



Review of the *Electricity Feed-in (Renewable Energy Premium) Act 2008*

Environment and Planning Directorate

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Executive Summary

The *Electricity Feed-in (Renewable Energy Premium) Act 2008* (the Act) provides for a scheme through which premium feed-in tariff (FiT) payments can be made to the owners of small and medium-scale solar installations (the Scheme).

The Scheme opened on 1 March 2009 and was closed to new entrants on 13 July 2011. Successful applications made within this period are eligible to receive FiT payments for a period of 20 years from the system's date of connection to the electricity network. In 2015, amendments to the Act were passed so that the latest date at which a system may be connected under the Scheme is 31 December 2016. This means the Scheme will effectively operate until 2036.

The Scheme works by requiring electricity retailers in the ACT to offer a FiT rate to eligible owners of solar installations. Retailers contribute to this payment in relation to the Normal Cost of Electricity prescribed under the Act, which is a proxy for the wholesale cost of electricity. Retailers are entitled to recover the remaining amount from the ACT electricity distributor (ActewAGL Distribution) who recovers its costs from all users on the distribution network. In this way the Scheme provides a subsidy to the owners of solar systems, funded by all electricity consumers.

The objectives of the Act are to:

1. Promote the generation of electricity from renewable energy sources;
2. Reduce the ACT's contribution to human-induced climate change;
3. Diversify the ACT energy supply; and
4. Reduce the ACT's vulnerability to long-term price volatility in relation to fossil fuels.

Section 13 of the Act requires that the operation of the Scheme under the Act be reviewed every five years after its commencement. This is the first of these reviews (the Review).

The ACT Government Environment and Planning Directorate (EPD) conducted the Review based on information on FiT-supported rooftop solar in the ACT, provided by ActewAGL Distribution (the Distributor) and participating retailers. The key findings of this Review are:

- A. The Scheme has contributed to each of the objectives of the Act. In particular, the Scheme contributed to a rapid growth in solar installations in the ACT. There are now over 10,000 FiT supported connections totalling 26.0 MW of installed capacity. As at June 2015, 18.8 MW of solar capacity has been installed outside of the Scheme since it was closed to new applicants, and installation rates are expected to grow into the future.
- B. The Scheme must be considered as part of a national and international effort to promote solar which has been successful in increasing solar penetration and reducing production costs from manufacturing through to installation. Over the period of the Scheme, installed solar panel costs decreased from about \$9.62 per Watt in 2008-09 to \$2.42 per Watt in 2010-11.
- C. The cost of the Scheme is not a major component of retail electricity prices in the Territory. In 2013-14, the Scheme contributed approximately 2.3% to retail electricity charges. The annual cost to a household with a median consumption of 7.18 MWh per annum, is estimated at \$36.09.
- D. The extent of price reduction for solar over the period of the Scheme was not anticipated and with the benefit of hindsight, similar rates of solar installation may have been achieved with lower FiT rates. Further, it is possible that for residential-scale installations, a period of less than 20 years may have contributed to lower overall Scheme costs.

- E. Rooftop solar is a relatively expensive way to produce renewable energy and reduce greenhouse gas emissions. The cost of abatement to the ACT under the Scheme (excluding Small-scale Renewable Energy Scheme (SRES) costs) is estimated at around \$138 per tonne of carbon emissions (CO₂e). Nonetheless, solar PV costs have decreased significantly, and installation is now viable for many households and businesses in the ACT without the need for further 'direct' subsidies. It is important to note that a number of indirect subsidies still exist for rooftop solar as a result of current regulated and market tariff arrangements, and that low-income households may require greater assistance to overcome upfront cost barriers.
- F. The Scheme has not had any adverse impacts on the reliability of the ACT electricity network. While it is likely to have contributed to an estimated 3.6% reduction in summer peak demand, reductions in network investment are unlikely to have been material due to the fact that winter peaks are still a significant driver of new network investment. These can be optimised by ensuring tariffs for solar customers encourage matching of generation and load profiles, including through the incorporation of energy storage where cost-effective.
- G. The ACT Government's mandatory inspection program contributed to improvements in the quality and safety of solar installations over the course of the Scheme. It is estimated that about 70% of installations failed inspection tests in 2010-11 in contrast to around 20% in 2014-15, demonstrating a maturation of the local industry to deliver compliant installations.
- H. There have been issues in terms of the timeliness and consistency of data, administered by the Distributor and retailers, in relation to Scheme performance. Amendments to the Act passed in 2015 should improve reported outcomes going forward.
- I. There is a lack of clarity with regard to the role of ActewAGL Distribution as the Scheme administrator, as well as a lack of formal administrative systems maintained by the administrator and Environment and Planning Directorate. This contributed to inconsistent messages being provided, at times, to some applicants.

Background

How the ACT's premium FiT scheme works

A feed-in tariff (FiT) is a payment for electricity fed into an electricity network, generally from a renewable energy source, such as a solar photovoltaic (PV) system. FiT schemes introduced by governments around Australia, provide a premium rate for electricity produced, generally with the aim of encouraging the early adoption of renewable energy.

By providing a premium rate, the return on investment for solar is improved, thereby driving uptake. Early adopters of new technologies tend to pay high prices for systems which are often not as efficient as later designs¹. FiTs assist early adopters financially and stimulate demand, facilitating the industry to learn, innovate, build economies of scale and reduce installation costs for the benefit of later consumers and the community.

The *Electricity Feed-in (Renewable Energy Premium) Act 2008* (the Act) provides for a scheme through which premium FiT payments can be made to the owners of small and medium-scale solar installations in the ACT (the Scheme). The ACT's Scheme provided for a 'gross' FiT, whereby each kilowatt hour produced was paid the incentive. This is in contrast to the alternative, 'net' tariff arrangement, which pays only for electricity surplus to household consumption.

The Scheme opened on 1 March 2009 and was closed to new entrants on 13 July 2011. Successful applications made within this period are eligible to receive premium FiT payments for a period of 20 years from the system's date of connection to the electricity network. In 2015, amendments to the Act were passed so that the latest date at which a system may be connected under the Scheme is 31 December 2016. This means the Scheme will effectively operate until 2036.

The Scheme works by requiring electricity retailers in the ACT to offer a premium FiT rate to eligible owners of solar installations from the date of its connection to the electricity network. Retailers contribute to this payment in relation to the Normal Cost of Electricity prescribed under the Act. The Retailers are entitled to recover the remaining amount from the ACT electricity distributor (ActewAGL Distribution) who recovers its costs from all users on the distribution network. In this way the Scheme provides a subsidy to the owners of solar systems which is funded by all electricity consumers.

Under the Act, an eligible customer such as a homeowner could apply for a FiT provided their application met certain conditions, such as the size of the system (generating capacity) and compliance with relevant installation standards. If approved, these customers could enter into a contract with an energy retailer to receive the FiT for the electricity they generate and export to the grid. The Act also provides for the potential relocation of a renewable energy generator or a change of ownership of the property, where there is a connected generator.

When the Scheme opened on 1 March 2009, residents intending to connect a small-scale system (up to 10kW) were eligible to apply for a rate of 50.05c/kWh. The rate available to new applicants intending to connect small-scale systems changed to 45.7c/kWh, from 1 July 2010 until 31 May 2011.

As well as attracting residential applicants, the Scheme was intended to attract applications from community groups in the ACT wanting to connect medium-scale systems. When the Scheme opened,

¹ Parliament of Australia, 2014, *Overview of Feed in Tariffs: a quick guide*.

a 40.04c/kWh rate was available for applicants wanting to connect systems with a capacity greater than 10kW and up to 30kW. From 1 July 2010 until 31 May 2011, the rate changed to 45.7c/kWh for applicants wanting to connect a system up to 30kW. This rate was consistent with the rate available to applicants wanting to connect small-scale systems during this period. Applicants wanting to connect a system with a capacity between 30 to 200kW could apply for a rate of 34.27c/kWh from 7 March 2011 to 11 July 2011.

On 12 July 2011, a rate of 30.16c/kWh was available for all eligible applicants wanting to connect a system with a capacity up to 200kW. The Scheme was closed to all new applicants the following day on 13 July 2011, due to higher than expected demand.

Purpose and scope of this Review

The Review assesses the success of the *Electricity Feed-in (Renewable Energy Premium) Act 2008* (the Act) in meeting the objectives of the Act, including an assessment of whether the Scheme has promoted renewable energy generation, reduced the ACT's contribution to human-induced climate change and diversified the ACT's energy supply.

As required under Section 13 of the Act, the Review must include a consideration of the impact of costs on electricity users, and in particular, whether the impacts are equitable. The Review also considers amendments to the legislation and whether the legislation needs to be further updated to ensure the effective administration of the Scheme.

How the Review was conducted

The ACT Government Environment and Planning Directorate (EPD) conducted the Review of FiT-supported rooftop solar in the ACT, and used this information to assess the performance of the Scheme against the objectives under the Act.

The information on FiT supported rooftop in the ACT, is administered by ActewAGL Distribution (the Distributor) and participating retailers under the Scheme, and was provided to EPD in May 2015.

Financial analysis of the information was developed by EPD, and independently reviewed by Energetics Pty Ltd. Costs for solar PV systems are based on data and assumptions sourced from the:

- Clean Energy Regulator (CER)
- Solar Choice;
- The Australian Photovoltaic Institute (APVI); and
- The Grattan Institute.

