April onwards, and traded between \$85/MWh and \$90/MWh from July until the end of the year. Assuming an average LGC price of \$85/MWh over 2016, and given that retailers would need to surrender 21.43 million LGCs to ensure that 21,431 GWh of electricity would be generated from large-scale renewable energy sources, the LRET obligation would imply direct subsidies to the large-scale renewable generation sector of more than \$1.8 billion in 2016.
- STC prices traded close to \$40/MWh throughout the year. Given that almost 17 million STCs were required to meet the SRES target, the direct subsidies paid to households amounted to almost \$670 million in 2016.

Figure 2-1 shows the estimated subsidies paid to developers of renewable power stations and households under the LRET and SRES components of the RET since 2011. These estimates are based on average LGC spot price outcomes in these years, including weighted-average spot prices reported by CER for some years. It is possible that some retailers would have locked in lower LGC prices by entering into earlier power purchasing agreements with renewable generators and then passed these savings on to customers, in which case the LRET subsidy burden may be lower in some years. However, in the absence of published information about the overall annual subsidy cost of the LRET and the SRES, it is not possible to derive more precise estimates.

In the future, the expectation is that the amount of annual subsidies paid under the LRET is projected to increase. In part, this is a reflection of the increase in the annual target, from

around 26,000 GWh in 2017 to 33,000 GWh in 2020. Many commentators are also expecting LGC spot prices to remain at high levels for the foreseeable future, given a reported shortage of renewable energy investment (Energetics 2016; Bhavnagri 2016; Kumar 2016, EY 2016).

**Figure 2-1. Estimated subsidies paid under the LRET and SRES components of the RET**



Notes: Estimates have been derived by multiplying the annual MWh obligation under the LRET and SRES with estimates of average (weighted-average for some years) LGC and STC spot prices.

Source: See Appendix A.

## 2.2 Jurisdictional renewable energy mandates

A number of Australian jurisdictions have also either implemented or announced state- or territory-based renewable energy targets, and are funding renewable energy investments to achieve these targets:

- the ACT Government has implemented a target of sourcing the equivalent of 100 per cent of the electricity consumed in the ACT from renewables by 2020;
- the Victorian Government has announced a 40 per cent renewable energy target by 2025; and
- the Queensland Government has announced a 50 per cent renewable energy target by 2030.

### 2.2.1 ACT 100 per cent renewable energy target

The ACT's 100 per cent renewable energy target was legislated in 2016. The ACT Government has largely achieved that target via a series of 'reverse' auctions whereby the ACT Government



has entered into a series of 20-year power purchasing agreements (PPAs) with developers of large-scale renewable generation projects, and has effectively underwritten an estimated 640 MW of new renewable generation capacity. Relatedly, the target is also declared by the government as a vehicle for achieving economic development objectives, in particular, the ACT Government's vision of Canberra becoming a 'globally recognised centre for renewable energy innovation and investment'.<sup>1</sup> The cost of the subsidies paid to achieve the ACT's 100 per cent renewable target are recouped from ACT electricity customers via a surcharge on distribution tariffs.

Table 2-1 provides an overview of the renewable generation developments contracted by the ACT Government to achieve the 100 per cent target. Table 2-1 suggests that the ACT Government has effectively underwritten 640 MW of renewable generation capacity corresponding to an initial capital investment of around \$1.4 billion (although estimates are as high as \$1.7 billion, Kumar 2016). As is the case for the RET, the financing of these large-scale projects takes place off balance sheet. The renewable energy projects contracted by the ACT Government are financed via:

- the spot prices earned by each development in the NEM;
- the LGCs generated by each project under the LRET; and
- contract-for-difference (CfD) payments, referred to by the ACT Government as FiT support payments, that are specified in the PPA.

