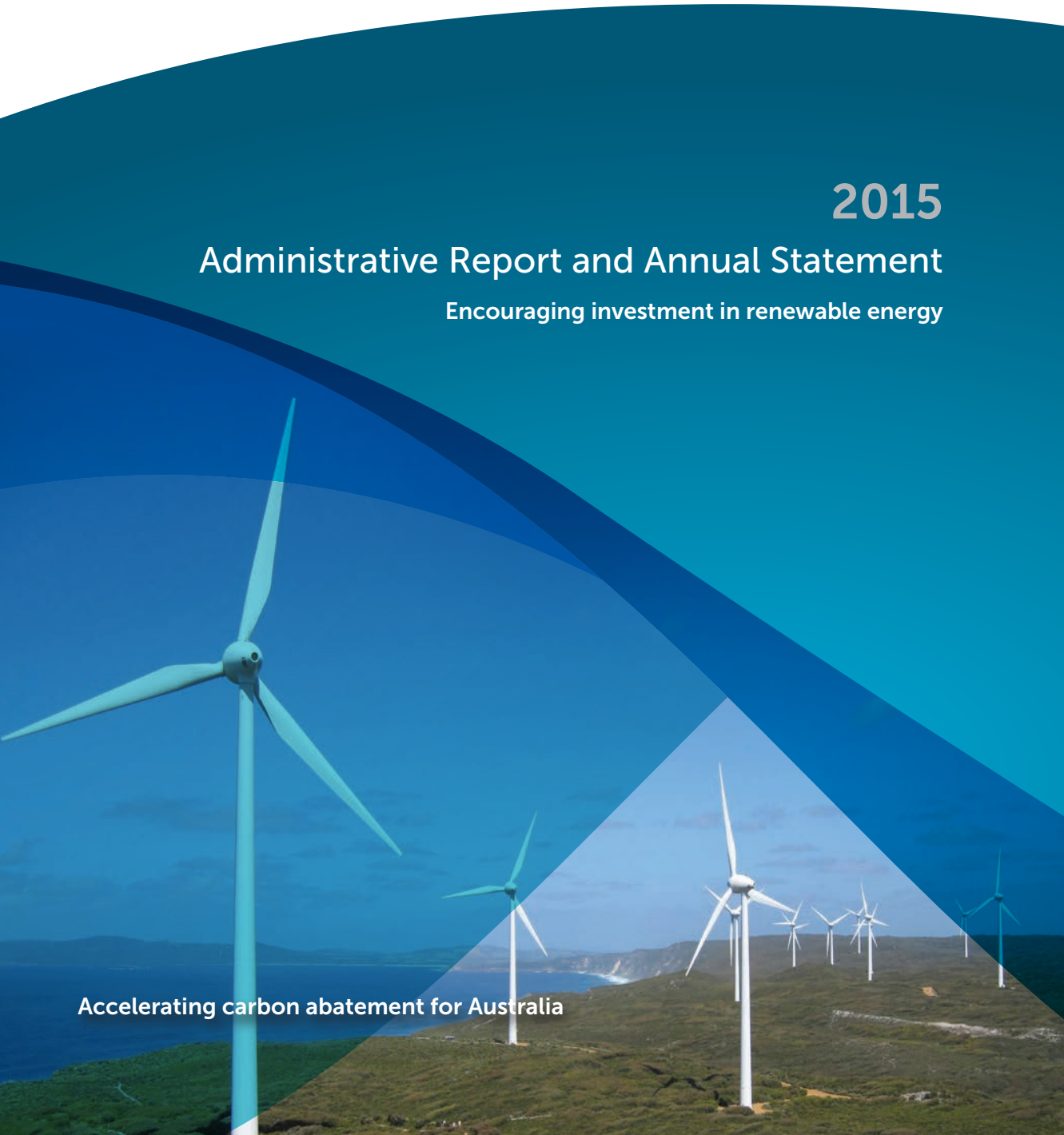
Australian Government
Clean Energy Regulator

RENEWABLE ENERGY TARGET

2015

Administrative Report and Annual Statement

Encouraging investment in renewable energy



Accelerating carbon abatement for Australia

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Contact us

General enquiries:

Mail GPO Box 621
Canberra ACT 2601

Phone 1300 553 542 if calling within Australia
+61 2 6159 3100 if calling from overseas
13 14 50 translating and interpreting service
133 677 TTY service
1300 555 727 speak and listen service

Email enquiries@cleanenergyregulator.gov.au

Website www.cleanenergyregulator.gov.au

More information about the report

Enquiries about this report:

Manager, Communications Section
People and Communications Branch
Business Operations Division
Clean Energy Regulator

Phone 02 6159 3100
Email enquiries@cleanenergyregulator.gov.au

Photo acknowledgement:

Clean Energy Regulator, Albany Wind Farm WA

Australian Government
Clean Energy Regulator

CLEAN ENERGY REGULATOR

Letter of transmittal

The Hon Greg Hunt MP
Minister for the Environment
Parliament House
CANBERRA ACT 2600

Dear Minister

I am pleased to submit the *Renewable Energy Target 2015 Administrative Report*.

The report is submitted for presentation to the Parliament in accordance with section 105 of the *Renewable Energy (Electricity) Act 2000*.

It covers the operations of the *Renewable Energy (Electricity) Act 2000* for the 2015 calendar year.

This report also includes the Renewable Energy Target 2015 *Annual statement* and supporting information about progress towards meeting the revised 2020 Large-scale Renewable Energy Target.

Yours sincerely

Chloe Munro
Chair, Clean Energy Regulator

May 2016

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Chapter 1

Executive summary

Renewable Energy Target at a glance

Provides an incentive

The *Renewable Energy (Electricity) Act 2000* encourages the supply of additional electricity from renewable sources to reduce greenhouse gas emissions from the electricity sector. It provides an incentive for investment in renewable energy power stations and smaller systems such as household solar, while ensuring the energy sources used are ecologically sustainable.

When we refer to the Renewable Energy Target, it includes both the Large-scale Renewable Energy Target and the Small-scale Renewable Energy Scheme:

- The Large-scale Renewable Energy Target—requires Australia to generate 33 000 gigawatt hours (33 million megawatt hours) of additional renewable electricity by 2020. That is equivalent to the electricity required by around five million houses for a year.[1]
- The Small-scale Renewable Energy Scheme—encourages additional electricity supply from small scale systems. The Small-scale Renewable Energy Scheme has no set target.

More information about large-scale systems is on page 41 and more information about small-scale systems is on page 25.

Creates a market

The Renewable Energy Target works by creating a market for renewable energy certificates. On the supply side, certificates are created for each megawatt hour of renewable energy generated or displaced. On the demand side, liable entities (mainly electricity retailers) buy certificates to meet their obligations under the Renewable Energy Target. We provide the secure systems that enable the market to operate.

