
New South Wales Auditor-General's Report
Special Report
Solar Bonus Scheme



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GPO Box 12
Sydney NSW 2001

The Legislative Assembly
Parliament House
Sydney NSW 2000

The Legislative Council
Parliament House
Sydney NSW 2000

Pursuant to section 194(1) of the *Electricity Supply Act 1995*,
I present my report entitled **Solar Bonus Scheme**.

A handwritten signature in black ink that reads "Peter Achterstraat".

Peter Achterstraat

Auditor-General

7 November 2011

Contents

Executive Summary

Background	2
Key Findings	3
Recommendations	4
Responses from Department of Premier and Cabinet	6

Introduction

NSW Solar Bonus Scheme	14
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Key Findings

1. Number of Customers under the Scheme	15
2. Costs of the Scheme	18
2.1 Scheme costs incurred to 30 June 2011	18
2.2 Current projected Scheme costs	19
2.2.1 Projected costs	19
2.2.2 Uncertainty within projections	21
2.3 History of projected Scheme costs	23
2.3.1 Review of models underpinning the different projected costs of the Scheme	25
3. Other matters considered relevant	26
3.1 How the Scheme will be funded	27
3.2 Were specific and measurable program objectives set?	28
3.3 Were costs and benefits assessed?	29
3.4 Were relevant risks identified, assessed and addressed?	31
3.5 Was there an achievable implementation program?	32
3.6 Were there adequate control mechanisms?	33
3.7 Was information relevant and timely?	33
3.8 Was there an effective audit process to provide program assurance?	35

Appendices

Appendix 1: Chronology of the Key Scheme Events	36
Appendix 2: A Generous Scheme	38
Appendix 3: Uncertainty within Projections	39
Appendix 4: Sensitivity Analysis for Uncertainty within Projections	41
Appendix 5(a): Review of Models	42
Appendix 5(b): Comparison to DNSP#1 Scheme tariff payments	52
Appendix 5(c): Comparison to DNSP#2 Scheme tariff payments	53
Appendix 5(d): Comparison to DNSP#3 Scheme tariff payments	54
Appendix 6: Glossary	55
Appendix 7: About the Audit	56

Executive Summary

2

NSW Auditor-General's Report
NSW Solar Bonus Scheme
EXECUTIVE SUMMARY

Background

I have prepared this Report to Parliament as required by section 194(1) of the *Electricity Supply Act 1995*, on the following aspects of the NSW Solar Bonus Scheme:

- a. the number of small retail customers that have installed and connected complying generators,
- b. the costs of the scheme including the total amount credited to small retail customers under the scheme,
- c. any other matter that the Auditor-General considers to be relevant.

In relation to (c) above, I examined how the Scheme will be funded and whether:

- specific and measurable program objectives were set
- costs and benefits associated with achieving the objectives were assessed and reported in the proposals put forward for decision making
- relevant risks to the achievement of each program objective were identified, assessed and addressed
- there was an achievable implementation program
- there were control mechanisms to identify and react to the take-up of the scheme and other changes that could affect the achievement of program objectives
- relevant and timely information was provided to Government decision makers, potential applicants and other stakeholders to take informed action at each stage in the development and operation of the scheme
- there was an effective audit process to provide program assurance.

The New South Wales Government's Solar Bonus Scheme (the Scheme) was introduced through legislation in 2009 and commenced on 1 January 2010. The Scheme is legislated to run for seven years to 31 December 2016.

The Scheme is a gross feed-in tariff scheme. It provides support to people who produce electricity through rooftop solar photovoltaic (PV) systems or mini wind turbines connected to the electricity grid.

The Scheme originally announced by the Government in June 2009, was a net tariff scheme over 20 years. The Government later switched to a gross tariff scheme over seven years. Net tariff pay system owners only for the electricity they export to the grid in excess of that consumed inside the property. Under gross tariff arrangements, system owners export and receive payment for all the electricity generated by their system.

The NSW Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS), the Office of Environment and Heritage (OEH), Department of Premier and Cabinet (DPC) and Treasury have been the major agencies involved in the Scheme. They, or their predecessor agencies, were represented on the NSW Solar PV Feed-in Tariff Task Force that designed the Scheme originally and administered its implementation. DTIRIS chaired the task force; submitted the original proposals to Cabinet; drew up the implementation plan and reported progress to the Minister. The electricity network businesses registered new customers and reported statistics on number of application and installations to DTIRIS.

Whilst my report focuses on the actions of Government agencies, it is important to recognise that the final decisions in relation to the Scheme rested with the New South Wales Government and the New South Wales Parliament.

Key Findings

Number of Customers under the Scheme

In relation to section 194(1)(a) of the Act, I found that:

- at 30 June 2011, 132,061 small retail customers had installed and connected complying generators under the Scheme.

Additionally, I found the following with respect to connections:

- at 30 June 2011, the 300 MW cap had been broken and total capacity was forecasted to reach 372MW if all approved customers were connected
- 28,733 (or 17.9 per cent of total applicants) applicants were not connected to the Scheme at 30 June 2011
- 142,849 (88.8 per cent) applicants joined the Scheme when the tariff rate was 60 cents
- at 30 June 2011, Essential Energy had approximately 34.7 per cent of the Scheme connections compared to its approximate 24 per cent share of all network customers
- there was no centralised process for households to apply to join the Scheme.

Costs of the Scheme

In relation to section 194(1)(b) of the Act, I found that \$142 million had been credited to small retail customers under the Scheme to 30 June 2011. An estimated \$26.8 million of other further capital and operating expenditure has been incurred by the Government to 30 June 2011.

Additionally, I found the following with respect to costs:

- the latest Government projection for the total tariffs to be paid under the Scheme is \$1.75 billion, including the \$142 million paid to 30 June 2011
- I have reviewed the Scheme including modelling and, with the advice from my consultants, I anticipate the total tariffs to be paid under the Scheme will be between \$1.05 billion and \$1.75 billion. The Government's projected Scheme cost is at the upper end of this range. This is mainly because it has assumed very good energy output from the Solar panels over seven years
- there are many variables that contribute to the uncertainty of projected costs of this seven year Scheme. The two most significant variables are:
 - the 'real world' average performance of solar systems within the Scheme could be significantly less than typical 'good' solar system performance. Underperformance of systems can be caused by many factors, including system orientation to the sun, possible shading, quality of products and/or wiring of installations. Whilst there is little available information at present, it is entirely possible that, on average, PV systems within the Scheme might underperform very significantly. A 20 per cent reduction on 'good' typical PV generation is entirely possible, equating to an 18 per cent reduction in projected Scheme costs .
 - potentially changing weather patterns – total sunshine (i.e. solar insolation) can vary +/-10 per cent year to year, although it would be expected that the average variation over the remaining five years of the Scheme would be significantly less than this. A +/- 5 per cent variation in total sunshine (and hence PV generation) over the life of the Scheme equates to approximately +/-4.5 per cent variability in projected Scheme costs
- there are many models used to project the total cost of the Scheme. Some key models have been reviewed by my consultant, the University of New South Wales (UNSW), and overall I consider they are satisfactory given at times resource and time constraints, although one DNSP model can be improved by reducing the assumed PV performance
- determining and reporting of Scheme costs varied between the DNSPs as no guidance or direction was given.

Other Matters Considered Relevant

In relation to section 194(1)(c) of the Act, I found with respect to funding the Scheme:

- the majority of the funds in the New South Wales Climate Change Fund (NSW CCF) will be used to reimburse DNSPs for their tariff payments to retailers under the Scheme
- I understand approximately \$430 million of interest free loans will be made by the Government to the NSW CCF until the DNSPs network tariffs charged to all customers are sufficient to repay the loans

In relation to section 194(1)(c) of the Act, I found with respect to planning and management of the Scheme:

- the Scheme had three broadly stated objectives, with no specific targets against which progress could be measured. These objectives do not include reducing emissions or obtaining value for money
- no cost-benefit analysis was undertaken before the Government's decision in 2008 to introduce a scheme. Likewise, no cost-benefit analysis was undertaken when changes were made to the Scheme in 2009, or when changes were made to funding arrangements early in 2011
- no market research was undertaken (including about non-tariff options) to investigate customer motivations in generating renewable energy
- little was done early enough to identify and reduce relevant risks. I found no contingency planning, analysis and assessment of options and exit strategies to address potential high risk situations
- no overall implementation program, including no clear definition of project roles and responsibilities of those involved in implementing and delivering the Scheme
- the Scheme lacked the most elementary operational controls. There was initially a poor monitoring system. There was a time limit of 2016, but initially there was no cap on total Scheme capacity and costs
- there were significant shortcomings in the provision of information to Government decision-makers
- there were insufficient review points based on applications so that progress could be assessed and the Scheme amended or even stopped, if necessary. The one legislated review point was when capacity reached 50 MW. By the time that review was complete, capacity had doubled to 100 MW.
- at the outset, there was no audit process to provide program assurance.

Recommendations

Number of Customers under the Scheme

In relation to section 194(1)(a) of the Act, I recommend the DNSPs ascertain whether applicants who have not been connected to the Scheme still intend to join and/or need assistance with the process. A clear understanding of intentions will assist DNSPs to anticipate future resource needs and improve/maintain good service delivery by the Government.

Costs of the Scheme

In relation to section 194(1)(b) of the Act, I recommend:

- The Government publish the total projected Scheme costs, within a range, based on a sensitivity analysis of variables, including impact of weather patterns on the extent of energy produced and paid for under the Scheme
- DTIRIS seeks medium term forecasting of El Nino and La Nina weather patterns and shares this information with DNSPs to assist them in forecasting Scheme costs
- DNSPs continue to update total projected Scheme costs with actual data collected
- DNSPs use a standard approach to estimating and reporting Scheme costs.

Other Matters Considered Relevant

In relation to section 194(1)(c) of the Act, I recommend:

- Schemes that involve significant recurrent expenditure and economic costs to consumers should be assessed in a similar fashion to major Government infrastructure expenditure. Prior to approval, major programs need:
 - specific objectives that are measurable
 - a cost-benefit analysis
 - an economic analysis
 - a business case including options, costs, time frames and risks
 - a risk assessment and risk management plan
 - a budget
 - an implementation plan
 - a performance monitoring framework
 - an exit plan
- in the interests of being transparent, and ensuring that Government decision-makers have access to adequate information on such schemes, such assessments should be made public
- the performance of such schemes needs to be monitored more closely. Agencies need to be prepared to step in and take corrective action more quickly if important implementation risks begin to materialise
- there needs to be an ability and a willingness to alter the parameters of such schemes more quickly, particularly if there is a risk that they will not meet their objectives.

Responses from Department of Premier and Cabinet



Premier
& Cabinet

Mr Peter Achterstraat
Auditor-General
The Audit Office of NSW
GPO Box 12
SYDNEY NSW 2001

Dear Mr Achterstraat *Peter*

Report to Parliament as required by Section 194(1) of the *Electricity Supply Act 1995* on aspects of the Solar Bonus Scheme

Thank you for your correspondence providing the Statutory Review of the Solar Bonus Scheme in accordance with Section 194(1) of the *Electricity Supply Act 1995*.

The Department of Premier and Cabinet and other relevant agencies welcome the opportunity provided by this review to consider the information and findings that you have identified in relation to the Solar Bonus Scheme.

This letter attaches the joint comments of the Department of Premier and Cabinet, Treasury, the Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) and the Office of Environment and Heritage (OEH) on the Review report.

Your report rightly identifies some significant issues in the decision making processes associated with the policy design and implementation of the Solar Bonus Scheme. Agencies strongly support this Scheme review and the opportunity it has provided to clearly identify the reasons for the issues with the Scheme's design and the actions that may be taken to rectify current shortcomings and ensure that future policy development and implementation process can be improved.

Agencies are concerned, however, that the report does not make clear the limited discretion agencies had in relation to the Solar Bonus Scheme nor the impediments to the provision of timely advice on its design and implementation. In particular, the legislative arrangements enacted by the NSW Parliament for the Solar Bonus Scheme which, for example, included no provision for triggers to halt applications and very limited review points, presented specific impediments in the ability of agencies to respond to the faster than expected scheme uptake.

The findings in the Executive Summary relating to the planning for and management of the Scheme are provided without the above context, much of which you acknowledge in the body of the report.

Agencies were given the opportunity to view the UNSW review of projected Scheme costs. Publicly releasing the UNSW report, minus any commercially sensitive material, if necessary, would greatly assist readers of this report. Not releasing available information on Scheme costs in 2009 is one of the key issues you highlight in your report that may have led to poor decision making.

NSW Government agencies have provided the attached comments to provide some additional context on the Solar Bonus Scheme.

On behalf of the relevant Government agencies I thank you for the opportunity to comment on the Statutory Review report. The specific recommendations contained within the report will be considered by the Government.

Yours sincerely



Chris Eccles
Director General

NSW Agencies' Comments on Auditor General's Review of the NSW Solar Bonus Scheme

There were significant shortcomings in the design and implementation of the Solar Bonus Scheme (the Scheme). As such agencies support the intent of the Auditor-General's review of the Scheme to clearly identify the reasons for those shortcomings and identify actions that may be taken to ensure that future policy development and implementation processes can be strengthened.

Agencies welcome the main recommendations on page 5 relating to policy development and implementation processes, including the wider application of cost-benefit analysis, better risk assessment and management, performance monitoring, and exit plans.

Some of the drafting in the Auditor General's report, in particular the finding that there were "*significant shortcomings in provision of information to Government decision makers*" does not make it sufficiently clear that agencies were not always given the opportunity to provide relevant advice that may have led to different policy decisions, or that agencies did provide advice to Ministers' Offices which was not pursued further by the former Government.

Comments on the key matters set out in your report follow (Section 1)

To better appreciate these comments and the findings to which they refer in your report, an outline of the key facts in relation to the Solar Bonus Scheme and the changing market conditions in play during its development and operation is also provided (Section 2).

1. Comments on the Report

Program objectives

The Solar Bonus Scheme had objectives set out in the legislation that was passed by both Houses of Parliament in 2009. NSW parliamentary records show that three specific objectives were identified for the Solar Bonus Scheme. The objectives were set by the former Government and agreed to by the Parliament. They do not include emissions reduction or reducing electricity consumption as these were not direct outcomes under the Scheme, being dealt with by other Commonwealth and State Government programs and policies.

Better objectives would have assisted in determining when the Scheme had reached its goals. This was a key difficulty in the statutory review. If the Scheme was established as an industry development scheme, the objectives should have focussed on sustainability not boom/bust development.

Assessment of costs and benefits prior to introducing the Scheme

The report comments that no cost-benefit analysis was undertaken before the former Government's 2008 decision to introduce a Scheme, nor when changes were made to the Scheme in 2009 or when funding arrangements were altered in 2011.

Plans to establish a solar PV feed-in tariff scheme were announced by the former Government in November 2008 and a Taskforce was established to consider options

for such a scheme. It was widely known in the community at that time that solar PV was a relatively expensive form of electricity generation.

The report of the NSW Taskforce in February 2009 contained detailed financial analysis based on best available data of multiple scheme scenario options – ten in all – for consideration by Government. The Taskforce was asked to consider various design options for the Scheme after the then Government had announced that a scheme would be put in place. Cost-benefit analysis would have needed to be done prior to such an announcement. The Taskforce could therefore only consider relative costings about resourcing a decision that had already been made.

It should be noted that DTIRIS initiated further more detailed costing analysis in August 2009. This information was made available to the office of the then Minister for Energy and the then Treasurer's office. DTIRIS further notes that the decision to switch from a net to a gross Scheme was made in the face of new analysis indicating that in net present value terms the costs of the Scheme would almost double. This updated analysis also included sensitivity analysis on falling panel prices. This clearly showed that falling panel prices would lead to rapidly accelerating uptake (and Scheme costs). This risk, as the review report notes, should have been addressed by the former Government and Parliament providing more flexibility in adjusting the Scheme's parameters.

Cost Estimates Once Scheme Commenced

The report suggests that Scheme costs other than the direct costs of the feed-in tariff may be borne by electricity customers and the community. In fact, additional costs to Government agencies arising from the Scheme are borne by those agencies from within their existing budgets.