Under the CfD payment arrangements, the renewable generator is guaranteed a fixed price per unit of electricity generated. In the case of the Royalla Solar Farm, for instance, where the CfD strike price is set at \$186/MWh, difference payments are made to Royalla whenever the NEM spot price is below \$186/MWh, while Royalla must reimburse the local distribution business with difference payments whenever the NEM spot price rises above \$186/MWh.<sup>2</sup> Taking the capacity factors announced by each project proponent to determine the amount of electricity each project would generate and multiplying that amount by the strike price, suggests that the generation developments listed in Table 2-1 would be guaranteed revenues of around \$200 million in any given year.

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<sup>1</sup> For instance, the successful bidders for the 2015 wind auction have also committed to establishing a Renewable Energy Innovation Fund (Hornsedale Wind Farm Stage II, and contributing to the development of carbon neutral microgrid initiatives, developing a hybrid generation Asia-Pacific Export Hub in the ACT, and investing in local business and training partnerships (Sapphire Wind Farm Stage I).

<sup>2</sup> Under the Electricity Feed-in (Large-scale Renewable Energy Generation) Act 2011 (section.17A), the form of the FiT support payment is  $(\text{FiT} - \text{SP}) \times \text{quantity of electricity}$ , where FiT means the feed-in tariff, quantity of electricity means the quantity of the FiT entitlement holder's eligible electricity for the period, and SP means the spot price value for the FiT entitlement holder's eligible electricity for the period.

**Table 2-1. ACT Government – Large-scale renewable investment to achieve the ACT 100% Renewable Energy Target**

Renewable capacity contracted	Renewable capacity (MW)	Contract-for-difference strike price (\$/MWh)	Project investment cost (\$ million)
<b>2012/2013 solar auctions</b>			
Royalla Solar Farm	20	\$186	\$155
Mugga Lane Solar Park	13	\$178	\$30.4
OneSun Capital Solar Farm	7	\$186	\$17
<b>2014 wind auction</b>			
Ararat Wind Farm	80.5	\$87	\$150 <sup>E</sup>
Coonooer Bridge Wind Farm	19.4	\$81.5	\$40
Hornsedale Wind Farm Stage I	100	\$92	\$250
<b>2015 wind auction</b>			
Sapphire Wind Farm	100	\$89.1	\$93 <sup>E</sup>
Hornsedale Wind Farm Stage II	100	\$77	\$250 <sup>E</sup>
<b>2016 wind auction</b>			
Crookwell 2 Wind Farm	91	\$86.6	\$200
Hornsedale Wind Farm Stage III	109	\$73	\$250 <sup>E</sup>
	639.9		\$1,435 <sup>E</sup>

Notes: E refers to pro-rated estimates of the cost of the contracted capacity.

Source: See Appendix A.

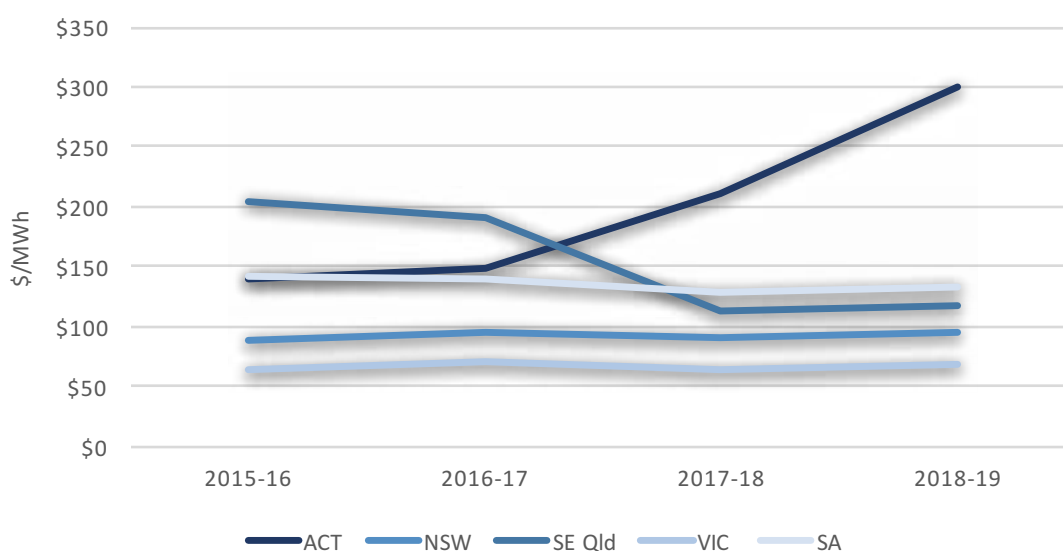
The ACT electricity distribution business (ActewAGL) is responsible for making the ongoing FiT support payments, which are in turn recovered from customers via higher network charges. In 2015-16, these payments amounted to around \$6 million. This relatively modest figure likely reflects the fact that of the power stations listed in Table 2-1, only Royalla Solar Farm (20MW), Mugga Lane Solar Park (13MW) and Coonooer Bridge Wind Farm (19.4MW) were (at least partially) operating. The remaining power stations are yet to be built or commissioned. There are other indicators of the potential cost impacts on electricity customers of these subsidies:

- The large-scale cost data that ActewAGL are required to publish indicate that in 2015-16, large-scale renewable generators contracted by the ACT Government were paid a weighted-average FiT support payment of \$101 per MWh. These payments were in addition to average pool prices in NSW in 2015-16 of \$54/MWh (AER 2016) and revenues

from LGCs, which are estimated to have averaged around \$70/MWh over the financial year.

- In its most recent report on jurisdictional electricity price trends the Australian Energy Markets Commission (AEMC 2016) estimated that the cost of the ACT Government’s FiT schemes would increase from \$61 per year per average residential customer in 2015-16 to \$212 per year per residential customer in 2018-19. As Figure 2-2 shows, overall, ACT customers are expected to pay by far the highest costs for environmental policies on the East Coast (and across all Australian jurisdictions).

**Figure 2-2. Trends in environmental policy costs paid by residential consumers**



Notes: Environmental policies include the LRET, the SRES, FiT schemes and energy efficiency improvement schemes.

Source: AEMC 2016.

### 2.2.2 Queensland 50 per cent renewable energy target

The Queensland Government has committed to achieving a 50 per cent renewable energy target by 2030. According to the Queensland Renewable Energy Expert Panel (2016), achieving the target would require:

- 4,000 to 5,500 MW of new large-scale capacity between 2020 and 2030;
- up to \$6.7 billion in investment in NPV terms in large-scale generation plant in Queensland; and
- subsidy payments to renewable generation projects of \$500 to \$900 million, assuming no thermal capacity is withdrawn.

On current plans, financing would follow a similar model as in the ACT; i.e. a CfD format whereby new renewable power stations would be financed under PPAs with a fixed strike price.

### **2.2.3 Victorian 2020 and 2025 renewable energy target**

The Victorian Government has committed to a 25 per cent renewable energy target by 2020 and a 40 per cent renewable energy target by 2025. To achieve these targets, the Victorian Government intends to (Victorian Government 2016):

- hold reverse auctions for up to 1,500 megawatts (MW) of new large-scale renewable energy capacity by 2020 and up to 5,400MW by 2025; and
- support capital expenditure of around \$9 billion in renewable energy projects.

### **2.2.4 NSW net-zero emissions**

While aspirational in nature, the NSW Government's strategic plan for the NSW Climate Change Fund refers to an objective for NSW of achieving net-zero emissions by 2050 (NSW Government, 2016). As part of this strategy, the Climate Change Fund would fund up to \$200 million of advanced renewable energy projects, and seek to maximise investment in NSW under the RET so as to double renewable energy capacity in NSW.