More information about supply and demand dynamics is in *How it works* on page 15 and more information about the market is in the *Annual statement* on page 63.

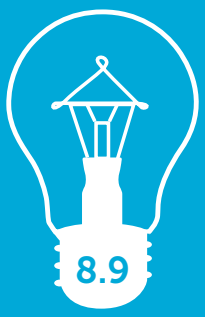
Accelerates carbon abatement

We administer the Renewable Energy Target as part of our purpose of accelerating carbon abatement for Australia.

1 Based on average household electricity consumption of 122.3 kilowatt hours per week. Household Energy Consumption Survey, Australia: Summary of Results, Australian Bureau of Statistics.

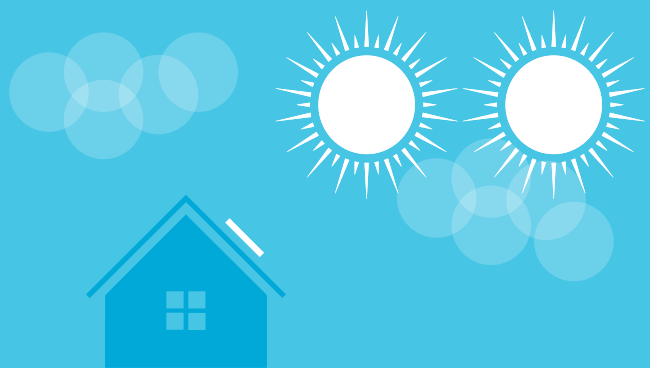
Achievements snapshot—
summary of significant outcomes in 2015

15.2 MILLION MEGAWATT HOURS
OF ELECTRICITY GENERATED FROM LARGE-SCALE RENEWABLE SOURCES—
ENOUGH TO POWER AROUND 2.4 MILLION AVERAGE AUSTRALIAN HOUSEHOLDS FOR A YEAR



MILLION MEGAWATT HOURS
OF ELECTRICITY GENERATED OR DISPLACED FROM SMALL-SCALE RENEWABLE SOURCES—
ENOUGH TO POWER AROUND 1.4 MILLION AVERAGE AUSTRALIAN HOUSEHOLDS FOR A YEAR

188 902 SMALL-SCALE SYSTEMS INSTALLED



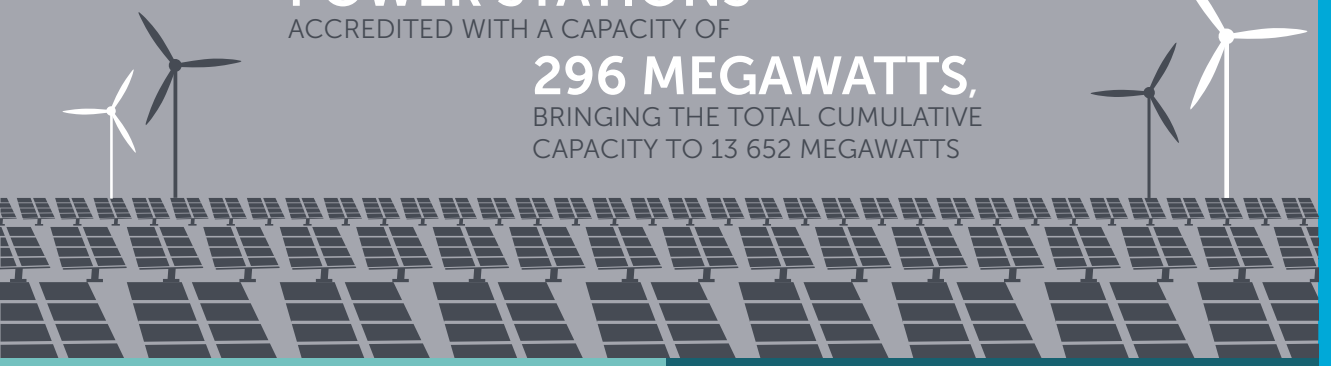
12% INCREASE
IN AVERAGE SMALL-SCALE SOLAR SYSTEM CAPACITY SINCE 2014,
DOUBLING CAPACITY
SINCE 2011

41 RENEWABLE POWER STATIONS

ACCREDITED WITH A CAPACITY OF

296 MEGAWATTS,

BRINGING THE TOTAL CUMULATIVE CAPACITY TO 13 652 MEGAWATTS



TOTAL GENERATION CAPACITY OF SOLAR POWER STATIONS

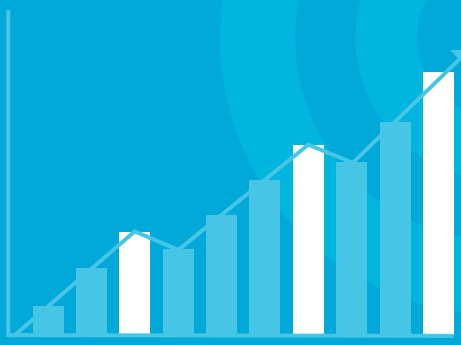
ALMOST TRIPLED

IN THE LAST 12 MONTHS

99.7% COMPLIANCE RATE

FOR MEETING RENEWABLE ENERGY TARGET OBLIGATIONS

(COMBINED ACROSS BOTH SCHEMES)



PROGRESS

TOWARD THE 2020 LARGE-SCALE RENEWABLE ENERGY TARGET WAS ADEQUATE UNDER THE CIRCUMSTANCES

+

THE LARGE-SCALE RENEWABLE ENERGY TARGET IN 2020 IS ACHIEVABLE

Annual statement—progress towards the 2020 target

On 23 June 2015 the Australian Parliament agreed to amending legislation to implement the Government's reforms to the Renewable Energy Target. The new target is for large-scale generation of 33 000 gigawatt hours in 2020.[2] This will result in more than 23.5 per cent of Australia's electricity derived from renewable sources by 2020.[3] The required gigawatt hours of renewable source electricity from 2017 to 2019 were also adjusted to reflect the new target.

To help track investment in new renewable energy capacity, the Minister for the Environment, the Hon Greg Hunt, MP, requested that we prepare an annual statement on progress of the scheme towards meeting the new target and the impact it is having on household electricity bills.

Overall finding

Our overall finding is that **progress in 2015 was adequate under the circumstances** and the Large-scale Renewable Energy Target in 2020 is achievable. There is no indication that the impact on household electricity bills in 2015 was more than anticipated when the target was amended. We estimate an additional 6 000 megawatts of installed capacity is required to meet the total cumulative demand for large-scale generation certificates through to 2020.