Audit Office's Independent Review of Cost Estimates

The report undertook another review of the Scheme cost estimates. This work was undertaken by UNSW as a consultant. Agencies were provided with very limited and recent access to the UNSW work. On the basis of this limited access agencies have been unable to be fully briefed on the detail and assumptions of the UNSW review as well as understanding how this has been interpreted in the report.

On the basis of our preliminary reading of the UNSW analysis, it is pleasing to note that it appears to support the analysis that was undertaken by the NSW Government. We note that the current cost estimate incorporated in the 2011-12 Budget falls within the cost range identified by UNSW. We note also the UNSW finding that NSW Government cost estimates are and were reasonable, in light of information available at the time they were developed.

Agencies endorse the findings that total Scheme costs may be somewhat reduced by factors that include: exits from the Scheme when participants move house; participants transferring from gross to net metering; and system performance degradation.

Agencies endorse the Auditor-General's recommendation that cost estimates for this Scheme should be presented as a range. This recognises the sensitivities and difficulties in forecasting Scheme costs, as acknowledged by UNSW. But as you would be aware for the purpose of preparing the NSW Budget a single figure rather

than a range must be used. The Budget estimate does allow for panels not being optimally aligned or optimally sited. As with all demand based programs, figures used in the Budget are necessarily estimates and will be adjusted periodically over the course of the Budget cycle to reflect best available cost estimates and best information.

We believe that the release of the UNSW report is in the public interest as it would make the review more transparent and make clear the assumptions and methodologies that underpin the scenarios referred to in your report. This additional information may assist Parliament and other interested parties to understand the deliberations and findings of the Review. Any information deemed to be confidential could be redacted.

Management/operational/review mechanisms

In considering whether the management and review mechanisms in place for the Scheme were ultimately sufficient, the report does not appropriately acknowledge that timeframes and mechanisms were set by the former Government and the Parliament through legislation.

There were operational controls consistent with the legislation in place around the Scheme. Distribution Network Service Providers (DNSPs) were required to provide data and review points were set within the legislation. DNSPs are also regularly audited as part of licence conditions. With hindsight it may be agreed, however, that the timeframes of these formal mechanisms, put in place at the commencement of the Scheme, did not match the unexpectedly high and rapid take up under the Scheme. It is the case that as the high take up became known, at their own discretion, agencies increased the frequency of data reporting beyond that which was set out in the legislation.

Under the legislation, the 50MW review was the responsibility for the Minister for Energy. Once the review was triggered it was completed quickly and this included ensuring that consultation took place. One problem with the review was that no signal was provided to the market about how the outcomes of the review would be applied to customers yet to join the scheme. This created a rush of applications to join the Scheme as customers sought to receive the overly generous financial benefits of the gross 60 cent tariff in their anticipation of future changes.

As noted in the review report, scheme capacity doubled over the period between reaching the review trigger and the former Government introducing legislation into Parliament to change the Scheme's parameters. Agencies and network businesses were not able to halt this rush of applications as the Scheme legislation passed by the Parliament did not permit the Minister to change the Scheme. Indeed, network businesses had legal obligations to accept applications and connect customers.

2. Key facts – Scheme framework and history of development

The following facts are important for an understanding of the NSW Solar Bonus Scheme.

The Scheme's three legislated objectives are to:

- encourage and support persons who want to generate renewable energy;
- develop jobs in the renewable energy sector; and
- increase public exposure to renewable energy technology.

The NSW Solar Bonus Scheme has the following parameters:

- Participants are paid for their gross energy production, and a 60 cent feed-in tariff (FIT) rate is generous both in comparison with other jurisdictions and relative to retail tariffs.
- Applications to connect were submitted to the DNSPs by households or their agents (eg installers).
- DNSPs assessed applications to connect and had an obligation to connect all complying installations.
- Once connected, installations were entitled to be paid the FIT by their retailer.
- The FIT is paid directly to participants, the retailer being reimbursed by the DNSP, who in turn will be reimbursed from the CCF (administered by OEH).
- Ultimate cost recovery of FIT payments is from consumers, as the CCF is paid for by a levy placed on DNSPs, who are authorised to recover their contribution from their customers.

This Scheme design is similar to the arrangements in other jurisdictions. It recognised the existing connection frameworks and voluntary feed-in tariff arrangements that were in place prior to the Scheme's commencement.

The Scheme operates through commercial transactions, and the respective roles and responsibilities of DTIRIS, Office of Environment and Heritage, Treasury, the electricity network businesses, electricity retailers and installers were clear from commencement. DTIRIS has no direct relationship with either customers or installers under the Scheme and is reliant on the DNSPs for intelligence on Scheme participation.

Market conditions and falling payback

The NSW Solar Feed In Tariff Taskforce completed its deliberations in early 2009. The former Government took a further six months to decide on the form of the Scheme, particularly tariff rate and Scheme length.

Based on the solar PV panel market conditions then prevailing, the limited financial analysis undertaken by the Taskforce was based on a gross installation cost for a typical 1.5kW installation of \$18,750. With the Commonwealth's Renewable Energy Target (RET) scheme providing a subsidy of \$7,673, this meant a corresponding net installation cost of a little over \$11,000 (see appendix 6 of the Taskforce's Report for detailed assumptions). At this cost, the Taskforce calculated that for a 60 cent gross tariff the typical payback time for a 1.5kW installation would be a little over 8 years.

As the report notes, the Taskforce report stated (p25) that "*a significant area of uncertainty in projecting financial impacts is the likely take-up rates*". At that time there was very little experience with FITs in Australia with different scheme designs and tariff rates that would have helped inform a judgement about take-up rates.

The 2009 analysis by AECOM which did take into account how consumers would respond to falling panel prices (ie uptake would accelerate) clearly highlighted the sensitivity of Scheme costs to falling panel prices.

As is now well known, there was a large fall in panel prices (nearly forty percent) from the time the Taskforce completed its report to the time the Minister's review of the Scheme commenced. This was in large part due to the redirection of panels to Australia from the European market, following the winding back of schemes in Spain and Germany in particular. Given the RET subsidy, a fifty percent fall in gross panel costs reduced net installation costs for a 1.5kW system by as much as three quarters – to as low as \$3,000.

At an upfront cost of \$3,000-\$4,000, and with a 60c gross tariff, the payback period for a 1.5kW installation when the SBS commenced was reduced to as little as 2-3 years. The opportunity to sell installations with an upfront commitment of \$3,000 and a payback period of 3 years was much greater than had the upfront commitment been \$12,000 and the payback 8 years. The installation market responded accordingly and participation boomed.

SBS Policy Development

The former Government announced its intention to implement a feed-in tariff Scheme in November 2008. It had not considered the details of such a Scheme at that time. After the announcement, the Government then commissioned a Taskforce to advise on Scheme design options. The Terms of Reference took the policy decision as a given, and therefore it was not appropriate for the Taskforce to assess the merits of a feed-in tariff Scheme with a cost-benefit analysis.

The FIT Taskforce did not recommend a specific Scheme design, and was not responsible for developing an implementation plan. It did make recommendations for Scheme elements including duration, cost recovery, payment method, eligibility and Scheme review.

The Taskforce also recommended that the tariff type (gross or net), the tariff rate, and the duration of the Scheme be considered in unison with the above recommendations and provided ten FIT Scheme scenarios that incorporate combinations of various tariff rates, tariff types (gross or net) and scheme durations to enable a cost comparison to be undertaken as part of the Government's final decision on Scheme design.

Following the selection of one or a few possible scheme designs, a detailed financial analysis of those options would have been appropriate before policy decisions were finalised and announced. The SBS as implemented reflected the FIT Taskforce's recommendations regarding the elements of the SBS, as an industry led scheme.

The Auditor-General's Report recognises that key Government policy decisions made in November 2009 relating to tariff rate, tariff type, and duration, drew upon the "relevant scenarios" in the Taskforce Report. The then Premier's Media Release of 10th November 2009 highlighted the generosity of the 60 cent gross tariff, and included the statement that "*households can pay off their investment in solar panels in around eight years*", consistent with the Taskforce's calculation for a 60 cent gross scheme with an installation cost of over \$11,000. But given the passage of time since the completion of the Report and the Taskforce's warning that "a significant area of uncertainty in projecting financial impacts is the likely take-up rates", the

relevance of the financial scenarios in the Taskforce Report should have been tested before finalising policy decisions. In this regard the Taskforce's 60 cent gross 7 year scheme scenario was not a cost projection for the scheme announced in November 2009.

NSW Solar Bonus Scheme

The Government's Solar Bonus Scheme (the Scheme) was introduced by way of legislation in late 2009 and commenced on 1 January 2010.

The Scheme is legislated to run for seven years to December 2016, offering customers a gross feed-in tariff of 60 cents per kilowatt hour (kWh) for electricity that was generated by eligible roof-top solar photovoltaic (PV) systems and mini wind turbines connected to the electricity grid.

In June 2009, the Government announced (but did not legislate) and commenced preparation for a 60 cents net tariff scheme over 20 years. The relevant scenario from the 2009 NSW Solar Feed-In Tariff Report (Tariff Report) to Ministers indicated the total nominal cost of tariff payments over the life of this Scheme design would be \$1.6 billion (net present value \$857 million). Later, in November 2009, the Government announced its final decision to switch to a 60 cents gross tariff scheme over seven years. That Scheme design had a total nominal cost of \$449 million (net present value \$355 million) based on the relevant scenario from the Taskforce Report. These Scheme scenarios assumed a linear uptake rate of 15 MW a year. Thus, at the end of a 20 year scheme the total installed capacity would be 300 MW and 105 MW for a seven year scheme.

A chronology of events is included in Appendix 1 and a comparison of the NSW Scheme with those in other jurisdictions is at Appendix 2.

How the Scheme works

Under a gross tariff scheme, all electricity produced by the solar PV system is paid for at the feed-in tariff rate, regardless of the amount used by the household or business. Therefore, the household or business's own consumption is treated as a standard retail purchase of electricity, the same as any other consumer.

Under a net tariff scheme, only the electricity produced that exceeds the requirements of the household or business is paid for at the feed-in tariff rate. In other words, the household or business substitutes the electricity generated by their solar PV system for the retail electricity purchase they would otherwise have to make, and only when their generation is greater than their consumption do they export this excess and receive payment for it at the feed-in tariff rate.

Although the Scheme may encourage and support persons who want to generate renewable energy, there is very little incentive under a gross tariff scheme for consumers to reduce their electricity consumption. Under a net tariff scheme consumers benefit from energy they do not consume. A net feed-in tariff thereby fosters improved energy efficiency in the household as the less electricity used by the household, the greater the return in the form of a tariff payment/credit they will receive.

The Government intends that the DNSPs' tariff payments will be recovered from the NSW CCF. The electricity retailers are currently not asked to pay for the energy gained as a result of the Scheme.

Example

In the case of a 60 cents gross tariff, a household with a 1.5 kW system that generates 2,073 kWh (for example) per year would expect to receive a credit on their electricity bill or a cash payment for \$1,244 from their electricity retailer. If the household uses:

- only 2,500 kWh per year for which they may typically pay an amount which averages around 26.4 cents per kWh to their electricity retailer, they will pay \$660 and receive \$1,244, a net benefit of \$584
- 7,500 kWh per year for which they pay an amount which averages around 30.1 cents per kWh, they will pay \$2,257 and their net cost of electricity use will be \$1,013 which is 45 per cent less than the full cost they would ordinarily pay.

In both cases, the electricity retailer is reimbursed for the \$1,244 paid to the household for solar energy generated.

Key Findings

1. Number of Customers under the Scheme

As required by section 194(1)(a) of the Act, I am to review and report to parliament on the number of small retail customers that have installed and connected complying generators under the Scheme.

At 30 June 2011, the number of small retail customers installed and connected under the Scheme with one of three DNSPs was 132,061. The total amount credited to this group of small retail customers was \$142.1 million.

The table appearing below covers the 18 month period from the commencement of the Scheme to 30 June 2011 and comprises data collated from information provided by the three DNSPs. The data has been confirmed to records from customer and network systems maintained by the DNSPs. I note that there was no centralised process for households to apply to join the Scheme. Households only interaction was with installers whose contact with DNSPs was for the purpose of arranging for a system to be connected.

The table also includes data for both connected customers at 30 June 2011 and those still awaiting connection and eligible for connection at that time. The data are updated by DNSPs over the life of the Scheme and is available for use by Treasury regarding to future funding commitments of the Scheme.

Solar Bonus Scheme Statistics for the eighteen months to 30 June 2011	\$0.60 kWh	\$0.20kWh	Total
Existing connected customers			
Total number connected	118,531	13,530	132,061
Total MW capacity connected	272.4	28.5	300.9
Total kWh generated under the Scheme	224,101,796	2,827,533	226,929,329
Total amount of subsidy paid (\$ million)	141.2	0.9	142.1
Approved but waiting connection			
Total number awaiting connection	24,318	4,415	28,733
Total MW capacity still to be connected	50.6	20.1	70.7
Total connected and awaiting connection			
Total number of customers	142,849	17,945	160,794
Total MW capacity	323.0	48.6	371.6

Source: Table compiled from data provided by the three DNSPs during July and August 2011

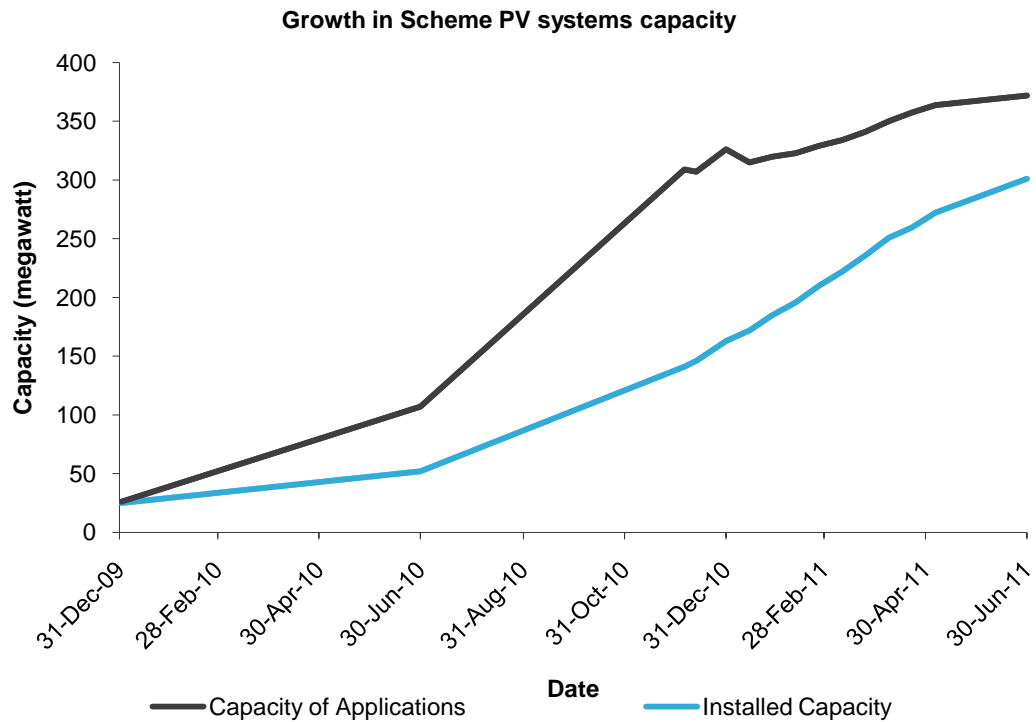
The data relating to outstanding connections at 30 June 2011 are subject to ongoing on-going validation by the three DNSPs and as a consequence may vary over time.

Since the Scheme commenced there was strong growth in the number and rate of installation of PV systems. By October 2010, it is understood that New South Wales had the largest amount of installed small scale PV systems of any jurisdiction in Australia.