### 3 Jurisdictional feed-in tariffs

Feed-in tariffs (FiTs) are a \$ per kilowatthour (kWh) payment to electricity customers (typically households) with rooftop solar facilities for some or all of the electricity they generate. From about 2008, Australian states and territories began offering customers who installed rooftop solar FiTs that were essentially pure subsidies.<sup>3</sup> These subsidies (in combination with the subsidies that are also available under the SRES) resulted in a very rapid uptake of FiTs, and all schemes closed within a year or two as legislated limits were reached and/or the scale of the subsidies became apparent.<sup>4</sup> Although the first generation of FiT programs have been closed for some time, customers that took up these offers remain eligible to receive payment so that the corresponding program costs continue to be incurred.

Table 3-1 shows the main schemes and associated payments in 2015-16. With the exception of the West Australian residential FiT scheme, the subsidies offered to participating households are recovered from electricity customers as a whole via increased distribution charges.

As is apparent from Table 3-1, most FiT schemes offer participating households subsidies over very long timeframes with corresponding significant ongoing subsidy payments. For instance, the Queensland Productivity Commission (2016) estimated that the cost to electricity customers of the Queensland Solar Bonus Scheme over the life of the scheme would be more than \$4.1 billion. Overall, the annual payments to participating households under the various FiT schemes amounted to approximately \$722 million in 2015-16.

**Table 3-1. Overview of jurisdictional FiT schemes**

State/ territory	FiT scheme	Year introduced (ended)	FiT rates (amended FiT rates)	Type of scheme	Original scheme payments end	2015-16 FiT subsidy payments (\$ millions)
QLD	Solar Bonus Scheme	2008 (2013)	44¢/kWh (8¢/kWh)	Net	2028	\$256
NSW	Solar Bonus	2009	60¢/kWh	Gross	2016	\$202

<sup>3</sup> Various Australian agencies have measured the network benefits that are sometimes claimed to arise from solar PV installations, and have concluded that there are no such benefits and/or that they cannot be achieved using FiT schemes. In contrast, today retailers may offer consumers market-based rates for any excess energy they generate. In some states (e.g. Queensland), state regulators set electricity feed-in rates on terms that are intended to approximately reflect market rates.

<sup>4</sup> For instance, the NSW Auditor-General reviewed the NSW Solar Bonus Scheme and found it was poorly planned and designed, and implemented with no risk management and limited operational controls. The cost of the seven-year scheme was estimated at \$1.05 to \$1.75 billion (Audit Office of New South Wales 2011).

	Scheme	(2011)	20¢/kWh			
SA	Solar Feed-in Tariff Scheme	2008 (2011)	44¢/kWh 16¢/kWh	Net	2028	\$117
ACT	Small-scale, Medium, and Large-scale Feed- in tariff	2009 (2011)	47.5¢/kWh 30.2¢/kWh	Gross	20 years from installation	\$14
VIC	Premium Feed-in Tariff for Solar Transitional Feed-in Tariff for Solar	2009 (2012)	60¢/kWh 25¢/kWh	Net	2024	\$87
WA	Residential net feed-in tariff scheme Solar buyback (Synergy customers)	2010 (2011)	40¢/kWh 20¢/kWh (+7¢/kWh)	Net	10 years from installation	\$31
<b>Total</b>						<b>\$722</b>

Notes: 'Gross' tariffs, where all the electricity generated by a customer's rooftop solar facility is purchased are more generous schemes. 'Net' tariffs only apply only to the surplus electricity generated (i.e. solar generation net of household consumption).

Source: Appendix A.

## 4 Direct support of renewable energy projects

This section focuses on the remaining subsidy payments to renewable electricity producers from a variety of sources.

### 4.1 ARENA

The Australian Renewable Energy Agency's (ARENA's) mission is 'to make renewable energy solutions more affordable and increase the supply of renewable energy in Australia'. ARENA supports a broad range of projects, including generation from geothermal, solar and bioenergy sources, as well as storage technologies. In 2015-16, ARENA received Australian Government funding of \$90 million (Table 4-1), and paid out or committed to around \$836 million in funding for various activities (Table 4-2).