International and national policy context

The ACT's FiT Scheme should be considered as part of a national and international effort which has been successful in dramatically increasing solar penetration and reducing production costs from manufacturing through to installation, in a relatively short period of time. The ACT Scheme commenced in 2009 at a time when similar schemes were being introduced in other Australian jurisdictions, and around the world. In 2014 there were at least 75 jurisdictions world-wide with FiT or renewable energy credit schemes².

The ACT Scheme operates alongside Australia's national Renewable Energy Target (RET). The RET provides financial subsidies for the installation of small-scale solar systems. Unlike FiT schemes, which provide a premium rate for electricity produced over the life of the installation, the RET allows for premiums to be deemed and paid for as an upfront capital subsidy.

While the RET commenced in 2001, rates of solar installation were relatively modest across Australia until around 2010, peaking in 2011 at about 360,000 solar installations per annum³. The interaction between the RET and the ACT FiT Scheme is an important consideration which is discussed further below.

National principles for FiT schemes

On 29 November 2008, the Council of Australian Governments (COAG) agreed to national principles for FiT schemes to be applied to promote renewable energy. These were:

- Micro renewable generation to receive fair and reasonable value for exported energy; and
- Any premium FiT rate to be jurisdictionally determined, transitional and considered for public funding.

As part of a package of energy market reforms endorsed by COAG on 7 December 2012, COAG agreed that the National Principles for Feed-in Tariff Arrangements be amended to provide that all forms of micro generation technologies be offered a fair and reasonable tariff and premium schemes to new participants be closed by 2014. In particular, governments agreed electricity retailers should provide payment for exported electricity which reflects the value of that energy in the relevant electricity market and the relevant electricity network it feeds into, taking into account the time of day during which energy is exported. The adoption of the revised principles coincided with the conclusion of state and territory FiT schemes and their replacement by, lower, 'market offers' from electricity retailers at an unregulated price.

A comparison of FiT Schemes across National Electricity Market (NEM) jurisdictions is provided in Table 1.

² Burt, D., Dargusch, P, 2015, *The cost-effectiveness of household photovoltaic systems in reducing greenhouse gas emissions in Australia: Linking subsidies with emission reductions*, Applied Energy, volume 148, pp. 439 – 448, with reference to Honghang S, Qiang Z, Yanxi L, Yurui Z, Jun S. China's solar photovoltaic policy: an analysis based on policy instruments, Applied Energy 2014;129(2014):308–19.

³ Clean Energy Regulator, *Small-scale installations by installation year*, <http://www.cleanenergyregulator.gov.au/RET/Forms-and-resources/Postcode-data-for-small-scale-installations>

Table 1. Australian state and territory government FiT rates in NEM jurisdictions⁴

State	FiT rate and eligibility of NEM jurisdiction	Model	Closed to new applicants
ACT	<ul style="list-style-type: none"> • 50.05c/kWh, installation capacity up to 10kW, applications approved 1 March 2009 to 30 June 2010 • 40.04c/kWh, installation capacity between 10 to 30kW, applications approved 1 March 2009 to 30 June 2010 • 45.7c/kWh, installation capacity up to 30kW, applications approved 1 July 2010 to 31 May 2011 • 34.27c/kWh, installation capacity between 30 to 200kW, applications approved 7 March 2011 to 11 July 2011 • 30.16c/kWh, generator capacity up to 200kW, applications approved 12 July 2011 to 13 July 2011 	Gross	2011
NSW	<ul style="list-style-type: none"> • 60c/kWh, applications approved 1 January 2010 to 18 November 2010 • 20c/kWh, applications approved 19 November 2010 to 28 April 2011 • Installation capacity up to 10kW, connected by 30 June 2012. Customers must have been consuming less than 160 MWh p.a. 	Gross	2011
VIC	<ul style="list-style-type: none"> • 60c/kWh, generator capacity up to 5kW, applications approved late 2009 to end 2011 • 20c/kWh, generator capacity up to 5kW, applications approved 1 January 2012 to 31 December 2012 • One-for-one, generator capacity less than 100kW, application 1 January 2013 to 31 December 2016 	Net	2016
SA	<ul style="list-style-type: none"> • 44c/kWh, applications approved up until 31 August 2010 • 44c/kWh, FiT limited to 45kWh daily export, applications approved 1 September 2010 to 30 September 2011 and connected by 30 September 2011 • 16c/kWh, FiT limited to 45kWh daily export, applications approved 1 October 2011 to 30 September 2013 and connected by 29 January 2014 • 16c/kWh, upgrades applications allowed prior to 1 October 2011 and connected by 1 October 2013 • Installation capacity up to 10kVA (30kVA) with single phase (three phase). Customers must have been consuming less than 160MWh p.a. 	Net	2013
QLD	<ul style="list-style-type: none"> • 44c/kWh, applications approved prior to 10 July 2012, connection by 30 June 2013, customers must be consuming less than 100MWh p.a. 	Net	2012

Interactions between FiT schemes and the Small-scale Renewable Energy Scheme

The Commonwealth RET has included two key components - the Small-scale Renewable Energy Scheme (SRES) and the Large-scale Renewable Energy Target (LRET). The SRES creates a financial

⁴ NSW Trade & Investment – Resources & Energy, *Solar Bonus Scheme*. Victorian Energy and Earth Resources, *Closed Feed-in Tariff Schemes*. South Australian Water Energy and Environment, *Solar feed-in scheme*. Queensland Department of Energy and Water Supply, *Solar Bonus Scheme*.

incentive for households, businesses and community groups to install eligible small-scale renewable energy systems such as solar water heaters, heat pumps, solar photovoltaic (PV) systems, small-scale wind systems, or small-scale hydro systems. It does this by legislating demand for Small-scale Technology Certificates (STCs).

STCs are created for these systems at the time of installation, according to the amount of electricity they are expected to produce or displace in the future. For example, the SRES allows eligible solar PV systems to create STCs at the time of installation, equivalent to 15 years of expected system output.

RET-liable entities have a legal requirement under the SRES to buy STCs and surrender them to the Clean Energy Regulator on a quarterly basis.

Changes to the SRES over time have impacted the value of incentives paid to households and businesses installing solar PV systems. Of particular importance to the ACT's FiT Scheme were changes to the 'STC multiplier rate'. This multiplier was applied to STCs from mid-2009 until the end of 2012 (see Table 2). For systems connected to the grid, the multiplier applies to the first 1.5kW of capacity; output from capacity above 1.5kW is eligible for 1 STC per MWh⁵.

Table 2. SRES multiplier rates⁶

Time period	Multiplier
9 June 2009 – 30 June 2010	5x
1 July 2010 – 30 June 2011	5x
1 July 2011 – 30 June 2012	3x
1 July 2012 – 31 December 2012	2x
1 January 2013 onwards	1x

When the Scheme first opened there was no multiplier rate applied to STCs. Three months later, in mid-2009, the number of STCs available increased by a factor of 5 for system output, from the first 1.5kW of capacity.

Being a Federal Government initiative, this SRES discount on rooftop solar installations was available to all customers under the ACT FiT Scheme. There is information available for systems with a capacity of 1.5 kW or 3.0 kW to show that Scheme customers would have received an estimated SRES discount of \$2.80 per watt, or \$1.70 per watt, for the respective system sizes.

In 2009, the SRES discount to ACT FiT customers purchasing a 1.5kW or 3kW solar PV system, is estimated at 23% or 17%, respectively. In 2010-11, this was as high as 53% and 38%, due to decreasing solar PV module and installation costs.

⁵ Australian PV Association, 2011, *Australian Photovoltaic's Status Report*.

⁶ Climate Change Authority, *The Small-Scale Renewable Energy Scheme*, <http://www.climatechangeauthority.gov.au/chapter-5-small-scale-renewable-energy-scheme>

The introduction of the SRES multiplier in mid-2009 is likely to have accelerated the number of applicants and subsequently approved customers under the Scheme. The Scheme was closed to new small-scale applicants at the end of May 2011 because the then 15 MW micro component total capacity cap had been fully committed, some 12 months prior to what was anticipated in 2010.

Reductions in solar costs

Solar PV module and installation costs have reduced significantly over the past decade. Module costs have declined primarily as a result of mass-scale production of solar PV panels and inverters, primarily in China, that brought down manufacturing costs⁷.

Installations costs also fell significantly in the last decade, with the industry in Australia becoming more efficient at installing new systems. The removal of neighbouring NSW's FiT in 2012 is also understood to have NSW installers increasing supply to the ACT where a FiT was still in place. These 'soft costs' can be as much as half of the total cost of a PV installation⁸ and the total 'out-of-pocket' costs for solar customers in Australia are understood to be amongst the lowest in the world, due to incentives such as the SRES and feed-in tariff schemes⁹.

Over the period of the Scheme, installed solar panel costs decreased from about \$9.62 per Watt in 2008-09 to \$2.42 per Watt in 2010-11. Over this period, the average capacity of solar installations also increased. In 2008-09 the average rooftop solar system had a capacity of 1.8 kW, meaning an out-of-pocket cost of around \$17,100. In 2010-11, the typical system had a capacity of 2.1 kW and an out-of-pocket cost of around \$5,100.