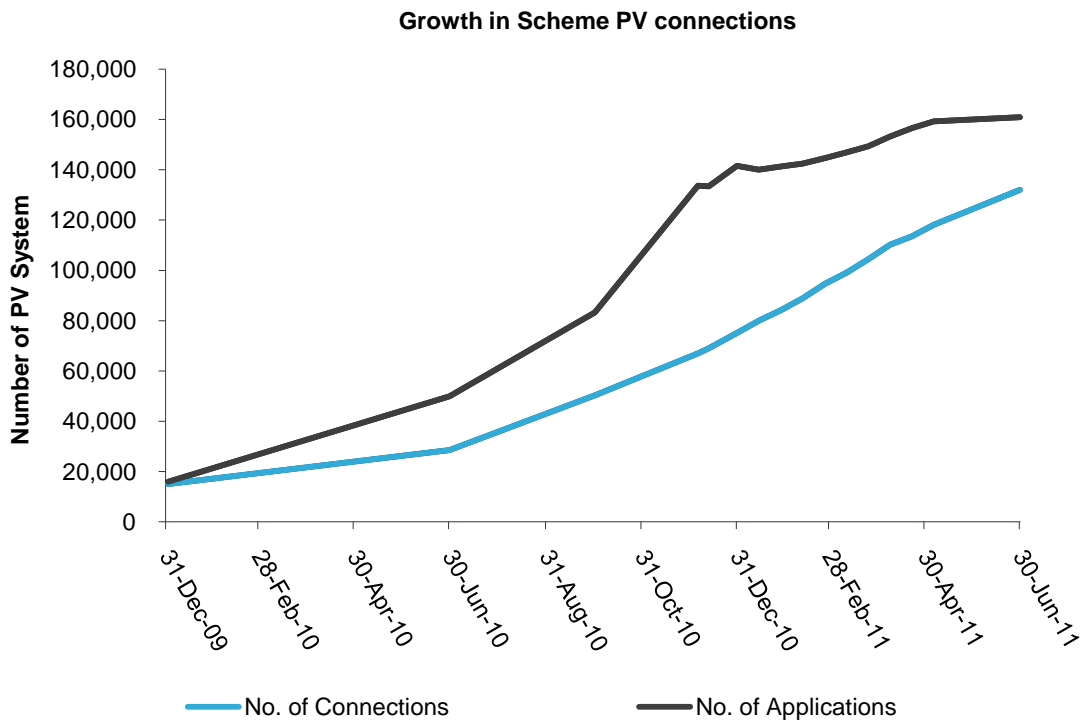
A reason for the high uptake and cost of the Scheme, as noted in the October 2010 NSW Solar Bonus Scheme Statutory Review Report, was global solar panel prices had more than halved since mid 2009. Another reason for the high take up rate was the upfront Commonwealth subsidy. The take up rate also increased around the time the Government introduced legislation reducing the tariff rate (from midnight on 27 October 2010) from 60 cents to 20 cents for new Scheme applicants.

On 29 April 2011, the Minister for Resources and Energy announced a two month hold on the Scheme to new applications. On 13 May 2011, the New South Wales Government announced no more applications would be received for the Scheme effective midnight on 28 April 2011. The Scheme was formally closed on 1 July 2011 with the publication of a gazette notice. Legislation allowed the Minister to close the Scheme once satisfied the total generating capacity of all complying generators installed and connected to the grid reached 300 MW.

Number of PV Systems in New South Wales, as at 30 June 2011:



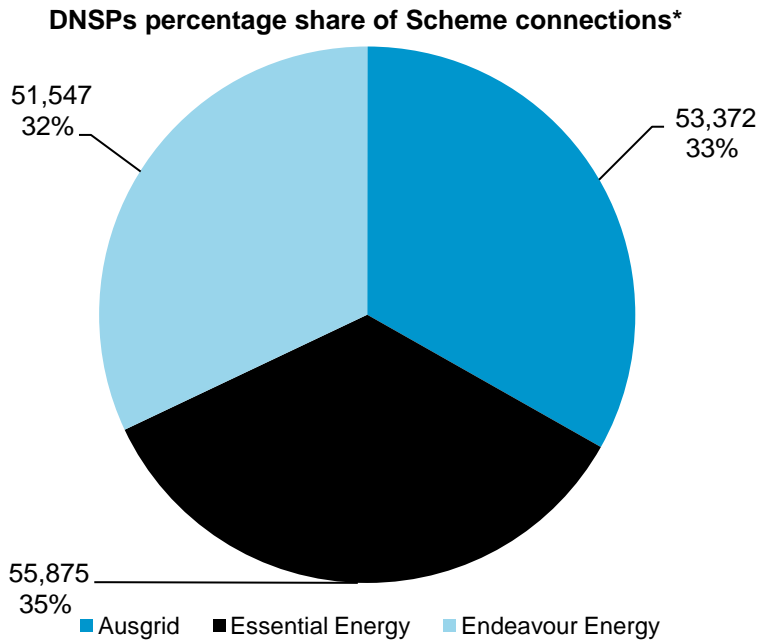
Capacity of PV Systems in New South Wales, as at 30 June 2011:



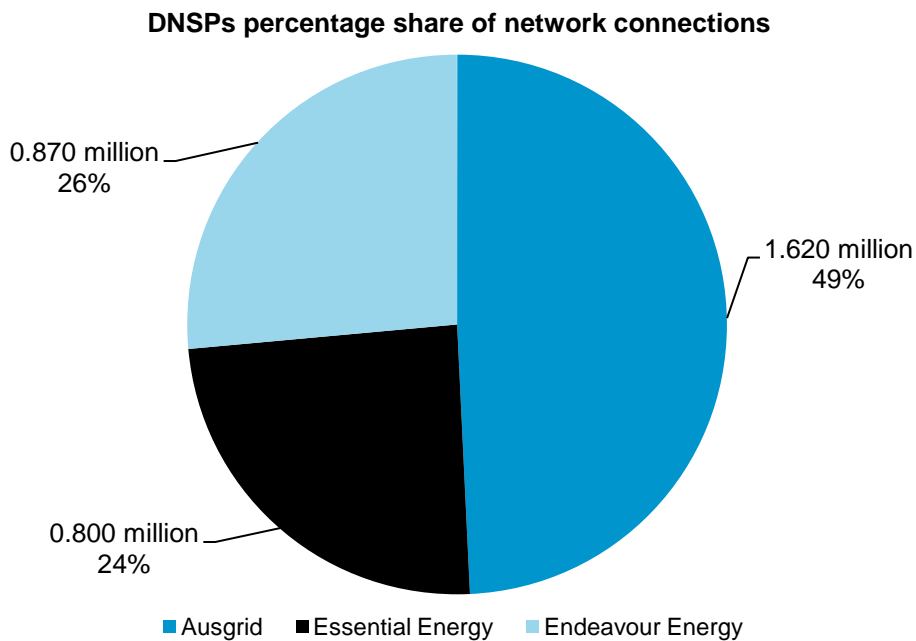
Sources: DTIRIS, May 2011 and DNSPs, 30 June 2011

At 30 June 2011, Essential Energy had approximately 34.7 per cent of the Scheme connections compared to its approximately 24 per cent share of all network customers.

The graph below details market share of the three DNSPs at 30 June 2011.



* Connections and pending connections



Recommendation

I recommend the DNSPs ascertain whether applicants who have not been connected to the Scheme still intend to join and/or need assistance with the process. A clear understanding of intentions will assist DNSPs to anticipate future resource needs and improve/maintain good service delivery by the Government.

2. Costs of the Scheme

As required by section 194(1)(b) of the Act, I am to review and report to parliament the costs of the Scheme including the total amount credited to small retail customers under the Scheme.

2.1 Scheme costs incurred to 30 June 2011

Tariff Costs

The total amount credited to small retail customers was \$142.1 million.

The total tariffs paid to customers over the 18 month life of the Scheme to 30 June 2011 has been compiled from information provided by the three DNSPs during July 2011. The total amount paid as subsidies under the Scheme comprises cash payments, accrued amounts and estimates for unread meters. The unread meters amounts are estimates of the value of electricity generated under the Scheme, where customer meters have not been read at 30 June 2011. These customers will have their meters read progressively over the four months from 30 June 2011.

The DNSPs provide the Minister and Director-General figures on the number of customers who have installed and connected to the network; the total generating capacity; and the amount of electricity supplied by their systems, as required under the *Electricity Supply Act 1995*. In addition to this information, each DNSP also provides details of tariffs paid to date as well as estimates of the total amount of tariffs expected to be paid over the life of the Scheme.

Other Costs

While it was a licence condition of each DNSP to maintain and provide both prescribed and requested information to the Minister and Director-General, there was no requirement to collect information on other costs incurred by each DNSP and other Government agencies involved in the administration, policy direction and reporting obligations for the Scheme. These have not been considered when assessing total cost over the life of the Scheme.

While not significant when compared to the total subsidy cost of the Scheme, these other costs are still considerable and may be borne by all electricity customers and the community, either through increased network charges or reduced dividend payments made to Government and appropriations by Government.

18 months period to 30 June 2011	DNSP \$'000	Other Government \$'000	Total \$'000
Operating expenditure	14,888	1,650	16,538
Capitalised costs	10,276	--	10,276
Total operating and capital expenditure	25,164	1,650	26,814
Life of Scheme to 31 December 2016	DNSP \$'000	Other Government \$'000	Total \$'000
Operating expenditure	19,050	3,150	22,200
Capitalised costs	10,407	--	10,407
Total operating and capital expenditure	29,457	3,150	32,607

Notes: The table comprises a collection of both actual costs incurred and costs calculated from management estimates. The significant costs for DNSP#3 were subject to independent external review as part of an AER pass through application.

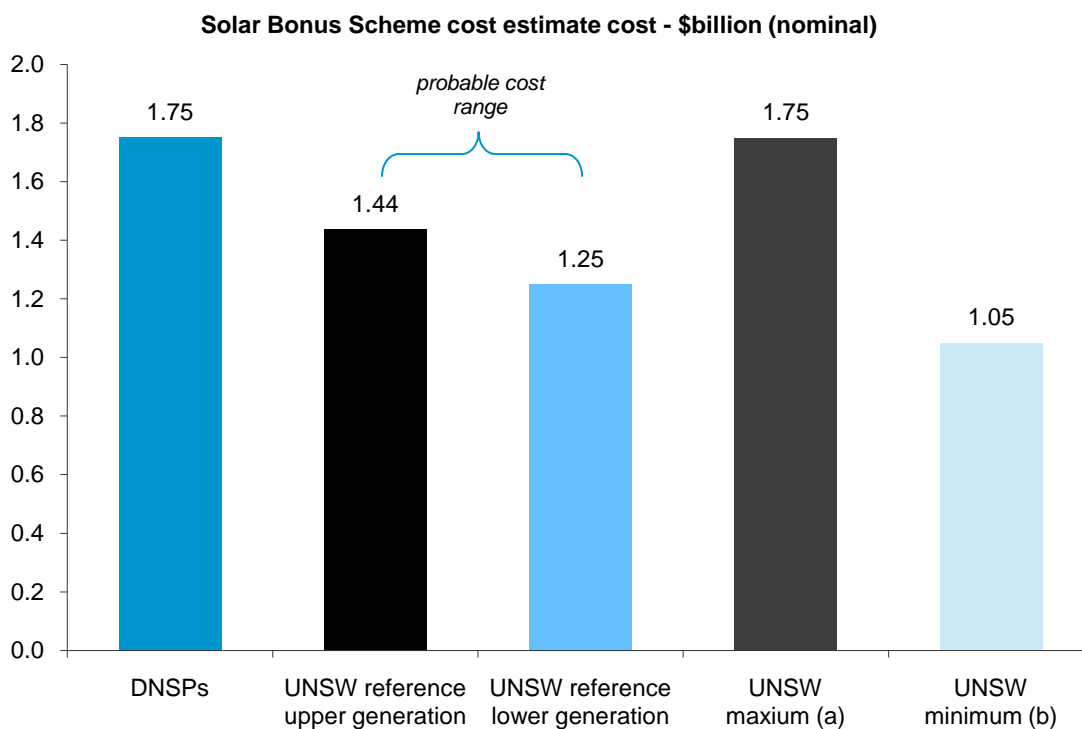
Operating expenditure will be reported annually by each agency through their profit and loss statements, while capital cost are depreciated over the life of each asset added to the agencies' balance sheets.

2.2 Current projected Scheme costs

2.2.1 Projected costs

I engaged UNSW to provide an estimate of the projected costs for the Scheme. The following summarises UNSW's possible and probable ranges of Scheme costs expected over the life of the Scheme to December 2016. UNSW has provided a possible range of the Scheme costs between \$1.05 billion and \$1.75 billion. The current Scheme cost estimate of \$1.75 billion is compiled from estimates supplied by the three DNSPs. It is at the top of this range and is higher than the UNSW reference scenario value of \$1.44 billion. Differences between the UNSW and DNSPs' estimates are discussed below.

The UNSW Consultants have developed a 'reference scenario' that incorporates their best central estimates of key uncertainties. They term this a scenario because there are currently significant uncertainties that mean this estimate of Scheme tariff payments will almost certainly prove wrong. However, the upper generation scenario does provide a basis for comparison with each DNSP's data provided to Treasury for the 2011-12 NSW State Budget.



- a Scheme cost that is unlikely to be exceeded
- b Scheme cost that is unlikely to be lowered

	Cost Estimate (nominal) \$ billion	Comments
DNSPs	1.75	Estimate at June 2011. UNSW assume that DNSPs will continue to update these models and this estimate may change.
UNSW reference upper generation ('reference' scenario)	1.44	The most appropriate basis for comparison with alternative modelled outcomes. The reference scenario uses PV system generation estimates that allow for some loss due to suboptimal orientation and shading. It differs from some of the alternative models used for Government in the assumed PV system performance, allowance for net metering, different system sizes, inclusion of some participant churn from 60 cents to 20 cents and some PV system performance degradation over the life of the scheme.
UNSW reference lower generation ('reference – low generation' scenario)	1.25	There are significant concerns about actual average performance of systems installed under the Scheme but little firm data to make a formal assessment. This estimate is based on average PV performance of 1,175 kWh/kW/yr, which is a 15 per cent reduction compared with typical 'good' PV systems (correctly oriented, tilted and largely unshaded). This performance uncertainty can be significantly reduced once installed PV systems under the Scheme have settled and sufficient systems have provided a year or more of metered data.
UNSW maximum ('upper bound' scenario)	1.75	It is unlikely that the Scheme tariff costs will exceed this unless there has been some significant misreporting of PV system sizes, or NSW experiences highly clear weather.
UNSW minimum ('lower bound' scenario)	1.05	It is unlikely that Scheme costs will be less than this unless average PV system performance is significantly worse than currently appreciated, or NSW experiences highly cloudy weather.

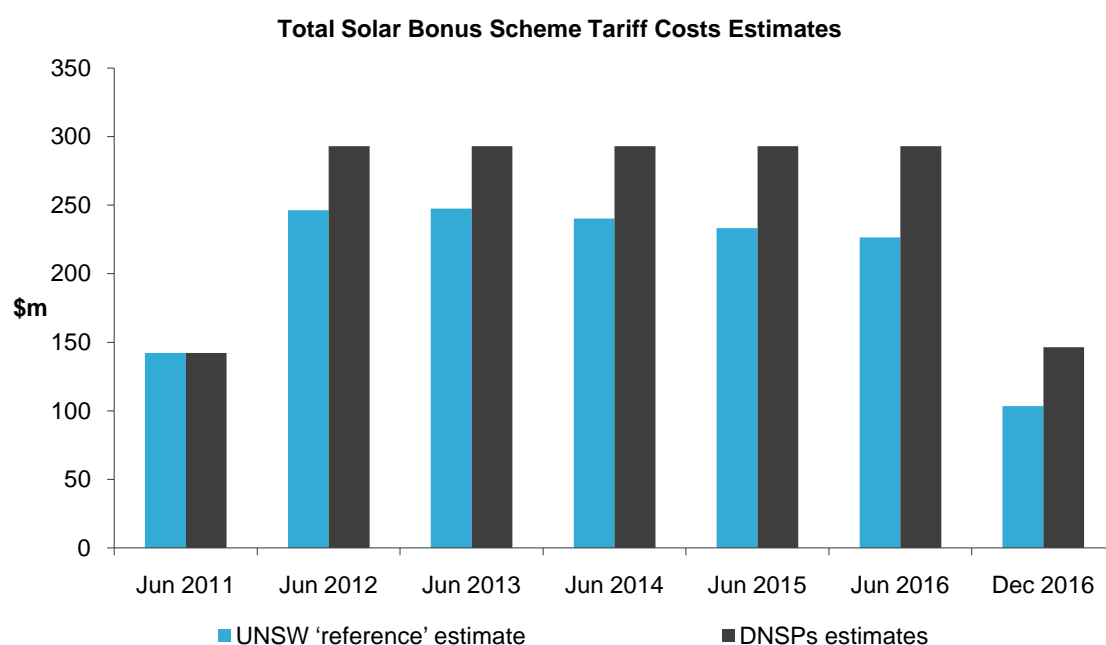
Differences between the UNSW and DNSPs' modelling

The main reasons for the differences between the UNSW and DNSPs' modelled figures are attributable to the following significant items:

- DNSPs' assumed high level of annual generation. This has increased the cost estimate by \$152 million
- DNSPs' use of constant cost data throughout the life of the Scheme added a further \$56.8 million
- one DNSP's assumption that all connections are gross metered adds another \$45.9 million.