2015 results

Based on publicly available information, we estimate that 409 megawatts of new renewable power station build was committed in 2015.[4] In addition, renewable power stations with a combined capacity of 296 megawatts were accredited and commenced generation. These figures reflect the relatively short period of time since the new target was legislated and the observed slowdown in investment while the target remained under review. Based on industry and published sources, we estimate additional capacity of around 9 000 megawatts of large-scale renewables projects have development approval. If built, this is more than sufficient to meet the 2020 target.

The spot market for large-scale generation certificates is sending a strong price signal that new projects are required. At the end of 2015 the large-scale generation certificate spot price was just over $72. This is a significant increase compared with $33 at the beginning of 2015. The average large-scale generation certificate spot price over the 52 weeks of 2015 was $54. The spot price remained well below the post-tax equivalent shortfall charge of $93 (per certificate).[5]

2 Note that more than 33 000 gigawatt hours of generation will be required in 2020 to meet the legislated target to accommodate additional demand for large-scale generation certificates from the ACT Government renewable electricity consumption target, voluntary initiatives such as GreenPower, permitting requirements, and the 850 gigawatt hours annual target for waste coal mine gas fired generation.

3 The Hon. Greg Hunt MP and the Hon. Ian Macfarlane MP, Media release: 'Certainty and growth for renewable energy', 23 June 2015.

4 Committed projects are large-scale renewable energy projects that have received all development approvals and a final investment decision within the normal commercial understanding of that term. Finance approvals are independently verified.

5 The cost of certificates surrendered against liability is tax deductible, however the shortfall charge of $65 is not. For an entity paying full corporate tax the shortfall charge is equivalent to a cost of $93 per large-scale generation certificate.

The deadline for acquitting Large-scale Renewable Energy Target liability for the 2015 calendar year was 15 February 2016. Following this deadline, a surplus of approximately 18 million large-scale generation certificates were held in Renewable Energy Certificate Registry (REC Registry) accounts.

Overall compliance with large-scale liability for 2015 remained high with 99.4 per cent of large-scale generation certificates surrendered on time.

However, seven liable entities had a shortfall of 10 per cent or more of their total large-scale generation certificate liability for the 2015 assessment year. These liable entities were required to pay a shortfall charge. They can surrender certificates to acquit their 2015 shortfall within three years and come back into compliance with their obligations. We publish on our website the name of each liable entity that has a large-scale generation shortfall, and the amount of such shortfall, under section 134 of the *Renewable Energy (Electricity) Act 2000*.

The Australian Energy Market Commission (AEMC) estimates[6] that at a national level in the retail market, the compliance costs of the Large-scale Renewable Energy Target account for 1.9 per cent of electricity prices or an average of $7.13 per quarter on a household electricity bill. The overall impact on electricity prices may be less as the Large-scale Renewable Energy Target can also lower wholesale electricity prices.[7]

Progress indicators, data and analysis can be found on pages 63 to 76 of this report.

Looking forward

The total capacity of committed new build in 2016 will need to be around 3 000 megawatts for satisfactory progress towards the 2020 target.[8]

Financing is the key determinant of the pace of future construction. Evidence from the market indicates that procurement processes are underway for additional supply of large-scale generation certificates and renewable electricity. For instance, in recent months major electricity corporations and state-owned entities have announced tenders for renewable energy projects (see page 66). We will report the extent of committed new projects in future annual statements.

6 *2015 Residential Electricity Price Trends*, Australian Electricity Market Commission, 2015. As the Renewable Energy Target operates on a calendar year, the quoted figures average the 2014–15 and 2015–16 financial year estimates by the Australian Energy Market Commission.

7 The Large-scale Renewable Energy Target encourages a greater supply of generation which should place downward pressure on wholesale prices. Sources: Australian Energy Market Commission, *2015 Residential Electricity Price Trends*, 2015 and Expert Panel, *Renewable Energy Target Report of the Expert Panel Review*, 2014.

8 A lower capacity committed in 2016 would not necessarily mean the target may not be met. The difference would need to be committed early in 2017 to ensure adequate liquidity to meet the annual statutory demand targets to 2020.

The surplus of large-scale generation certificates provides a buffer for liable entities to avoid incurring shortfall charges in 2016 and 2017, as it allows time for new renewable projects to be committed, constructed and start generating power and supplying new large-scale generation certificates.

Over the coming years this surplus will diminish. As large-scale generation certificate holdings are concentrated in relatively few hands, there may not be sufficient liquidity in the market for liable entities to rely on the spot market to meet their future obligations. To continue to comply with their obligations, it would be prudent for all liable entities to take steps to secure sufficient large-scale generation certificates to surrender in future years. Paying the renewable energy shortfall charge, rather than surrendering certificates, is non-compliance with the Large-scale Renewable Energy Target.[9] We are engaging with liable entities to manage compliance obligations.

9 See Explanatory Memorandum to the Renewable Energy (Electricity) Bill 2000, and explanatory materials to its 2009 and 2010 amendments, and the Renewable Energy (Electricity) (Charge) Amendment Bill 2009 Explanatory Memorandum.

"PROGRESS IN 2015 WAS ADEQUATE UNDER THE CIRCUMSTANCES AND THE LARGE-SCALE RENEWABLE ENERGY TARGET IN 2020 IS ACHIEVABLE."

Chair's review

New target

This past year included a significant turning point for the Renewable Energy Target. In June 2015, the Australian Parliament passed a bill to amend the 2020 target from 41 000 gigawatt hours (41 million megawatt hours) to 33 000 gigawatt hours (33 million megawatt hours). It also increased the partial exemption for emissions-intensive trade-exposed industries to full exemption. This ended 18 months of review and speculation about the Renewable Energy Target's future, and we are beginning to see confidence return to the market.

Efficient operation

While the target was under review, the Large-scale Renewable Energy Target and the Small-scale Renewable Energy Scheme continued to operate efficiently behind the scenes and drive both supply and demand in the renewable energy certificate market.

In 2015, the Renewable Energy Target once again achieved its objectives of:

- Encouraging additional generation of renewable electricity—15.2 million megawatt hours of electricity was generated from large-scale renewable power stations and an estimated 8.9 million megawatt hours was generated or displaced from small-scale systems, mainly rooftop solar photovoltaics (solar panels).
- Reducing greenhouse gas emissions—the Renewable Energy Target increases the amount of renewable electricity in Australia's electricity generation mix. This means less generation from coal and other fossil fuel based electricity generators, thereby contributing towards lowering overall emissions from Australia's electricity sector.
- Ensuring ecologically sustainable renewable energy sources—all renewable energy linked to renewable energy certificates was generated from ecologically sustainable energy sources.

Trends

While we accredited another 41 renewable power stations under the Large-scale Renewable Energy Target in 2015, the cumulative capacity of all renewable power stations grew at a slower rate than the number of power stations (see page 41). This reflects a trend towards investment in commercial and industrial solar systems, which are much smaller than utility scale power stations.