Value for customers under current market offers

Today, the availability of lower cost solar PV, combined with increasing household electricity prices, means it remains attractive for many households and businesses to install PV under current market offers¹⁰. The rate of return for non-FiT-supported solar installations is highly sensitive to the consumption profile of the household or business. In particular the proportion of solar generation consumed at the premises is important.

When rooftop solar is installed as a net-FiT under current market offers, the system will achieve savings on network and other charges, in addition to the cost of the electricity purchased by the customer's electricity retailer. Analysis by EPD indicates that a household consuming 80% of their solar generation could achieve a payback on a new 3kW solar installation in 8 years, compared to 13.5 years if only 20% of the electricity is consumed at the premises.

This incentive for self-consumption is appropriate and will encourage more efficient deployment of solar than would otherwise be the case. It also provides a source of value for energy storage technologies, which can assist in the transition to a much higher penetration of solar on the ACT

⁷ Wood, T., Blowers, D., and Chisholm, C., 2015, *Sundown, sunrise: how Australia can finally get solar power right*, Grattan Institute

⁸ Office of Energy Efficiency and Renewable Energy, *Reducing Non-Hardware Costs*, <http://energy.gov/eere/sunshot/reducing-non-hardware-costs>

⁹ RenewEconomy, 2013, *Why Australian Rooftop Solar PV Prices are Cheaper*, <http://reneweconomy.com.au/2013/why-australian-rooftop-solar-pv-prices-are-cheaper-98991>,

¹⁰ Burt, D., Dargusch, P., 2015, *The cost-effectiveness of household photovoltaic systems in reducing greenhouse gas emissions in Australia: Linking subsidies with emission reductions*, Applied Energy, volume 148, pp. 439 - 448

distribution network. The important point, as noted by the Grattan Institute¹¹, is that price signals should reward efficient generation and use of the network.

Scheme performance

Objectives under the Act

Under the *Electricity Feed-in (Renewable Energy Premium) Act 2008* (the Act), there are four objectives of the Scheme:

1. Promote the generation of electricity from renewable energy sources;
2. Reduce the ACT's contribution to human-induced climate change;
3. Diversify the ACT energy supply; and
4. Reduce the ACT's vulnerability to long-term price volatility in relation to fossil fuels.

Take-up

Prior to the introduction of the Scheme, it is estimated that there were approximately 400 rooftop solar systems in the ACT in 2007-08. As at June 2015, there are now a total of 10,175 connections under the Scheme, representing a total of 26.0 MW of installed capacity¹².

Figure 1 shows the number of customers by FiT rate and financial year, how they changed from the opening year of the Scheme in 2009 through to closure to new applicants in 2011, and subsequent years.

There was a rapid increase in customer numbers during 2010-11 and 2011-12, with a plateau in subsequent years due to the closure of the Scheme to new applicants. The highest rate of new applicants occurred immediately after the change in FiT rate from 50.05c/kWh to 45.70c/kWh.

¹¹ Wood, T., Blowers, D., and Chisholm, C., 2015, *Sundown, sunrise: how Australia can finally get solar power right*, Grattan Institute

¹² Based on Distributor data, May 2015.

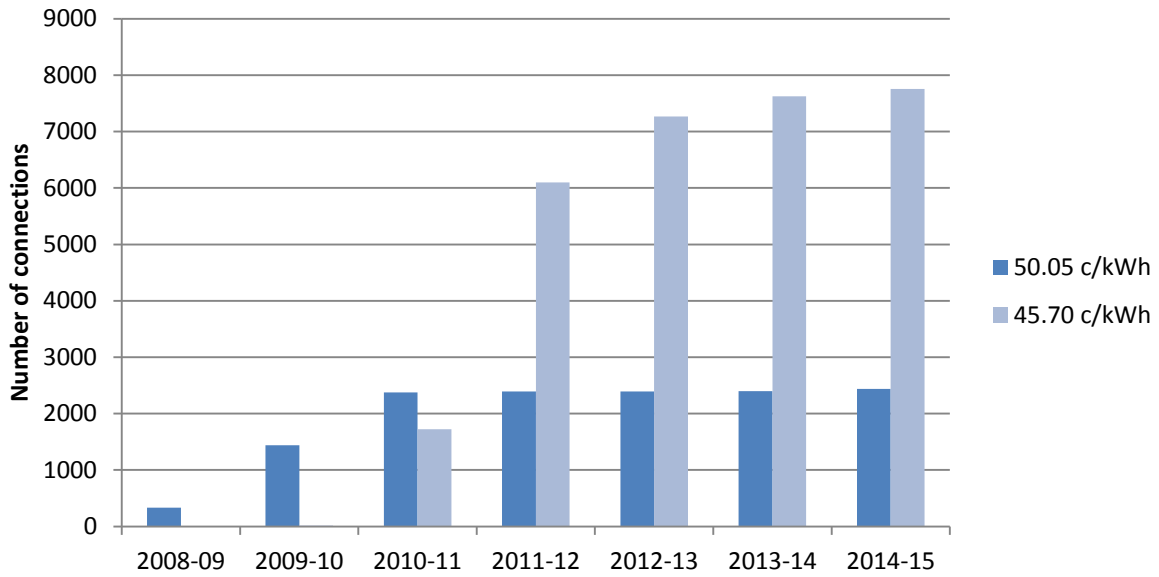


Figure 1. Connections by FIT rate and financial year

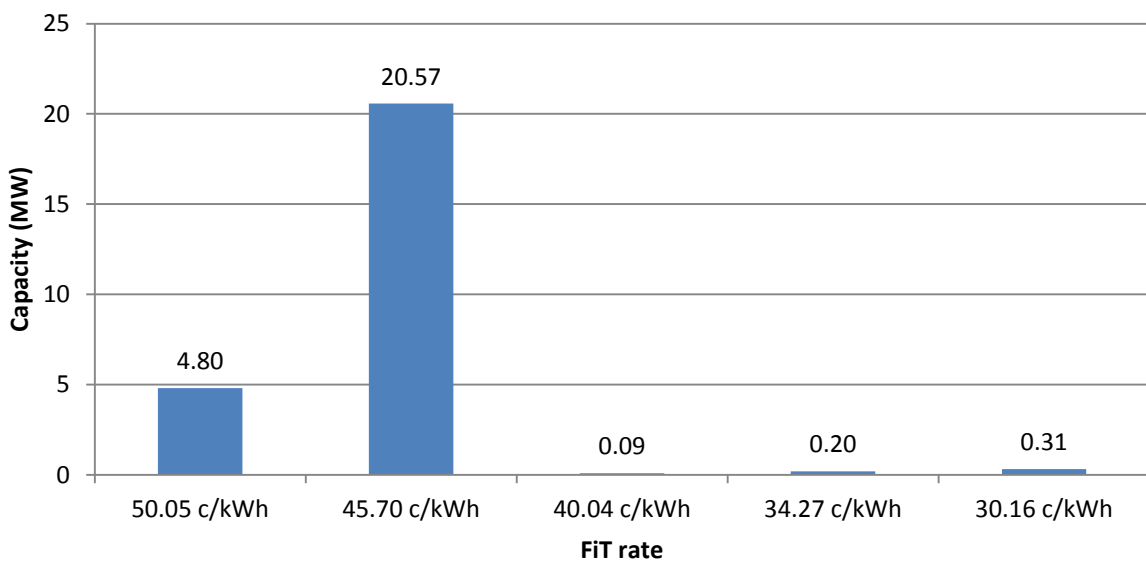


Figure 2. Connected capacity (MW) by FIT rate (as at May 2015)

There are only three customers with connections on the 40.04c/kWh FiT rate (capacity between 10 to 30 kW), and seven customers combined on either the 34.27c/kWh or the 30.16c/kWh (capacity between 30 to 200kW).

The total installed capacity of customers on the 50.05c/kWh and 45.70c/kWh FiT rates is shown in Figure 2. There is 20.57 MW and 4.80 MW of capacity installed on the 45.70c/kWh and 50.05c/kWh FiT rates, respectively. There is an additional 0.50 MW of capacity installed on the other three FiT rates.

Figure 3 shows the increase in connected capacity, corresponding with the increase in the number of connections. In total, 26.0 MW of capacity has been connected with peak new connections in 2011-12.