Together these items total \$255 million and represent approximately 82 per cent of the variance between the UNSW reference scenario and the DNSPs' cost estimate reported above. These confirm why differences occur and therefore confirm that UNSW has a model that can be relied upon to produce a range within which the projected Scheme tariff payments will be, namely \$1.05 billion to \$1.75 billion.

Year	Total all DNSPs		DNSP#1		DNSP#2		DNSP#3	
	UNSW reference (\$m)	DNSPs (\$m)	UNSW reference (\$m)	DNSP#1 (\$m)	UNSW reference (\$m)	DNSP#2 (\$m)	UNSW reference (\$m)	DNSP#3 (\$m)
Jun 2011	142.1	142.1	57.6	57.6	46.8	46.8	37.7	37.7
Jun 2012	246.2	292.9	99.4	130.6	74.3	78.0	72.5	84.3
Jun 2013	247.5	292.9	100.1	130.6	72.4	78.0	75.0	84.3
Jun 2014	240.2	292.9	97.2	130.6	70.1	78.0	72.9	84.3
Jun 2015	233.2	292.9	94.4	130.6	68.0	78.0	70.8	84.3
Jun 2016	226.5	292.9	91.6	130.6	66.0	78.0	68.9	84.3
Dec 2016	103.5	146.5	41.9	65.3	30.1	39.0	31.5	42.2
Scheme total	1,439.2	1753.1	582.2	775.9	427.7	475.8	429.3	501.4
Differences		313.9		193.7		48.1		72.1



2.2.2 Uncertainty within projections

There are a range of uncertainties associated with the Scheme that may have significant implications for the projected and actual cost of the Scheme over each year to the end of the calendar year 2016. Most of the uncertainty is reducing with the closure of the Scheme and the settling out of eligible PV capacity. Other uncertainties might also be reduced with some analysis. I detail some of the key uncertainties, their potential impact on current estimates of the Scheme tariff payments and possibilities to reduce uncertainty as follows:

- climate variation in solar insolation
- real world performance of PV systems
- participant churn
- approval queue
- participant transition to gross feed-in tariff (FiT)
- participant transition to net FiT
- registration/data/metering errors
- PV system degradation
- percentage of generation exported.

Uncertainty	Potential impacts on current Scheme estimates	Options to reduce uncertainty
Highly Significant Variables		
Panel Performance - Difference in average generation per kW	<p>Typical estimates of PV performance are for well installed systems with reasonable orientation, tilts and no shading. There are no available estimates for overall NSW residential PV systems that the UNSW consultants are aware of at present. Some limited assessment on Sydney PV systems in DNSP#2 and DNSP#3 regions suggests average performance may be significantly less than for 'good' systems. UNSW consultants suspect that average performance may be up to 20 per cent less than for the 'good' systems used in modelling, including our reference scenario. This would reduce Scheme costs by some 18 per cent against current estimates. There is also some limited possibility that systems might perform better than this typical 'good' system (for example, from improved efficiency of inverters over the last few years).</p>	<p>As systems are connected and a year of metered performance data is collected, actual tariff payments made by DNSPs could provide useful guidance on actual average PV performance. This could also be 'tuned' with respect to actual solar insolation for that year to provide better estimates looking forward.</p>
Weather - Variation in solar insolation	<p>Research suggests an approximate 20 per cent annual range of solar insolation in Australia (Troccoli and Davy, 2010). UNSW Consultancy modelling using SAM for PV system generation over 1998-2010, similarly, found a +/- 10 per cent range around approximately 400 kWh/kW/year. Uncertainty hence with respect to both increased and decreased the Scheme tariff payments of perhaps +/-10 per cent for each year of the scheme. Likely less an issue over full the Scheme life unless annual variability has significant longer (multi-year) patterns.</p>	<p>Long-term climatic forecasting may be able to assist (El Nino and La Nina patterns may be relevant).</p>
Less Significant Variables		
Churn from 60 cents net to 60 cents gross	<p>The 60 cents gross tariff is far more financially attractive than a net 60 cents tariff for all scheme participants with significant loads (that reduce exports under a net tariff). Nevertheless, as of June 2011, three to four per cent of 60 cents systems are still on net metering. It is unclear how many and at what rate these might transition to gross tariff, or the impact of this (those on net may have virtually no load at that metering point hence little change in the Scheme tariff payments received). Based on DNSP#1's advice, I have assumed 10 per cent per year. Current models generally assume that all eligible generation is, or will transition to, gross so the impact would be to reduce Scheme costs.</p>	<p>Actual data will become available as the Scheme progresses.</p>
Churn from 60 cents to 20 cents	<p>PV systems on houses that are sold over the period of the Scheme transition from 60 cents to 20 cents tariff. Typical estimates of three to five per cent annual household churn suggest impact might be significant, although the Scheme participants may not represent typical households because they made a long-term investment decision installing PV. Note that churn rates of two to five per cent/year might see some nine to 21 per cent of scheme participants transition to 20 cents by 2016 reducing scheme costs in that final year by some seven to 15 per cent.</p>	<p>Actual data will become available as the Scheme progresses.</p>
Percentage of generation exported	<p>The per cent of generation exported will vary between households and is influenced by both system size and the nature of the load profile. This is only relevant to net tariffs.</p>	<p>Actual data will become available as the Scheme progresses.</p>

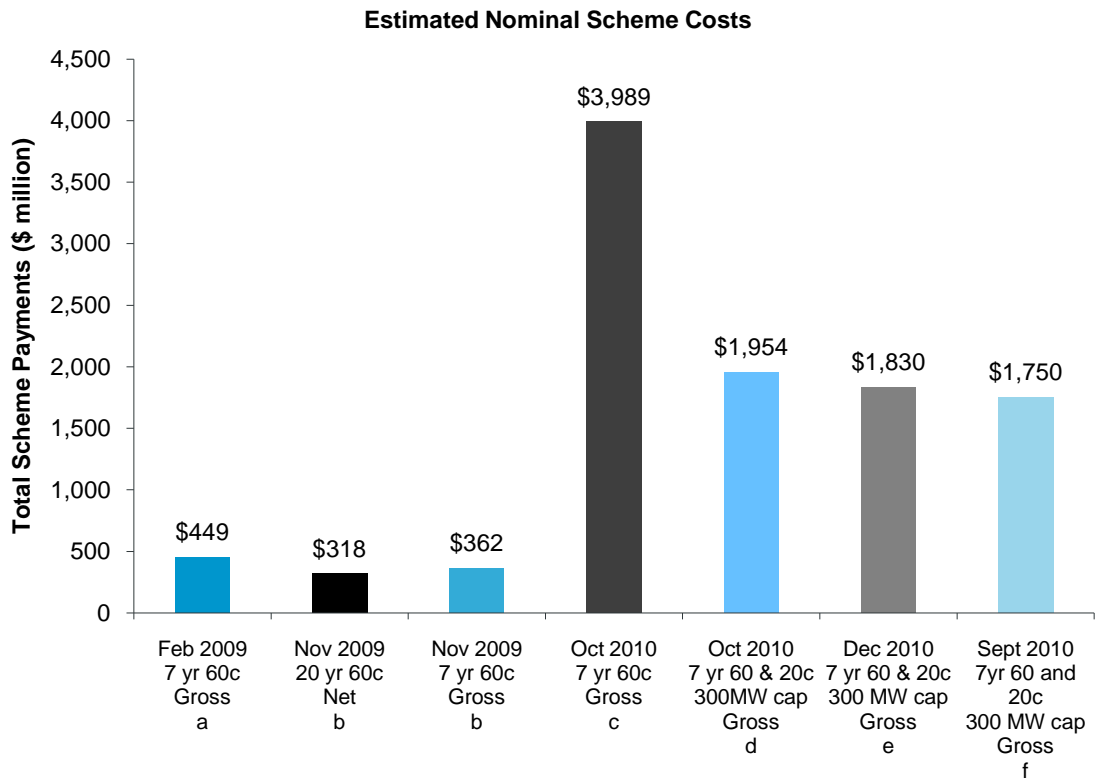
Sensitivity analysis applying UNSW Consultant's judgments of reasonable high/low variations to key uncertainties has highlighted which of these uncertainties are likely to be the most significant for estimates of overall system costs.

Uncertainty	UNSW Consultants reference scenario	Sensitivity range assessed (+%/-%)	Impact on 'reference' scenario costs (\$)
Panel Performance - Difference in average generation per kW	0% (assumed average NSW PV performs at level of a 'good system')	+ 5/–20% around 1382 kWh/kW/year	+ \$65m to–\$259m
Weather - Variation in solar insolation	0% (typical year)	+/-5% around 'Typical Mean Year' values (note that modeling for overall scheme tariff payments representing six years – year to year variability of +/-10% previously noted likely to overestimate variability over six years)	+/- \$65m
Churn from 60 cents net to 60 cents gross	10%/per year	0% to 75% of those on 60 cents net transition to 60 cents gross each year	+\$94.4 to–\$42.9m
Churn from 60 cents to 20 cents	5%	1% to 7%/year	–\$10.5m to+\$28.5m
Percentage of generation exported	50%	10% to 60% of PV generation exported and hence eligible for net Feed-in tariff.	–\$36.8m to+\$9.2m
Annual churn from 20 cents net to 20 cents gross	0%/per year	0% to 25% of current net 20 cents tariff participants transition to gross 20 cents tariff each year	\$0m to +\$5.9m
PV system degradation	0.8%/per year	0% to 1.6% per year (reflecting PV panel degradation but also potential other reasons for system performance to degrade such as dirty panels, growth of trees that shade system)	+/- \$0.9m
Annual churn from 20 cents gross to 20 cents net	0%/per year	0% to 25% of current gross 20 cents tariff participants transition to net 20 cents tariff each year	\$0m to –\$22.6m
Approval queue conversion to connections	100%	UNSW Consultant model assumes that all currently approved but unconnected systems are connected by November 2011	

2.3 History of projected Scheme costs

The following graph summarises different cost estimates for the total nominal tariff payments from when the Scheme was established and noting the changes in Scheme features.

The forecast assumptions and variables used for each cost projection differ, but demonstrate the significant fluctuation in cost projections for the Scheme within the period of two years.



- a NSW Government, NSW Feed-in Tariff Taskforce Report to Ministers, February 2009. (being Taskforce scenarios, not forecasts)
<http://www.industry.nsw.gov.au/energy/sustainable/renewable/solar/solar-scheme/established>
- b External consultant, NSW Solar Bonus Scheme Advice Forecast Scheme Capacity and Costs, prepared for Industry and Investment NSW, 5 November 2009 (not publicly available)
- c Industry and Investment NSW, NSW Solar Bonus Scheme Statutory Review Report to the Minister for Energy, October 2010. The cost estimate of \$3.989 billion was provided by an external consultant.
http://www.industry.nsw.gov.au/data/assets/pdf_file/0015/360141/Solar-Bonus-Scheme-Review-Report.pdf
- d External consultant, Solar Bonus Scheme, Forecast NSW PV Capacity and Tariff Payments, prepared for Industry and Investment NSW, 25 October 2010
http://www.industry.nsw.gov.au/data/assets/pdf_file/0016/360142/AECOM-REPORT-for-Solar-Bonus-Scheme-Review.pdf
- e Industry and Investment NSW, NSW Electricity Network and Prices Inquiry, Final Report, December 2010
http://www.dpc.nsw.gov.au/data/assets/pdf_file/0005/118904/NSW_Electricity_Network_and_Prices_Inquiry_Report.pdf
- f DNSPs' cost estimates underpinning the 2011–12 NSW State Budget

None of the capital and working capital costs associated with the Scheme (for example meters, administration and other implementation costs) have been included in the total tariff cost of the Scheme outlined above.

2.3.1 Review of models underpinning the different projected costs of the Scheme

UNSW reviewed the models that were used to forecast the different projected costs of the Scheme over its life. Overall, I consider these models to be satisfactory. Comments on the individual models follow (Refer Appendix 5 (a) for complete table and Appendices 5 (b) to (d) for comment on each DNSP's model):

Report	Model	UNSW Consultant comments
a NSW Feed-in taskforce (2009)	Estimated the Scheme costs for different tariff settings given two assumed scenarios of deployment as part of scheme design.	A particularly challenging modelling task at the early stages of Scheme design. PV deployment not modelled as such, instead assumed. PV generation appears to have been estimated in house.
b AECOM Advice (2009)	Estimated future deployment and the Scheme costs for two tariff options as part of Scheme design.	Review of this modelling limited and based on discussions with stakeholders that were intended to better understand the AECOM (2010) modelling. PV uptake model was an earlier version of AECOM (2010) model and incorporated 2009 PV system price estimates. PV performance model apparently the same as AECOM (2010), as was eligible generation estimate.
c & d AECOM (2010)	Estimated future deployment and the Scheme costs given early experience with scheme and 50 MW review trigger. Scenarios of possible tariff changes investigated. Estimated Scheme costs of \$2.7 billion (60 cents gross, seven years).	PV deployment model based on modified NPV function using statistical tariff from historical Australian PV uptake. Incorporated much lower installed PV system costs than earlier models given 2010 data. PV performance model provided by AECOM in-house research group.
e & f DNSP#1 (ongoing)	Two separate budget impacts models: one used for input to Parry Duffy and one used for ongoing reporting to DTIRIS.	In-house budgeting models based on system application and connection data. PV performance based on DNSP#1's consultant advice. Ongoing model development and tuning given the Scheme closure and system application and connection data.
e & f DNSP#2 (ongoing)	Three separate budget impacts models: one used for input to Parry Duffy, one used for ongoing reporting to DTIRIS and one provided as including the latest data.	In-house budgeting models based on system application and connection data. PV generation based on Clean Energy Council data. Ongoing model development and tuning given the Scheme closure and system application and connection data
e & f DNSP#3 (ongoing)	A budget impacts model provided by Oakley Greenwood, that includes some scope for modelling deployment.	Model used for projecting deployment and internal budgeting and AER pass through request. PV generation based on ORER performance estimates. Ongoing model development and tuning given the Scheme closure and system installation and connection data.
f Combined DNSPs' (ongoing)	Estimated budget impacts spreadsheet consists of three main components. June 2011 spreadsheet suggests total the Scheme tariff costs of \$1.75 billion.	Component 1 sums ongoing DNSP reporting of estimated tariff costs. Component 2 summarises the Scheme applications and connections with respect to net and gross 60 cents and 20 cents Scheme participants. Component 3 presents various scenarios based on former Scheme options. Reviewed by DNSPs' consultant.

Recommendations

- The Government publish the total projected Scheme costs, within a range, based on a sensitivity analysis of variables, including impact of weather patterns on the extent of energy produced and paid for under the Scheme
- DTIRIS seeks medium term forecasting of El Nino and La Nina weather patterns and shares this information with DNSPs to assist them in forecasting Scheme costs
- DNSPs continue to update total projected Scheme costs with actual data collected
- DNSPs use a standard approach to estimating and reporting Scheme costs.