Solar farms made up the majority of new accredited renewable power stations for the second year in a row. In 2015, the total capacity of large-scale solar power stations was 172 megawatts, more than tripling in the cumulative capacity from 2014. The rate of uptake of solar panel installations on commercial and industrial sites also increased.

There has been a large surplus of certificates since the Renewable Energy Target was split into the large-scale and small-scale schemes in 2011. However, the surplus of 25.5 million large-scale generation certificates on 14 February 2015 was reduced to 18 million certificates after the 15 February 2016 surrender date. This marks a transition, with the surplus now expected to reduce more quickly to a lower level of liquidity. This is due to the time lag between the commitments to new projects and when these projects actually begin generating renewable energy.

The gradual downward trend in annual installations under the Small-scale Renewable Energy Scheme continued in 2015. Small-scale installations (mainly rooftop solar panel systems) peaked in 2011–12, primarily due to additional financial incentives from the former solar credits multiplier initiative and state-based feed-in tariffs.

Despite the overall decline in small-scale installations in 2015 compared with 2014, and the slight decline in total new installed capacity, the average capacity of solar panel systems installed increased. In 2015, the average small-scale solar panel system capacity increased to 4.9 kilowatts from 4.4 kilowatts in 2014, almost double the average system capacity in 2011 (see more information on page 25).

Nevertheless, demand for household solar installations has remained solid and we will watch with interest the impact of new financing options and the anticipated uptake of household solar battery storage (see the feature on page 33).

Compliance

Our objective is to achieve a high rate of voluntary compliance. We engage with liable entities and broader stakeholder groups to explain legal obligations, facilitate market participation and ensure market integrity. Liable entity compliance with their obligation was once again very high in 2015. In aggregate, they surrendered 99.7 per cent of the required number of renewable energy certificates on time.

Our certificate validation activities are an important component of maintaining the integrity of the Renewable Energy Target certificate markets.

Each year we investigate alleged breaches of the *Renewable Energy (Electricity) Act 2000*. One of our investigations in 2015 prompted the replacement of non-genuine solar panels on around 180 rooftops across two states (see the feature on page 40).

We also inspect a percentage of small-scale systems for compliance with required standards. Our inspection program has identified a recurring issue with direct current isolator switches. In response, we informed state and territory safety regulators, the Clean Energy Council and other relevant bodies. As a result, the matter has been referred to Standards Australia and industry guidelines are being updated.

In addition, all renewable power stations we inspected during the year were found to comply with the legislation.

Upturn

The year finished on a strong and positive note. The Australian community recognises renewables as a practical means to reduce greenhouse gas emissions. Costs are falling, particularly at the large-scale end, and innovations such as battery storage and smart control systems have captured the popular imagination. New approaches to finance look set to lift investment in renewable energy projects and widen participation in the small-scale scheme. We look forward to continued achievement of the objectives of the Renewable Energy Target in 2016.

Chloe Munro
Chair, Clean Energy Regulator

Chapter 2

How it works

The schemes

The Renewable Energy Target is a government initiative designed to increase the overall amount of Australia's electricity generated from renewable sources. It does this through two schemes:

- the **Large-scale Renewable Energy Target**, which encourages new investment in large-scale renewable energy such as solar farms, wind farms, hydro-electric and waste power stations, and
- the **Small-scale Renewable Energy Scheme**, which encourages small-scale renewable energy system installations, such as household solar panels and solar water heaters.

HOW ARE WE TRACKING?

Since the Renewable Energy Target was established in 2001:

- 482 renewable power stations have been accredited—capable of generating more than 16.7 million megawatt hours[10] of electricity a year, and
- 2.5 million small-scale systems have been installed—capable of generating or displacing around 8.9 million megawatt hours of electricity a year.

The 2020 target

Around one-third of Australia's greenhouse gas emissions are related to electricity generation.[11] The Renewable Energy Target recognises the important role of renewable energy in reducing emissions in this sector.

The Large-scale Renewable Energy Target is for 33 million megawatt hours of additional renewable electricity to come from renewable sources by 2020, delivered through renewable power stations.

Additional electricity will come from the installation of small-scale systems.

10 The estimation of megawatt hours of renewable electricity considers variable such as capacity factors for each renewable energy technology and other factors that may affect capacity to generate electricity.

11 *Electricity generation emissions projections 2014–15*, Department of the Environment.

Legislation

The Renewable Energy Target is underpinned by the:

- *Renewable Energy (Electricity) Act 2000*, which sets out the aims of the scheme including the annual targets, creates liabilities, provides for registration of persons and accreditation of renewable power stations, and establishes the market for renewable energy certificates
- *Renewable Energy (Electricity) Amendment Act 2015*, which changed the 2020 target from 41 million megawatt hours to 33 million megawatt hours, and increased the exemption for emissions-intensive trade-exposed industries to 100 per cent
- *Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000*, which provides the rate of charge for the applicable renewable energy shortfall charge for the Large-scale Renewable Energy Target
- *Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010*, which provides the rate of charge for the applicable renewable energy shortfall charge for the Small-scale Renewable Energy Scheme, and
- Renewable Energy (Electricity) Regulations 2001, which provide details on issues including eligibility criteria for renewable energy sources, set the rate of liability and therefore demand for certificates, and provide criteria for accreditation of renewable power stations and eligibility requirements for small-scale systems.

Objectives

The objectives of the *Renewable Energy (Electricity) Act 2000* are to:

- encourage additional generation of electricity from renewable sources
- reduce emissions of greenhouse gases in the electricity sector, and
- ensure that renewable energy sources are ecologically sustainable.

HOW ARE WE TRACKING?

In 2015:

- 15.2 million megawatt hours were generated from large-scale renewable sources
- 8.9 million megawatt hours were generated or displaced from small-scale renewable systems, and
- 12 different ecologically sustainable sources of renewable electricity were used.

Photo acknowledgement: Clean Energy Regulator, Alice Springs NT

The renewable energy certificate market

The Renewable Energy Target works by creating a market for renewable energy certificates. Like any market, it is based on supply and demand.

Supply

A renewable energy certificate can be created for each megawatt hour of renewable energy generated or displaced.

These certificates are either small-scale or large-scale:

- **Small-scale technology certificates**—individuals or businesses that have installed small-scale renewable energy systems can create, or assign their right to create, small-scale technology certificates. One small-scale technology certificate is equivalent to one megawatt hour of renewable electricity generated by small-scale solar, wind or hydro systems, or displaced (no longer required from the grid) by solar water heaters or air source heat pumps. These certificates are created upfront based on the estimated amount of renewable energy the system will generate or displace over its lifetime. See page 29 for details.
- **Large-scale generation certificates**—operators who have generated electricity from accredited renewable power stations can create large-scale generation certificates. One large-scale generation certificate is equivalent to one megawatt hour of renewable electricity generated above the renewable power station's renewable power baseline. These certificates are created after the electricity is generated. See page 48 for details.