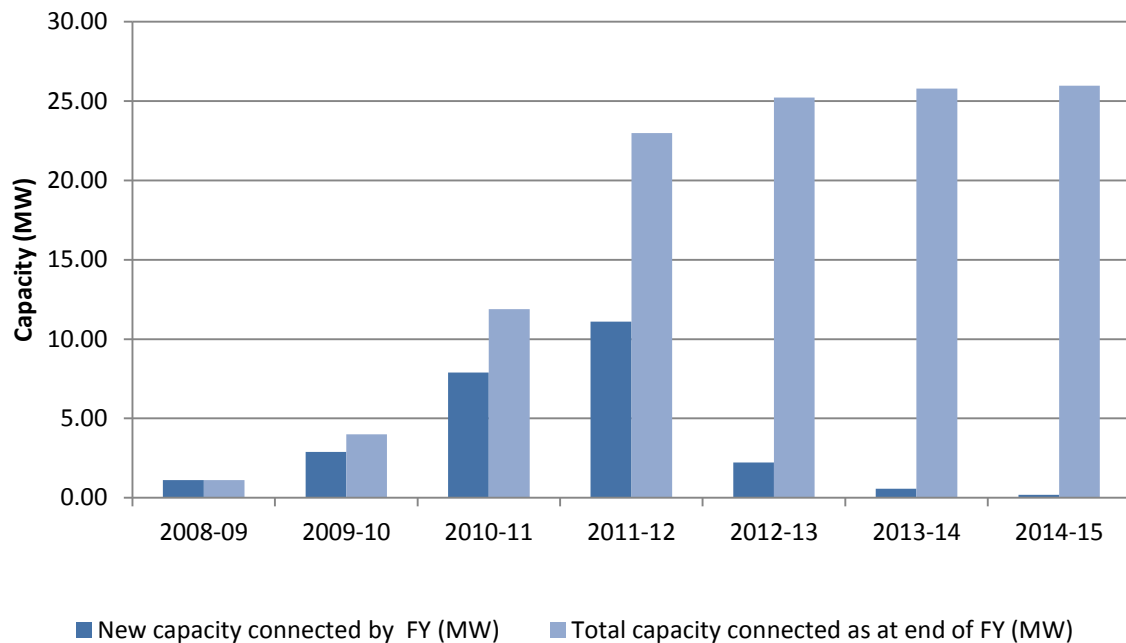


Figure 3. Connected capacity (MW) of systems receiving the FiT by financial year

Of the 26.0 MW of capacity already connected, there are 44 community groups that were provided a small-scale FiT, via the ACT Government’s Community Energy Grants program, with a combined capacity of 243kW¹³.

There is an additional number of small-scale customers (systems up to 30kW) that have not yet been connected (estimated at 404kW of total capacity), and who can connect until the end of 2016. Up to 7 MW of medium-scale capacity (greater than 30kW and up to 200kW) is anticipated for connection by the end of 2016. This capacity, if connected, will bring the total capacity to approximately 33 MW, 2 MW below the 35MW cap legislated under the Act. The government does not intend to re-open the Scheme for any shortfall of the capacity cap.

Since the closure of the Scheme, the small-scale solar PV industry in the ACT has added 18.8 MW of capacity, without premium FiT support. According to the ActewAGL Distribution, there were 16,234 (FiT-supported and non-FiT supported) small-scale connections with a total capacity of 44.8 MW in the ACT as at the end of June 2015.

Figure 4 shows the growth in generating capacity of FiT and non FiT-supported installations based on various reports from the ICRC and ActewAGL Distribution. It shows that the growth in FiT-supported installations plateaued in 2013-14 following the closure of the FiT scheme to new entrants in 2011. The fastest rate of growth for non FiT-supported capacity was between 2011-12 and 2013-14. The growth rate from 2013-14 to 2014-15 was 12% with around 2 MW of new capacity installed in that period. This data series includes a number of solar installations completed prior to the commencement of the FiT scheme that subsequently became eligible for FiT support.

¹³ Environment and Planning Directorate, Community Energy Grants, http://www.environment.act.gov.au/energy/community_energy_grants

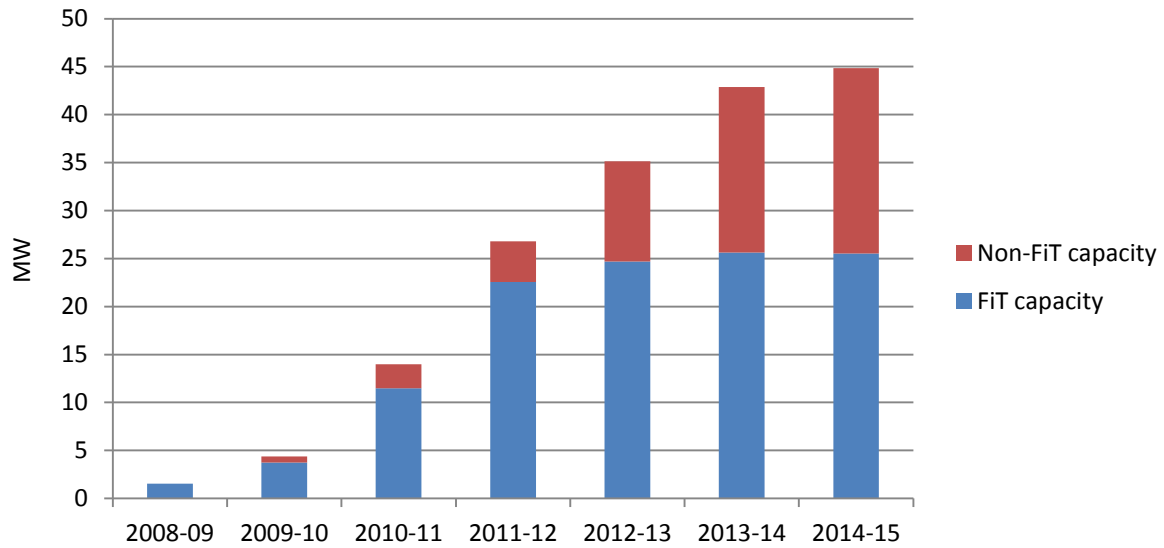


Figure 4. Estimated cumulative installed FiT and non FiT-supported capacity by financial year

A national trend in new capacity

The rate of uptake of new solar installations in the ACT has been broadly in line with national trends. The spike in installations under the ACT Scheme in 2011 was at a time when the SRES multiplier was still at its highest.

Figure 5 shows a national surge in solar installations during 2011 that coincided with the reductions to the national SRES solar credits multiplier from 5 to 3. This provided an incentive for new applications to be completed by mid-2011 so as to secure the higher multiplier rate. A second drop in the multiplier rate occurred in mid-2012 and this produced a similar, but smaller surge in new applications under that scheme. This greatest impact of these changes in Commonwealth policy settings were for systems with a capacity of less than 2.5 kW.

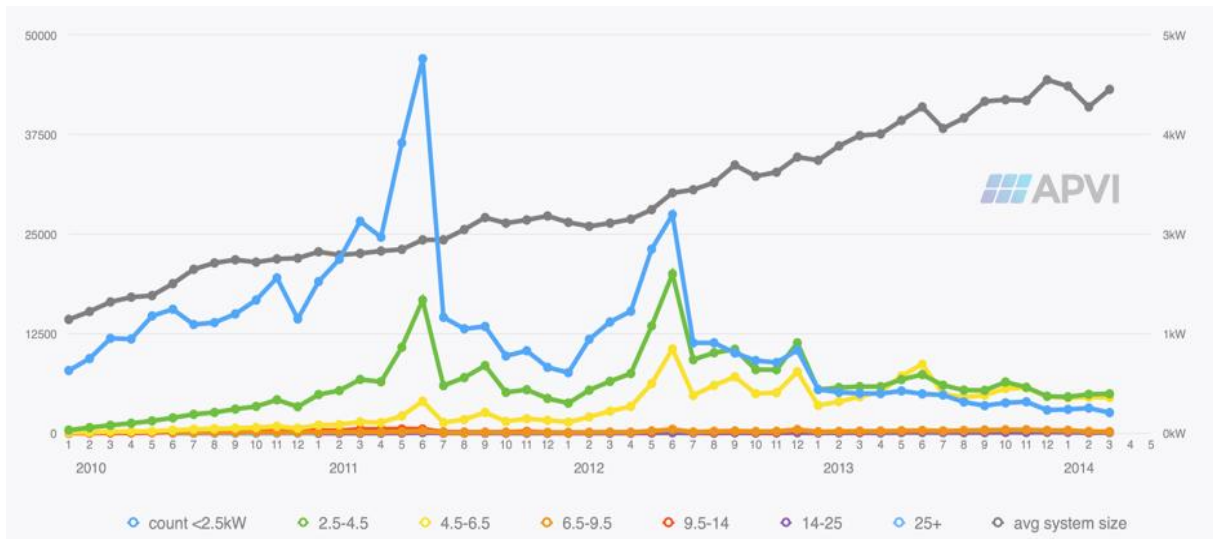


Figure 5. Australian monthly solar PV installations (by capacity, 2010 to 2014). Source: APVI¹⁴

¹⁴Australian Photovoltaic Institute, <http://pv-map.apvi.org.au/analyses>, accessed May 2015

The ACT now has an installation rate amongst stand alone houses (about 17%) comparable to rates in Sydney, Melbourne and Hobart (see Figure 6). Regional areas generally have higher rates of penetration.

When comparing states/territories it is important to consider that the ACT has the lowest electricity prices of any jurisdiction, meaning less market incentive for ACT residents to invest in small-scale renewable generators. This is in contrast, for example, to South Australia and Queensland with capital city penetration rates of around 40%, where electricity prices are relatively high and there is higher solar insolation. It is interesting to note that Tasmania did not implement a premium FiT scheme but has a comparable penetration rate to the ACT, NSW and Victoria.

The rate of uptake associated with the ACT’s FiT scheme is consistent with the objectives of the Act *to promote the generation of electricity from renewable energy sources*. However, given the overall extent and rate of uptake and the close alignment with national trends, changes to the SRES are considered to be an important factor. It is not possible to isolate the impact on the ACT’s premium FiT Scheme from the impact of the SRES on overall rate of uptake of rooftop solar between commencement in 2009, and closure of the Scheme to new applicants in 2011.