3. Other matters considered relevant

As required by section 194(1)(c) of the Act, I am to review and report to parliament any other matter I consider to be relevant.

This section looks at how the Scheme will be funded, and key aspects of the establishment and administration of the Scheme. In particular, I examined whether:

- specific and measurable program objectives were set
- costs and benefits associated with achieving the objectives were assessed and reported in the proposals put forward for decision making
- relevant risks to the achievement of each program objective were identified, assessed and addressed
- there was an achievable implementation program
- there were control mechanisms to identify and react to the take-up of the scheme and other changes that could affect the achievement of program objectives
- relevant and timely information was provided to Government decision-makers, potential applicants and other stakeholders to take informed action at each stage in the development and operation of the scheme
- there was an effective audit process to provide program assurance.

I did not seek to:

- question the merits of Government policy objectives
- duplicate any reviews already being conducted in relation to this topic.

My findings are based on discussions and documentation from the NSW Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) (formerly the Department of Industry and Investment NSW), the Office of Environment and Heritage (OEH)(formerly the Department of Environment, Climate Change and Water), and Treasury. The then Industry and Investment NSW chaired the NSW Solar PV Feed-in Tariff taskforce that originally designed the Scheme, and continued to administer its implementation in conjunction with the network businesses. I found that the roles and responsibilities of other agencies were less clearly defined.

To guide my work, I have referred to principles of better practice including the NSW Government's:

- Guide to Better Regulation, 2009
- Gateway Review System
- Internal Audit and Risk Management Policy for the NSW Public Sector, 2009.

Whilst my report necessarily focuses on the actions of Government agencies, it is important to recognise that the final decision making in relation to the Solar Bonus Scheme rested with the New South Wales Government and the New South Wales Parliament.

3.1 How the Scheme will be funded

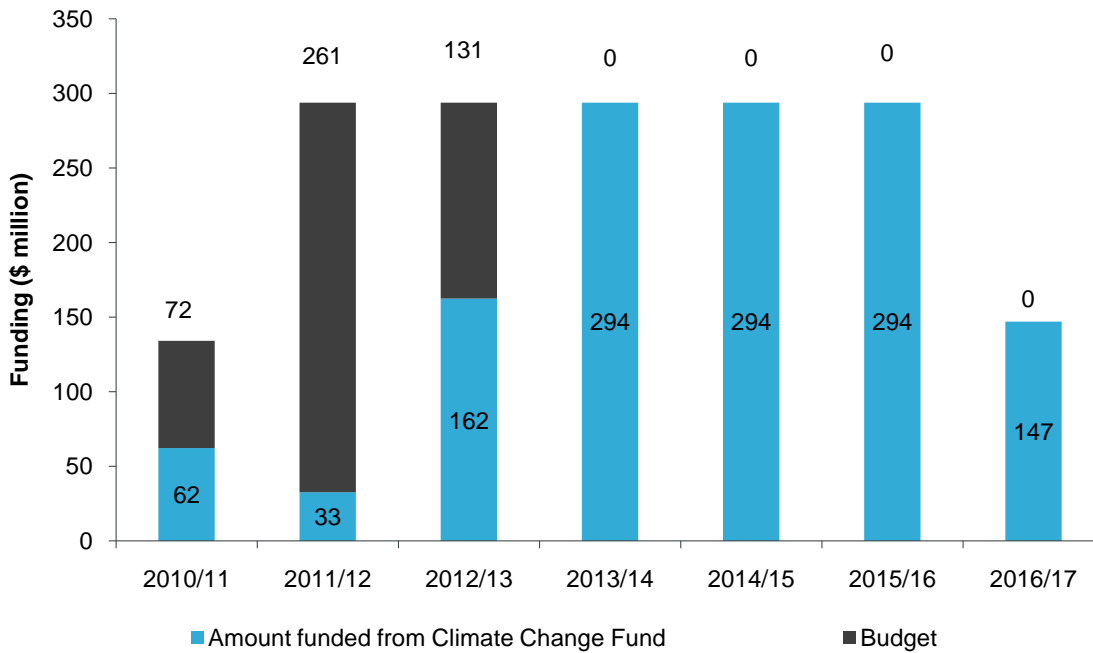
While the DNSPs have been making tariff payments for Scheme participants since 1 January 2010, they have not been reimbursed from the NSW CCF.

Electricity customers are likely to bear the costs of the Scheme via the NSW CCF levy through higher electricity prices.

Sufficient funding to meet the costs of the Scheme will not be available through the NSW CCF at the time reimbursements are due to the DNSPs. The Treasury has advised that the difference is expected to be covered, in the interim, through the Government's Consolidated Fund as interest free repayable advances to the NSW CCF from the Crown. This will have a short term impact on the Budget. The NSW CCF will then reimburse the Crown over a period of time when positive cashflows are available. The actual time period is not certain due to the relationship between future contributions into the NSW CCF and the actual cost of tariff payments in the future.

The costs of the NSW CCF are ultimately funded by contributions from electricity and water utilities and recovered by these agencies through network tariffs which apply to all customers. In 2010-11, the DNSPs are required to contribute a total of \$150 million to the NSW CCF. The 2011-12 NSW State Budget detailed the NSW CCF will require DNSPs to contribute \$250 million in 2012-13 and \$400 million per annum from 2013-14 to 2016-17. The Parry Duffy report states that this would be equivalent to about a one per cent increase in regulated retail tariffs for electricity customers.

Likely funding sources for the cost of total tariff payments



Sources: NSW Treasury April and June 2011; Combined estimates distribution businesses July 2011

Details of the operations of the NSW CCF will be reviewed in volume six of my 2011 Report to Parliament.

3.2 Were specific and measurable program objectives set?

I found that the Scheme had three broadly stated objectives, with no specific targets against which progress could be measured. These objectives do not include reducing emissions or obtaining value for money.

The design taskforce was guided by three New South Wales Government policy objectives for renewable energy. These were later incorporated in the legislation that introduced the Scheme as follows:

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

Source: NSW Electricity Supply Act 1995 – s.15A

While the number of jobs in the renewable energy sector could be estimated, the Scheme was set no specific targets against which progress could be measured. Nor could levels of encouragement and increased public exposure be measured.

The New South Wales Government's Guide to Better Regulation, 2009 states that the objectives of a regulatory proposal should:

- be clear, concise and specific
- directly target the root cause of the problem
- where possible, be measurable (e.g. by specifying an outcome and a time period over which the objective is to be achieved)
- be consistent with existing Government objectives or policies.

The Scheme was not a regulation, but the principles are pertinent. It had no specific targets against which progress could be measured.

There is a range of alternative measures available to address the policy objectives of renewable energy, and the Scheme should have been assessed on its merits as one such measure.

No objectives were set for:

- reducing emissions (as required by the NSW State Plan)
- reducing electricity consumption (as required by the NSW State Plan)
- minimising costs to Government or the consumer
- obtaining value for money.

Further to this:

- the Scheme was designed when the Commonwealth Government's Carbon Pollution Reduction Scheme (CPRS) was well advanced and expected to commence on 1 July 2011 and the taskforce was required to prepare its report taking into consideration COAG's Complementarity Principles for Climate Change Mitigation Measures (principles designed to ensure jurisdictions' mitigation measures complemented the CPRS). In this context, the taskforce in its February 2009 Report to Ministers found that the Feed-in Tariff scheme would not result in a net reduction in greenhouse gas emissions once the CPRS was introduced
- the Scheme was designed to encourage generation of renewable electricity, rather than cut consumption of electricity
- the taskforce considered that the Scheme would in fact increase costs to the consumer.

3.3 Were costs and benefits assessed?

I was concerned to establish if costs and benefits associated with achieving the objectives were assessed and reported in the proposals put forward for decision making.

There was some costing of scenarios and some assessment of benefits but, overall I found that no cost-benefit analysis was undertaken before the Government's decision in 2008 to introduce a scheme. Likewise, no cost-benefit analysis was undertaken when changes were made to the Scheme in 2009, or when changes were made to funding arrangements early in 2011.

The New South Wales Government's Guide to Better Regulation, 2009 states that the impact of Government action should be properly understood by considering the costs and benefits of a range of options, including non-regulatory options.

The Government announcement that it would establish a feed-in tariff for New South Wales was made without seeking preparation of a business case. While a taskforce was established by the Government to consider options for the design of the Scheme, there was no requirement to consider the merits of establishing a Scheme at all. It is not evident that there was an adequate examination of the options, costs, time frames and risks associated with the Scheme.

Major Government infrastructure projects are required to go through an independent Gateway Review process which requires, amongst other things, economic and financial appraisals and risk management plans. For infrastructure projects undergoing a Gateway Review, these documents would be prepared by the policy agency and would have been submitted to Treasury for assessment as part of the Budget Committee approval process. However, as the Solar Bonus Scheme was not an infrastructure project, this was not a requirement.

In the context of its announcement that a feed-in tariff would be established, the Government sought no additional economic appraisal or cost-benefit analysis. Had an equivalent process to Gateway Review existed for major recurrent programs and assuming such a process was complied with, the requirements would have been more stringent. With the advantage of hindsight it is unfortunate that this level of scrutiny did not occur, considering the size and impact of the Scheme.

In 2008, the Council of Australian Governments (COAG) had agreed to a set of national principles for feed-in tariff schemes. This included a requirement to undertake analysis to establish the benefits and costs of any subsidy against the objectives of that subsidy. The difficulty in assessing the performance of the Scheme more closely was that, as discussed earlier, there were three broadly stated objectives set for the Scheme but no specific targets against which progress could be measured. No cost-benefit analysis was undertaken before the Government's decision on 18 November 2008 to introduce a feed-in tariff. With the decision to have a feed-in tariff taking place without a cost-benefit analysis, there was no assessment of whether the installation of small solar panels on the rooftops of houses was an efficient or effective way for New South Wales to ensure an adequate and reliable energy supply; whether it would reduce reliance on coal fired generation and also meet its climate change objectives in a cost effective way. The taskforce did consider common reasons for implementing feed-in tariff Schemes, including greenhouse abatement and 'green job' support and, in their report to Government, noted the inefficiency of this mechanism to support either of these goals in the New South Wales context.

No cost-benefit analysis was undertaken when changes were made to the scheme on 9 November 2009, or when changes were made to funding arrangements on 1 February 2011. For example, the NSW CCF provides for a range of different programs. The programs are focused on reducing greenhouse gas emissions and the impact of climate change. Examples include the Home Power Savings Program, Fridge BuyBack Program, a home insulation program, and an Energy Efficiency for Small Business Program. Treasury advised that, while the programs were due to wind down, the decision to use them to meet the costs of the Scheme, rather than passing them directly through to electricity consumers, may prevent or delay the establishment of equivalent new programs.

No business case to consider merits of Scheme

No cost-benefit analysis

No market research

The New South Wales Government's Guide to Better Regulation, 2009 states that Government action is commonly justified on the basis of responding to market failures or imbalances. It is important to determine whether there is a need for Government to be involved, or whether the problem will be solved through market forces or by existing regulations at the State or Commonwealth level.

I found that no market research was undertaken (including about non-tariff options) to investigate customer motivations in generating renewable energy. The taskforce sought submissions on the design of the tariff scheme and held a stakeholder forum.

The tariff was in addition to generous incentives provided by the Commonwealth's Mandatory Renewable Energy Target scheme, which also supported the installation of small scale solar panel systems through the Solar Credits Scheme. The taskforce report acknowledged the incentives that were in place through Commonwealth programs, and included consideration of these in their scenarios costings. The taskforce also considered the national feed-in tariff principles agreed by all levels of Government at COAG. But I found no evidence of State Government agencies liaising closely with Australian Government agencies on the design of the Scheme.

As there was no clear assessment of the market need and the possible options and the costs and benefits of addressing it, it is more difficult to assess how much of the Scheme's unexpectedly high take-up can be attributed to the financial support being offered. The NSW Solar Bonus Scheme Statutory Review identified that the major reason for the rapid take-up under the Scheme was that customers were receiving high returns due to a rapid decline in the costs of purchasing solar PV generators since 2009. The Scheme may have been seen as a business opportunity by many small investors, rather than just a means of tackling climate change.

Costs were examined under differing scenarios, and there was some assessment of the benefits of the Scheme in terms of the NSW Government's policy objectives for renewable energy.

Financial Assessments

Three major assessments were undertaken, as outlined below:

- The first assessment was in February 2009, when the NSW Solar PV Feed-in Tariff taskforce of representatives from DTIRIS, OEH, Treasury and the Department of Premier and Cabinet presented a financial analysis of ten scenarios based on alternative scheme designs including net and gross tariff rates over seven year and 20 year periods. Given limited time in which to report it assumed simple linear take-up rates, noting that this represented a significant area of uncertainty. On 22 June 2009, on the basis of the different scenarios presented in the taskforce report, the Government decided on a 60 cents/kWh net tariff over 20 years. The taskforce had presented a scenario which could attract up to 202,900 participants and cost up to \$856 million (calculated using net present value at a five per cent discount rate). On 9 November 2009, again relying on the scenarios in the taskforce report, the Government switched to a 60 cents/kWh gross tariff over seven years. The taskforce report had included a scenario in which the Scheme could attract up to 72,900 participants and cost up to \$354 million (calculated using net present value at a five per cent discount rate).

Initial estimate up to \$354m

Not all agencies were aware of a second report

- A second assessment was commissioned by DTIRIS from specialist consultants and presented to them on 5 November 2009, entitled NSW Solar Bonus Scheme Advice Forecast Scheme Capacity and Costs. The report indicated that, rather than the seven years gross scheme having a lower cost as in the previous assessment, the reverse would more likely be the case. The report forecast the likely cost of a 60 cents/kWh gross tariff over seven years to be \$289 million, while a 60 cents/kWh net tariff over 20 years was forecast to only cost \$155 million (both calculated using net present value at a seven per cent discount rate). This is because the report showed that under the net scheme scenario, take-up was likely to be at the lower end of the range considered by the taskforce, while under the gross scheme, take-up would be higher. The report also identified the likelihood that solar panel installation costs would fall and indicated that under a gross feed-in tariff scheme, a reduction in PV installation costs of 20 per cent would result in an increase in system installations of approximately 50 per cent by 2016 respectively. Total premium feed-in tariff costs would increase by a similar proportion (at a total cost of \$433 million). It is apparent that not all agencies were aware of this report at the time the Government made its decision to redesign the scheme from a net to a gross tariff.
- The third assessment was in October 2010 when the DTIRIS NSW Solar Bonus Scheme Statutory Review report reviewed the progress of the Scheme with the support of a second report from the specialist consultant. The figures were revised sharply upward. Installed capacity was forecast to grow to around 250 MW by June 2011 and to nearly 1,000 MW by the planned conclusion of the Solar Bonus Scheme in December 2016. Unless changes were made, the Scheme was forecast to cost \$2,701 million (calculated using net present value at a seven per cent discount rate).

These cost assessments were based on the tariffs paid. They did not include associated costs, such as network costs, customer costs, administration costs, avoided infrastructure costs, network electricity savings.

Benefit Assessments

The reviews endeavoured to broadly assess the benefits of the scheme, but with varying success. For example, in relation to the creation of new jobs:

- The 2009 NSW Feed-in Tariff Taskforce Report stated that the number of new jobs created by the Scheme would be dependent upon the rate of take-up. It noted that the Commonwealth's Carbon Pollution Reduction Scheme and the expanded Renewable Energy Target would also be providing incentives and support for the expanded take-up of solar PV. So any new jobs created would result from a combination of these three separate incentives. As a result, identifying the relative contribution of each of these policies to the number of jobs created was not possible. Furthermore, the taskforce identified that the subsidy cost per job created was likely to be very high, demonstrating to the Government that a feed-in tariff was unlikely to be an efficient mechanism for supporting industry development.
- The 2010 statutory review reported that benefits to the renewable energy industry and jobs growth were reported to be mixed. On the one hand, there was strong growth in installation jobs. On the other hand, some large generation companies, including those with renewable energy portfolios, had raised concerns. They considered that the amount of new generation when combined with the Commonwealth's renewable energy multiplier for small generation had delayed investment in large-scale renewable projects.