Demand

The Renewable Energy (Electricity) Act 2000 requires liable entities to surrender certificates to us, to meet their renewable energy obligations.

Liable entities are wholesale purchasers of electricity. They have separate obligations for both the Small-scale Renewable Energy Scheme and the Large-scale Renewable Energy Target. These obligations require them to surrender a certain number of renewable energy certificates in proportion to the amount of electricity they acquired during the year.

If liable entities do not purchase and surrender enough certificates each year, they are not compliant with the scheme and must pay a shortfall charge of $65 per certificate. This is not tax deductable.

For detailed information about liability and the percentages that determine the amount of certificates liable entities must surrender (the renewable power percentage and small-scale technology percentage) see page 54.

Voluntary surrender of certificates

Owners of certificates can choose to surrender certificates for any reason. For example, supporting the generation of electricity from renewable energy sources over and above the Renewable Energy Target or meeting GreenPower obligations (a voluntary state government accreditation program). This is known as voluntary surrender.

Individuals or companies may also choose to offer certificates for surrender to offset the impacts of improper creation of certificates. If offers are made for these reasons they are considered to be non-compliance surrender offers to ensure the integrity of the scheme.

HOW ARE WE TRACKING?

Market activity in 2015:

- 32.3 million certificates were validated
- 123.4 million certificate transfers occurred
- 1.3 million certificates were voluntarily surrendered, and
- 39.8 million certificates were surrendered against liability obligations.

Certificates accepted for voluntary surrender are permanently removed from the market and cannot be transferred to another party or used to acquit a mandatory surrender liability under the Act.

In 2015, a total of 1 324 434 certificates (representing 114 offers) were accepted for voluntary surrender in the REC Registry. More than 98 per cent of these were large-scale generation certificates.

A total of 1 293 094 certificates were surrendered to meet GreenPower obligations.

“THE AUSTRALIAN COMMUNITY RECOGNISES RENEWABLES AS A PRACTICAL MEANS TO REDUCE GREENHOUSE GAS EMISSIONS.”

Secondary market

Since renewable energy certificates are like a form of currency that can be sold or transferred at negotiated prices, there is a secondary market. It includes financial institutions, traders, agents and installers.

On the secondary market, large-scale renewable energy certificates and small-scale technology certificates that we have previously validated can be bought and sold.

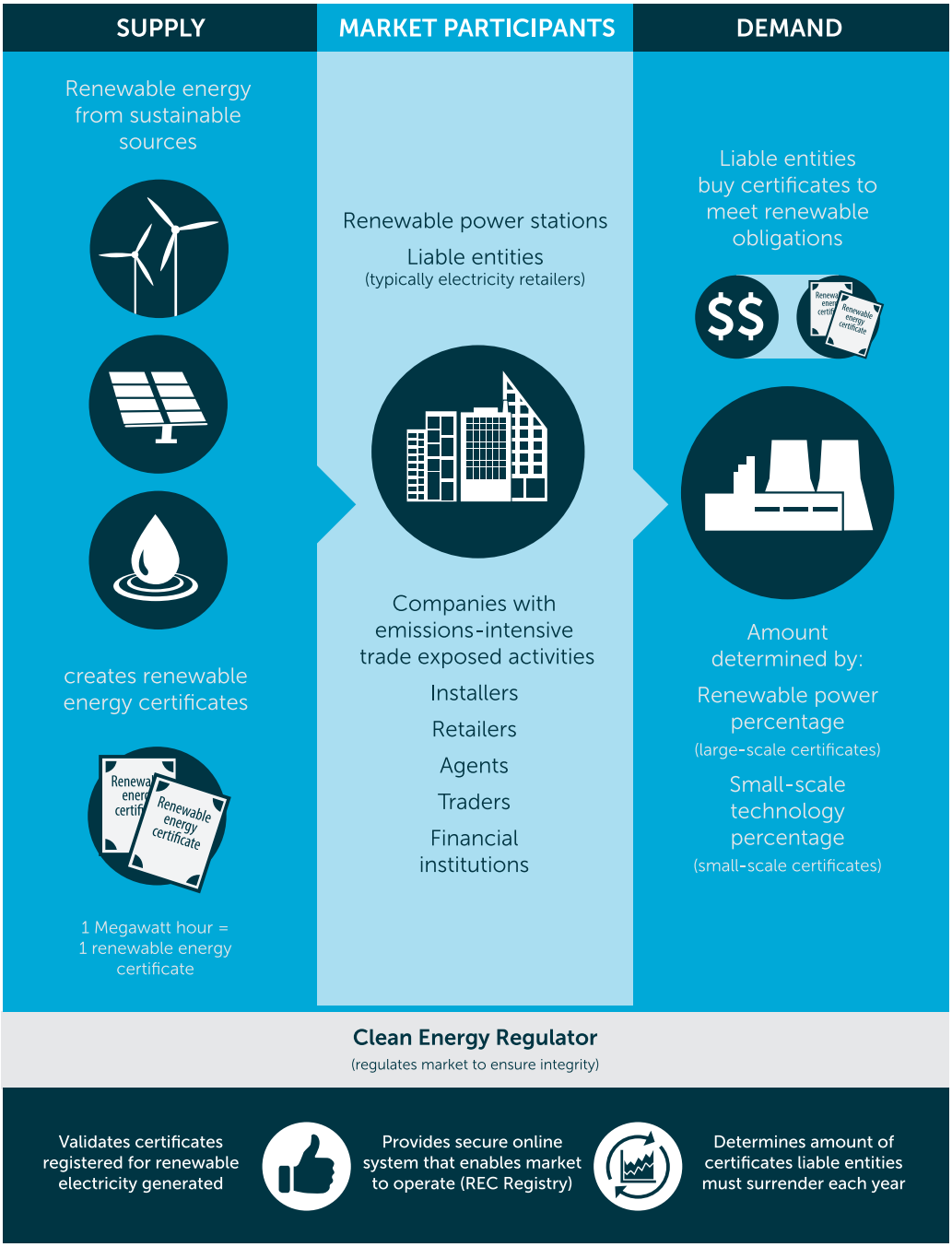
We are not actively involved in the secondary market, but we do provide the REC Registry to facilitate transactions between parties. We also liaise with market participants to help them understand the workings of the schemes to ensure an efficient market for renewable energy certificates.

Clearing house

The Small-scale Renewable Energy Scheme has no set target. This means it is driven by supply, with demand set annually to equal the expected supply through the small-scale technology percentage (see page 54).

