NSW GOVERNMENT | Trade & Investment

NSW Solar Bonus Scheme

Statutory Review

Report to the Minister for Resources and Energy

August 2014

Executive Summary

Under the *Electricity Supply Act 1995* (Sect 195), the Minister is required to "review the solar bonus scheme (being the scheme for the payment of electricity supplied to the network by small retail customers using complying generators) to determine whether the policy objectives of the scheme remain valid and whether the terms of the Act remain appropriate for securing those objectives." The Act requires that this review occur "as soon as possible after 1 July 2012".

The NSW Solar Bonus Scheme commenced on 1 January 2010 and will conclude on 31 December 2016. It requires retailers to pay eligible customers either 60 or 20 cents per kilowatt hour (c/kWh) for solar photovoltaic (PV) or wind generated electricity that is exported to the distribution network, depending on their date of entry. The Scheme is now closed to new connections.

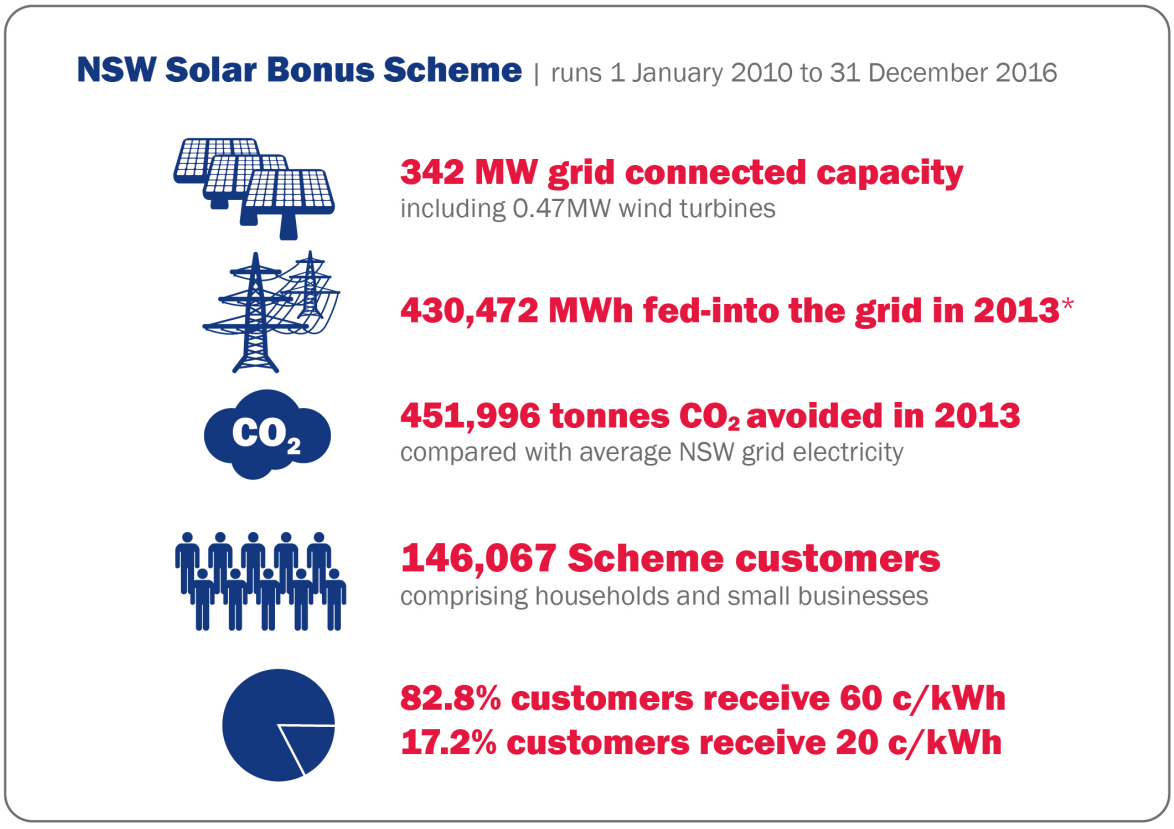

Figure 1 Solar Bonus Scheme statistics[1]

* Total generation from Scheme generators exceeds the amount fed into the distribution network as some of the generators are net metered. Emissions reductions associated with Scheme exports are not additional to those required by the Renewable Energy Target.

Whilst some of the statutory provisions are specific to the Scheme, others are relevant to current and future connection of micro generators outside of the Scheme. Therefore review of the Scheme's statutory provisions has relevance to the ongoing management of micro generation and other distributed generation in NSW.

[1] Data from NSW Trade & Investment, 2014

Electricity consumers have installed small-scale renewable energy generators since closure of the Scheme to lower the consumption component of their electricity bills and possibly receive a market offer feed-in tariff for any residual generation that is exported to the distribution network. In this report these non-Scheme customers are referred to as 'new connections' or 'new customers'.

To provide guidance to these customers and retailers the NSW Government asks the Independent Pricing and Regulatory Tribunal (IPART) each year to identify a benchmark range for solar feed-in tariffs that would not increase electricity prices or require any additional funding from the NSW State Budget.

Scheme cost projection

A challenge for jurisdictions with premium feed in tariffs in Australia and elsewhere has been to contain costs as take up rates accelerated in response to a range of factors.

Costs of the Scheme are now projected to be $1.248 billion, even though a number of steps have been taken to contain them. This excludes the retailer contribution to the costs of the Scheme. This projection is at the lower end of the $1.25 - $1.44 billion estimate provided in the 2011 Auditor General's Special Report, and lower than the $1.8 billion estimate from the Parry Duffy report.

The current projection benefits from:

- several years of actual data providing a better understanding of the (export) performance ratio of Scheme generators, and
- the requirement for network businesses to provide forward estimates.

The Office of Environment and Heritage and Distribution Network Service Providers scrutinise the provision of Scheme credits[2] and changes to generators[3] to control costs and prevent fraud.

The Scheme has met its objectives under the Act, of:

1. Encouraging and supporting people who want to generate renewable energy in response to climate change

Through the Scheme, over 146,000 households and small businesses have been encouraged to install a small-scale renewable energy generator by the provision of Scheme credits (placing downward pressure on Scheme customers' bills).

Despite a contraction in PV sales across Australia following the removal of subsidised feed-in tariffs and scaling back of the Commonwealth's Small-scale Technology Certificate (STC) multiplier, there is ongoing demand for PV. The industry in NSW now has the scale and experience to pursue opportunities for commercial size installations.

[2] Scheme feed-in tariffs take the form of credits for customer bills rather than payments. In instances where a customer's bill is in credit they may request payment for part or all of that credit.

[3] Where customers on the 60 c/kWh Scheme tariff expand the capacity of their Scheme generator, they cease to be eligible for that rate and become eligible for the 20 c/kWh Scheme tariff. A change in the account name to a person not in a domestic relationship with the former account holder also results in a reduction of the tariff rate to 20 c/kWh.

Growing this segment of the market offers opportunities to better align generation profiles with demand, helping to reduce the requirement to augment networks in locations with emerging constraints. The NSW Government's Renewable Energy Action Plan also aims to support this development.

2. Developing Renewable Energy Jobs in the Sector by Assisting Renewable Energy Generation to Compete with Non-Renewable Energy Generation

The Solar Bonus Scheme provided significant stimulus for small scale solar job growth in NSW. Most of the jobs in the solar industry in NSW are in the sales, marketing, installation and financing of systems, with some employment in research and development. There is no universally accepted method for estimating employment effects and it is difficult to isolate the factors that contribute to employment creation in any industry.

It is probable that employment in the industry has contracted as government incentives have been wound back and sales volumes have retreated from their peak levels. Nevertheless, generator connections have averaged 1,400 per fortnight since 1 July 2012 suggesting that solar employment opportunities persist in NSW.

By making small-scale solar more financially attractive, the Scheme accelerated the growth of a nascent solar industry. By building scale and industry linkages the Scheme has paved the way for demand for solar installations in the absence of subsidised feed-in tariffs. In this context the Scheme has met the objective of developing jobs in the renewable energy sector by assisting renewable energy generation to compete with non-renewable energy generation.

3. Increasing public exposure to renewable energy technology in order to encourage the whole community to respond to climate change

There is broad community support for improving energy efficiency and growing renewable generation. The Scheme was restricted to two small-scale technologies, wind and solar, with solar dominating the Scheme.

It is difficult to assess the extent to which the Scheme influenced 'whole community' responses to climate change. However, rooftop PV is visible and located where people live. The Scheme resulted in solar generators being visible on many of the 146,000 plus participants' rooves across NSW.

The Scheme stimulated marketing and media interest helping to expose consumers to the possibility and benefits of obtaining a small-scale renewable energy generator. There is ongoing demand for solar PV. While the Australian market is still dominated by domestic installations, NSW is beginning to grow the mid-scale market and is also gaining some experience in financing utility scale solar.

The Scheme catalysed growth and provided rapid learning for industry

The Scheme catalysed rapid growth of the PV industry in NSW. While this rapid growth provided challenges for consumer protection and safety it also facilitated the development of technical and safety standards and more efficient management of soft costs including administration and approvals.

Recommendations

It is recommended that the NSW Government:

1. streamline reporting on the Scheme by reducing the frequency of reporting by the distribution network service providers;

2. encourage 20 c/kWh hour gross metered customers to change to net meters; and

3. develop a plan through public consultation for an orderly end to the Scheme ensuring the necessary legislation, business and connection rules are in place for the connection of small scale and embedded generation.

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1. Context and Scope of Review

The NSW Solar Bonus Scheme, paying a premium feed-in tariff, commenced on 1 January 2010 and will conclude on 31 December 2016. Small retail customers (those with annual electricity consumption of 160 megawatt hours or less) entered the Scheme by arranging connection of a single solar photovoltaic (PV) system or a wind turbine, with a generating capacity of no more than 10 kilowatts (kW), to the electricity distribution network. These customers may be connected via a gross or net meter and receive either 60 or 20 c/kWh of generated electricity that is fed into the distribution network. The Scheme is closed to new entrants.

Under the *Electricity Supply Act 1995* (Sect 195), the Minister is required "to review the solar bonus scheme (being the scheme for the payment of electricity supplied to the network by small retail customers using complying generators) to determine whether the policy objectives of the scheme remain valid and whether the terms of the Act remain appropriate for securing those objectives." The Act requires that this review occur "as soon as possible after 1 July 2012".

The Scheme has three objectives under the Act. These are to:

1. encourage and support persons who want to generate renewable energy as a response to climate change;
2. develop jobs in the renewable energy sector by assisting renewable energy generation to compete with non-renewable energy generation; and
3. increase public exposure to renewable energy technology in order to encourage the whole community to respond to climate change.

This statutory review occurs in a context where:

- the Council of Australian Governments (COAG) has decided that premium feed-in tariff schemes should only be transitional in nature; and
- the NSW Government has closed the Scheme to new entrants.

This review does not seek to revisit the decision to close the Scheme to new entrants but notes that, other than meeting commitments to existing Scheme participants, a premium feed-in tariff scheme is no longer required in NSW.

Key changes following the 2010 review included:

- closure of the 60 c/kWh component of the Scheme to additional connections;
- introduction of a 20 c/kWh tariff;
- adoption of strict compliance measures and provision for penalties;
- introduction of a 300 megawatt (MW) closure trigger as a mechanism for limiting Scheme costs;
- enabling net metering indefinitely; and
- requiring the Minister for Energy to review the Scheme after 1 July 2012 to determine whether the policy objectives of the Scheme remain valid and whether the terms of the Act remain appropriate for securing those objectives.

In 2012 the NSW Government introduced a deadline of 30 June 2012 for customers with outstanding applications to connect in order to be eligible for receipt of Scheme credits. No new Scheme connections have been permitted since 1 July 2012.

This review is therefore in the context of the original Scheme having been reviewed, substantially amended, and closed to new applicants since 1 July 2011.

The legislative requirement for frequent reporting of data on Scheme connections and capacity occurred in the context of monitoring Scheme growth with a view to managing costs and closing the Scheme to new entrants. The number of connections and capacity are now relatively stable and the review recommends that the required frequency of reporting be reduced.