3.4 Were relevant risks identified, assessed and addressed?

I was concerned to establish whether relevant risks to the achievement of each program objective were identified, assessed and addressed.

I found that little was done early enough to identify and reduce relevant risks. I found no contingency planning, analysis and assessment of options and exit strategies to address potential high risk situations. A risk management plan was not finalised until 30 September 2010, ten months after the Scheme had commenced.

Little was done, early enough, to identify and reduce risks

Significant external factors contributed to a faster than anticipated take-up of the scheme. These included a rapid decline in PV system prices since 2009, the strong Australian dollar, and the compounding effect of Commonwealth Government schemes.

Early cost assessments had identified considerable uncertainty in relation to take-up rates, quoting a wide range of possibilities. The specialist consultants' report prepared for DTIRIS NSW Solar Bonus Scheme Advice Forecast Scheme Capacity and Costs 2009 indicated that PV costs were expected to continue to decrease. PV cost reductions in excess of 50 per cent from 2007 levels had been predicted by individuals within the electricity industry and that within three to seven years, solar energy's unsubsidised cost to end users could approach the cost of conventional electricity in a number of markets.

DTIRIS discussed risks arising from the high take-up with the Government. A Scheme risk management workshop was held on 1 July 2010, and the Scheme was included on the Industry and Investment NSW Risk Register on 17 August 2010. A risk management plan was developed and risks advised to the Government, but not until 30 September 2010. It identified a range of risks including the high rate of take-up, limited controls and accountability, customers' lack of understanding, industry capacity and safety. It pointed to the need for the statutory review.

Had more stringent policy development protocols, such as those applied to infrastructure projects, been in place and been complied with, a risk management plan would have been required and submitted to Treasury for assessment as part of the Budget Committee of Cabinet approval process. For infrastructure projects, such plans are required to contain schedules that identify and allocate the risks associated with a particular project and detail how each risk is to be managed.

3.5 Was there an achievable implementation program?

I found no overall implementation program, including no clear definition of project roles and responsibilities of those involved in implementing and delivering the Scheme.

Interest in the Scheme was much greater than expected. DTIRIS had to respond to policy decisions at short notice, and I have been advised that a restructure and staffing levels limited its ability to respond quickly.

The Scheme was announced on 23 November 2008 and the taskforce was asked to produce a report in January 2009 with recommendations on how best to implement a NSW feed-in tariff scheme. It was anticipated that the new feed-in tariff would be introduced in mid 2009. The Government did not announce the parameters for the Scheme until late June 2009.

By September 2009, DTIRIS had developed a Draft Implementation Framework. It described the elements of the Scheme, but did not address the likely activity levels, performance measures, time frames, or resources required.

While the design of a feed-in tariff was a policy matter, implementing the program rested with the DNSP, which already had frameworks for connecting solar systems to the grid and reviewing the metering arrangements for these installations. This commenced in June 2009.

As the Government substantially redesigned the Scheme on 9 November 2009, including switching from a net 20 year scheme to a gross seven year scheme, there was little time before the Scheme's planned commencement on 1 January 2010. Aside from the administrative and operational changes needed, a gross scheme would provide higher tariff payments and was expected to lead to a greater demand from the public. Agency advice cautioned that such a substantial redesign so close to the planned commencement date was administratively complex, and proposed delaying the scheme's start for 6 months to allow the implications of this decision to be better understood.

By 11 December 2009, DTIRIS had consulted with Department of Premier and Cabinet, Treasury, OEH, the electricity distributors and the Clean Energy Council to develop a draft regulation.

No overall
implementation
program

Electricity retailers were given six months to make the required billing system changes to put tariff payment information on customer bills. These were to take effect by 1 July 2010. Transitional metering arrangements were also put in place to 1 July 2010 to allow the networks sufficient time to source gross meters. However, as not all customers were able to install gross meters, the legislation passed in October 2010 provided for customers to join the Scheme with either net or gross metering arrangements.

3.6 Were there adequate control mechanisms?

I was concerned to establish whether there were control mechanisms to identify and react to the take-up of the Scheme and other changes that could affect the achievement of program objectives.

I found that the Scheme lacked the most elementary operational controls.

There was initially a poor monitoring system. There was a time limit of 2016, but initially there was no cap on total Scheme capacity and costs. At least one agency expressed concern that the gross tariff option presented an increased risk that Scheme costs would blow out, and that the total cost of the Scheme should be capped.

The New South Wales Government's Guide to Better Regulation, 2009 states that it is important that agencies develop performance indicators based on the objectives of regulations.

There were no overarching performance measures or evaluation framework established for the Scheme. As there was no budget, there were no budgetary controls. For example, there was no table summarising the committed and remaining budgets as take-up progressed. Such a tool helps control against the possibility of overspending. Without such control mechanisms DTIRIS had limited ability to effectively administer the Scheme.

DTIRIS attributed the strong take-up of PV to the generosity of the Scheme, coupled with Commonwealth Solar Credits, and a significant drop in system prices as the Scheme commenced.

The design of the Scheme in a legislative framework could not be readily adjusted. There was no ability to alter the Scheme parameters in response to changes in demand without introducing amending legislation. There was no way of stopping the Scheme, other than by asking Parliament to amend the legislation. This differs greatly from other schemes, such as the Commonwealth Government's insulation scheme, where controls can be put in place fairly quickly as the scheme is not legislated.

This legislative amendment is what happened following the 2010 Review which recommended a cap on total Scheme capacity as a mechanism for limiting Scheme costs.

But, even then, the Scheme was not completely 'capped'. Rather, provision was made that the Minister could declare that no further tariff payments be made—after he was satisfied the total installed generating capacity had reached 300 MW.

Even though total connections and applications exceeded 300 MW during November 2010 the DNSP could continue to accept applications. At 30 June, the total capacity of applications to connect to the electricity grid was 371.6 MW.

3.7 Was information relevant and timely?

I was concerned to establish if relevant and timely information was provided to Government decision-makers, potential applicants and other stakeholders to take informed action at each stage in the development and operation of the Scheme.

I found that there were significant shortcomings in the provision of information to Government decision-makers.

The taskforce provided the Government with relevant and timely information on scheme design at the outset, although it was given relatively little time to do so. Subsequently, the agencies provided their views to the Government and made sure it was aware of the issues in relation to the Scheme, as their knowledge improved.

Scheme lacked the most elementary operational controls

Significant shortcomings in information

Insufficient review points

However, by the time the Government was considering the switch from a net tariff to a gross tariff, the taskforce's report was no longer as relevant. DTIRIS had commissioned a more thorough expert report to assess the Scheme costs so that the network businesses could develop 'cost pass through' applications to submit to the Australian Energy Regulator (AER). While this report was available, I have seen no evidence that it was considered. Copies were not provided to agencies to allow them to consider its findings in providing advice to the Government. Treasury advised me that the report was not sighted by them until after the Government's decision to switch to a 60 cents gross scheme.

With the advantage of hindsight, there were insufficient review points based on applications so that progress could be assessed and so that the Scheme could be amended or even stopped, if necessary.

The taskforce identified the need for regular reviews, pointing to likely reductions in the price of solar PV systems and changes in the level of Commonwealth Government subsidy. I found that one review had been planned—under the *Electricity Supply Act 1995* the Minister for Energy was required to review the Scheme when capacity reaches 50 MW or in 2012, whichever occurred first. This was similar to reporting requirements built into equivalent schemes in other Australian jurisdictions. The capacity was reached by mid 2010, the installed capacity had doubled to 100 MW.

DTIRIS asked the electricity distributors to report six monthly on the take-up rate in accordance with the requirements of the legislation. In the light of the rapid growth of the Scheme and the lag between applications and installations, this information was subsequently realised to be far from timely.

The distributors were asked early in 2010 to report more frequently as DTIRIS took action to address the growing seriousness of the problem. Reports were requested monthly, and then fortnightly. There were concerns about data quality. Despite rapid take-up, accurate expenditure data on tariff payments was not available. Reliable expenditure data lagged connection data reflecting the variability in solar system generation rates due to factors such as weather patterns, location of panels and three-monthly billing cycles.

No regular forecasts of take up and expenditure

No forecasting model was being used. There were no systematic and regularly updated forecasts of take-up and expenditure against expectations.

DTIRIS commissioned the statutory review, but four months elapsed after reaching the 50 MW review trigger before the results and recommendations to cap the Scheme were brought to the Government. During this time the connected capacity doubled (from 50 MW to 101 MW). This appears to have been the first time the Government was provided with a financial assessment of the Scheme's high take-up rate.

A wide range of information was provided to applicants. But some potential applicants were left confused by the sudden changes to the Scheme due to the complexity of eligibility requirements, with a long transitional period in place for those still wishing to apply for the 60 cent tariff.

In January 2011, DTIRIS provided information to Scheme participants (including energy retailers, industry bodies and consumers) about the application of the 300 MW cap and implications for future participants. Information was provided on its website that due to the cap, some applicants may not be eligible to receive the tariff if the cap is reached. It provided further advice that consumers should seek to ensure that all deposits paid to solar panel providers/installers were refundable.

On 13 January 2011, DTIRIS issued a media release advising that more than 300 MW in applications to join the Scheme had been received by the businesses, and therefore there was no guarantee that any future applications would be eligible to participate in the Scheme. This media release was followed up by advertisements placed in industry publications.

No audit program to provide assurance early on

3.8 Was there an effective audit process to provide program assurance?

I found that at the outset, there was no audit process to provide program assurance.

Potential areas of concern could have included regulatory compliance (by applicants, installers and distributors), fraud, safety, accuracy of reporting against take-up, accuracy of tariff payments and accuracy of reporting against the Scheme's objectives.

The 2010 statutory review provided the only relatively independent assessment of the effectiveness of the Scheme. The review suggested developing a suitable compliance and safety regime that takes into account the nature and level of risk.

A regulatory compliance program has now begun, but it is initially only looking at applications made in the transition period from 27 October 2010 to 18 November 2010, as this is considered to be a period of significant risk.

The DNSPs and retailers had existing programs to meet the regulatory compliance requirements of their operating licences.

A safety review is being conducted by NSW Fair Trading to assess the quality of installations.

Preliminary results of an audit by NSW Fair Trading inspectors of 658 solar panel systems in Sydney's north-west found that:

- 122 (18.5 per cent) had major defects related primarily to incorrect wiring
- 418 (63.5 per cent) had minor defects related to cabling, and marking and signage.

Recommendations

In relation to section 194(1)(c) of the Act, I recommend:

- Schemes that involve significant recurrent expenditure and economic costs to consumers should be assessed in a similar fashion to major Government infrastructure expenditure. Prior to approval, major programs need:
 - specific objectives that are measurable
 - a cost-benefit analysis
 - an economic analysis
 - a business case including options, costs, time frames and risks
 - a risk assessment and risk management plan
 - a budget
 - an implementation plan
 - a performance monitoring framework
 - an exit plan
- in the interests of promoting transparency, and ensuring that Government decision-makers have access to adequate information on such schemes, such assessments should be made public
- the performance of such schemes needs to be monitored more closely. Agencies need to be prepared to step in and take corrective action more quickly if important implementation risks begin to materialise
- there needs to be an ability and a willingness to alter the parameters of such schemes more quickly, particularly if there is a risk that they will not meet their objectives.

Appendices

36

NSW Auditor-General's Report

NSW Solar Bonus Scheme

APPENDICES

Appendix 1: Chronology of the Key Scheme Events

Date	Event
24 November 2008	Former Minister for Energy and the Minister for Climate Change and the Environment announced Scheme, with the expectation to commence in mid-2009.
Late 2008	NSW Feed-in Tariff taskforce was established to advise the NSW Government on the design of a feed-in tariff scheme.
February 2009	NSW Solar Feed-in Tariff Report to Ministers. It contained financial analysis of ten different scheme scenarios. 'The taskforce undertook an analysis of simple financial calculations based on assumed uptake rates'.
23 June 2009	NSW Government publicly announced (but did not legislate) details of a new Scheme: a net feed-in tariff paying eligible households 60 cents per kWh for renewable energy that is fed back into the grid that will operate for 20 years, starting 1 January 2010.
5 November 2009	Industry & Investment NSW (now known as the Department of Trade & Investment, Regional Infrastructure and Services) received final modelling which estimated that a 20 year, 60 cents net tariff scheme would cost \$318 million at nominal value (net present value \$155 million) and the costs of a seven year, 60 cents gross tariff scheme would cost \$362 million at nominal value (net present value \$289 million). (External consultant, NSW Solar Bonus Scheme Advice Forecast Scheme Capacity and Costs, prepared for Industry and Investment NSW, 5 November 2009 - not publicly available). Treasury advised us that the report was not sighted by them until after the Government's decision to switch to a 60 cents gross scheme.
10 November 2009	NSW Government announced the final scheme design whereby the Scheme runs for seven years, paying a gross feed-in tariff of 60 cents per kWh with a Statutory Review required when 50 MW capacity is reached or 2012, whichever came first. Commencement date of 1 January 2010 remained unchanged.
1 January 2010	Scheme commenced.
Mid-2010	Scheme reached the 50 MW installed capacity.
24 August 2010	The then Minister for Energy announced the statutory review and invited public submissions until 30 September 2010.
October 2010	Reaches largest amount of installed capacity of any state at 101 MW.
27 October 2010	The then Premier announced outcomes of the statutory review of the Scheme. Legislation is passed to introduce a reduction in the tariff rate to 20 cents per kWh from midnight and 300 MW cap. The estimated total nominal cost of tariff payments of up to \$2.0 billion (net present value of \$1.4 billion) (external consultant, Solar Bonus Scheme, Forecast NSW PV Capacity and Tariff Payments, prepared for Industry and Investment NSW, 25 October 2010).
18 November 2010	Last day for customers that had purchased or entered into a binding contract to purchase a PV system by 27 October 2010 to have lodged an application for connection to the grid in order to be eligible for the 60 cents gross scheme.
December 2010	The estimated total nominal cost of tariff payments of up to \$1.8 billion. (Industry and Investment NSW, NSW Electricity Network and Prices Inquiry, Final Report, December 2010).

Date	Event
13 January 2011	Industry and Investment NSW press release advising customers that applications may not be eligible if not connected prior to Scheme cap being reached and the Scheme closed as the applications had reached 300 MW. Customers advised to seek refundable deposits.
1 February 2011	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 CCF, as well as drawing \$55.0 million in efficiencies from the electricity network business'.
4 April 2011	The Premier committed to a Solar Summit within the 100 Day Action Plan.
27 April 2011	The Government released an independent assessment of the integrity of the NSW Budget financial estimates which included some commentary on the Scheme costs.
29 April 2011	Minister for Resources and Energy announced a hold to new applicants effective midnight on 28 April 2011.
6 May 2011	Solar Summit Stage One held.
13 May 2011	<p>The New South Wales Government announced new changes to the scheme, including:</p> <ul style="list-style-type: none"> - it remaining closed to new applicants effective midnight 28 April 2011 - all applications received before 29 April 2011 will be assessed and if eligible, will receive tariff payments even if this breaks the 300 MW cap. - households already receiving, or who applied (but are not yet connected) for, the 60 cents tariff will receive a 40 cents tariff rate from 1 July 2011. (However, this did not eventuate).
7 June 2011	The Government announced there would be no change to tariff payments for customers already receiving, or about to receive, tariff payments under the Scheme.
29 June 2011	The Premier announced preliminary results of an audit by NSW Fair Trading inspectors of 658 solar panel systems in Sydney's north-west.
1 July 2011	<p>The Minister for Resources and Energy announced an Independent Pricing and Regulatory Tribunal review to determine a fair price for small-scale generated solar assuming:</p> <ul style="list-style-type: none"> - no increase in electricity price - no additional funding from the NSW State Government Budget. <p>Gazette notice published to formally close the Scheme and a regulation made to allow customers who had submitted an application by midnight of 28 April 2011 to join the Scheme.</p>

Appendix 2: A Generous Scheme

One reason for the high cost of the Scheme is that it was a generous scheme.