To provide liquidity to the market, a small-scale technology certificate clearing house provides certificates at a fixed price of $40, effectively setting a maximum price and ensuring sufficient certificates are always available for liable entities to meet their obligations.

Figure 1: The renewable energy market



Our role in the market

We manage the Large-scale Renewable Energy Target and Small-scale Renewable Energy Scheme as part of our purpose of accelerating carbon abatement for Australia.

Specifically, we:

- advise the Minister for the Environment about the amount of certificates liable entities must buy and surrender each year, determined through the:
  - » small-scale technology percentage—for small-scale technology certificates under the Small-scale Renewable Energy Scheme, and
  - » renewable power percentage—for large-scale generation certificates under the Large-scale Renewable Energy Target
- issue exemption certificates for emissions-intensive trade-exposed activities
- provide the secure online system that enables the market to operate
- register market participants, and
- oversee the operation of the market to ensure its integrity.

Exemption certificates

We issue exemption certificates for certain emissions-intensive trade-exposed activities. Each exemption certificate states the amount of electricity that is exempt from liability under the Renewable Energy Target. These certificates can then be transferred to the liable entity named on the certificate. That liable entity can use the certificate to reduce their liable acquisitions by the same amount.

Secure system

We provide the secure online REC Registry. Buyers and sellers use the REC Registry for all Renewable Energy Target transactions including creating, registering, selling, trading and surrendering certificates.

We also use the REC Registry to assess new account applications, validate certificates and report on certificate activity.

Public registers are also available through the REC Registry. They include information about the Renewable Energy Target, such as certificate data for analysts.

Market participants

To create certificates, individuals and companies must apply to become a 'registered person' or 'registered agent'. Registered persons can create large-scale generation certificates from renewable power stations (see page 41 for details). Registered agents create the majority of small-scale technology certificates and have the ability to create certificates assigned to them from system owners.

During 2015 we approved 159 registered persons, bringing the total to 7 585, and 72 registered agents, bringing the total to 1 575.

Operation of the market

We oversee both supply and demand to ensure the efficiency and integrity of the market. This involves:

- validating certificates—scheme participants creating certificates must provide thorough supporting documentation before we validate certificates
- engaging with clients and stakeholders—we work with a wide range of stakeholders and clients to communicate regulations, policy and procedures, provide information to facilitate market participation and educate liable entities about their obligations and how to comply
- undertaking compliance activities—we monitor and enforce compliance if necessary, including working with other regulators and law enforcement bodies, and carrying out inspections of small-scale systems (see page 34), investigations into possible breaches of the *Renewable Energy (Electricity) Act 2000* (see page 36), and monitoring inspections of renewable power stations (see page 52), and
- market monitoring and reporting—we track and report on key market trends. Further information about market trends is included in the Progress toward the Large-scale Renewable Energy Target (see page 63).

We do not oversee certificate transfer or payment arrangements (buyers and sellers negotiate this directly) or regulate certificate prices (this is market-driven, determined by factors including supply and demand).

Chapter 3

Small-scale Renewable Energy Scheme

Overview

During 2015, the Small-scale Renewable Energy Scheme continued to encourage investment in small-scale renewable energy systems. These are mainly solar panel systems on residential rooftops but also commercial-sized solar panel systems such as those on schools, businesses and hospitals. While the number of installations was less than last year, continuing a gradual downward trend since 2011, the average system capacity has increased.[12]

Small-scale system installations

The Small-scale Renewable Energy Scheme creates a financial incentive for owners to install eligible small-scale renewable energy systems. These include solar panel, small-scale wind and small-scale hydro systems as well as solar water heaters and air source heat pumps.

As at 25 February 2016, we recorded a total of 188 902 small-scale systems installed in 2015. Of these, 137 468 were solar panel systems. This brings the total number of systems to 2 479 079 since the scheme was introduced in 2001.

HOW ARE WE TRACKING?

Small-scale systems installations:

- 188 902 new small-scale systems installed in 2015 comprising:
  - » 137 468 solar panel system installations
  - » 42 525 solar water heater installations
  - » 8 898 air source heat pump, and
  - » 11 small-scale wind installations
- total number of small-scale installations now more than 2.4 million.

12 The data that informs this chapter is accurate as at 25 February 2016. However, small-scale technology certificates can be created up to 12 months after a system is installed so we expect a slight increase in the final number of installations in 2015. For up-to-date figures, please refer to our website.

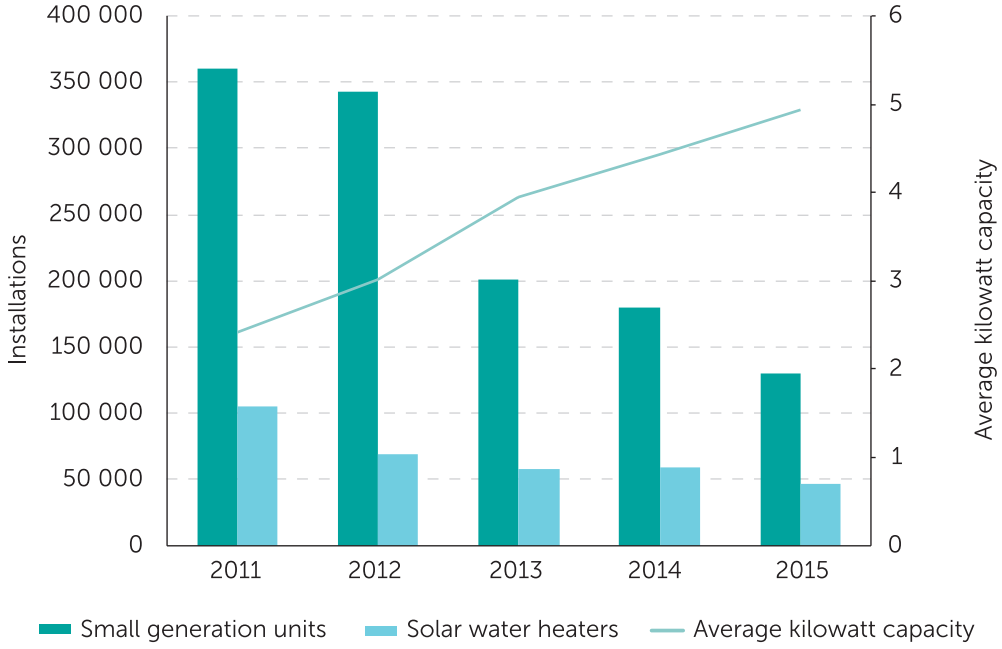
These small-scale systems have the capacity to generate or displace around 8.9 million megawatt hours of renewable electricity each year—enough to power around 1.4 million average Australian households.

Around 73 per cent of the small-scale installations in 2015 were solar panel systems, with the majority of the remainder being solar water heaters. There were 11 small-scale wind installations and no small-scale hydro installations in 2015.