The current projections are for Scheme costs to be lower than previous projections. The new projections benefit from several years of actual data and also factor in the measures taken to contain costs. The review provides an overview of the measures taken to contain and manage Scheme costs.

As only 99 of the 146,067 small-scale generators participating in the Scheme are wind generators, the focus of this review is on solar PV.

Scheme generators still constituted a majority of the state's small-scale generators, as at 7 March 2014, with just under 59% of all small-scale generators were in the Scheme. This review includes consideration of safety, compliance and consumer issues associated with the installation and operation of small-scale solar PV. With around 1,400 new connections per fortnight, this is shifting rapidly.

Legislative arrangements for new generators are covered by many of the statutory provisions that apply to the Scheme. Accordingly, review of the Scheme's statutory provisions has relevance to the future management of micro generation and other distributed generation in NSW.

In 2008 COAG adopted the National Principles for Feed-in Tariff Arrangements under which the governments agreed that legislated arrangements for customers to receive more than the value of their energy should be transitional.[4] All jurisdictions have subsequently moved to end their premium Feed-in Tariffs (FiTs).

At the NSW Government's request, IPART developed a mechanism for advising a value for non-subsidised solar feed-in tariffs for customers who install solar PV generators outside of the Solar Bonus Scheme. The terms of reference specified that this mechanism and value must not increase retail electricity prices, and must support competition in the retail electricity market. IPART's March 2012 final report recommended that a non-subsidised solar feed-in tariff should be encouraged (not mandated) by publishing a benchmark range for a fair and reasonable tariff. The benchmark range is a guide for solar customers who are not part of the Solar Bonus Scheme and retailers who make offers to those customers. Not all retailers

[4] "any jurisdictional or cooperative decisions to legislate rights for small renewable consumers to receive more than the value of their energy must be a transitional measure (noting that a national emissions trading system will provide increasing support for low emissions technologies), with clearly defined time limits and review thresholds" https://www.coag.gov.au/node/243

offer a feed-in tariff. IPART also recommended that a mandatory contribution be made by retailers to the cost of the Scheme.

In 2012/13 IPART set a benchmark range of 7.7 to 12.9 c/kWh. In 2013/14 the range was revised down to 6.6 to 11.2 c/kWh and in 2014/15 the range is 4.9 to 9.3 c/kWh. These downward revisions reflect declines in projected wholesale electricity prices (generation costs) in the National Electricity Market (NEM) and for 2014/15 this included the anticipated removal of carbon pricing. The benchmark range excludes network charges and retail margins that also make up the final retail price of electricity as these services are not provided by the owners of small scale solar generators.

IPART also set a mandatory retailer contribution to the costs of the Solar Bonus Scheme. This amount is revised each year along with the benchmark range for non-subsidised FiTs. The retailer contribution has also been revised down in recent years reducing the portion of the costs of the Scheme each year that is recovered from retailers. In 2014/15 the rate is 5.1 c/kWh.

Over 130,000 Scheme customers currently have gross meters. The customers on the 20 c/kWh rate would now be financially better off with net meters as the retail price of day time electricity exceeds the feed-in tariff rate. All customers will be financially better off with a net meter after the Scheme ends on 31 December 2016 for the same reason. This review recommends encouraging the 20 c/kWh customers to consider changing to a net meter and that preparation be made for an orderly end to the Scheme including metering arrangements.

The rapid uptake of solar PV in NSW

In the first year of the Scheme's operation, the installed capacity of PV in NSW increased by 700% from 24.5 MW to more than 170 MW. The 2010 review found that this rapid uptake had implications for total tariff payments to be paid to Scheme customers and that this cost would be paid for by all NSW electricity consumers.

A number of factors drove the rapid uptake of solar PV. Alongside the Solar Bonus Scheme, this rapid uptake was driven by:

- the introduction in 2009 by the Commonwealth of the five times solar credits multiplier for systems up to 1.5 kW[5] and associated significant reduction in balance of system costs;
- the increasing value of the Australian dollar;[6]
- rising electricity prices; and
- a significant reduction in the price of installed systems, particularly solar panels, because of technical innovation and industry transformation.

Solar panel prices (the dominant cost component of an installed system) in Australia more than halved from the time when the Scheme was being designed in 2008/09 to mid 2010 when the first statutory review was triggered. This meant that the payback period had fallen

[5] The Commonwealth Government introduced Solar Credits in 2009 to replace the Solar Homes and Communities Plan. Solar Credits was intended to provide an upfront capital cost subsidy worth around $7,500 by applying a multiplier – initially set at five – to certificates generated from small generation units.

[6] Climate Change Authority, Renewable Energy Target Review, December 2012, pg 63.

from around eight years to within two years for some systems, once the value of certificates under the Renewable Energy Target (RET) was deducted from the price.

Summary of significant Scheme events

Date	Event
1 January 2010	Scheme commences
Mid 2010	First statutory review triggered as Scheme reaches 50 MW installed capacity
October 2010	Statutory review report provided to Minister. The review recommended substantially lowering the feed-in tariff rate so as to balance Scheme costs against the objective of continuing to provide support for industry and households wishing to generate renewable energy as a response to climate change. The review also recommended imposing a cap on total Scheme capacity as a mechanism for limiting Scheme costs and ensuring the Government's goals on deployment of small-scale renewable energy generation are achieved.
27 October 2010	*Electricity Supply Act 1995* amended giving effect to the Scheme review's recommendations.
18 November 2010	Deadline for 60 c/kWh customers whose eligible system was purchased or leased on or before 27 October 2010; and on or before 18 November 2010 the customer (or his or her representative) lodged an application to apply to connect the system to the grid. Late applications (i.e. those received after 18 November 2010) were to be assessed under the new 20 c/kWh provision in the Scheme. There were no exceptions or exemptions permitted.
December 2010	NSW Electricity Network and Prices Inquiry Final Report (Parry Duffy review) undertaken. In October 2010, the then Premier announced an inquiry to investigate options to reduce or defer electricity network charges in order to place downward pressure on electricity price increases.
1 February 2011	Solar Bonus Scheme Reimbursement Program: The then Premier announced the New South Wales Government will 'off-set the full impact of the Scheme on household electricity bills by redirecting uncommitted funds from the NSW Climate Change Fund, as well as drawing $55 million in efficiencies from the electricity network business'.
February 2011	The report: 'NSW Solar Bonus Scheme: Compliance with Transition Period Regulations following the Announcement of Change of Tariff Rates on 27 October 2010' (RSM Bird Cameron's Report of Factual Findings) released.
29 April 2011	Minister for Resources and Energy announced a hold to new applicants effective midnight on 28 April 2011.

6 May 2011	First Solar Summit convened to develop a set of actions to manage the costs of the Solar Bonus Scheme.
2 June 2011	NSW Solar Bonus Scheme – KPMG Review of Financial Model (an independent assessment of the Solar Bonus Scheme costings methodology and calculations).
1 July 2011	The NSW Government hosted the NSW Solar and Renewable Energy Summit in Newcastle. The Summit discussed: ▪ options for a fair price for solar generated electricity; ▪ a practical way forward for small, medium and large scale solar in NSW; ▪ peak load management to reduce costs and energy consumption; ▪ renewable energy investment; and ▪ measures to contain the costs of the Scheme.
1 July 2011	Scheme closed to new connections, having reached 300 MW of connected capacity. Customers who have already applied are allowed to proceed to join the Scheme by connecting at a later date.
1 July 2011	The Minister for Resources and Energy announced an Independent Pricing and Regulatory Tribunal review to determine a fair price for small-scale generated solar.
7 November 2011	NSW Auditor-General's Report, as required by the Act.
1 July 2012	Deadline for customers with outstanding applications to connect a generator and be eligible to receive Scheme credits. First year that retailers are required to contribute to the costs of the Scheme (IPART sets the retailer contribution rate). 2012/13 retailer contribution of 7.7 c/kWh commenced.
1 July 2013	2013/14 retailer contribution of 6.6 c/kWh commenced.
1 July 2014	2014/15 retailer contribution of 5.1 c/kWh commenced.
31 December 2016	Scheme credits cease.

Table 1 Significant Scheme Events

2. Objective: To Encourage and Support Persons Who Want to Generate Renewable Energy as a Response to Climate Change

Motivation for generating renewable energy

This review finds that those who wanted to generate renewable energy, and who were able to organise a connection before the Scheme closed, were encouraged and supported to do so.

A national survey of Australian householders' interest in distributed generation found that the main motivation for a householder's decision to install solar PV was to save money on their power bills (70.4% of respondents). Other reasons provided included 'to reduce my household carbon emissions' (11.7%), 'to benefit from government rebates' (10.5%), and to be less reliant on energy retailers (3.7%).[7] The survey also found "significant evidence of a positive correlation between respondents' support for solar distributed energy technologies and their values, beliefs and norms which encompass awareness of the impact of energy use and perceived responsibility for associated problems".[8] Correspondence received by NSW Trade & Investment confirms that customers who accessed the Scheme did so for a variety of reasons consistent with the reasons provided in the national survey above.

Scheme connections as evidence people were supported

The very strong increase in the number of grid-connected systems in NSW during the time the Scheme was open to applicants, is evidence that people in NSW were encouraged and supported to generate renewable energy. The data as at 7 March 2014 is shown in Table 2.

Connections at 07 MARCH 2014	Number of Customers	Generator Capacity (MW)
Scheme Connections at 60 c/kWh	120,885	289.17
Scheme Connections at 20 c/kWh	25,182	52.39
TOTAL SCHEME	**146,067**	**341.56**
New Connections	103,702	Approximately 328.04*
TOTAL (Scheme & New)	**248,796**	**Approximately 669.60***

Table 2 Summary of connections and generation data (Scheme and New)

* Endeavour Energy does not provide records of new customer generating capacity. An estimate of Endeavour Energy's new customer generating capacity is made by taking the mid-point of average capacity per unit of the other DNSPs. This is consistent with known data for Scheme generators and is a reasonable assumption given the convergence of average generator size of the other two DNSPs since closure of the Scheme to new connections.

[7] Romanach, L., Contreras, Z., and Ashworth, P. (2013). Australian householders' interest in active participation in the distributed energy market: Survey results. Report nr EP133598. CSIRO, Pullenvale http://www.apva.org.au/sites/default/files/documents/DEM/CSIRO%20Report%20to%20APVA-Survey%20Results-Australian%20householders'%20interest%20in%20the%20distributed%20energy%20market-May%202013.pdf

[8] Ibid, p32.

As at 7 March 2014:

- 146,067 households and small businesses in NSW were participating in the Scheme with a generating capacity of 341.56 MW. 145,968 participants had installed solar PV under the Scheme, with a further 99 having installed small-scale wind systems.
- Of the 146,067 Scheme customers, 82.8% (or 120,885) are receiving a 60 c/kWh feed-in tariff. The remaining 17.2% of Scheme customers (25,182 connections) receive a 20 c/kWh tariff.