The Scheme was generous and one of only two that paid a tariff on all electricity generated (the other being in the ACT, which pays 45.7 cents a kilowatt hour), known as a 'gross' tariff. All other states offer 'net' tariffs, which pay only for the excess power householders produce above what they use.

Features of feed-in tariff schemes in Australia present at or near the time of the introduction of the NSW Scheme.

Jurisdiction	Length	Type	Rate per KWh	Cap
NSW	End 2016	Gross	60 cents (until 27 Oct 10) 20 cents (thereafter)	300 MW cap (introduced 27 Nov 10 and closed 1 July 2011)
ACT	20 years from connection	Gross	Initially 50.5 cents Reduced to 45.7 cents Rate for new systems reviewed each financial year.	240 MW (proposed 15 MW micro, 15 MW medium, 210 MW large)
VIC	End 2024	Net	60 cents (equivalent to 39 cents gross)	100 MW or \$10/year on bills
SA	End 2028	Net	Initially 44 cents (equivalent to 28.6 cents gross) Increased to 54 cents. Rate is capacity-determined with reduced rates for larger increments.	60 MW (proposed)
QLD	End 2028	Net	44 cents (equivalent to 28.6 cents gross). Rate is capacity-determined with reduced rates for larger capacity increments.	N/A
WA	10 years from connection	Net	40 cents (equivalent to 26 cents gross)	N/A

Source: Industry and Investment NSW, NSW Solar Bonus Scheme Statutory Review Report, October 2010

Appendix 3: Uncertainty within Projections

Uncertainty	Potential impacts on current Scheme estimates	Options to reduce uncertainty
Highly Significant Variables		
Panel Performance - Difference in average generation per kW	<p>Typical estimates of PV performance are for well installed systems with reasonable orientation, tilts and no shading. There are no available estimates for overall NSW residential PV systems that the UNSW consultants are aware of at present. Some limited assessment on Sydney PV systems in DNSP#2 and DNSP#3 regions suggests average performance may be significantly less than for 'good' systems. UNSW consultants suspect that average performance may be up to 20 per cent less than for the 'good' systems used in modelling, including our reference scenario. This would reduce Scheme costs by some 18 per cent against current estimates. There is also some limited possibility that systems might perform better than this typical 'good' system (for example, from improved efficiency of inverters over the last few years).</p>	<p>As systems are connected and a year of metered performance data is collected, actual tariff payments made by DNSPs could provide useful guidance on actual average PV performance. This could also be 'tuned' with respect to actual solar insolation for that year to provide better estimates looking forward.</p>
Weather - Variation in solar insolation	<p>Research suggests an approximate 20 per cent annual range of solar insolation in Australia (Troccoli and Davy, 2010). UNSW Consultancy modelling using SAM for PV system generation over 1998-2010, similarly, found a +/-10 per cent range around approximately 1,400 kWh/kW/year. Uncertainty hence with respect to both increased and decreased the Scheme tariff payments of perhaps +/-10 per cent for each year of the scheme. Likely less an issue over full the Scheme life unless annual variability has significant longer (multi-year) patterns.</p>	<p>Long-term climatic forecasting may be able to assist (El Nino and La Nina patterns may be relevant).</p>
Less Significant Variables		
Churn from 60 cents net to 60 cents gross	<p>The 60 cent gross tariff is far more financially attractive than a 60 cent net tariff for all scheme participants with significant loads (that reduce exports under a net tariff). Nevertheless, as of June 2011, three to four per cent of 60 cents systems are still on net metering. It is unclear how many and at what rate these might transition to gross tariff, or the impact of this (those on net may have virtually no load at that metering point hence little change in the Scheme tariff payments received). Based on DNSP#1 advice, I have assumed 10 per cent per year. Current models generally assume that all eligible generation is, or will transition to, gross so the impact would be to reduce Scheme costs.</p>	<p>Actual data will become available as the Scheme progresses.</p>
Churn from 60 cents to 20 cents	<p>PV systems on houses that are sold over the period of the Scheme transition from 60 cents to 20 cents tariff. Typical estimates of three to five per cent annual household churn suggest impact might be significant, although the Scheme participants may not represent typical households because they made a long-term investment decision installing PV. Note that churn rates of two to five per cent/year might see some nine to 21 per cent of scheme participants transition to 20 cents by 2016 reducing scheme costs in that final year by some seven to 15 per cent.</p>	<p>Actual data will become available as the Scheme progresses.</p>
Percentage of generation exported	<p>The per cent of generation exported will vary between households and is influenced by both system size and the nature of the load profile. This is only relevant to net tariffs.</p>	<p>Actual data will become available as the Scheme progresses.</p>

Uncertainty	Potential impacts on current Scheme estimates	Options to reduce uncertainty
Annual churn between 20 cents net and 20 cents gross	The financial advantage of the 20 cents gross tariff over the 20 cents net tariff is far less clear depending on any premium payments on exported generation from retailers, the proportion of generation self-consumed and future electricity tariffs.	Actual data will become available as the Scheme progresses.
Participant transition to net Feed-in tariff	Some potential that will see gross 20 cents participants transition to a net tariff. This would reduce Scheme tariff payments but note that the impact is only significant at very high churn rates since 20 cents tariff payments only represent a small component of the overall tariff payments.	
PV system degradation	As discussed above, PV system output reduces over time. I have assumed a rate of 0.8 per cent per year. This has little impact on the overall scheme costs.	This may become more apparent over time but could be difficult to extract from other reasons for reduced output.
Registration/data /metering errors	The very rapid uptake of the scheme has created major data issues for the DNSPs including double registrations (which aren't necessarily resolved until connection) but also some potential registration errors (such as installed PV capacity, or gross versus net). There may also be incentives for PV system owners to under-report PV panel capacity, or increase it over time (although note that this is illegal under the Scheme). Impact on scheme costs could be in both directions.	Simple checks on metered data of PV systems by DNSPs (similar to those conducted on metered consumption data) should be able to identify many potential discrepancies.
Approval queue	At 30 June 2011, some 19 per cent of approved applications for eligible systems still hadn't been connected. Likely that most will be connected reasonably soon, and current modelling of scheme costs assumes this. However, there are some reasons why some approved systems might not transition to actual deployment. Impact would be to reduce scheme tariff payments.	Actual data will become available as the Scheme progresses.

Appendix 4: Sensitivity Analysis for Uncertainty within Projections

Uncertainty	UNSW Consultants reference scenario	Sensitivity range assessed (+%/-%)	Impact on 'reference' scenario costs	
			(%)	(\$)
Panel Performance - Difference in average generation per kW	0% (assumed average NSW PV performs at level of a 'good system')	+ 5/-20% around 1382 kWh/kW/year	+4.5/-18%	+ \$65m to-\$259m
Weather - Variation in solar insolation	0% (typical year)	+/-5% around 'Typical Mean Year' values (note that modeling for overall six years – year to year variability of +/-10% previously noted likely to overestimate variability over six years)	+/-4.5% (of reference scenario cost)	+/- \$65m
Churn from 60 cents net to 60 cents gross	10%/per year	0% to 75% of those on 60 cents net transition to 60 cents gross each year	+6.6% to -3%	+\$94.4 to-\$42.9m
Churn from 60 cents to 20 cents	5%	1% to 7%/year	-0.7% to +2%	-\$10.5m to+\$28.5m
Percentage of generation exported	50%	10% to 60% of PV generation exported and hence eligible for net Feed-in tariff.	-2.6% to +0.6%	-\$36.8m to+\$9.2m
Annual churn from 20 cents net to 20 cents gross	0%/per year	0% to 25% of current net 20 cents tariff participants transition to gross 20 cents tariff each year	0% to -0.4%	\$0m to +\$5.9m
PV system degradation	0.8%/per year	0% to 1.6% per year (reflecting PV panel degradation but also potential other reasons for system performance to degrade such as dirty panels, growth of trees that shade system)	-0.1% to +0.1%	+/- \$0.9m
Annual churn from 20 cents gross to 20 cents net	0%/per year	0% to 25% of current gross 20 cents tariff participants transition to net 20 cents tariff each year	0% to -1%	\$0m to -\$22.6m
Approval queue conversion to connections	100%	UNSW Consultant model assumes that all currently approved but unconnected systems are connected by November 2011	Not considered	

Appendix 5(a): Review of Models

Overall PV uptake: For forward estimates the achieved rate and level of deployment is clearly critical and, as noted above, highly uncertain. The use of historical trends or fixed scenarios is of limited value when evaluating possible budget impacts of different scheme designs (except if these include caps). A range of modified NPV and payback approaches have been used to correlated financial outcomes to system owners with levels of deployment. Despite their limitations, they may be the best available option at present. For such forward looking estimates the UNSW consultants' view is that such approaches should, ideally and given sufficient time and resources, be carefully undertaken with detailed and formal exploration of the potential uncertainties involved. If no more systems can be installed under the Scheme then the maximum cost of the Scheme is far easier to calculate, although there can be continuing uncertainties for some time as the Scheme settles out.

PV performance and eligible generation: This depends on estimates of PV system performance (kWh/kW) over time (typically annual), and what proportion of this is eligible for the tariff. Engineering-oriented models are more likely to provide realistic PV generation than those applying average insolation with simple system assumptions. For overall scheme costs the key issue is aggregate performance of all eligible systems – generally less than the expected performance of appropriately located and oriented high quality systems. In the UNSW consultants' view, it should be possible to develop reasonable models of this although I am not aware of publicly available work in the Australian context that has yet done this in any systematic manner.

The Scheme models reviewed by Consultants

Two key aspects of the modelling were assessed – Uptake and PV performance

Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
UNSW best estimate for typical year (basis for comparison).					Average of ORER, PSyst and SAM for Sydney in a 'typical' climate year	1,382	Using Sydney modelled data with estimated performance from two packages averaged to give final figure. ORER estimate of 1,382 applies for all of NSW other than the Western region. Note, this may still underestimate performance of systems in some areas of regional NSW (See discussion in AECOM (2010)).

The Scheme models reviewed by Consultants

Two key aspects of the modelling were assessed – Uptake and PV performance

Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
NSW Feed-in taskforce (2009)	<p>Estimated the Scheme costs for different tariff settings given two assumed scenarios of deployment as part of scheme design.</p> <p>Estimated Scheme costs of \$91m to \$354.5m (60 cents gross, 7 years), and \$193m to \$856.9m (60 cents net, 20 years).</p>	<p>A particularly challenging modelling task at the early stages of Scheme design. PV deployment not modelled as such, instead assumed. PV generation appears to have been estimated in house.</p>	<p>Estimated the Scheme costs for different tariff settings given two assumed scenarios of deployment with linear uptake. Low growth scenario of 2,000 additional systems per year, high scenario with 10,000.</p>	<p>A simple spreadsheet model. Forward looking estimates of deployment are extremely difficult, hence not attempted. Note that the two deployment scenarios did not factor in impact of different tariff settings despite their major impact on financial attractiveness of deployment. This makes interpretation of the taskforce modelling results and tariff costs potentially challenging. Uncertainty also not managed in any formal way beyond the two deployment scenarios. Modelling therefore needs considerable caution in interpretation.</p>	<p>PV generation model appears to be based on in-house calculations.</p>	1662 (+20%)	<p>Appears high. ORER estimates of system performance used in deeming RECs referenced in report but discrepancy between these and their own estimate not addressed.</p>

The Scheme models reviewed by Consultants			Two key aspects of the modelling were assessed – Uptake and PV performance				
Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
AECOM Advice (2009)	Estimated future deployment and the Scheme costs for two tariff options as part of scheme design.	Review of this modelling limited and based on discussions with stakeholders that were intended to better understand the AECOM (2010) modelling. PV uptake model was an earlier version of AECOM (2010) model and incorporated 2009 PV system price estimates. PV performance model apparently the same as AECOM (2010), as was eligible generation estimate.	Model fits an underlying polynomial of NPV against historical data regarding number of systems deployed to estimate potential future uptake under different Scheme scenarios.	As noted earlier, UNSW consultants have based their assessment on discussions regarding this model (the model itself was not available). Approach taken relatively common and, in our view, appropriate. However it does involve significant assumptions that require careful explanation. Our understanding is that the model was used to undertake a number of sensitivity studies which represents good practice.	See AECOM (2010).	1640 (+18.5%) for most of DNSPs' customer apt from region calc. for one DNSP	See AECOM (2010).

The Scheme models reviewed by Consultants			Two key aspects of the modelling were assessed – Uptake and PV performance				
Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
AECOM (2010)	<p>Estimated future deployment and the Scheme costs given early experience with Scheme and 50MW review trigger. Scenarios of possible feed-in tariff changes investigated.</p> <p>Estimated scheme costs of \$2.7 billion (60 cents gross, 7 years).</p>	<p>PV deployment model based on modified NPV function using statistical tariff from historical Australian PV uptake. Incorporated much lower installed PV system costs than earlier models given 2010 data. PV performance model provided by AECOM in-house research group.</p>	<p>Revised model to above using a different polynomial given early experience with the Scheme.</p>	<p>Additional information from early experience with the Scheme, and significant falls in PV system costs led to changes in the PV deployment model. Chosen approach seems appropriate.</p> <p>Did some sensitivity testing on issues such as PV system prices and existence, or absence, of a carbon price which represents good practice.</p>	<p>PV generation model from inhouse research group</p>	<p>1640 (+18.5%)</p>	<p>PV generation model from in-house research group using a model that does not appear specifically designed for PV performance simulation. ORER estimates of system performance used in deeming RECs referenced in report, but discrepancy between estimates not addressed. Resulting performance estimate appears high, although consistent with original taskforce work. AECOM notes that they were asked, and therefore sought to provide an 'upper bound' estimate of potential future deployment and hence the Scheme costs.</p>

The Scheme models reviewed by Consultants

Two key aspects of the modelling were assessed – Uptake and PV performance

Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
DNSP#1 (ongoing)	Two separate budget impacts models: one used for input to Parry Duffy and one used for ongoing reporting to DTIRIS.	In-house budgeting models based on system application and connection data. PV performance based on DNSP's consultant's advice. Ongoing model development and tuning given the Scheme closure and system application and connection data.	No uptake modelling based on financial impacts, only 'assumed' levels of future uptake.	In-house budgeting model based on assumed levels of uptake. Basis of some key assumptions unclear and significantly impact results. Some limited ongoing model development and tuning since the Scheme closure.	Based on DNSP#1's consultant's advice	1,767 (+28%) and 1,752 (+27%) (two separate models)	Appears high. DNSP#1 advises that figure was provided by DNSP#1's consultants. They have the particular challenge of widely varying climatic conditions over their franchise area including regions with the best insolation in NSW. ORER has 1536 kWh/kW estimate for western NSW, however, unclear where most PV deployment is occurring and used value still seems high. Modelling apparently now being 'tested' according to actual measured performance of systems.

The Scheme models reviewed by Consultants			Two key aspects of the modelling were assessed – Uptake and PV performance				
Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
DNSP#2 (ongoing)	Three separate budget impacts models: one used for input to Parry Duffy, one used for ongoing reporting to DTIRIS and one provided as including the latest data.	In-house budgeting models based on system application and connection data. PV generation based on Clean Energy Council data. Ongoing model development and tuning given the Scheme closure and system application and connection data.	No uptake modelling based on financial impacts, only on connections and applications to date.	In-house deployment model based on system application and connection data. Model reviewed by DNSP#2's consultant. Some ongoing model development and tuning since the Scheme closure. Modelling seems appropriate given DNSP context.	Based on data from the CleanEnergy Council.	1,423 (+3%)	Appears reasonable.

The Scheme models reviewed by Consultants			Two key aspects of the modelling were assessed – Uptake and PV performance				
Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
DNSP#3 (ongoing)	A budget impacts model provided by Oakley Greenwood, that includes some scope for modelling deployment.	Model used for projecting deployment and internal budgeting and AER pass through request. PV generation based on ORER performance estimates. Ongoing model development and tuning given the Scheme closure and system installation and connection data.	Limited uptake modelling based on industry capacity to install and financial returns STCs.	Oakley Greenwood model used for internal budgeting and AER pass-through request. Some ongoing model development and tuning since the Scheme closure. Modelling seems appropriate given DNSP context.	Based on ORER estimates	1,382 (+0%)	Appears reasonable.