Since 2011 there has been a consistent decline in small-scale system installations. There were fewer installations in 2015 than in 2014 when 238 876 small-scale systems were installed. However, the average system size has increased from 4.4 kilowatts to 4.9 kilowatts. This trend is consistent with previous years, as shown in Graph 1.

A number of factors may have contributed to this trend, including market saturation and changes to state and Commonwealth funding arrangements.

Graph 1: Number of small-scale system installations since 2011



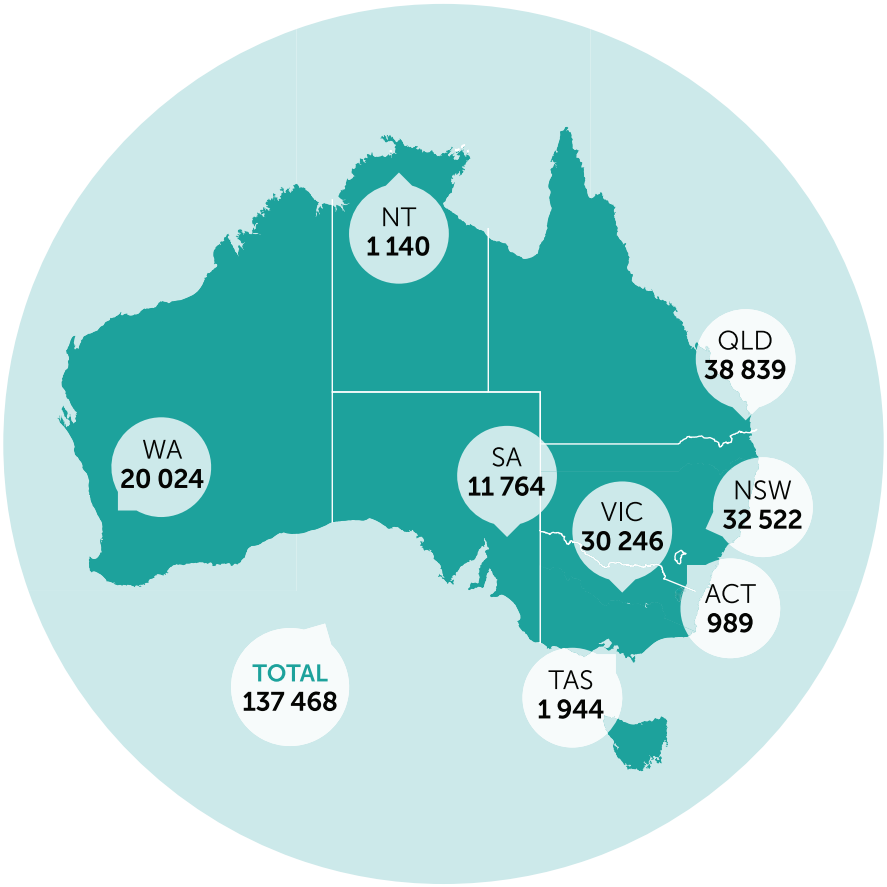
Note: Given the 12 month period for creating small-scale technology certificates, the number of installations will continue to rise.

Small-scale solar panel system installations

Figure 2 shows the number of system installations by state during 2015. Queensland had the highest proportion of all installations (28 per cent) followed by New South Wales (24 per cent) and Victoria (22 per cent).

A total of 130 667 residential-sized solar panel systems (1 to 10 kilowatts) and a total of 6 801 commercial-sized solar panel systems (10 to 100 kilowatts) were installed Australia-wide in 2015. This is a 0.4 per cent decrease on the number of commercial-sized systems installed in 2014. However, when compared with total installations for 2015 this demonstrates a continuing trend of larger systems entering the market. New South Wales had the highest number of commercial-sized solar panel installations, with 2 288 installed during 2015.

Figure 2: Small-scale solar panel installations in 2015



Feature

Changing solar market

As the Australian renewable energy market evolves, the potential of solar panel systems is expanding beyond the small-scale residential sector and into business and industry. These commercial-size solar panel systems are being installed in industrial estates, bakeries, supermarkets, schools, retirement villages, hospitals, community centres, airports, zoos and even old power stations, at an increasing rate.

As the popularity of commercial-size solar panel systems increases, more system owners may be attracted to the benefits of generating renewable electricity.

Depending on the size of the system, owners of commercial-sized installations may be eligible to participate in either the Small-scale Renewable Energy Scheme or the Large-scale Renewable Energy Target.

Under the Small-scale Renewable Energy Scheme, system size is capped at 100 kilowatts and certificates are created upfront based on the amount of renewable electricity expected to be generated over the system's lifetime. Alternatively, owners of systems over 10 kilowatts may choose to participate in the Large-scale Renewable Energy Target where certificates are created after generation, based on the actual amount of renewable electricity generated.

At the end of 2015, certificates created under the Large-Scale Renewable Energy Target were worth almost double the value of the certificates created under the Small-scale Renewable Energy Scheme.

The uptake of commercial-scale renewable energy systems, and their size, is expected to grow in the future. The benefits of participating in the Renewable Energy Target are clear. All businesses who are considering installing solar systems are encouraged to research which scheme under the Renewable Energy Target is right for them.

Photo acknowledgement: Clean Energy Regulator, small-scale installation

Small-scale technology certificates

Once small-scale renewable energy systems are installed and capable of producing electricity or delivering hot water, small-scale technology certificates can be created.

Under the Small-scale Renewable Energy Scheme, participants can create small-scale technology certificates up to 12 months after the system is installed. This means that during 2015 we validated small-scale technology certificates created for systems installed in both 2014 and 2015.

HOW ARE WE TRACKING?

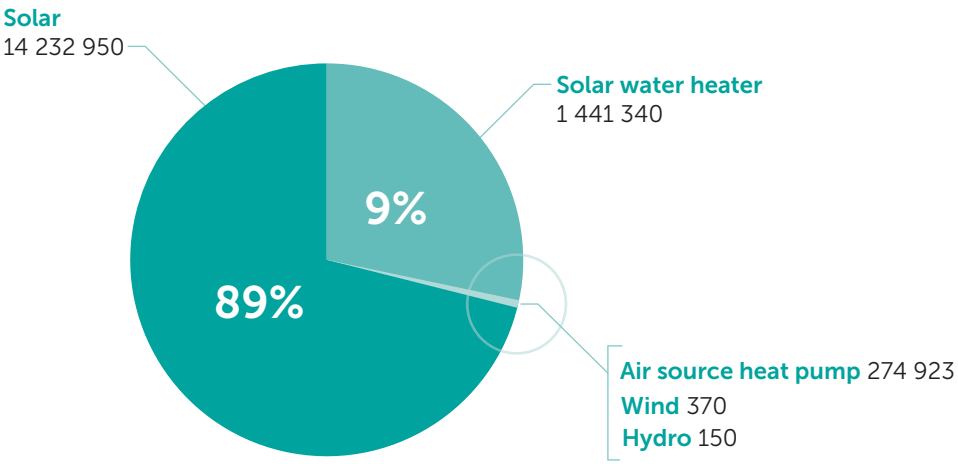
Small-scale technology certificates in 2015:

- 15.9 million validated—reflects 15.9 million megawatt hours of renewable energy estimated to be generated or displaced over the lifetime of the systems.