**Table 4-1. ARENA funding profile (2013-14 to 2021-22)**

Financial year	Amount for financial year (\$ million)
2013-2014	\$581.3
2014-2015	\$194.3
2015-2016	\$90.0
2016-2017	\$57.0
2017-2018	\$257.9
2018-2019	\$235.3
2019-2020	\$254.7
2020-2021	\$134.0
2021-2022	\$132.5

Source: <https://arena.gov.au/about-arena/governance-and-funding-profile/>; accessed on 22 December 2016.

**Table 4-2. ARENA funding provided/committed 2015-16**

Funding initiatives	Funding provided/committed
Research and development	\$151.4
Postgraduate scholarships and fellowships	\$14.4
Demonstration	\$389.0
Deployment, of which:	\$280.8
Fixed angle PV power stations at Broken Hill (53MW) and Nyngan (102MW)	\$166.7
Gullen Range Solar Farm	\$12.4

Funding initiatives	Funding provided/committed
Design, construction and build 56MW PV	\$101.7
<b>Total</b>	<b>\$835.6</b>

Source: ARENA Annual Report 2015-16.

## 4.2 Clean Energy Finance Corporation

The Clean Energy Finance Corporation (CEFC) is an Australian Government statutory authority formed to 'facilitate increased flows of finance into the clean energy sector', including by investing in renewable energy, energy efficiency and low emissions technologies (CEFC 2015-16). The CEFC does not offer outright grants, but instead finances projects 'with the expectation of a positive risk-based financial return on a portfolio basis' (CEFC 2015-16). The CEFC does not operate as a purely commercial lender, given that its investment mandate directs it to have regard to 'positive externalities and public policy outcomes'. The CEFC may then offer various concessions, including one or more of:

- lower than market interest rates;
- longer loan maturity; and/or
- longer/more flexible grace periods before the payment of principal and/or interest is due.

All of these types of arrangements would be classed as incorporating some degree of a subsidy, although quantifying the value of these subsidies would require a detailed analysis and has not been attempted here.

The CEFC derives its funding from the CEFC Special Account maintained by the Department of the Environment and Energy. In 2015-16, the CEFC committed \$110 million to four renewable energy projects, two of which also received grants from ARENA and one of which was partly funded via a PPA with the ACT Government (Table 4-3).

**Table 4-3. CEFC support of renewable energy projects (2015-16)**

Renewable energy projects	CEFC contribution	Comments
Barcaldine Wind Farm (25 MW)	\$20 million	\$22.8 million grant funding from ARENA
Ararat Wind Farm (240 MW)	\$67 million	PPA with ACT Government
Windlab (wind energy prospecting and assessment tools)	\$8 million	N/a
DeGrussa copper mine solar (10.6MW) and storage project (6MW)	\$15 million	\$20.9 million grant funding from ARENA

Source: CEFC 2015-16.



### 4.3 Other direct renewable energy subsidies

There are many initiatives – across all layers of government – that subsidise the production of renewable electricity. Other Australian Government programs to subsidise renewable energy include:

- the Solar Towns Programme (\$2.1 million in funding from 2014-15 to 2015-16) to support community organisations wishing to install a renewable energy system; and
- the Solar Communities program (\$5 million, from 2017), which will fund community groups wishing to install rooftop solar PV, solar hot water and solar-connected battery systems.

Most or all Australian jurisdictions, as well as a number of local government and university entities directly fund renewable energy developments that would not be commercially viable. **Error! Reference source not found.** provides an overview of ongoing projects or commitments made by the Queensland and NSW governments to subsidise electricity from renewable sources.