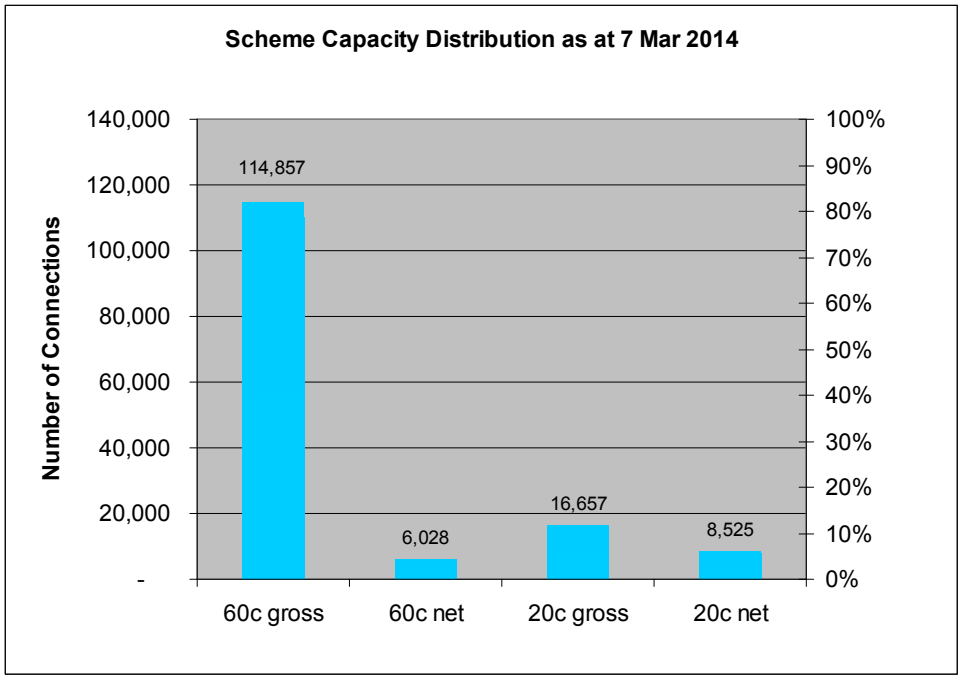

Figure 2 Distribution of Scheme generation capacity by tariff rate and metering

Connection growth

Some 15,079 customers already had systems connected to the distribution network when the Scheme commenced in January 2010, representing 24.7 MW of capacity. All systems connected in NSW prior to 1 January 2010 were eligible for Scheme participation. Customers may have connected systems throughout 2009 in anticipation of the introduction of a mandatory feed-in tariff.

Scheme growth was exponential, with connected capacity doubling in the first six months of operation, reaching 50 MW (with some 28,000 connections). Connected capacity doubled again while the Scheme's 2010 review was underway, so that by early October 2010, 100 MW was connected (50,000 connections).

The Scheme was closed to new applicants after the trigger for closure, representing a further tripling of connected capacity, was reached on 1 July 2011 (300 MW of connected capacity, 132,061 connections). Outstanding applicants were given until 1 July 2012 to connect their system.

Solar Bonus Scheme				
	Essential Energy	**Endeavour Energy**	**Ausgrid**	**TOTAL**
Solar Connections	53,232	44,583	48,153	145,968
Wind Connections	70	28	1	99
Total Connected	**53,302**	**44,611**	**48,154**	**146,067**
Solar Capacity (MW)	143.141	99.694	97.918	340.753
Wind Capacity (MW)	0.568	0.237	0.000	0.805
Total Capacity (MW)	**143.709**	**99.931**	**97.918**	**341.558**
Average Capacity per unit				
Solar (kW/unit)	2.689	2.236	2.033	2.334
Wind (kW/unit)	8.114	8.464	0.010	8.131
Average of TOTAL (KW/unit)	2.696	2.240	2.033	2.338

Table 3 NSW Scheme connections, installed capacity and average system size[9]

As of 7 March 2014, 146,067 Scheme connections provided a generating capacity of approximately 341.6 MW. Figure 3 shows Scheme capacity and exports by DNSP to the end of 2013.

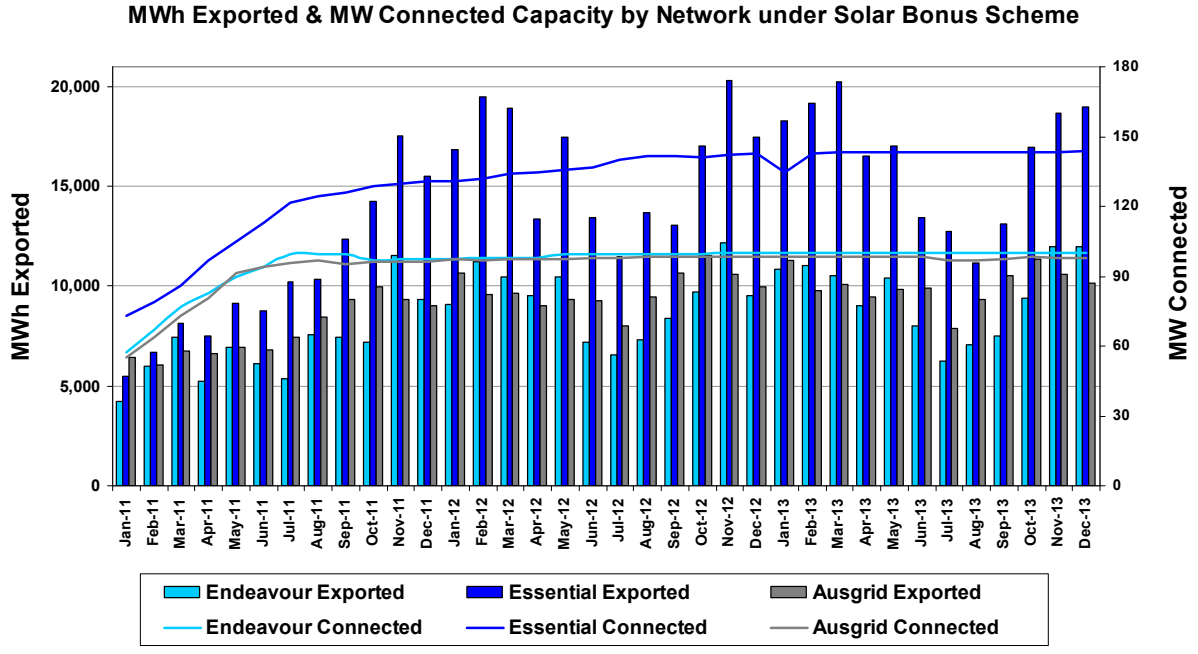

Figure 3 MWh Exported & MW Connected Capacity by DNSP under the Scheme

[9] Source: Ausgrid, Essential Energy and Endeavour Energy reports to the Minister for Resources and Energy as at 7 March, 2014. As there is a limit of one system per customer, the number of connections equates to the number of customers participating in the Scheme.

Generating Capacity

As would be expected with closure of the Scheme to new connections, the total capacity and number of customers in the Scheme is now stable. However, connections and capacity are not perfectly static. Minor changes in the reported data occur for a number of reasons. Generators permanently exit the Scheme if they are moved to another premises. Generators are temporarily removed from the reported data when the premises of a Scheme generator is not occupied but are restored when a new account holder is established. A premises that is on the 60 c/kWh rate will transition to 20 c/kWh if the name on the account changes (unless there is a domestic relationship between the current and former account holder).

New Connections (outside the Scheme)

As at 7 March, 2014, there were 102,729 customers that had connected to the distribution network outside of the Scheme. These generators are not eligible for the Scheme's premium feed-in tariffs but may receive a market offer tariff. The main financial benefit of solar for most new customers is the ability to reduce consumption charges by consuming their generator's energy rather than from exporting the energy for a feed-in tariff since retail prices exceed unsubsidised feed-in tariffs.

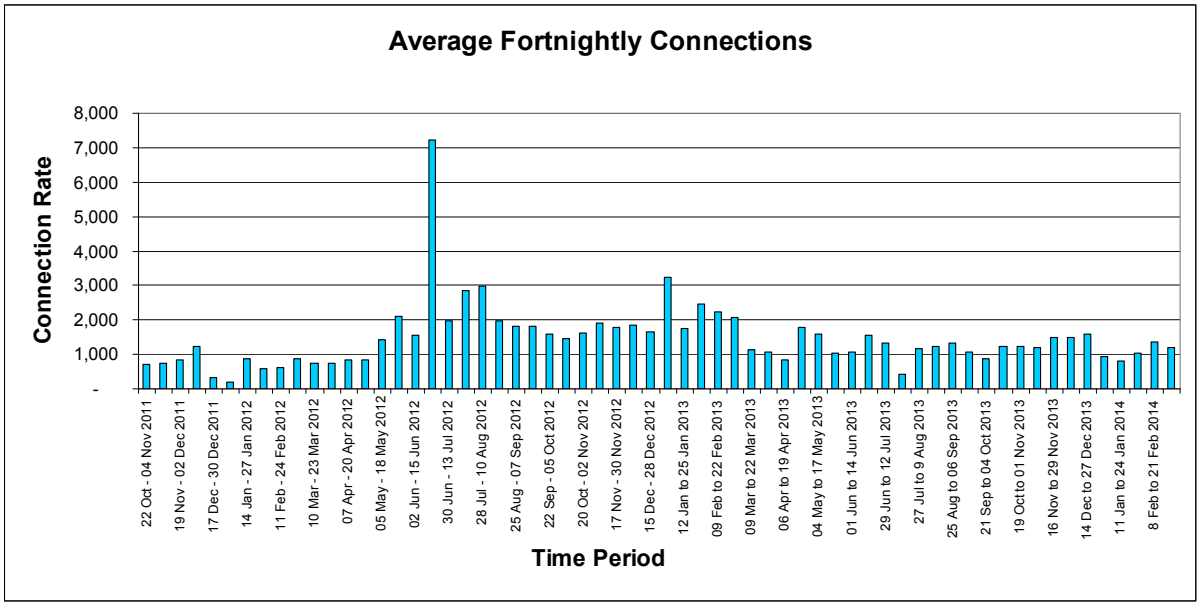

Figure 4 Average Fortnightly New Connections[10]

Average Solar PV system prices – June 2014						
	1.5kW	2kW	3kW	4kW	5kW	10kW
Sydney, NSW	$3,357	$4,148	$5,123	$6,421	$7,867	$13,380
All capital cities	$3,792	$4,634	$5,883	$7,237	$8,488	$15,568

Table 4 Average solar PV system prices[11]

[10] Data as at 7 March 2013.
[11] Solar Choice http://www.solarchoice.net.au/blog/solar-pv-system-installation-prices-june-2014 viewed 18 June 2014.

Average prices for larger generators are now under $2 per watt of capacity. Accordingly, premium feed-in tariffs, beyond those in the Scheme, are no longer required to meet the objectives of the Act.