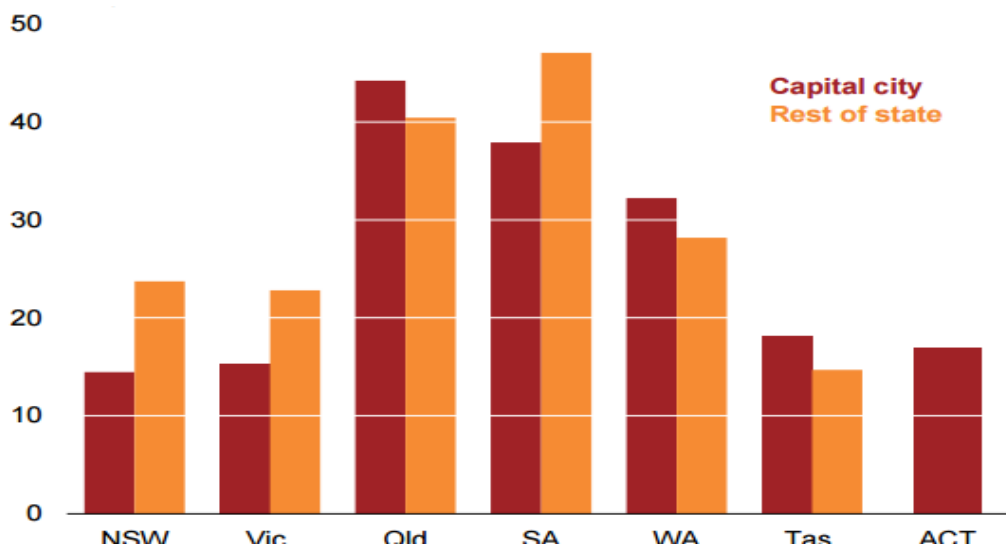


Figure 6. Solar PV penetration rates (%) by State/Territory for owner-occupied houses Source: Grattan Institute¹⁵

Renewable energy generation

Roof-top solar installations in the ACT reduce imports from the broader electricity market which is predominantly supplied by fossil fuel generators. FiT-supported solar generators therefore contribute to the Schemes objectives of diversification of the ACT’s electricity supply, reduced emissions and reduced vulnerability to long-term price volatility in fossil fuels.

¹⁵ Wood, T., Blowers, D., and Chisholm, C., 2015, *Sundown, sunrise: how Australia can finally get solar power right*, Grattan Institute

Electricity output from the Scheme increased in line with the number of connections, as shown in Figure 7. Output from FiT-supported solar generators has increased by financial year, with output accelerating between 2008-09 to 2012-13, from 0.2 GWh to 33.7 GWh.

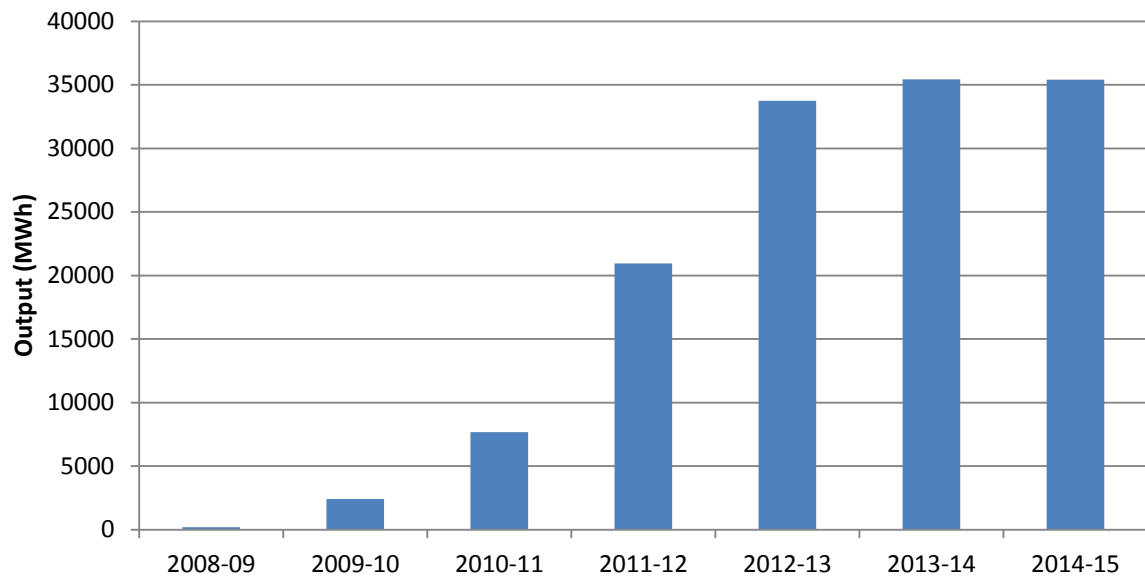


Figure 7. Metered output of FiT-supported solar PV panels

A plateau in generation occurs after the Scheme was closed to new entrants, levelling off at 35.4 GWh in 2013-14 and 2014-15. The output of small-scale FiT-supported generation represents 3.2% of total residential electricity sales in 2013-14. FiT-supported solar PV generation is shown as a percentage of total ACT residential electricity sales in Figure 8.

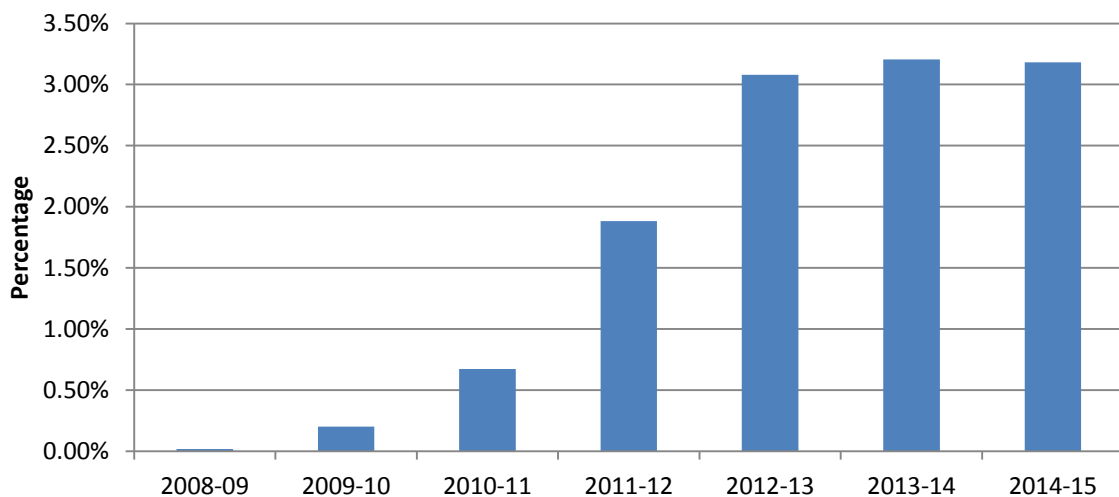


Figure 8. FiT scheme metered output as a percentage of total ACT electricity sales

Output is anticipated to peak in 2016-17, if anticipated median-scale capacity is connected by the end of 2016. Post 2016-17, output is projected to decline with solar panel degradation (between 0.5% to 0.75% per annum). The output of solar PV in the ACT has a capacity factor of about 0.16 based on the best available retailer data, meaning that on average a small-scale solar PV installation produces about 16% of its rated peak capacity. Peak capacity rating occurs in ideal conditions with peak levels of direct, uninterrupted energy from the sun, ideal module operating temperatures and when the panels are new and at their most efficient. In practice, the energy available from the sun is

reduced by an indirect angle for most of the day (and all night) and by obstructions such as clouds, shade and dust.

Large-scale solar PV installations, such as the Royalla solar farm, have their direction, tilt and condition calibrated and maintained to maximise the time that the panels receive direct sunlight. The capacity factor for such a solar farm can be around 21%. In contrast, residential solar PV installations must accommodate the orientation and location of the premises, which are often sub-optimal, leading to lower capacity factors.

Non-FIT-supported solar generating capacity in the ACT is expected to continue to grow, with EPD projections showing output reaching 95.0 GWh by 2020, around 4% of total renewable energy supply.

Emission reductions

Renewable energy generation, including from small-scale solar PV, displaces demand for electricity generation from non-renewable electricity, such as electricity produced through the combustion of coal and gas.

The emissions intensity of the ACT electricity sector will continue to reduce with the implementation of the ACT Government's target for 90% of electricity to be sourced from renewable energy by 2020. Despite this, increases in renewable energy generation have a direct impact on emissions within the broader electricity market with each MWh of renewable energy generation, displacing a MWh of non-renewable energy generation.

Over the life of the Scheme, there is an estimated saving of 767 kt- CO₂e from non-renewables. This is about 1.2% of ACT electricity generated emissions per annum, based on information for 2013-14.¹⁶

¹⁶ Based on total ACT electricity sales in 2013-14.