**Table 4-4. Queensland and New South Wales government renewable energy initiatives**

Commitment	Description	Comments	Funding in 2015-16
Queensland Government			
One million rooftops	One million rooftops or 3,000 MW of solar PV in Queensland by 2020	Funding via 'broader market mechanism operating alongside the RET', in combination with: <ul style="list-style-type: none"> <li>– a time-varying FIT for regional Queensland;</li> <li>– expanded eligibility for regional FITs from 5 kilowatts to 30 kilowatts</li> </ul>	N/a
Solar 150	Support of up to 150 MW of large-scale solar power generation in Queensland in conjunction with ARENA	Queensland Government funding through long-term PPAs with successful Queensland bidders for ARENA funds. ARENA funding support received for: <ul style="list-style-type: none"> <li>– Darling Downs Solar Farm (110 MW)</li> <li>– Whitsunday Solar Farm (58 MW)</li> <li>– Kidston Solar Project (50 MW)</li> <li>– Oakey Solar Farm (25 MW)</li> <li>– Longreach Solar Farm (15 MW)</li> <li>– Collinsville Solar Farm (42 MW)</li> </ul>	N/a

<b>Commitment</b>	<b>Description</b>	<b>Comments</b>	<b>Funding in 2015-16</b>
NSW Climate Change Fund			
Large-scale solar projects	Fixed angle PV power stations at Broken Hill (53MW) and Nyngan (102MW)	Co-investment with ARENA	\$5 million
TransGrid Renewable Energy Hub	Renewable Energy Hub for network connection for renewable energy generation plants	Co-investment with ARENA, Trans Grid	\$430,000
Solar PPAs	Support up to 50 MW of new solar capacity in NSW for NSW Government's electricity retail contract	Procurement process initiated	\$500,000

Source: Qld Government, 2016. NSW Climate Change Fund 2015-16.

At the local level, the City of Melbourne, together with other local governments, public institutions, and private-sector corporations has launched a competitive tender to purchase 100 to 120 GWh of energy from new large-scale renewable generation from 2017 (City of Melbourne 2015). Funding will follow the ACT Government's model of using LGCs, as well as one or more long-term PPAs structured around a fixed strike price.

## Appendix A. Data

### A.1 RET

#### A.1.1 LRET target

<http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/The-certificate-market/annual-targets-and-the-renewable-power-percentage>; accessed on 22 December 2016.

#### A.1.2 SRES target

<http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/The-certificate-market/The-small-scale-technology-percentage/The-current-small-scale-technology-percentage>; accessed on 22 December 2016.

#### A.1.3 LGC prices

2016	<a href="http://greenmarkets.com.au/resources/insight-ret-wont-be-met-in-2018">http://greenmarkets.com.au/resources/insight-ret-wont-be-met-in-2018</a> ; <a href="http://greenmarkets.com.au/resources/lgc-market-prices">http://greenmarkets.com.au/resources/lgc-market-prices</a> ; <a href="http://lgc.mercari.com.au/index.php">http://lgc.mercari.com.au/index.php</a> ; <a href="http://reneweconomy.com.au/renewable-energy-certificate-prices-hit-record-highs-as-market-prices-in-failure-45170/">http://reneweconomy.com.au/renewable-energy-certificate-prices-hit-record-highs-as-market-prices-in-failure-45170/</a> ; <a href="http://reneweconomy.com.au/renewable-energy-market-hurtles-towards-a-penalty-price-18202/">http://reneweconomy.com.au/renewable-energy-market-hurtles-towards-a-penalty-price-18202/</a> ; accessed on 22 December 2016.
2015	CER 2015 Administrative Report and Annual Statement
2011-2014	<a href="http://www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-industry/Industry-assistance/Industry-assistance-published-information/Volume-weighted-average-market-price-for-large-scale-generation-certificates">http://www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-industry/Industry-assistance/Industry-assistance-published-information/Volume-weighted-average-market-price-for-large-scale-generation-certificates</a>