Cumulative Scheme and New connections and capacity as at 7 March, 2014

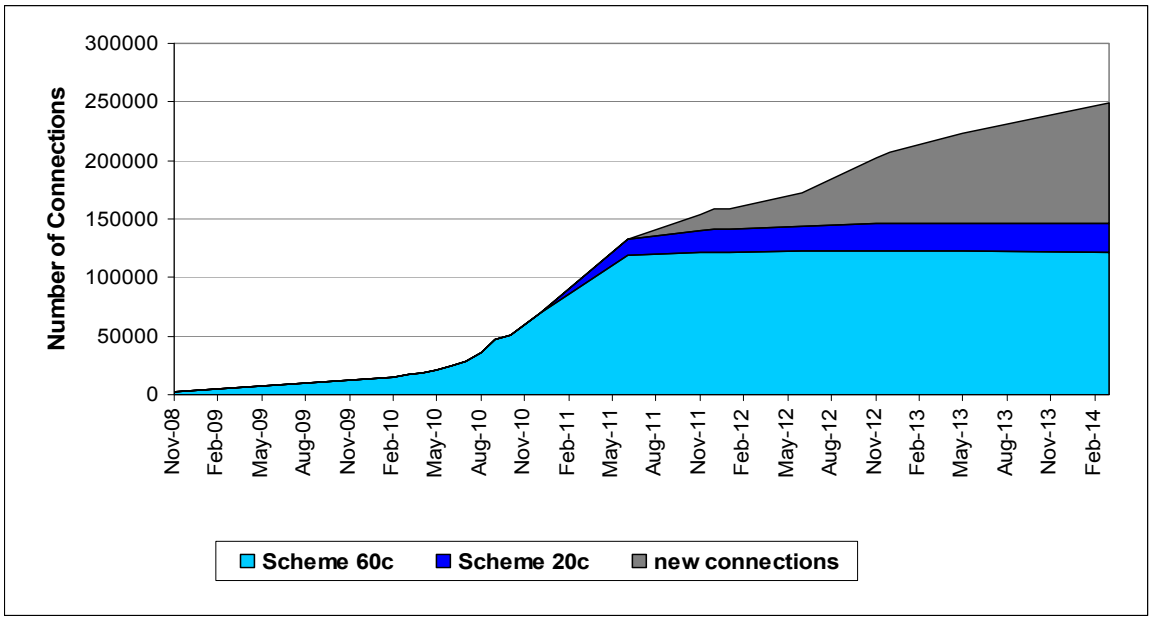

Figure 5 Total number of connections in NSW

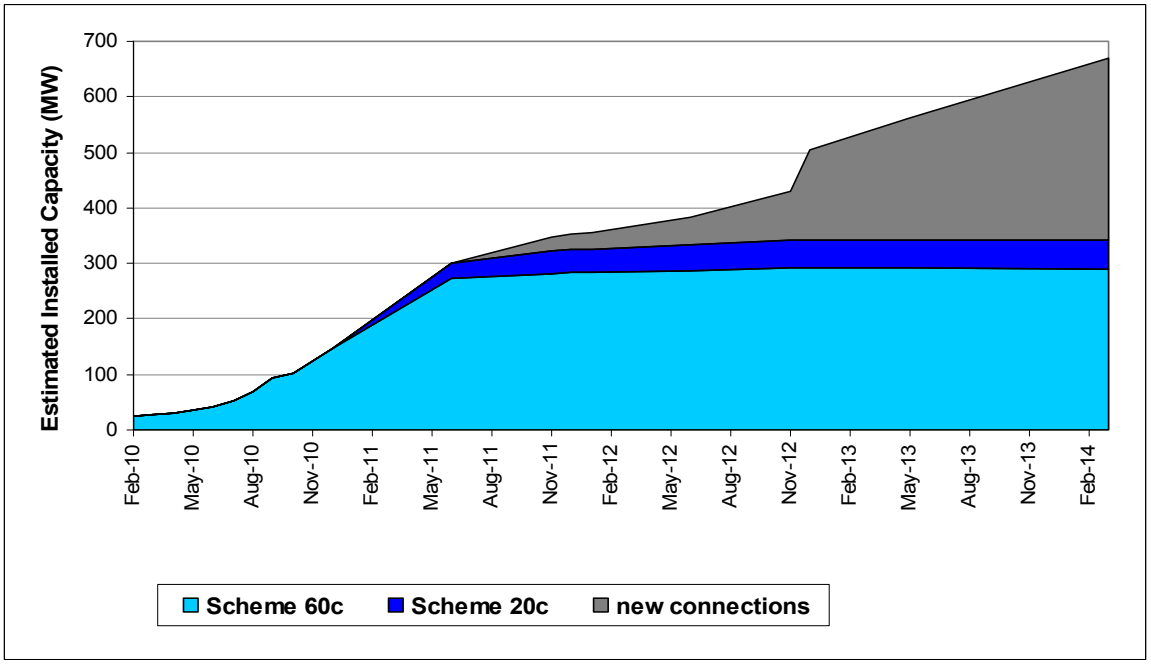

Figure 6 Total generating capacity connected in NSW (MW)

Figures 5 and 6 show the ongoing connection of solar generators and increase in total generating capacity despite an end to Scheme connections in June 2012. This is evidence that a premium feed-in tariff is no longer required. The notable increase in the connection rate between May and November 2012 coincides with the run up to the reduction of the Commonwealth's solar credit multiplier from three to two.

3. Objective: Develop Renewable Energy Jobs in the Sector by Assisting Renewable Energy Generation to Compete with Non-Renewable Energy Generation

The national context in which this review assesses the Scheme's support for Renewable Energy

The Solar Bonus Scheme provided significant stimulus for the development of jobs associated with renewable energy. As noted in the NSW Auditor General's Special Report on the Scheme, other influences on the uptake of solar PV included falling costs of PV systems, rising electricity prices and the Commonwealth's expanded Renewable Energy Target. It is not possible to identify the relative contribution of each of these influences. The following have been drivers of demand for solar PV rather than direct drivers of job development. Nevertheless, increased demand for solar installations was a prerequisite for the development of jobs and industry linkages.

Falling cost of PV systems

The main cause of price reductions since the Scheme's commencement has been falling module prices. Module prices have declined from around $4 per watt to less than $1 per watt today. Other components of final installed prices include cables, inverters, installation, racking and administration. There have been price declines in most of these components, but they have not been as dramatic as the modules themselves

Retail electricity price increases

Regulated electricity prices doubled in real terms in the 11-year period from 2002/03 to 2013/14. However, average household electricity bills increased by only about 75% in real terms in this period. This is because average consumption per household had fallen. Nevertheless, households were spending more of their income on electricity bills because average incomes had risen by less than bills over the same period.[12]

Commonwealth Renewable Energy Target

The Renewable Energy Target (RET) scheme is designed to ensure that 45,000 GWh of Australia's electricity comes from renewable sources by 2020. Since January 2011 the RET scheme has operated in two parts, the Small-scale Renewable Energy Scheme (SRES) and the Large-scale Renewable Energy Target (LRET).

The *Renewable Energy (Electricity) Act 2000* places an obligation on liable entities (usually electricity retailers) to purchase an amount of large-scale generation certificates (LGCs) and small-scale technology certificates (STCs) in proportion to the amount of electricity they purchase each year.

[12] IPART, Review of regulated retail prices and charges for electricity From 1 July 2013 to 30 June 2016, June 2013

Under the SRES, customers who purchase solar systems are credited STCs for the deemed generation. The majority of customers assign their certificates to the solar installer in return for a discount on their purchase. Alternatively, customers may sell their certificates to a broker. Take up rates for solar were sensitive to Commonwealth changes to the STC multiplier. The RET is under review by the Commonwealth Government.

Job development

Most of the jobs in the solar industry in NSW are in the sales, marketing, installation and financing of systems, with some employment in research and development at places like The School of Photovoltaic and Renewable Energy Engineering at UNSW. The difference in estimates, sensitivity to underlying assumptions, and inability to isolate the effects of Scheme feed-in tariffs make it impossible to quantify the job development effect of the Scheme. However, it is reasonable to conclude that the Scheme stimulated job development in the solar industry given the difference in installation rates during and after the Scheme.

There is no universally accepted method for estimating job creation effects. However, the Scheme's objective relates to renewable energy job development rather than net job creation. In a report for the Clean Energy Council, ROAM Consulting use a job multiplier of 15 full-time equivalent jobs per annum for every megawatt of small scale solar PV installed.[13] It is conceivable that the jobs multiplication effect is reduced as business systems are refined and as industry consolidation occurs. The Australian PV Institute (formerly APVA) notes that with the residential market stabilising, many installation companies have reduced staffing. However, development of larger systems is increasing with associated increases in consulting, engineering, legal and related activities. In addition, as PV grid penetration levels rise, more utility staff are engaged in PV related work.[14]

As at 28 June 2012, the approximate time of the Scheme's closure to connections, about 416 MW of solar PV had been installed in NSW.[15] Of this, about 334 MW of solar PV was installed under the Scheme. More than 95% of the systems connected to the grid under the Scheme were installed in 2010 and 2011.[16] Applying the ROAM consulting multiplier to the Scheme installations in 2010, 2011 and to 28 June 2012, the Scheme was associated with approximately:

- 2,200 full time equivalent positions in 2010;
- 3,200 full time equivalent positions in 2011; and
- 500 full time equivalent positions in the period 1 January to 28 June 2012.

[13] Clean Energy Council – RET Policy Analysis, 29 April 2014. The multiplier of '15 jobs per MW installed per year' needs to be applied to annual installation rather than cumulative. It is 18 full time equivalent jobs. In effect, 15 full time job-years for every MW installed annually.

[14] APVA, Australian National Photovoltaics Status Report 2012, http://apvi.org.au/wp- content/uploads/2013/11/Australian-PV-Report-2012.pdf

[15] Source: DTIRIS Six-monthly reports from DNSP's as at 28 June 2012.

[16] Total installed capacity of solar PV under the Scheme was 339.87 MW as at 28 December, 2012. On 13 January, 2012, total Scheme installed PV capacity was already 325.55 MW.

By making small-scale solar more financially attractive, the Scheme accelerated the growth of the nascent solar industry in NSW. Providing scale and industry linkages has paved the way for demand for solar installations in the absence of subsidised feed-in tariffs. Sydney continues to have the lowest installation costs of all Australian Capital cities.[17] NSW installation costs are now in line with installation costs in Germany.[18] In this context the Scheme has met the objective of developing jobs in the renewable energy sector by assisting renewable energy generation to compete with non-renewable energy generation.

[17] Martin, James, 2014, "Solar PV price check – June", *Climate Spectator*, Available at: http://www.businessspectator.com.au/article/2014/6/10/solar-energy/solar-pv-price-check-june

[18] Calhoun, Koben; Crofton, Karen; McIntosh, Robert, 2014, *Lessons from Australia: Reducing Solar PV Costs Through Installation Labor Efficiency*, Rocky Mountain Institute, p. 4. Available at: http://www.rmi.org/Knowledge-Center/Library/2014-11_RMI-AustraliaSIMPLEBoSFinal

4. Objective: Increase public exposure to renewable energy technology to encourage the whole community to respond to climate change

There are numerous community responses to climate change. However, it is not possible to attribute particular actions to the public's exposure to renewable energy driven by the Scheme. Given the Scheme accelerated the uptake of solar PV and that solar PV is highly visible, the Scheme has increased public exposure to renewable energy and provided encouragement for community responses to climate change.

In March 2013 the millionth solar power system was installed in Australia, meaning that around 2.5 million Australians live in a home with solar panels on the roof. Solar PV now has a detectable presence on the National Electricity Market and other networks. In NSW, it is making material reductions in average demand and parts of summer peak demand.

Geographic and socio-economic distribution

Postcode analysis provides insight to the demographic characteristics of public exposure to renewable energy for this objective. Although the uptake of solar PV is not demographically uniform, it is broad and not clustered in high wealth households. In its submission to the Australian Energy Markets Commission, Seed Advisory found that on a nationwide basis postcodes with higher penetration rates of solar also had a higher proportion of the population with an income in the range of $1,000 to $1,700 per week and that postcodes with higher average income generally had a lower take-up of solar PV than the national average.[19]

	Essential Energy	Ausgrid	Endeavour Energy
Number of Connections (solar and wind)	53,302	48,154	44,611

Table 5 Total scheme connections by DNSP (Solar and Wind)[20]

The distribution of Scheme participants across NSW in Figure 7 (PV systems per 1,000 suitable dwellings as at end of 2013) indicates wide community exposure to renewable energy generation. The definition of suitable dwellings is not a direct match for customers who were eligible to join the Scheme but provides a reasonable proxy for demonstrating the distribution of uptake amongst eligible customers.[21] Small businesses with consumption of less than 160 MWh per annum were entitled to participate in the Scheme.

[19] Climate Change Authority, Renewable Energy Target Review, Final Report, December 2012, pg 21.
[20] Source: DTIRIS as at 7 March 2013.
[21] Data concerning all PV solar connections in NSW by postcode can also be obtained from the Clean Energy Regulator's (CER) website. There is some difference between the data supplied by the DNSPs and the CER at any point in time. The CER's data is based on the registration of small-Small-scale Technology Certificates (STCs). While the bulk of STCs are registered shortly after generators are installed, the CER allows up to 12 months for registration so the two data sets will not match. Further, in a small number of instances, STCs are not registered for eligible generator installations.