Scheme costs and equity outcomes

A Grattan Institute report estimates that, over the period from 2009 to 2030, subsidies for solar PV in Australia provide benefits in the form of avoided centralised electricity generation, worth \$7.1b¹⁷. Over the same period the purchase, installation and maintenance of solar PV systems is estimated to cost \$18.7b.¹⁸

There are similar trends found in costs and benefits of ACT FiT Scheme over its lifecycle, being its commencement in 2009 to the last possible payment of FiTs in 2036-37. This analysis considers the value (in 2015 dollar terms) of avoided electricity purchases against the cost of capital, maintenance and administration of the Scheme, as shown in Figure 9.

Producing solar energy locally reduces requirements to buy electricity from the NEM, resulting in financial savings to the ACT. This is compared against capital and maintenance costs of rooftop solar borne by customers of the Scheme. Finally, there is a cost to government to administer the Scheme, the only taxpayer funded element of the Scheme. FiT payments are considered an internal transfer within the Territory, that is, they are payments between electricity users and customers of the Scheme, and not a net cost.

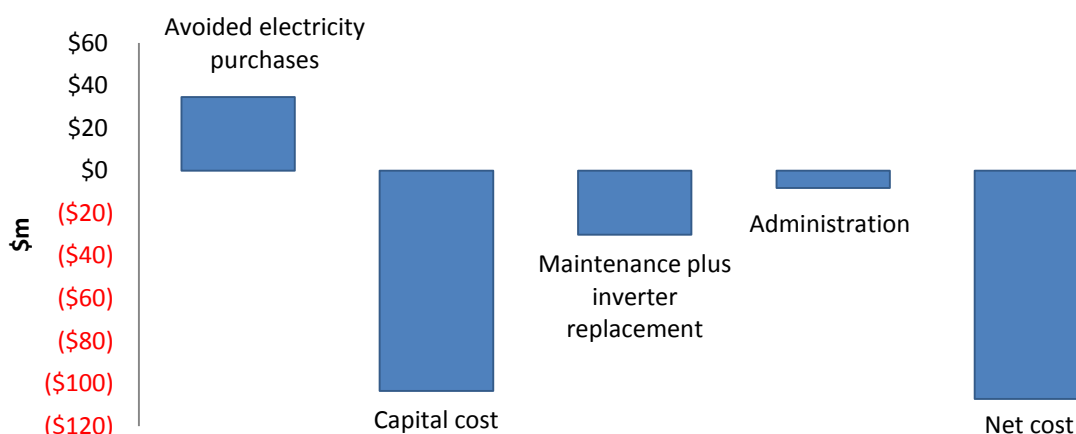


Figure 9. Lifecycle (2008-09 to 2036-37) costs and benefits of the ACT FiT Scheme (in 2015 dollars)

This analysis projects a benefit of avoided electricity (wholesale) purchases from the NEM equal to \$34.5m. Installed capital costs, less the SRES discount, are estimated at \$103.5m. Maintenance costs (\$11.8m), inverter replacement (\$18.3m) and administration costs (\$8.2m) have a combined cost of \$38.3m. The net economic cost over the life of the Scheme, being the benefits less costs, is equal to \$107.2m.

¹⁷ Wood, T., Blowers, D., and Chisholm, C., 2015, *Sundown, sunrise: how Australia can finally get solar power right*, Grattan Institute. CO₂ is priced at \$30 a tonne, with an estimated saving of 66 million tonnes of CO₂ by 2030.

¹⁸ IBID.

Inverters need to be replaced about once every ten years. Solar PV modules produce direct-current and inverters convert this to alternating current for usage by the household or distribution by the network. There are also other maintenance costs, such as inspections mandated under the Distributor, which occur every five years. The inverter replacement cost is based on 15% of the out-of-pocket capital cost and the maintenance cost is estimated at \$20/kW per annum (\$2015).

The financial analysis of the Scheme applies a discount rate of 7% to all lifecycle costs and benefits. The normal cost of electricity is a proxy for wholesale electricity cost, determined each year under the legislation. There is a forecast 1.5% per annum increase in the normal cost of electricity, from 2015-16 onwards. A degradation rate of solar PV panels of 0.5% to 0.75% per annum is also applied to output in future years¹⁹.

It can be assumed that high FiT rates stimulate uptake by some households that may have lower than optimal installation conditions. This in turn decreases the ratio of benefits-to-costs. As a point of reference, one study finds 67% of rooftop solar take up would have occurred with zero FiT support.²⁰ It should be noted, however, that under current market arrangements, upfront costs may remain a barrier for low-income households.

A key exclusion in the cost-benefit analysis is the value of avoided carbon emissions. A carbon price applied to the generation sector has the effect of inflating wholesale electricity prices, increasing the value of avoided electricity imports. Including a carbon price of \$15 and \$25 per tonne decreases the net cost of the Scheme to around \$102m and \$98m, respectively. For the Scheme to have a positive benefit-to-cost ratio, a fixed carbon price in the order of \$290 per tonne would need to be applied, from 2015-16 to 2036-37.

The costs-benefit analysis also excludes transmission and distribution network augmentation. Rooftop solar in the ACT is likely to have contributed to an estimated 3.6%²¹ reduction in summer peak demand. However, network costs and benefits are difficult to quantify²² and are likely to be minor, due to the limited contribution rooftop solar makes to peak demand reduction in the Territory, especially winter peak demand.

Cost to ACT households

Over the period 2008-09 to 2014-15, the total cost of the Scheme to ACT electricity users, being the FiT rates less the normal cost of electricity, is \$52.55m²³. Annual pass-through costs are estimated at \$36.09 per household for 2013-14, based on average household consumption of 7.18 MWh per annum²⁴.

¹⁹ Normal cost forecast per annum increases derived from Jacobs SKM estimates for NSW increases in NEM prices between 2014-15 and 2019-20. Degradation rates are based on data from FRV.

²⁰ Burt, D., Dargusch, P., 2015, *The cost-effectiveness of household photovoltaic systems in reducing greenhouse gas emissions in Australia: Linking subsidies with emission reductions*, Applied Energy, volume 148, pp. 439 – 448,

²¹ ACT Environment and Planning Directorate, 2015, *Electricity and Natural Gas Consumption Trends in the Australian Capital Territory 2009-2013*, http://www.environment.act.gov.au/data/assets/pdf_file/0006/711699/Electricity-and-Natural-Gas-Consumption-Trends-in-the-Australian-Capital....pdf

²² Wood, T., Blowers, D., and Chisholm, C., 2015, *Sundown, sunrise: how Australia can finally get solar power right*, Grattan Institute

²³ Based on Distributor data, as at May 2015. The Scheme cost to ACT electricity users is the FiT rates paid by the retailer less the normal cost of electricity. Note that the normal cost of electricity, under the Act, is a proxy for the wholesale cost of electricity.

²⁴ Average usage based on annual supply data for 2013-14, as provided by the Distributor.

Should anticipated medium-scale capacity of 7MW be connected by the last possible date of 31 December 2016, pass-through costs are estimated to peak at \$43.79 per household per annum, in 2016-17. Assuming similar household consumption and income, the cost would represent about 2.8% of the average ACT household annual electricity bill and 0.02 % of the average household annual income²⁵.

As at May 2015, there were 1,817 FiT customers that held concession cards²⁶ representing 17.8 % of all FiT customers. In 2014-15, concession card holders received an annual rebate of up to \$426.26 for all utilities (electricity, gas and water).²⁷ It is estimated that approximately 20% of ACT households hold a concession card.

It is important to note that the high take-up rate in these households was likely influenced by the combination of upfront incentives available through the Commonwealth's scheme, which coincided with a rapid reduction in system and installation costs in 2011.

The Australian Energy Market Commission (AEMC) has estimated that, nationally, a consumer using an average-size, north-facing solar PV system will save themselves about \$200 per year in network charges, compared with a similar consumer without solar. However, because most of the solar energy is generated at non-peak periods during the day, it reduces the network's costs by \$80, leaving other consumers to make up the \$120 shortfall through higher network charges.²⁸

Customer payback period

Over 80 % (four out of five) customers connected their system in 2011-12 or later, with an average capacity of 2.0 kW. The output from these systems provides revenue to the customer of the Scheme of about \$1,200 per year. Based on the average out-of-pocket expenses for solar PV installations of around \$2.42 per Watt from 2010-11, the payback period was 4.2 years.

In contrast, the payback period for the customers who connected in 2008-09 (at \$9.62/Watt) and 2009-10 (\$5.41/Watt) would have a payback period of 14.4 years and 8.4 years, respectively.

Distribution of installations by suburb

Residential sites across ACT suburbs, including apartment blocks, have an average penetration rate of 8.9% of FiT-supported solar PV. Two thirds (67%) of suburbs have a penetration rate between 5 and 10%. Table 3 shows the top ten and bottom ten suburbs by rate of connection of FiT-supported solar PV per residential site. Monash tops the list at 25.34%, and has a capacity of 0.75MW. This capacity is second only to Kambah with 1.37 MW. The penetration rate for Monash is higher than Kambah's (9.99%), explained by far fewer residential sites (Monash has about 1,600 residential roof tops whereas Kambah has about 5,600).

²⁵ Household usage and electricity bill from 2013-14 EPD annual report, Cost of Living Statement. Average household income taken from page 44, 2013-14 Budget paper No.3, 'In the ACT, the median weekly family income for families with children was \$3,060'

²⁶ Concession holders including pension cards (1,472), life support (282) and healthcare (63).