#### STC prices

2015, 2016	<a href="http://greenenergytrading.com.au/news-events/detail/spot-lgc-price-exceeds-stc-price-for-first-time-in-nearly-2-years">http://greenenergytrading.com.au/news-events/detail/spot-lgc-price-exceeds-stc-price-for-first-time-in-nearly-2-years</a> ; <a href="http://reneweconomy.com.au/renewable-energy-certificate-prices-hit-record-highs-as-market-prices-in-failure-45170/">http://reneweconomy.com.au/renewable-energy-certificate-prices-hit-record-highs-as-market-prices-in-failure-45170/</a> ; <a href="http://reneweconomy.com.au/renewable-energy-market-hurtles-towards-a-penalty-price-18202/">http://reneweconomy.com.au/renewable-energy-market-hurtles-towards-a-penalty-price-18202/</a> ; accessed on 22 December 2016.
2011-14	CER 2015 Administrative Report and Annual Statement.

## A.2 ACT

### A.2.1 Details of large-scale power purchase agreements

[http://www.cmd.act.gov.au/open\\_government/inform/act\\_government\\_media\\_releases/corb-ell/2012/act\\_labor\\_government\\_delivers\\_big\\_solar\\_for\\_canberra2](http://www.cmd.act.gov.au/open_government/inform/act_government_media_releases/corb-ell/2012/act_labor_government_delivers_big_solar_for_canberra2) ;

<http://www.solarchoice.net.au/blog/news/act-announces-next-20mw-of-large-scale-solar-projects-210813/>;

<http://www.environment.act.gov.au/energy/cleaner-energy/next-generation-renewables>;

<http://www.ararat-windfarm.com/ararat-wind-farm-signs-200-million-debt-package/>;

[http://www.resourcesandenergy.nsw.gov.au/about-us/news/2016/\\$200-million-nsw-wind-farm-helps-australias-capital-meet-renewable-energy-target](http://www.resourcesandenergy.nsw.gov.au/about-us/news/2016/$200-million-nsw-wind-farm-helps-australias-capital-meet-renewable-energy-target);

[http://www.windlab.com/projects/coonooer\\_bridge\\_wind\\_farm](http://www.windlab.com/projects/coonooer_bridge_wind_farm);

<http://www.corality.com/news/hornsedale-wind-farm-reaches-financial-close>;

<http://reneweconomy.com.au/hornsedale-wind-farm-secures-financial-close-second-100mw-92425/>;

<https://www.partnersgroup.com/en/news-views/investment-news/current/detail/article/partners-group-invests-aud-250-million-in-wind-farm-project-in-new-south-wales-australia-1/>;

[http://www.cmd.act.gov.au/open\\_government/inform/act\\_government\\_media\\_releases/corb-ell/2016/wind-farms-final-piece-in-100-by-2020-plan](http://www.cmd.act.gov.au/open_government/inform/act_government_media_releases/corb-ell/2016/wind-farms-final-piece-in-100-by-2020-plan);

<http://www.adelaidenow.com.au/business/act-government-to-buy-more-power-from-hornsedale-wind-farm/news-story/be6eb5eabe2af673e542697bf8ef0b73>; accessed on 22 December 2016.

Chief Minister, Treasury and Economic Development Directorate, 2013. Talking Points, ACT Large-scale Solar Auction regular stream announcement, 19 August.

Jacobs, 2015. Wind Auction Review, Summary report, August.

AECOM, 2016. ACT Wind Auction II Review, 27 May.

SKM, 2013. ACT Solar Auction Review, October.

### A.2.2 ActewAGL FiT support payments

ActewAGL 2015-16 - Annual RIN Response - Templates – 1

## A.3 Jurisdictional FiT schemes

### A.3.1 FiT scheme details

<http://www.solarchoice.net.au/blog/when-do-feed-in-tariffs-end-NSW-QLD-VIC-ACT-TAS-SA-WA-NT>; accessed 22 Dec 2016.