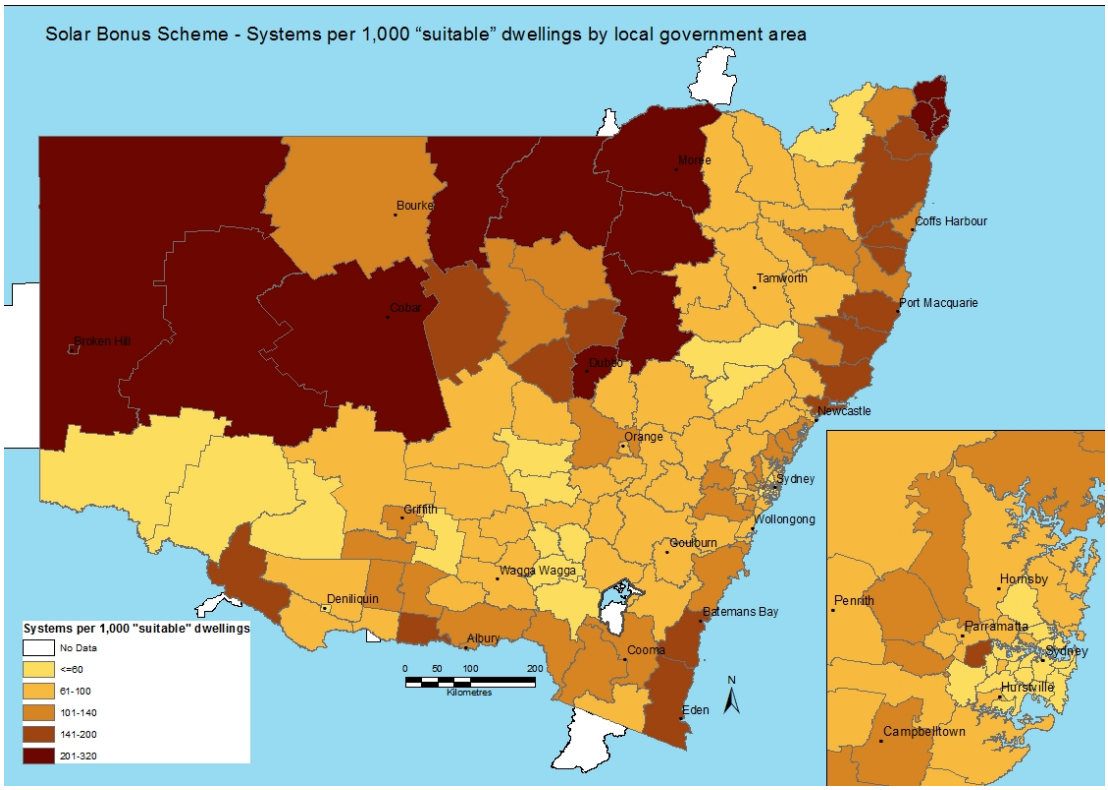

Figure 7 Systems per 1,000 households by LGA[22]

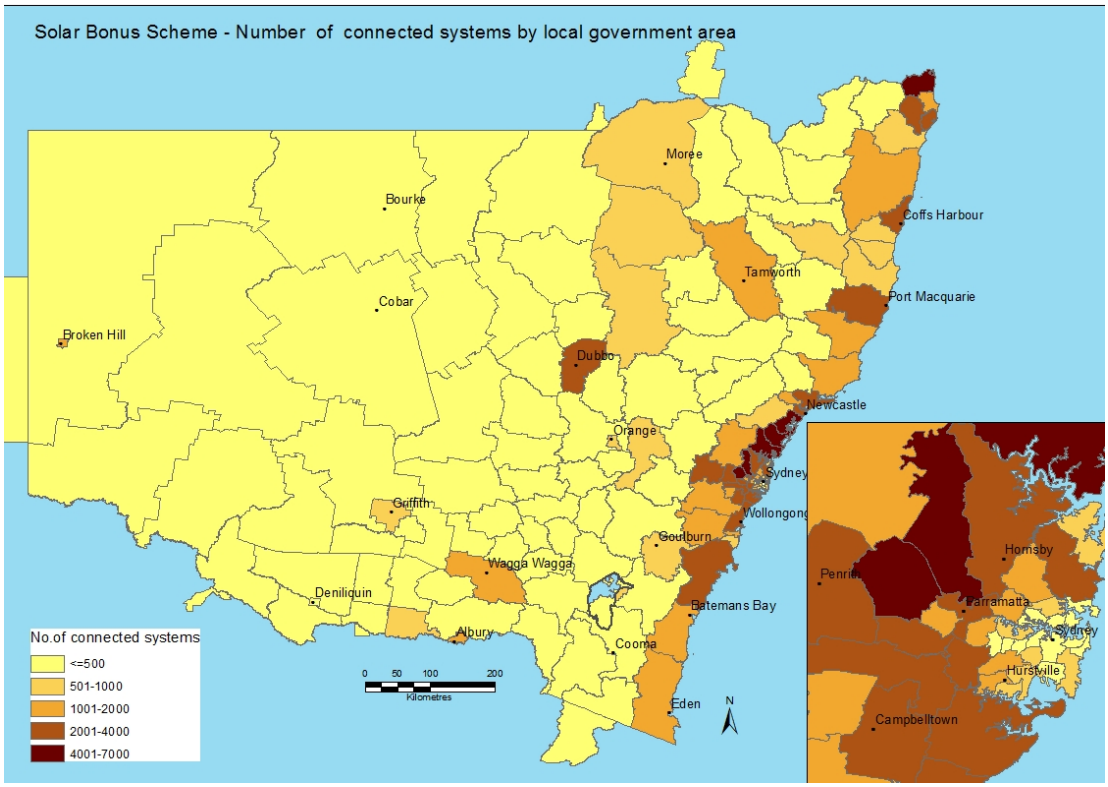

Figure 8 Number of households with systems by LGA[23]

[22] Source: OEH data as at 31 Dec 2013.
[23] Source: OEH data as at 31 Dec 2013.

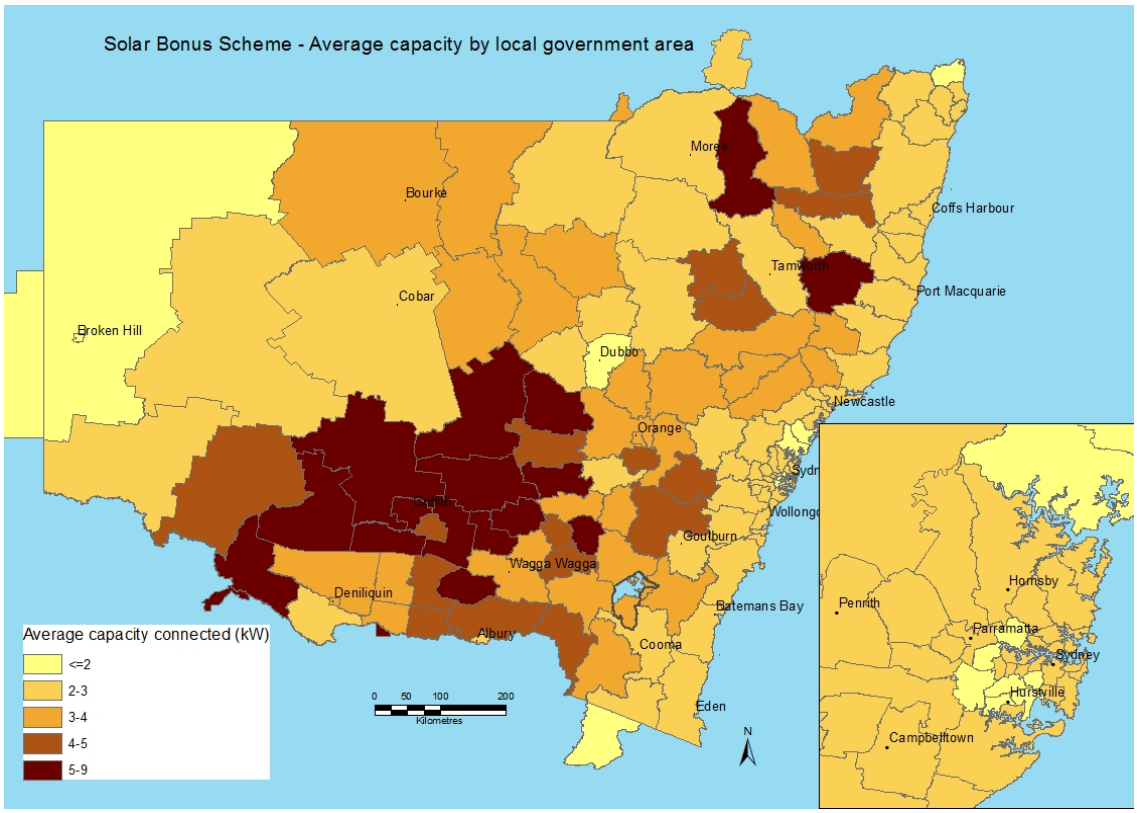

Figure 9 Scheme average capacity by LGA[24]

[24] Source: OEH data as at 31 Dec 2013.

5. Data Reporting Requirements

Section 15A (7) of the Act places an obligation on the DNSPs to provide the Minister with Scheme data at times defined in the *Electricity Supply (General) Regulation 2001*. Data on the number of connections and total generating capacity must be provided fortnightly and the number of customers in each postcode and the amount of energy being exported must be provided every six months. These requirements apply to both Scheme and new generators.

The requirement in s15A (7) of the Act for fortnightly reports of connections and capacity was necessary to monitor Scheme growth so that the Minister could close the Scheme to new applicants when the 'cap' had been reached. As the Scheme is now closed to new entrants and Scheme capacity has stabilised, fortnightly reporting is no longer required and provides an unreasonable regulatory burden.

The reports provide useful information about the state of the solar installation industry and the potential impact that small scale generation has on NSW energy supply. However, this same benefit can be derived from less frequent reporting. NSW Trade & Investment and the DNSPs support reducing the frequency of reporting. As the frequency of reporting prescribed in the legislation is not necessary for achievement of the Scheme's objectives, it is recommended that reporting frequency be reduced.

Recommendation 1

It is recommended that the NSW Government streamline reporting on the Scheme by reducing the frequency of reporting by the distribution network service providers.

6. Scheme Costs

Tariff payments

The table below shows actual and projected payments (excluding the retailer contribution) until the end of the Scheme. As at 7 March 2014 there were 146,067 Scheme generators with 342 MW capacity within the Scheme. In the year to the end of 2013 these generators exported 430,472 MWh of renewable electricity.[25]

With the Scheme closed to new connections, tariff payments are anticipated to be just under $200 million per annum for the remaining life of the Scheme. This means the Scheme is expected to cost around $1.248 billion.[26] This updated projection is lower than the headline number of the previous statutory review, the *NSW Electricity and Network Prices Inquiry* (Parry Duffy review) of $1.8 billion, and is at the lower end of the range provided in the Auditor General's 2011 Special Report of $1.25-$1.44 billion. Introduction of the retailer contribution and improvements in data quality are the main reasons for the difference from previous estimates.

	2010/11	2011/12	2012/13	2013/14	2014/15 projection	2015/16 projection	1/7/16 – 31/12/16 projection	Total
$M	138.3	211.8	197.9	206.4	199.0	198.1	96.4	1,247.8

Table 6 Summary of actual and projected payments[27]

The Parry Duffy review projected a possible total cost of more than $1.8 billion with most years recording costs of $300 million. The receipt of actual data and annual provision of estimates by the distribution network businesses now make it possible to provide a more realistic projection of final Scheme cost. There is now a better understanding of the performance ratio of Scheme generators. Nevertheless, actual costs will remain subject to a number of variables. These include:

- weather (insolation);
- the number of customers on the 20 c/kWh tariff who expand their systems;
- the number of systems whose capacity is removed or reduced due to component failure;
- temporary or permanent removal or shut down of systems e.g. during renovations;
- movement from the 60 c/kWh to 20 c/kWh tariff rates;
- changes to meter type; and
- degradation of system output.

[25] Customers with net meters may consume part of their generator's energy and only receive Scheme credits for the residual portion of generation which is exported to the distribution network. Therefore the amount of non-renewable generation displaced by Scheme generators exceeds the amount exported.

[26] This excludes the retailer contribution component of the costs of the Scheme.

[27] Actual costs supplied by the Office of Environment and Heritage which administers the Climate Change Fund. Projected costs are supplied by NSW Treasury based on projections supplied by the DNSPs for the purposes of the NSW Budget for which point estimates are used rather than ranges.