²⁷ Community Services Directorate, *Energy Concessions*, http://www.assistance.act.gov.au/adult/utilities/energy_concession

²⁸ The Australian Energy Market Commission, 2014, *New rules proposed for distribution network prices*, <http://www.aemc.gov.au/News-Center/What-s-New/Announcements/New-rules-proposed-for-distribution-network-prices>

Hall was the suburb with the highest average capacity per site (10.0kW). The second highest was Forrest (4.9 kW). Monash had the lowest capacity per site at 1.9 kW, even though it had the highest penetration rate. Most suburbs (86%) had an average capacity per site of between 2 to 3 kW.

Table 3. Top ten and bottom ten suburbs by penetration rate

Top ten suburbs by penetration rate		Bottom ten suburbs by penetration rate	
Monash	25.34%	Crace	1.23%
Belconnen	17.60%	Casey	2.01%
Bruce	14.70%	Bonner	3.00%
Nicholls	12.98%	Kingston	3.34%
Hawker	12.59%	Charnwood	4.23%
Oxley	12.09%	Ngunnawal	5.32%
Isaacs	12.08%	Gungahlin	5.42%
Cook	11.97%	Harrison	5.85%
Bonython	11.92%	Griffith	6.09%
Stirling	11.90%	Gowrie	6.35%

There is no obvious relationship between penetration rates and household income. However, there are factors in addition to household income that can help explain the lower penetration rates shown for the bottom ten suburbs. For example, town centres such as Gungahlin have medium density apartment buildings that generally do not have solar PV installations because of the administrative hurdles associated with gaining a consensus within a body corporate.

Penetration rates in new suburbs such as Bonner may be distorted by the relatively high proportion of households that have been established during or after the close of the Scheme.

Figure 10 shows a map of the ACT with the penetration rate of FiT-supported solar PV connections, by suburb. The penetration rate is the number of residential sites with FiT-supported connections, divided by the number of total residential sites including rental properties and apartment blocks.

Figure 11 shows a map of the ACT with the average capacity of FiT-supported solar PV installations per residential site, by suburb.

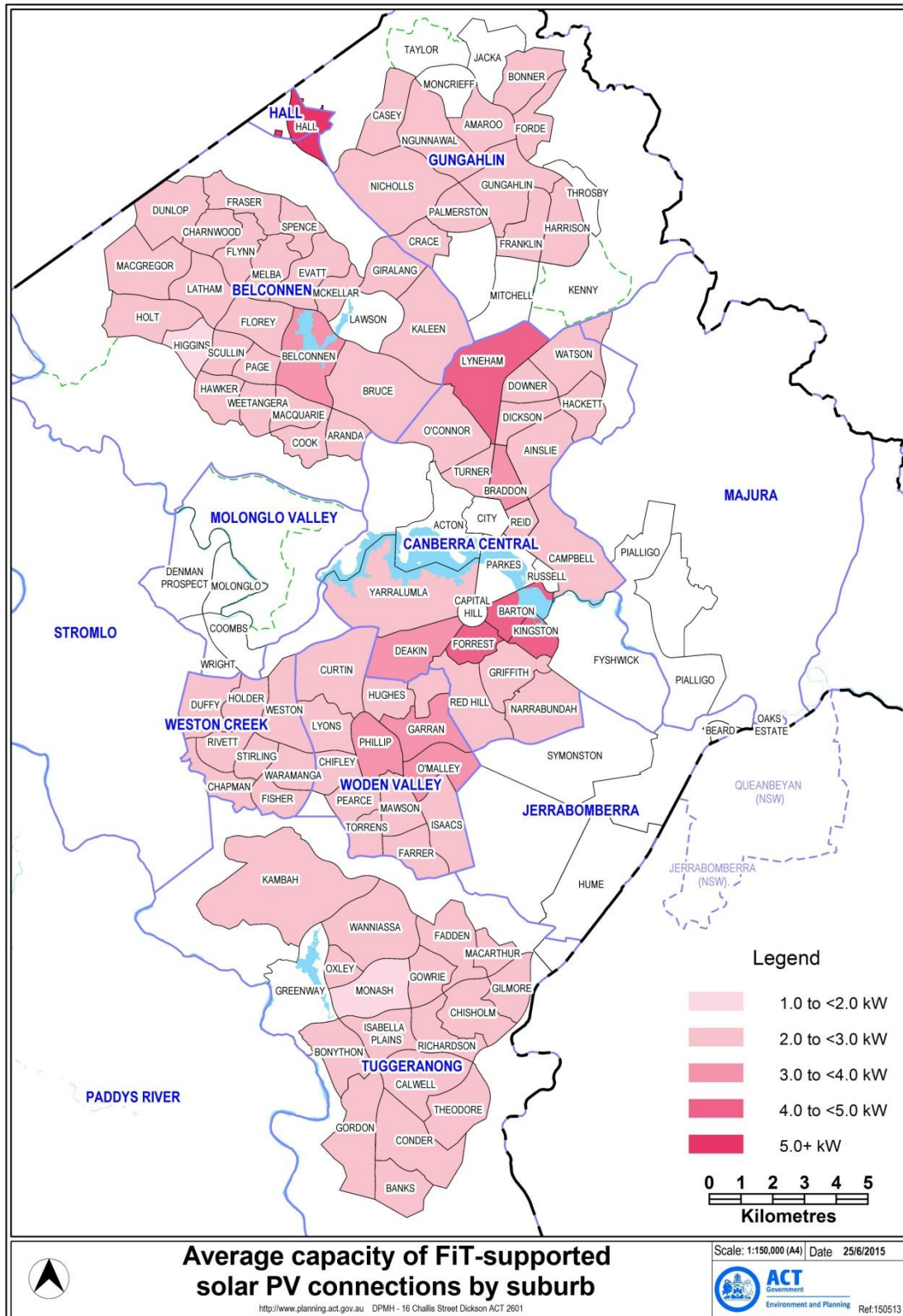


Figure 11. Average capacity of FiT-supported solar PV connections by suburb

Scheme administration

Legislation

The ACT FiT Scheme operates under the *Electricity Feed-in (Renewable Energy Premium) Act 2008* (the Act). It was introduced in 2008 as a Private Member's Bill (PMB) on 9 April 2008 and passed in the Legislative Assembly on 2 July 2008. As a PMB, Cabinet agreement and a Regulatory Impact Statement (RIS) were not required for the development of the policy. Shortcomings were identified in the original form of the legislation, necessitating a number of amendments to the Act prior to it commencing on 1 March 2009. Table 4 shows there have been multiple republications of the Act, for reasons including clarifying definitions of system capacities.

Table 4. Republications of the Act

Version	Republication for amendments by
R7 (current) - 17 April 2015	<u>A2015-6</u>
R6 - 20 November 2014	<u>A2014-48</u>
R5 - 1 July 2012	<u>A2012-32</u>
R4 - 12 December 2011	<u>A2011-52</u>
R3 - 12 July 2011	<u>A2011-25</u>
R2 - 7 March 2011	<u>A2011-6</u>
R1 (RI) - 2 March 2009	<u>A2009-8</u>
R1 - 1 March 2009	A2008-21

This legislation was implemented in consultation with the Independent Competition and Regulatory Commission (ICRC), which made recommendations on price determinations. Table 5 shows the Minister made four determinations to alter the FiT premium rates prior to the Scheme's closure.

A total capacity cap of 30MW was established in the 7 March 2011 amendment. To provide for the cap having been exceeded as at the closure of the Scheme and under the provisions of s5E(3) of the Act, in February 2012 the Minister subsequently determined a new total cap of 35MW, based on the total capacity of all applications received as at 13 July 2011.

Table 5. Determinations of FiT premium rate under the Act

Name	<u>Under</u>	<u>Effective</u>	<u>Year and No</u>
Electricity Feed-in (Renewable Energy Premium) Percentage Determination 2010 (No 1)	s 9	1 July 2010 - 12 July 2011	DI2010-43
Electricity Feed-in (Renewable Energy Premium) Rate Determination 2009 (No 1)	s 10	1 March 2009 - 30 June 2010	DI2009-22
Electricity Feed-in (Renewable Energy Premium) Rate Determination 2010 (No 1)	s 10	1 July 2010 - 30 June 2011	DI2010-42
Electricity Feed-in (Renewable Energy Premium) Rate Determination 2011 (No 1)	s 10	1 July 2011	DI2011-48
Electricity Feed-in (Renewable Energy Premium) Total Capacity Determination 2012 (No 1)	s 5E	14 February 2012	DI2012-15

Table 6 shows that the Minister made five determinations on the normal cost of electricity, under s6A of the Act. The rate remained steady at 6.00c/kWh for the period 1 March 2009 to 30 June 2013 before increasing to 7.5c/kWh for the period 1 July 2013 to 31 August 2014. On 1 September 2014 the rate was revised to 6.06c/kWh.