[http://www.aph.gov.au/About\\_Parliament/Parliamentary\\_Departments/Parliamentary\\_Library/Browse\\_by\\_Topic/ClimateChangeold/governance/domestic/national/feed](http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Browse_by_Topic/ClimateChangeold/governance/domestic/national/feed); accessed 22 Dec 2016.

### A.3.2 2015-16 FiT scheme costs

Queensland	QCA, 2013. Estimating a Fair and Reasonable Solar Feed-in Tariff for Queensland, Final Report, March.
South Australia	SA Power Networks, Revised Regulatory Proposal 2015-20.
ACT	ActewAGL, Revised Regulatory Proposal, 2015–19 Regulatory control period.
NSW	NSW Climate Change Fund, Annual Report 2015–16.
WA	Government of West Australia, 2016-17 Budget Paper No. 3, Economic and Fiscal Outlook.
Victoria	<p>D16 54718 Jemena 2015 - Annual RIN - Attachment 1-1 Appendix B - Templates - Financial - 29 April 2016 - PUBLIC</p> <p>D16 52556 Citipower 2015 - Annual RIN - email 3 of 4 - Templates - financial - 26 April</p> <p>D16 52657 Powercor 2015 - Annual RIN - Email 3 of 4 - Attachment 1 - Templates -</p> <p>D16 55397 AusNet Services 2015 - Annual RIN - 6. Attachment J (ii) - Templates -</p> <p>United Energy 2015 - annual rin - templates - financial - 29 april 2016 - public</p>

## References

- ACT Government, 2016. <http://www.environment.act.gov.au/energy/cleaner-energy/renewable-energy-target,-legislation-and-reporting>; accessed 22 December 2016.
- Australian Energy Regulator, 2016. Annual volume weighted average spot prices; <https://www.aer.gov.au/wholesale-markets/wholesale-statistics/annual-volume-weighted-average-spot-prices>; accessed 22 December 2016.
- Australian Energy Market Commission, 2016. 2016 Residential Electricity Price Trends, 14 December.
- Audit Office of New South Wales 2011, Solar Bonus Scheme, Special Report, Sydney.
- Bhavnagri, Kobad, 2016. Six Energy Policy Issues Australia Must Address, Bloomberg New Energy Finance, Australian Clean Energy Summit, 27 July.
- City of Melbourne, 2015. Melbourne Renewable Energy Project: industry briefing questions and answers, 15 December.
- Clean Energy Finance Corporation, 2015-16 Annual Report.
- Department of the Environment and Energy, 2016. <https://www.environment.gov.au/climate-change/renewable-energy-target-scheme>; accessed 22 December 2016.
- Energetics, 2016. <http://www.energetics.com.au/resources/latest-news/climate-change-matters/large-scale-generation-certificates-part-1>; accessed on 22 December 2016.
- EY 2016. Meeting the Renewable Energy Target, Innovative approaches to financing renewables in Australia.
- Kumar, Ronal, BIS Shrapnel, 2016. \$10 Billion Needed (Fast) to Reach the 2020 Renewable Energy Target, 2 May; <http://www.bis.com.au/im-renewable-energy.html/section/4579>; accessed on 22 December 2016.
- NSW Climate Change Fund, Annual Report 2015–16.
- NSW Government, 2016. Climate Change Fund Draft Strategic Plan 2017 to 2022.
- Queensland Government 2016. <https://www.dews.qld.gov.au/electricity/solar/solar-future>; accessed on 22 December 2016.
- Queensland Productivity Commission, 2016. Solar Feed-in Pricing in Queensland, Final Report, December.
- Queensland Renewable Energy Expert Panel, 2016. Credible pathways to a 50% renewable energy target for Queensland, Draft Report, October.
- Victorian Government, 2016. <http://delwp.vic.gov.au/energy/renewable-energy/victorias-renewable-energy-targets>; accessed on 22 December 2016.