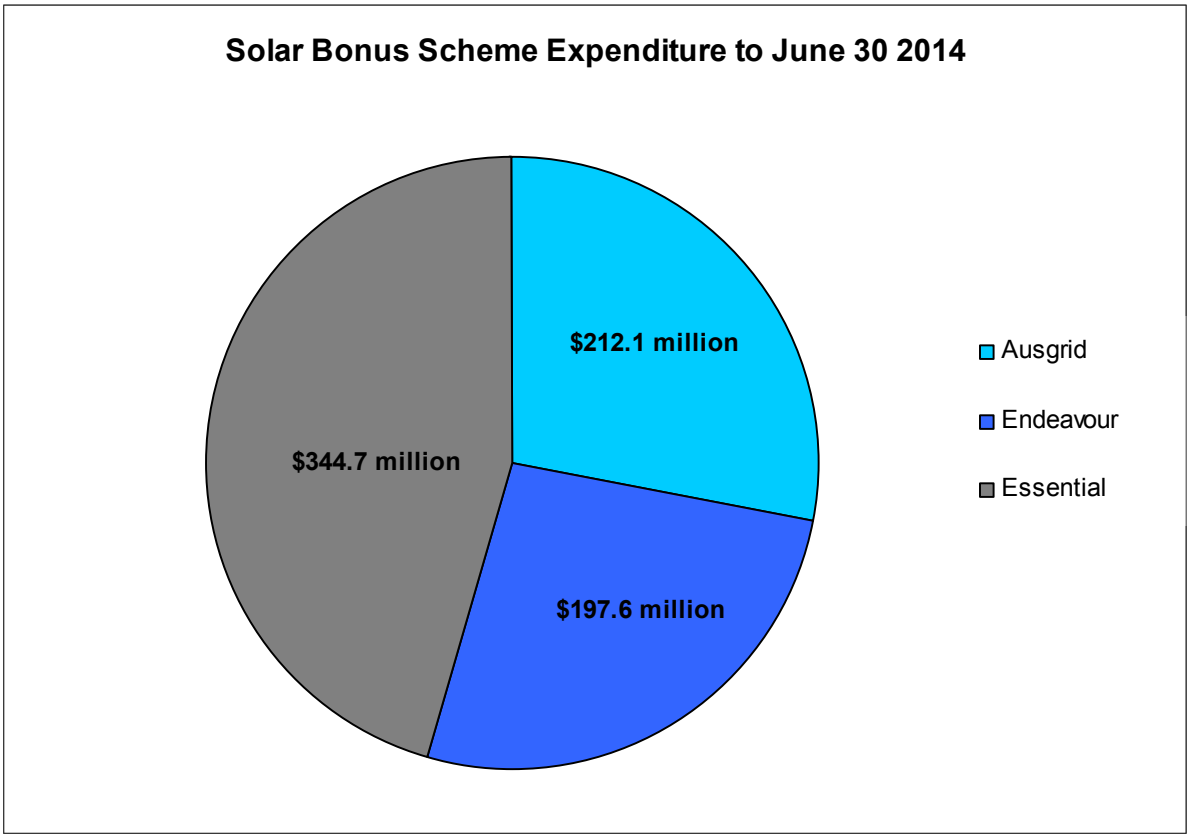

Figure 10 Solar Bonus Scheme Expenditure by DNSP ($ million)

The Climate Change Fund levy

The Climate Change Fund levy is charged to electricity distributors to provide financial support to the NSW Climate Change Fund (CCF). This is passed on to customers through electricity bills. The CCF finances projects to help businesses, households, schools, communities and government save water, energy and greenhouse gas emissions. From 1 July 2012, the levy was increased to recover the costs of the Scheme.[28]

Measures to contain costs

A series of policy decisions to contain Scheme costs have been taken since the 2010 review. These include:

- closure of the 60 c/kWh tariff to new customers on 27 October 2010 and introduction of a 20 c/kWh tariff for those who subsequently joined the Scheme; [29]
- reducing the tariff rate from 60 c/kWh to 20 c/kWh where a customer increases the capacity of their Scheme generator or where a new customer becomes the electricity account holder;

[28] IPART, The impact of green schemes on a typical residential electricity retail bill from 1 July 2013, 17 June 2013

[29] Customers who had entered an agreement to purchase or lease a generator on or before that date were able to receive the 60 c/kWh tariff if the DNSP had received an application for connection by 18 November 2010.

- provided a deadline of 30 June 2012 for customers to connect a generator and remain eligible for Scheme credits; and
- introduced a requirement for electricity retailers to contribute to the costs of the Scheme from 1 July 2012 as recommended by IPART.[30]

Spreading the impact of Scheme Costs over time and customer base - Changing the cost recovery mechanism

When first designed, the Scheme's tariff payments to participating customers were to be paid entirely by the electricity customer base of each network through their electricity bills. This was amended so that tariff payments were made through the CCF. A shortfall of available CCF funds in early years of the Scheme was made up through a repayable advance to the CCF to be recovered in later years when CCF revenues exceed program costs. This mechanism does not contain Scheme costs but spreads them more evenly over time, avoiding a spike effect on prices.

In order to cover the costs of the Scheme, an increase in the CCF was announced in the 2011-12 Budget. This announced increased CCF contribution was for $100 million in 2012-13 (to a total of $250 million), and a further $150 million from 2013-14 to 2016-17 (to a total of $400m). However, policy changes to reduce Scheme costs including mandatory retailer contributions and closing the scheme to new participants, alongside better cost forecasts, meant this was reduced by over $90 million in the 2012-13 Budget, to a total contribution in 2013-14 of $309 million.

[30] 'Solar feed-in tariffs: Setting a fair and reasonable value for electricity generated by small-scale solar PV units in NSW', IPART, March 2012

7. Metering and preparing for the end of the Scheme

Wherever retail usage charges exceed the value of a feed-in tariff per kilowatt hour it is in the financial interest of a customer to be net metered, not gross metered. This is currently the case for Solar Bonus Scheme customers on the 20 c/kWh tariff. After the Scheme's end on 31 December 2016, it will also be in the financial interest of customers formerly receiving the 60 c/kWh tariff to be net metered. This is because gross metered customers must export all their generation for a feed-in tariff that will be below the retail price they must pay for any electricity they consume. They are unable to make bill savings from consuming on-site generation until they are net metered.

There are ongoing savings for 20 c/kWh customers who change to a net meter. Increasing the proportion of 20 c/kWh customers who are net metered will also reduce costs of the Scheme and its impact on the CCF.

Existing 20 c/kWh Scheme customers upgrading the size of their systems

As at July 2014 2% (503) 20 c/kWh tariff customers have upgraded their system's generating capacity. The average capacity of these customers increased from 2.1 kW to 3.7 kW. If capacity upgrades follow the same trend as seen over the last three years, the additional generation over the final two and half years would be an estimated 1.66 GWh, with additional cost to the CCF of $248,000 (assuming no meter changes and the retailer contribution rate of 5.1 c/kWh remaining unchanged).

Potential savings if 20 c/kWh customers switch to net metering

The total benefit to the average 20 cent customer with a gross meter if they changed to a net meter by the end of 2014 is estimated to be $1,473 (calculated over ten years and includes the cost of changing the meter). The benefit to the Climate Change Fund per customer is estimated to be $284.

If all 16,385 20 c/kWh customers with gross meters moved to net metering by the end of 2014, the combined benefit to customers is estimated to be $24.1 million (calculated over ten years and includes a conservative estimate for the cost of the meter itself and the service of hanging it) and the benefit to the CCF estimated to be $4.6 million.

Recommendation 2

It is recommended that the NSW Government encourage 20 c/kWh hour gross metered customers to change to net meters.

There is no financial incentive for 60 c/kWh tariff customers to transition to net meters ahead of the Scheme's closure other than the risk that they might face a delay in having their meter changed. These customers do not have perfect knowledge of the likely demand for meter changing services at that time, nor would they have good knowledge of the potential supply of Level 2 accredited service providers (ASPs) in their area that would be available to conduct the work.

It is not feasible to achieve the number of required meter changes in the weeks surrounding the end of the Scheme. Such a concentrated demand for meter changes carries several risks including price inflation for ASP services, diversion of ASP activity from other important work, and customer dissatisfaction over forgoing the benefits of consuming behind the meter consumption.

Initial consultation with the DNSPs suggests that changing metering will entail hardware replacement and is unlikely to be resolved through a software solution. A staged and orderly transition of meters is desirable.

It is proposed that NSW Trade & Investment undertake work to identify ways to facilitate an orderly transition for customers wishing to change from gross to net metering. This will include consideration of future amendments to the National Electricity Rule, NSW smart meter policy, communication strategies, the financial impact on customers and the climate change fund, and what resources might be deployed to induce customers to make the change ahead of the end of the Scheme.

The National Energy Customer Framework (NECF) is a national customer protection framework for the retail sale of electricity and gas to residential and small business energy customers. Its implementation involves the transfer of current state and territory (except Western Australia and the Northern Territory) legislation to a single set of national Laws, Regulations and Rules. The NECF commenced in NSW on 1 July 2013.

The Australian Energy Regulator oversees compliance and enforcement with the NECF and the Australian Energy Market Commission (AEMC) oversees the rules.

Connection of micro-generation and distributed generation is provided for by the NECF and metering competition will enhance this. The national electricity and gas connection frameworks were designed to enable retail customers to obtain standardised contractual arrangements for new or modified connections to energy distribution networks. They do not provide for contestability of connection services but were designed to work alongside existing and future contestability arrangements such as the existing contestability arrangements in NSW.

Recommendation 3

It is recommended that the NSW Government develop a plan through public consultation for an orderly end to the Scheme ensuring the necessary legislation, business and connection rules are in place for the connection of small scale and embedded generation.

8. Safety and Compliance

With the mass installation and connection work for Scheme generators complete, the likelihood of safety and compliance issues occurring for Scheme customers has reduced significantly compared with the Scheme's early years. Nevertheless, there is an ongoing need to audit and enforce safety and compliance rules. Agencies involved, including the distribution network service providers, NSW Fair Trading, the Clean Energy Council, the Energy and Water Ombudsman NSW, NSW Trade & Investment, and the Office of Environment and Heritage continue their roles in reporting, monitoring and acting as appropriate to manage risks.

New customers connecting small generators to the electricity network now benefit from the safety and compliance framework, and consumer protections that have been established through operation of the Scheme. These include stronger accreditation practices, improved inspection programs, better knowledge of system performance, and a more efficient workforce.

A more detailed summary of Scheme safety and compliance can be found at Appendix 1.

9. Conclusion and recommendations

This review notes that the Solar Bonus Scheme has been closed to new entrants in accordance with the National Principles for Feed-in Tariffs and finds that the objectives of the Scheme set out in the *Electricity Supply Act* are being met.

Tariff payment costs ultimately borne by electricity consumers are projected to be $1.248 billion. A series of measures have been undertaken to contain costs of the Scheme, including closing the 60 c/kWh component of the Scheme, reducing the tariff to 20 c/kWh, limiting the time for outstanding applicants to connect and introducing the retailer contribution.

With installation and connection work for Scheme generators complete, the likelihood of safety and compliance issues occurring for Scheme customers has reduced significantly compared with high take-up periods. Nevertheless, there is an ongoing need to audit and enforce safety and compliance rules. New customers connecting small generators to the electricity network now benefit from the safety and compliance framework, and consumer protections that have been established through operation of the Scheme.

Outside of the Scheme, solar still represents an attractive investment in the absence of a premium feed-in tariff. With the Scheme's closure to new connections, the policy focus for the NSW Government is shifting to other customers and other scales of solar generation. The Renewable Energy Action Plan[31] includes a number of actions specific to solar PV, including:

- requesting IPART to estimate a benchmark range for a fair price for small-scale generated solar energy;
- developing online information for small-scale solar PV, wind and solar hot water customers; and
- supporting mid-scale solar PV by identifying opportunities and working with electricity distributors to enable uptake of solar technologies where they are most cost effective.

This review finds that the current reporting requirements for DNSPs exceed what is required and the frequency should be reduced.

This review also finds that it would be financially beneficial for gross metered 20 c/kWh Scheme customers to change to net meters and that they should be encouraged to do so. If these customers move to net meters ahead of the Scheme's end then there will also be a modest reduction to Scheme costs.

The NSW Government has committed to the Revised 2012 COAG National Principles for Feed-in Tariff Schemes.[32] NSW will continue to work with other jurisdictions to harmonise its approach to feed-in tariffs for small scale generation and the connection of distributed generation. The current legislative arrangements for the connection of Scheme customers to the distribution network also apply to new customers. As these arrangements cease on 31 December 2016 it is necessary to ensure the appropriate legislative, business and

[31] http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0010/475318/Renewable-Energy-Action-Plan.pdf
[32] http://www.coag.gov.au/node/507

connection rules are in place for small-scale and distributed generation connections to the network ahead of the end of the Scheme.