The Scheme models reviewed by Consultants		Two key aspects of the modelling were assessed – Uptake and PV performance					
Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
Parry Duffy			No uptake modelling within the report as such – instead used budget estimates that were requested from DNSPs.	No guidance or direction was given to DNSPs when requested to provide their current cost estimates based on take up rates and applications received. At the time of Parry Duffy the tariff had been reduced from 60 cents to 20 cents and it might have been assumed that additional tariff applications would end, or at least greatly reduce in number. Does not appear to have been a formal process for reconciling the significantly different estimates provided by DNSPs that appear to reflect different assumptions and context.	Not directly applicable but a value can be backed out from DNSP data	1,677 (+21%)	See details on the DNSP models used to provide budget estimates for Parry Duffy. Backed out estimates of assumed PV performance (calculated from 300 MW cap and \$302m/yr) is 1,662 kWh/kW/yr which seems high.

The Scheme models reviewed by Consultants		Two key aspects of the modelling were assessed – Uptake and PV performance					
Report	Models	Overall Comments	Uptake model	Comment on appropriateness of uptake assumptions	PV performance modelling	Assumed performance (kWh/kW/yr)	Comments on appropriateness of performance assumptions
Combined DNSPs (ongoing)	Estimated tariff payments spreadsheet that consists of three main components. June 2011 spreadsheet suggests total the Scheme tariff costs of \$1.75 billion.	Component 1 sums ongoing DNSP reporting of estimated tariff costs. Component 2 summarises the Scheme applications and connections with respect to net and gross 60 cents and 20 cents the Scheme participants. Component 3 presents various scenarios based on former Scheme options. Reviewed by DNSPs' consultant.	Model sections that were reviewed did not include any uptake modelling as such. Does includes some scenarios based on predetermined levels of deployment	Cost estimates based on ongoing DNSP reporting of their estimated the Scheme costs although actual DNSP connection and approval MW for 60 cents and 20 cents the Scheme participants also collected, and used to 'back out' PV performance check for each DNSP. Approach seems reasonable given the effective closure of the scheme. Modelling spreadsheet implementation reviewed by DNSPs' consultant.	Not directly applicable but does 'backed out' estimates	1,362.5 (-1.5%)	From network data and appears reasonable.

Appendix 5(b): Comparison to DNSP#1 Scheme tariff payments

It can be seen that the values calculated by DNSP#1 are significantly greater than those using the UNSW Consultant's model for its 'reference scenario' – with the scheme total for the former being \$193.7 million higher.

The main reason for the difference between the UNSW and DNSP#1's figures is the assumed high level of annual generation (1752 kWh/kW/year). Increasing the annual generation to 1752 kWh/kW/year in the UNSW model increases the cost by \$141 million.

The DNSP#1 model assumes that all the connections are gross metered. Incorporating this assumption into the UNSW model increases the cost by \$27.3 million.

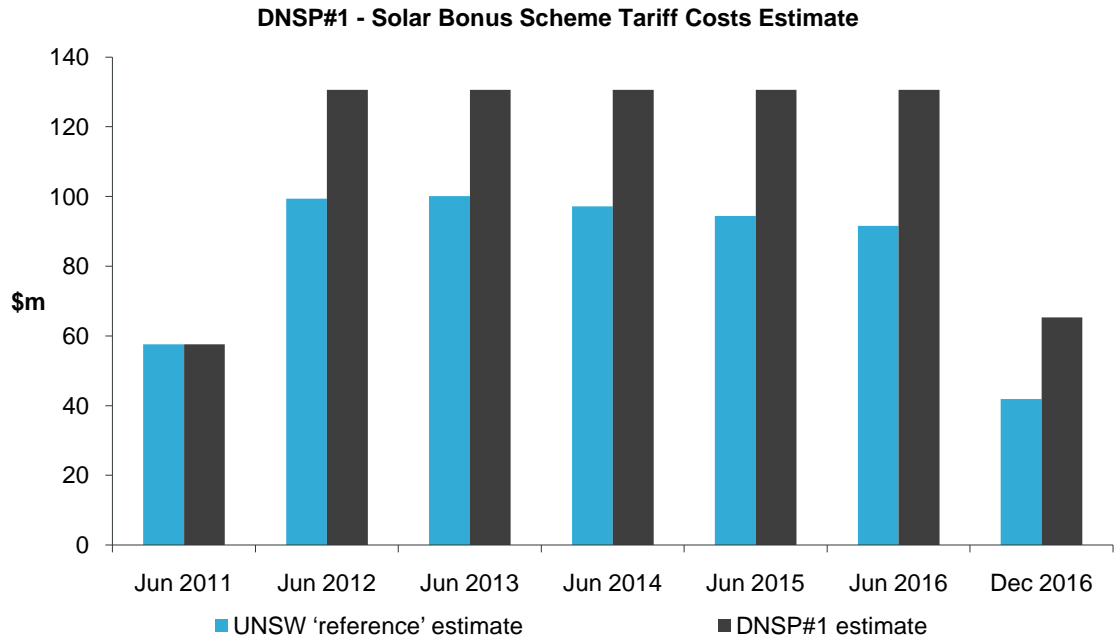
Although the DNSP#1 model allows for churn from 60 cents to 20 cents over time, its use of the 2011–12 figure for all years of the Scheme out to 2016 (pro rata for the last six months), increases the estimated costs. Incorporating this assumption into the UNSW model increases the cost by \$21.9 million.

Removing the allowance for system degradation over time increases the cost by only \$300,000.

The DNSP#1 model assumes that all systems are 2.5 kW, which is slightly below the actual average, and so incorporating a 2.5 kW size into the UNSW model decreases the cost by \$16.3 million.

The DNSP#1 model also does not allow for churn from net 60 cents to gross 60 cents, however this is immaterial as they assume all systems are gross metered.

The aggregate effect of all changes is to increase the cost according to the UNSW model by \$186 million, bringing the total to \$769 million, only \$7 million less than according to DNSP#1's figures. This final difference simply reflects the slightly different rates of installation in each month.



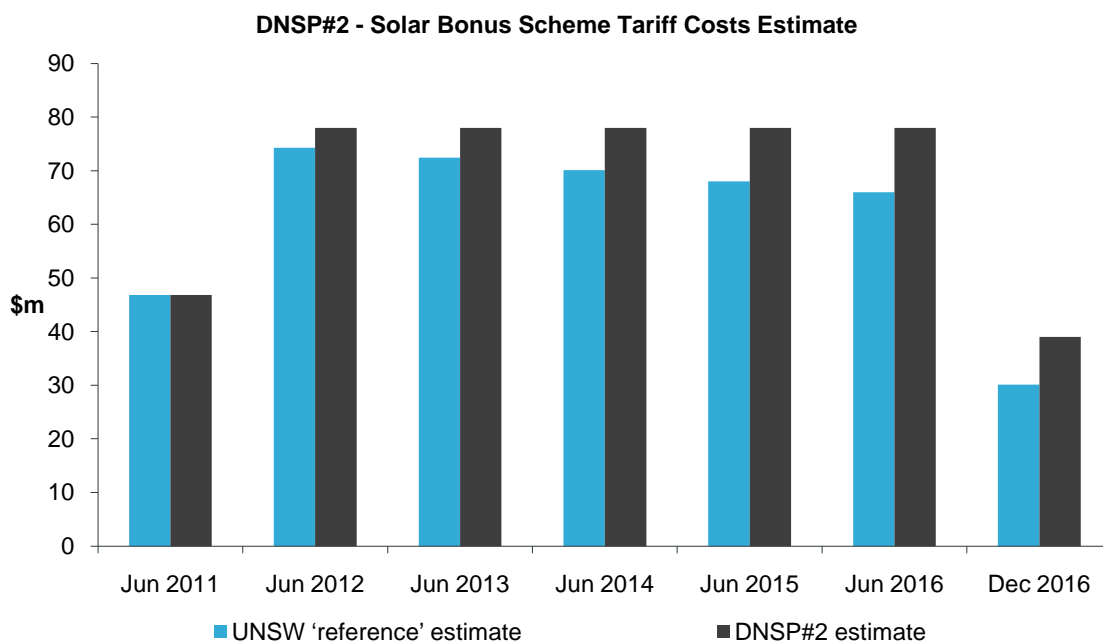
Appendix 5(c): Comparison to DNSP#2 Scheme tariff payments

The DNSP#2's values appearing in the graph and table below are similar to those produced using the UNSW model for its 'reference scenario' – with the Scheme total for the former being \$48.1 million higher.

The main reason for the difference between the UNSW and DNSP#2's figures is the DNSP#2's use of the 2011-12 figure for all years of the Scheme to 2016 (pro rata for the last six months). Incorporating this assumption into the UNSW model increases the cost by \$27.8 million. The most recent version of the DNSP#2's model assumes that systems on a 60 cents tariff average 2.35 kW and those on a 20 cents tariff average 2.07 kW. Incorporating these sizes into the UNSW model increases the cost by \$14.2 million.

Increasing the annual generation in the UNSW model to the 1,423 kWh/kW/year in the DNSP#2 model increases the cost by \$11.3 million. Removing the allowance for system degradation over time increases the cost by only \$0.2 million. The DNSP#2 model also doesn't allow for churn from net 60 cents to gross 60 cents, however this is immaterial as they assume almost all systems are gross metered.

The aggregate effect of all changes is to increase the cost according to the UNSW model by \$56.9 million, bringing the total to \$485 million, only \$8.8 million more than according to DNSP#2's figures. This final difference simply reflects the slightly higher rates of installation during 2011.



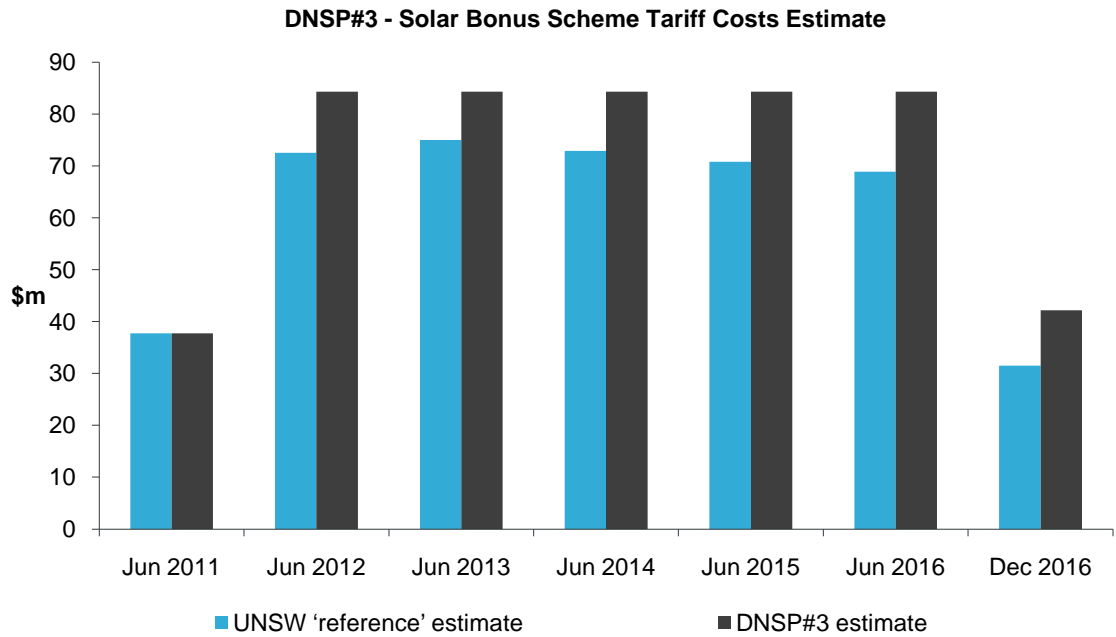
Appendix 5(d): Comparison to DNSP#3 Scheme tariff payments

The values used by DNSP#3 are similar to those produced using the UNSW model – with the scheme total for the former being \$72.1 million higher.

The main reason for the difference between the UNSW for its 'reference scenario' and DNSP#3's estimates, is the assumption that all DNSP#3's systems were gross metered. Incorporating this assumption into the UNSW model increased the scheme cost by \$18.6 million.

The next greatest impact was caused by the use of the 2011–12 figure for all years of the Scheme out to 2016 (pro rata for the last six months). This assumption increased the cost by \$10.6 million. According to DNSP#3's consultant, an annual 60 cents to 20 cents churn rate of 3.5 per cent was assumed. When this is applied to the UNSW model (instead of 5 per cent), the cost increases by \$7.1 million. Removing the allowance for system degradation over time increases the cost by only \$230,000.

The aggregate effect of all changes is to increase the cost according to the UNSW model by \$35.5 million, bringing the total to \$465 million, which is \$36.6 million less than according to DNSP#3's figures.



Appendix 6: Glossary

AECOM	AECOM Pty Ltd
AER	Australian Energy Regulator
CPRS	(former) Carbon Pollution Reduction Scheme
DEWHA	Department of Environment, Water, Heritage and the Arts
DNSP	(NSW) Distribution Network Service Provider
DTIRIS	NSW Department of Trade and Investment, Regional Infrastructure and Services (Trade and Investment)
eRET	expanded Renewable Energy Target
FIT	Feed-in-Tariff
IPART	NSW Independent Pricing and Regulatory Tribunal
NPV	Net Present Value
OG	Oakley Greenwood Consulting
ORER	Office of the Renewable Energy Regulator
PV	Photovoltaic system
PVSyst	PV studies, sizing and simulations software package
REC	Renewable Energy Certificate
SAM	Solar Advisor Model
SBS	NSW Solar Bonus Scheme
STC	Small scale Technology Certificates (within the eRET)
wrt	with respect to

Appendix 7: About the Audit

Background to Report

This Report stems from section 194 of *Electricity Supply Act 1995* (the Act) requiring the Auditor-General to commence a review after January 2011 and report on certain aspects of the Scheme as soon as practicable after 1 July 2011.

Section 194 of the Act reads:

194 Review of solar bonus scheme by Auditor-General

(1) The Auditor-General is to review and report to Parliament on the following aspects of the solar bonus scheme (being the scheme for the payment of electricity supplied to the network by small retail customers using complying generators):

(a) the number of small retail customers that have installed and connected complying generators,

(b) the costs of the scheme including the total amount credited to small retail customers under the scheme,

(c) any other matter that the Auditor-General considers to be relevant.

(2) The review is to be undertaken as soon as practicable after the period of 1 year from the commencement of section 15A.

(3) The Auditor-General is to report to each House of Parliament on the results of the review conducted by the Auditor-General under this section as soon as practicable after 1 July 2011.

(4) If a House of Parliament is not sitting when the Auditor-General seeks to present a report under this Part, the Auditor-General is to present the report to the Clerk of the House concerned.

(5) The provisions of section 63C (Documents presented to Clerk of House of Parliament) of the *Public Finance and Audit Act 1983* apply in relation to a report presented to a Clerk of a House of Parliament under this section in the same way as they apply to documents presented to a Clerk under that Act.

Acknowledgements

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Reliance on this Report

This Report has been prepared for the benefit of Parliament and my views and findings have been formed in this light. While the New South Wales Parliament can rely on the findings in this Report, they are not intended to provide any comfort to other parties. Parties are expected to undertake their own examinations, and in any event, should not place any reliance that this Report addresses their interests or concerns.

Our vision

To make the people of New South Wales proud of the work we do.

Our mission

To perform high quality independent audits of government in New South Wales.

Our values

Purpose – we have an impact, are accountable, and work as a team.

People – we trust and respect others and have a balanced approach to work.

Professionalism – we are recognised for our independence and integrity and the value we deliver.

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Level 15, 1 Margaret Street
Sydney NSW 2000 Australia

t +61 2 9275 7100

f +61 2 9275 7200

e mail@audit.nsw.gov.au

office hours 8.30 am–5.00 pm

audit.nsw.gov.au