Table 6. Determinations of normal cost of electricity under the Act

Determination	<u>Effective</u>	<u>Year and No</u>
Electricity Feed-in (Renewable Energy Premium) (Normal Cost of Electricity) Determination 2009 (No 1)	1 March 2009 - 30 June 2010	NI2009-83
Electricity Feed-in (Renewable Energy Premium) (Normal Cost of Electricity) Determination 2010 (No 1)	1 July 2010 - 30 June 2012	NI2010-346
Electricity Feed-in (Renewable Energy Premium) (Normal Cost of Electricity) Determination 2012 (No 1)	31 August 2012 - 16 May 2013	NI2012-444
Electricity Feed-in (Renewable Energy Premium) (Normal Cost of Electricity) Determination 2013 (No 1)	17 May 2013 - 28 August 2014	NI2013-219
Electricity Feed-in (Renewable Energy Premium) Normal Cost of Electricity Determination 2014 (No 1)	29 August 2014	NI2014-414

On 1 June 2011 the Government announced the closure of the micro component of the Scheme as at 31 May 2011, however provision was made for applicants who had entered into purchase contracts and who had paid a deposit, even if they had not yet submitted a request for connection (the default Scheme application form) by the closing date. Subsequently, those parties were advised that such installation requests must be submitted to the Distributor by 29 July 2011 to retain eligibility.

On 14 July 2011, the Government announced that the Scheme as a whole had closed the previous day, as the then 30MW total installed capacity cap had been fully committed.

In May 2015, the Government introduced legislation to amend the Act, to ensure unconnected entitlements do not exist indefinitely into the future, by requiring installation and connection to the electricity network by 31 December 2016.

Administration processes

While over 10,000 PV connections have been successfully facilitated by the legislation to-date, over the course of the Scheme, and in consultation with stakeholders conducted as part of the Review, concerns have been raised in relation to the Scheme's administrative arrangements. For example, the role of ActewAGL Distribution is not clearly defined in the legislation and this contributed to some confusion regarding the role of ActewAGL Distribution as the administrator of the Scheme as opposed to EPD as the Government agency with policy oversight.

This contributed to less efficient decision-making processes on matters such as the eligibility of some installations and applicants, applicable FiT rates, and in relation to the closure of the Scheme to new applicants. While these matters were able to be resolved, they point to deficiencies in the legislative framework of the Scheme in relation to role definition, and in administrative support processes implemented under the legislation. For example, the Act did not explicitly define how an 'application' under the Scheme should be made. As a result, ActewAGL Distribution relied on previous processes for connecting embedded generators using a Special Connection Request form. While this process was generally effective, it did not capture sufficient information to resolve more complex circumstances. For example, while the Act allowed an application to be transferred between persons or between locations, it was not clear in some cases who the party to an application was (e.g. the landowner or the agent submitting the Special Connection Request Form). As a result, subsequent processes need to be applied to deal with these cases, creating uncertainty and increasing costs for all parties.

The lack of clarity in the legislation, and subsequently in the administrative arrangements, made the Scheme more vulnerable to changes in key staff both at the Distributor and within EPD. EPD is aware of one case in which this resulted in inconsistent advice being provided to an applicant. In this context, the Government could have been supported by better advice from the Directorate both during its development phase and during its subsequent operation.

Until 2015, the Act did not include an expiry date for applications. This meant that holders of FiT entitlements could bank an application indefinitely into the future irrespective of the decline in installation costs. This delayed the delivery of Scheme objectives and has required additional administrative resources than would otherwise have been required.

Reporting

Under the Utilities Act 2000, the Independent Competition and Regulator Commission (ICRC) has reported quarterly on the Scheme since its commencement, and has included information such as customer numbers, capacity installed and FiT rates paid.

Following amendments to the *Electricity Feed-in (Renewable Energy Premium) Act 2008* (the Act) in mid-2011, this data included both FiT-supported and non-FiT-supported installations. Section 11A of the Act requires the responsible Minister to publish monthly reports²⁹ on the following matters:

- The number of applications for connection during the month
- The number of renewable energy generators connected during the month
- The total number of renewable energy generators connected to date
- The total capacity of all micro and medium renewable energy generators connected to date.

²⁹ ACT Environment and Planning Directorate, 2015, *Rooftop Solar*
http://www.environment.act.gov.au/energy/rooftop_solar

Reports are based on information provided by participating electricity retailers and ActewAGL Distribution (the Distributor). During the administration of the Scheme, data provided has variously and erroneously included information relating to ActewAGL Retail's Solar Buyback scheme, being a market product it provides to households with solar PV panels connected to the electricity network. This scheme is external to the ACT FiT Scheme and has no mandated contract term or FiT rate payment.

Monthly data due to be submitted by the Distributor under the Act was late for the months of October to December 2014. An anomalous update provided in December 2014 to the ICRC, showed high variance in customer numbers and was later withdrawn by the Distributor.

Anomalies in the timing and consistency of data raised questions from the ICRC and EPD regarding the reliability and accuracy of pass-through costs reported by retailers and the Distributor. Data provided by retailers and the Distributor for the purpose of the Review showed a 1.6 % variance, as at May 2015, of aggregate data since the commencement of the Scheme, with retailer payments equal to \$53.42m and Distributor payments equal to \$52.55m. It is possible that this variance can be accounted for by processing differences, or time-lag, between retailer and Distributor databases. Verifying the reasons for past reporting anomalies, and the overall variance in FiT payments, would however require an additional Review.

The latest amendments to the Act enhance compliance and reporting of information by electricity retailers and the Distributor, with the provision for the use of targeted penalties if information from retailers and the Distributor is not provided. The amendments also allow the Government to require an independent audit if there is evidence indicating the information provided is misleading, inaccurate or incomplete. Previous monthly and quarterly reporting requirements have been replaced by a single annual reporting requirement to streamline the regulatory burden on electricity retailers and Distributor. Monthly requirements are considered redundant with the closure of the Scheme.

Safety

The ACT *Electricity Safety Act 1971* requires all new electrical installations be tested by an electrical inspector before being connected to the electricity network. Every new solar installation in the ACT is inspected prior to connection to the network, to identify upfront any safety and non-compliance issues associated with installations.

The ACT Electrical Regulator (the Regulator) has identified a higher non-compliance rate in rooftop solar than general electrical installations. Historically, 4% to 5% of general electrical installations fail their first inspection. In contrast, up to 70% of rooftop solar installations failed their first inspection during the boom in solar rooftop installation, in 2010-11. This figure is now closer to 20%, much lower than the previous high, however, still requires close attention from the Regulator.

The improvement shows the Scheme's contribution to the maturation of the ACT's solar industry to deliver safe and compliant installations, and that inspections upfront can educate the industry to deliver a compliant product.

The Regulator attributes the high rate of inspection failures during 2010-11 and 2011-12 to installers that were not properly trained in the installation of solar PV systems. It should be noted that additional training and skills are required when working on renewable energy systems.

The use of semi-skilled labour was in part to save time and keep up with demand. Interstate businesses/installers entering the ACT market at this time generally came from jurisdictions that do not have an inspection system. It should be noted that the ACT has no additional requirements other than the Australian Standards, applicable to all Australian jurisdictions. While most electricians were accredited by the Clean Energy Council, this was as a result of a Commonwealth requirement for installers to be able to register STCs, and did not reflect the capacity of installers to meet

jurisdictional technical regulatory requirements.

The Utilities Technical Regulator noted that accurate data is required to ensure the ongoing safety of existing systems. Under requirements set by the Distributor, inspections of solar PV systems are due to occur every five years by a qualified electrician. Accurate and reliable data is needed from the Distributor on the number of disconnections of existing systems relating to failure to meet current Australian safety standards.

Conclusions

Performance against the Act's objectives

Feed-in tariffs have seemingly had a role in promoting distributed generation and driving down costs, with the industry in the ACT no longer requiring additional support. There have been rapid cost reductions and uptake of solar PV above what was anticipated by governments. There is evidence to suggest that there was a level of cost inefficiency due to the setting of tariffs by jurisdictional governments, instead of through market-based mechanisms.

In the ACT, the medium-scale category of the Scheme was originally introduced with community groups in mind. The sudden surge in applications resulted in a small amount of capacity connected by community groups accessing the Scheme prior to its closure. The capacity provided for in this category was mainly taken up by commercial entities.

Distribution of FiT-supported systems and pass-through costs to electricity users

There was rapid growth in solar PV in the ACT of FiT-supported connections and this growth continued after the closure of the Scheme. The ACT's solar PV penetration rate is similar to other states in south-eastern Australia. FiT-supported connections now number 10,175 with 26.0 MW of capacity. A further 18.8 MW of capacity has been added independent of the Scheme, bringing the total ACT residential capacity to 44.8 MW.

The payback period of around 4.2 years for the typical customer of the Scheme is short compared with the 20 year duration of tariff payments. There is a broad distribution of FiT-supported connections across all suburbs in the ACT and household income does not appear to have been a significant factor in the distribution across suburbs.

The Scheme allowed for the pass-through of FiT costs to all electricity users in the ACT, with the average annual pass-through cost equal to about \$36.09, in 2013-14. It represents 2.3% of the average ACT household annual electricity bill or 8.2% of the energy and utility rebate amount available for eligible concession holders.

Administration

Accurate reporting on the Scheme is reliant on customer and metering data from participating retailers and the Distributor. The data is needed to ensure correct pass-through costs and to accurately identify the number of disconnections of existing systems where there is failure to meet current Australian safety standards. While aggregate information over the period from 2008-09 to 2013-14 appears consistent, there has been instances of delayed or anomalous data since the Scheme commenced in 2009. The Distributor and retailers need robust internal processes and software to ensure accurate reporting on the Scheme.