This review notes that there will be high demand from gross metered 60 c/kWh customers to change to net metering arrangements on conclusion of the Scheme. The review recommends that planning and public consultation take place to ensure an orderly end to the Scheme.

Recommendations

It is recommended that the NSW Government:

1. streamline reporting on the Scheme by reducing the frequency of reporting by the distribution network service providers;

2. encourage 20 c/kWh gross metered customers to change to net meters; and

3. develop a plan through public consultation for an orderly end to the Scheme ensuring the necessary legislation, business and connection rules are in place for the connection of small scale and embedded generation.

Appendix I

NSW Solar Bonus Scheme Safety and Compliance Summary

July 2014

Background

Solar Bonus Scheme generators must comply with safety, technical and metering requirements prescribed by the legislative framework of the Scheme, including the Act, Regulations, Market Operations Rules, and other statutory requirements that generally relate to electrical installations.

Solar PV systems installed and connected since the Scheme began must have been installed by a person who at the time of installation had a *Grid-connect Design & Install* accreditation from the Clean Energy Council, to be eligible for the Scheme. Accreditation is given to individuals as opposed to companies.

Once the solar PV system or wind turbine is connected to the switchboard by an electrical contractor the connection to the distribution network via meter installation must be conducted by a Level 2 accredited service provider (ASP). A list of level 2 ASPs who may provide this service is available from NSW Trade & Investment's website.[1]

The Clean Energy Regulator is required under the *Renewable Energy (Electricity) Act 2000* to conduct inspections on small-scale solar panel, wind and hydro installations that have had small-scale technology certificates (STCs) created against them in the REC Registry. The inspections are to ensure that selected installations meet the legislated requirements for the creation of STCs. These include:

- applicable Australian standards and industry guidelines as in force at the time the unit was installed; and
- state/territory and local government requirements.

The inspections assist:

- the Clean Energy Regulator in identifying systems that have certificates improperly created against them;
- state and territory regulatory bodies responsible for electrical and building safety in identifying systems that do not meet State/Territory and local government requirements; and
- the Clean Energy Council in identifying installers that have breached the Clean Energy Council accreditation guidelines.

NSW Fair Trading legislation requires installers of renewable systems such as solar panels to hold a relevant home building licence and meet strict competency requirements. The installation must also comply with the *Service and Installation Rules of NSW* which references the Australian and New Zealand AS/NZS3000:2007 Wiring Rules and other relevant standards.

In accordance with the provisions of the *Electricity (Consumer Safety) Act 2004,* the electrical contractor is required to complete a Certificate of Compliance Electrical Work.

For grid-connected and stand-alone installations, electrical contractors are required under the *Home Building Act 1989* to warrant their work for seven years. The Act also sets out the

[1] http://www.resourcesandenergy.nsw.gov.au/energy-supply-industry/pipelines-electricity-gas-networks/network-connections/contestable-works

statutory warranties that apply to residential building work and mandates home warranty insurance for work over $12,000.

The *Fair Trading Act 1987* provides further protections by the standard requirements for goods to be of merchantable quality and suitable for the intended purpose. The *Service and Installation Rules of NSW* provide the standard of best practice for customer connection services and installations including small scale generators.

NSW Trade & Investment maintains a compliance register listing issues reported and the responses to those issues. The register helps inform periodic reviews of its Risk Management Plan and Compliance Framework. The Framework articulates the functions of Trade & Investment and the other agencies with responsibility for ensuring Scheme compliance. NSW Trade & Investment also reduces risk through the provision of information on its website and via Service NSW (formerly the Energy Information Line).

The primary means for addressing safety, compliance, and industry reputation issues is the inspection of installations by the distribution network service providers (DNSPs) and auditing of payments by the Office of Environment and Heritage.

The role of the distribution network service providers

The DNSPs have regulatory responsibility for safety issues associated with the Scheme such as inspecting meter connections and validating inverters. The DNSPs are also responsible for assessing individual customer eligibility including confirmation of generator and inverter capacity.

Inspections: The DNSPs routinely conduct inspections of domestic and commercial electrical works. In response to concerns about safety and lack of experience in the emerging industry, the three DNSPs developed *The Industry Guide for Minimum Audit Inspection of Micro Embedded Generating Systems*. This resulted in a more uniform and systematic approach to auditing solar and small wind installations.

Defect Reporting: All major defects are reported to NSW Fair Trading. Major defects are defined as defects which, in the opinion of the DNSP, have the consequence that the relevant works are unsafe or not suitable to energise or leave energised. The main major defects are:

- incorrect polarity;
- ingress protection (IP) rating of enclosures; and
- inadequately rated DC protective devices.

Auditing: The three DNSPs seek reimbursement from the Climate Change Fund of Scheme credits paid to customers. This process is administered by the Office of Environment & Heritage (OEH). The OEH validation system provides an additional layer of compliance checks to the initial connection approval role provided by the DNSPs under the Act. For example, OEH marks for investigation sites where the energy generation appears to exceed the rated capacity of the approved generator or inverter.

When a new account holder takes over the account of a residence where a Scheme generator was on the 60 c/kWh rate, the new customer is moved to the 20 c/kWh rate. The

DNSPs report that compliance with this aspect of the Scheme has been unproblematic. However, they depend on retailers to notify changes to account names.

Determining eligibility: The DNSPs continue to receive customer requests for clarification of Scheme eligibility and tariff rate eligibility despite closure of the Scheme to new connections in mid 2012. The DNSPs review eligibility and tariff rate inquiries in line with the requirements of the Act. Billing adjustments are initiated where necessary.

Notification of changed circumstances: S15A (8B) of the Act establishes a requirement to notify the DNSP of any change to a person's circumstances that would result in the person ceasing to be eligible for receiving Scheme credits or receiving credits at a different rate.

The Secretary of NSW Trade & Investment or the DNSP may require a person to provide information by statutory declaration in order to determine eligibility. It is an offence under s25 of the Oaths Act 1990 to provide information in a statutory declaration that is knowingly untrue in any material particular. The Local Court may impose a penalty of $5,500 or imprisonment for 2 years, or both. The Act also allows for a maximum penalty of 1,000 penalty units for breach of S15A (8B).

Consumer protection

In the early days of the Scheme most consumer concerns related to incorrect installation or connection, negative impacts on the grid or voltage issues, marketing of systems, delays in installation, and compliance with eligibility criteria.

Now that the Scheme is closed to new connections customer concerns are more focussed on warranty issues, change from the 60 c/kWh to 20 c/kWh rate, and options for expanding generation capacity.

Consumer inquiries are mainly handled by the Energy & Water Ombudsman NSW (EWON), NSW Fair Trading and Service NSW.

EWON

The Energy & Water Ombudsman NSW (EWON) investigates and resolves complaints from customers of electricity and gas providers in NSW, and some water providers. Matters relating to solar installations are outside EWON's jurisdiction. Solar installation complaints are referred to Fair Trading NSW.

EWON reports that the number of solar complaints rose steeply for the financial year ending 30 June 2011, and again the following year. It appears that complaint numbers may be starting to settle, and the level of complaints received has declined.

Customer complaints to EWON

For this review, EWON has outlined the range of solar related issues raised by customers between 1 October 2010 and 30 April 2014. These issues can be broadly separated into two categories:

- those that are directly related to the NSW Solar Bonus Scheme; and
- those that are indirectly related such as complaints about solar installers.

Complaints directly related to the NSW Solar Bonus Scheme

These include:

- retailers terminating voluntary feed-in payments when the mandatory retailer contribution towards the cost of the Scheme was introduced;
- an energy retailer offering a feed-in tariff of 28 c/kWh to customers ineligible for the Scheme; and
- eligibility changes and application of incorrect tariff following a transfer between retailers.

General complaints about solar PV

These include:

- incorrect payment or omission of solar credits following billing delay; and
- the switch to a Time of Use meter.

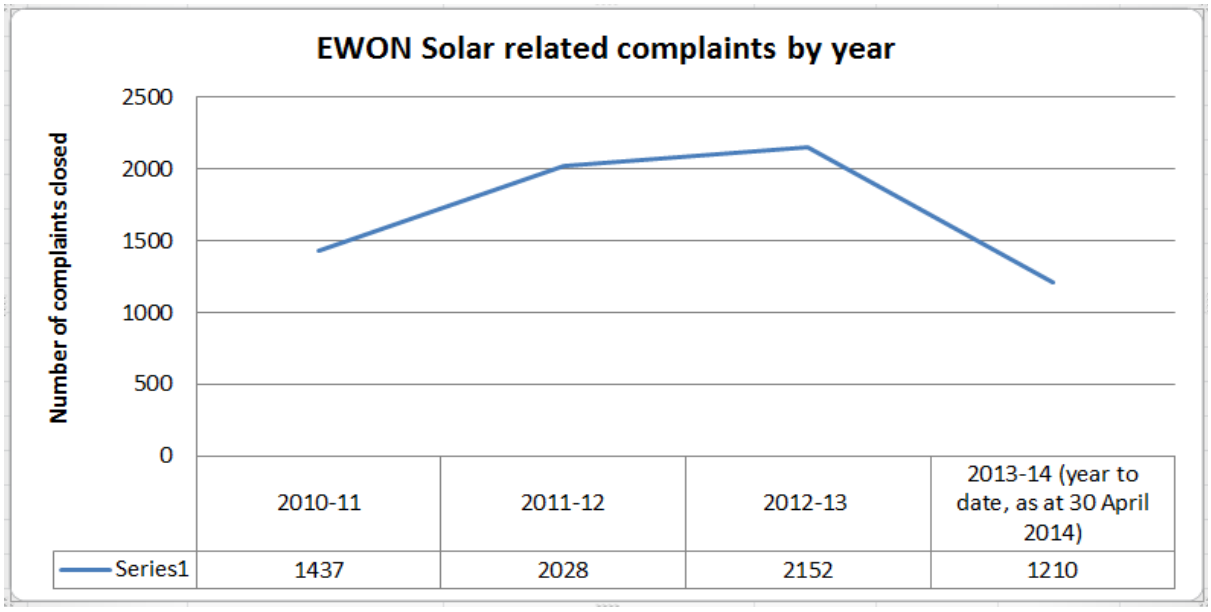

Figure 1 EWON Solar related complaints by year[2]

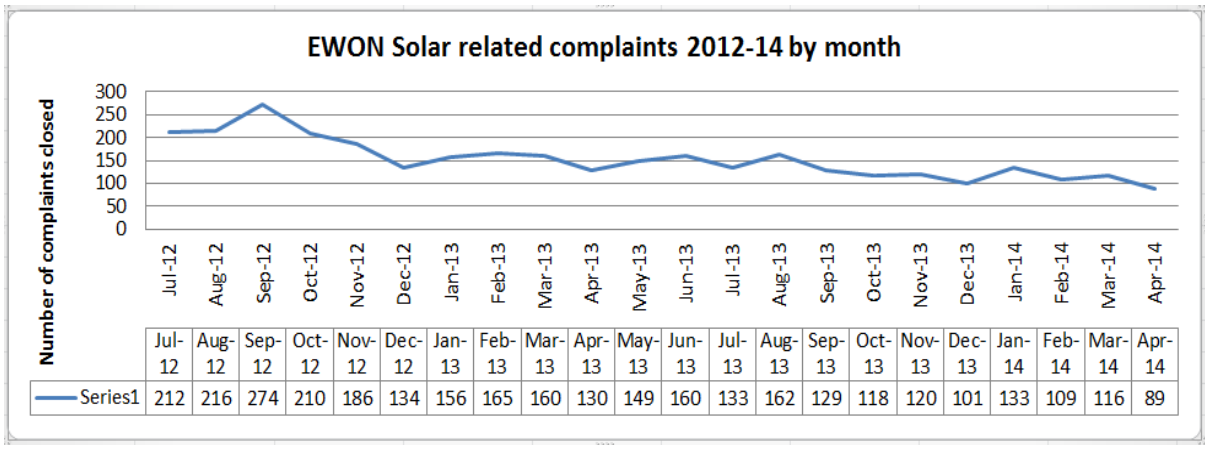

Figure 2 EWON solar related complaints by month[3]

[2] Source: EWON submission, April 2014
[3] Source: EWON submission, April 2014

EWON notes that the number of solar complaints has continued to trend downwards since peaking in September 2012. Although there has been some fluctuation between months, complaint numbers have settled overall.

Customers continue to complain to EWON about incorrect payment or omission of solar credits on bills, particularly where the customer has transferred retailers; retailer contributions to the Solar Bonus Scheme; and the lack of tariff choice after a time of use meter is installed as part of the solar installation. These issues were discussed in their June 2013 submission which is summarised below.

Termination of voluntary feed-in tariff payments upon introduction of the mandatory retailer contribution of 7.7 c/kWh towards the cost of the Scheme

Prior to 1 July 2012, many retailers were providing a voluntary payment of 6c/kWh or 8c/kWh to customers, on top of the statutory tariff. In other words, many customers were receiving a feed-in tariff of either 26 c/kWh or 28 c/kWh, or 66 c/kWh or 68 c/kWh. When the NSW Government required retailers to make a contribution of 7.7 c/kWh to the Scheme, those retailers who were paying an additional 6 c/kWh or 8 c/kWh withdrew these payments. This led to a surge in complaints to EWON.

Energy Retailer offering a feed-in tariff of 28 c/kWh to customers ineligible for the Scheme

One major energy retailer continued to offer new solar customers a feed-in tariff of 28 c/kWh after the Scheme closed on 28 April 2011. The retailer advised EWON that this was because they were unable to make the necessary changes to their billing system due to the frequent changes in these tariffs across all the jurisdictions in which they operate. The retailer advised that system limitations meant they had to apply the same network tariff code to both existing and new solar customers until they were able to effect system changes.

New solar customers continued to receive a 28 c/kWh feed-in tariff until 1 September 2012, when the retailer completed changes to their billing system and reduced the tariff to 8 c/kWh. Although the retailer had instructed their call centre staff to inform customers that the feed-in tariff of 28 c/kWh was not an ongoing commitment, and had notified affected customers of the tariff change by mail, this issue was a significant driver of complaints to EWON.

Customers complained that they based their decision to invest in a PV system on the 28 c/kWh tariff quoted by the retailer and were dissatisfied that the retailer could alter what they considered was an essential term of their contract.

Eligibility changes and application of incorrect tariff following a transfer

Some customers who were eligible for a feed-in tariff of 60 c/kWh complained that they received 28 c/kWh following a transfer to another retailer. Many of these cases reflect the complexity of data transfer and the failure of business to business communication between networks and retailers.

Incorrect payment or omission of solar credits following billing delay

Some solar customers of a major energy retailer complained of lengthy delays in receiving bills and of incorrect or omitted solar credits once the delayed bill was issued. The majority of these cases reflect problems with retail billing systems and the capacity of these systems

to handle a more complex billing environment. Other cases indicate an inefficient data transfer process between retailers and networks.

The switch to Time of Use billing after interval meter is installed

This issue stems from the meter changes associated with solar installations and continues to be a significant source of complaints. Customers receive an interval meter when a PV system is installed, and may be switched to time of use tariffs by their retailer. Customers have complained about the lack of information provided to them at the time of installation of the new meter. Many were unaware that they would be billed on a time of use basis. EWON understands that only one retailer in NSW was offering customers a choice between a flat or time of use tariff. Many of the complaints relate to what customers regard as an imposition of a time of use tariff. This concern is often exacerbated when marketers have advised that a flat tariff is available.

NSW Fair Trading

NSW Fair Trading's objectives are to ensure:

- fair trading legislation simplifies service provision for consumers and traders;
- fair marketplace regulation with minimal red tape;
- community access to information and services; and
- compliance with fair trading laws.

With regard to the installation of solar panels, Fair Trading provides information about:

- licence requirements;
- electrical wiring;
- connecting to the electricity distribution network;
- rebates;
- home warranty insurance;
- contracts;
- deposits; and
- statutory warranty.

Inquiries to Service NSW (formerly 'Energy Information line')

Service NSW receives inquiries on a wide range of topics relating to both Scheme and new solar generators. These include:

- eligibility requirements for the Solar Bonus Scheme;
- how changes to billing names affects eligibility for Scheme credits;
- warranty and repair;
- options for expanding generation capacity without incurring a reduction in Scheme credits;
- Scheme requirements to notify change of circumstances; and
- available feed-in tariffs for new connections.

DNSP safety and compliance statistics

Ausgrid

Ausgrid's initial policy was to inspect 100% of embedded generation due to the inexperience of installers at that time with DC wiring, and rapidly changing solar/inverter technology.

Ausgrid maintained 100% inspections throughout 2010 and 2011 in response to identification of incorrect polarity and DC circuit breaker issues. By mid 2012, major defects had dropped to around 6-7% and there were strong indications that installers had gained sufficient experience to reduce the inspection rate. Many installers with poor installation histories also appeared to no longer be active in the marketplace. In this climate, Ausgrid introduced a trial to inspect solar on an audit basis.

The audit system used was the same as that currently used for domestic and commercial installations, and as documented in its Customer Installation Safety plan. That is, three consecutive inspections without major defects would lead to a regime of one inspection in 10 notifications from the same installer. If a major defect is found on that inspection, the contractor reverts to at least 3 consecutive inspections. This equated to an approximate inspection rate of 30%. These audit ratios were reviewed after 12 months experience and, based on a continued higher defect rate on solar compared to domestic and commercial work, Ausgrid increased the audit ratio to 1 in 5 notifications. This equates to an approximate inspection rate of 60%. This continues to be the current inspection regime.

Since 2012 the defect rate for work for solar connections has remained steady at 8% with an overall inspection rate of around 33%.

Ausgrid reports sites to Fair Trading where there is evidence of contractors being unqualified or suspected of falsifying certification notifications.

Between January 2012 and 30 June 2014:

- 21,356 Notifications of solar systems
- 6,882 Inspections (32%)
- 598 jobs with Major Defects (8.6%)
- 299 of the 598 jobs with major defects were related to incorrectly wired DC circuit breakers.

Endeavour Energy

From July 2011, following the DNSPs adoption of *The Industry Guide for Minimum Audit Inspection of Micro Embedded Generating Systems*, Endeavour Energy commenced a more detailed inspection process.

In March 2013, responding to a high major defect rate, Endeavour Energy embarked on a program to inspect *all* generators to the higher standard in the *Industry Guide*. This entailed reinspecting some of the installations previously inspected and all of the ones not inspected as part of the initial selection criteria.

Endeavour Energy's inspection statistics (as at June 2014):

- total inspections to be conducted 63,732
- inspections completed 36,467
- inspections remaining 27,265
- major defects - polarity 1,987

  (1,700 fixed on site, 261 not fixed on site, 26 status to be confirmed)
- minor defects 6,865
- no access 3,436

Notification is provided to the customer for issues that require follow up. Endeavour Energy has made a decision to rectify some of the minor safety issues to reduce the impact on customers.

Program challenges include:

- ensure compliance with the Code of Practice Installation Safety Management & Network Management Plan Section 2 Customer Safety;
- inspection of all PV Solar Installations within Endeavour Energy distribution network area;
- exposure to high Major Defect rate;
- provide minimal impact to network customers;
- management of Asbestos switchboard panels; and
- cost effective & efficient systems to reduce the administration times & increase the available in field inspection time.

All major defects are reported to NSW Fair Trading. The three major defects reported to NSW Fair Trading were incorrect polarity, IP rating of enclosures, and inadequately rated DC protective devices.

The *Service and Installation Rules of NSW* now require all generator connection applications to be submitted to DNSPs. Endeavour Energy report that a Permission to Connect form is usually issued within seven days of receiving the application provided all required information is supplied.

A certificate of compliance electrical work (CCEW) is a uniquely numbered form that is completed by an electrical contractor every time the contractor adds, alters, disconnects, reconnects or replaces an electrical installation. The CCEW is the consumer's assurance that a licensed contractor has completed and tested the work to ensure it is effective and compliant with the Australia/New Zealand wiring rules for electrical installation work. Consumers should be given a copy of the Compliance Certificate at the completion of a job and advised to retain it.

During compliance inspections, customers are asked to produce a copy of the CCEW or obtain a copy from their installer. No reporting statistics are available on the number of CCEW not submitted to the customer.

Endeavour Energy remains concerned about new customers connecting systems without appropriate revenue metering. These installations are identified by meter reading staff,

inspected, and disconnected until the revenue metering is installed. If identified, the installer is reported to NSW Fair Trading.

Essential Energy Safety and Compliance

Essential Energy conducts inspections and energising of embedded generating systems in accordance with Essential Energy's Operational procedure - *Inspection and Energising Grid Connected Solar PV Systems - CEOP2454*. This procedure is used to manage the inspection of customer installations to Essential Energy's own risk based audit regime, in accordance with Safety Management Plans and procedures, and was developed in conjunction with the other NSW DNSPs and NSW Trade & Investment, as part of an industry working group.

The procedure provides information to assist Essential Energy employees, Accredited Solar Installers, Electrical Contractors and Accredited Service Providers (ASP's) in the inspection and commissioning of grid connected solar array installations. This ensures that only generating systems with the written approval of the DNSP and a negotiated feed-in tariff supported with the appropriate metering are eligible for connection. All grid connected inverters must hold Australian Standards approval and be included on the Clean Energy Council approved list. Only licensed electrical contractors holding Solar Accreditation through the Clean Energy Council permitted to energise these inverters and Accredited ASP's connect them permanently to Essential Energy's network.

Essential Energy records indicate that that there are no systems exceeding the maximum size in receipt of Scheme tariffs.

Essential Energy have received customer requests for an upgrade of the Scheme generator to greater than the 10kW size permitted for the Scheme. Prior to approving the upgrade it contacts the customer to clarify their intention and to advise that they would lose the Scheme tariff. If the customer advises that they still want to go ahead with the upgrade, they are changed from a Scheme tariff to a zero tariff.

To date Essential Energy has moved ten customers from the 60 to 20 c/kWh tariff due to increases in generator capacity. Essential Energy follows up with 60 c/kWh tariff customers who have failed to notify generator capacity increases.

Essential Energy inspection statistics (as at June 2014)

- Inspections (Jan 2011 to June 2014) 45,554
- Defects detected 1,058
- Reverse polarity (main major defect) 50

Appendix II Top 20 postcodes for PV installations

Ranking	Postcode	Location	Gross connections	Net Connections	Total
1	2830	Dubbo	2786	0	2786
2	2480	Lismore	2382	0	2382
3	2486	Tweed Heads South, Glengarrie	2025	0	2025
4	2259	Tuggerah, Wyong	1777	0	1777
5	2444	Port Macquarie	1743	0	1743
6	2170	Liverpool, Prestons, Moorebank	1679	0	1679
7	2880	Broken Hill	1609	0	1609
8	2250	Gosford	1608	0	1608
9	2560	Campbelltown	1572	0	1572
10	2478	Ballina	1553	0	1553
11	2540	Nowra	1461	0	1461
12	2153	Baulkham Hills , Bella Vista	1435	0	1435
13	2155	Kellyville, Rouse Hill	1315	0	1315
14	2450	Coffs Harbour	1201	0	1201
15	2640	Albury	1199	0	1199
16	2430	Taree	1182	0	1182
17	2145	Wentworthville, Girraween	1169	0	1169
18	2148	Blacktown, Prospect	1155	0	1155
19	2176	Abbotsbury, Bossley Park, Greenfield Park, Prairiewood	1086	0	1086
20	2261	The Entrance	1068	0	1068

Table 1 Frequency of Scheme connections[4] (top twenty)

[4] Excluding ineligible connections and blank generations. Note: This data should be interpreted with caution, as it is not per capita. Suburbs listed are indicative; surrounding areas can have the same postcode. Source: Office of Environment and Heritage, data obtained from DNSPs as at 31 December, 2013