Small-scale technology certificate creation

During 2015, a total of 15 949 733 small-scale technology certificates were validated for small-scale installations. This is down from the 18 784 182 small-scale technology certificates validated in 2014. Of the certificates validated in 2015, 89 per cent were from solar panel systems and nine per cent from solar water heaters. The remainder of certificates came from air source heat pumps and small-scale wind and hydro systems.

Graph 2: Small-scale certificates validated in 2015



TOTAL 15 949 733

Small-scale technology certificate market

The *Renewable Energy (Electricity) Act 2000* requires liable entities to buy and surrender certificates to meet their renewable energy obligations. The small-scale technology percentage is determined annually and sets the number of small-scale technology certificates that liable entities must acquire and surrender during the year (more information about liable entities is on page 53).

Small-scale technology certificates may be sold and purchased through the secondary market or through the clearing house.

The small-scale technology percentage for 2015 was 11.7 per cent which was equivalent to 20.6 million certificates—made up of 17.5 million estimated small-scale technology certificates from systems installed in 2015, plus a three million certificate surplus that remained from previous years.

With only 15.9 million small-scale technology certificates being validated in 2015, demand for small-scale technology certificates outweighed supply. This resulted in regular use of the small-scale technology certificate clearing house.

Graph 3: Small-scale technology certificate secondary market spot price (GST exclusive) since 2011

Note: We source market prices from NextGen.Net, Thomson Reuters and Mercari.

“WHILE THE NUMBER OF SMALL-SCALE SYSTEM INSTALLATIONS WAS LESS THAN LAST YEAR... THE AVERAGE SYSTEM CAPACITY HAS INCREASED.”

Clearing house

The *Renewable Energy (Electricity) Act 2000* allows for a small-scale technology certificate clearing house.

The clearing house allows liable entities to buy small-scale technology certificates at a fixed price of $40 (GST exclusive) when supply from the open market does not meet their demand. Large-scale generation certificates are not available through the clearing house.

Demand for certificates is set by the small-scale technology percentage (see page 54). Electricity demand was above the level forecast by the small-scale technology percentage, resulting in an under-supply of certificates in the market and the price of small-scale technology certificates rising during the year. The market price reached $40 in March 2015 (see Graph 3).

The increase in demand for certificates from the clearing house resulted in it going into deficit for the first time.

The clearing house goes into deficit when insufficient small-scale technology certificates are available to purchase. When this occurs, we create 'Regulator created small-scale technology certificates' for buyers to purchase. These certificates can be traded and surrendered like any other certificate. Over time as small-scale technology certificates become available in the clearing house, they are offset against the deficit and cancelled.

HOW ARE WE TRACKING?

Clearing house in 2015:

- 4 513 purchases valued at $248.8 million, involving a total of 6 219 809 small-scale technology certificates, and
- a deficit of around 600 000 small-scale technology certificates at the end of 2015.

The clearing house went into deficit a number of times during 2015, with the highest deficit of more than 2.5 million small-scale technology certificates occurring in October 2015. The clearing house has remained in deficit since then, with a deficit at the end of 2015 of around 600 000 small-scale technology certificates.

In 2015, there was $248.8 million worth of purchases through the clearing house. The largest purchase was for $29.7 million worth of small-scale technology certificates.

Feature

Battery storage

Household solar battery storage has been in the media spotlight lately, with Australians expected to lead the way in the uptake of this new technology. Australia is seen as a 'test ground' for small-scale battery storage because of the popularity of rooftop solar—already on around 15 per cent of households—combined with reductions in feed-in tariffs for returning excess power to the grid, and the significant price difference between peak and off-peak electricity.

People who have already installed solar panels may see value in using a battery to store the excess solar energy they generate during the day and use it later, rather than returning it to the grid at lower feed-in tariff rates during the day and paying peak prices for electricity in the evening. This option gives consumers greater control over their electricity bill.

The focus of the Renewable Energy Target is to encourage additional generation of renewable energy. There is no direct incentive through the scheme for adding battery storage to new or existing solar panel systems.

However, when small-scale technology certificates are created for new solar installations we ask whether a storage battery has also been installed. In 2015, a total of 472 of around 130 000 on-grid solar panel systems reported a concurrent battery installation.

Information for consumers who are considering battery storage with their rooftop solar is available on industry association websites including the Clean Energy Council, Australian Solar Council and Australian Energy Storage Council. These associations have information about reputable products and accredited installers.

Photo acknowledgement: Clean Energy Regulator, small-scale solar installation

Inspections of small-scale systems

Each year we inspect a statistically significant number of installed small-scale renewable energy systems for compliance with the Small-scale Renewable Energy Scheme. The inspections program allows the Clean Energy Regulator to monitor the increased installation demand resulting from Renewable Energy Target incentives impacts installation standards.

HOW ARE WE TRACKING?

Small-scale system inspections in 2015:

- 2 080 inspections undertaken
- 127 systems were found to be unsafe, and
- 409 were found to be substandard.

Our service providers carry out the inspections under section 23AAA of the *Renewable Energy (Electricity) Act 2000*. We have deeds of standing offer in place for inspection services with six providers: Global Sustainable Energy Solutions, Master Electricians Australia, the Australian Solar Council, IT Power, Techsafe and SpringCity. All inspectors hold an unrestricted electrical license in the state or territory where they conduct inspections, as well as Clean Energy Council accreditation.

Most inspections are of solar panels on residential rooftops, with a small proportion of commercial sites and schools also inspected. As required under the *Renewable Energy (Electricity) Act 2000*, we select a statistically significant sample of systems for inspection, typically within 12 months of installation, based on the number of installations for which small-scale technology certificates are created and their geographical location.

All inspection reports are referred both to state and territory electrical safety regulators as well as the Clean Energy Council which manages accreditation of solar panel installers. We are not an electrical safety regulator and have no power to directly require any verification work.

If a Clean Energy Regulator inspector finds an unsafe system, under their state or territory electrical licence they are required to render it safe. They are then required to notify all interested parties of the extent and nature of the safety risk, including the homeowner and the relevant state and territory electrical safety regulator. Any follow up is at the discretion of that state or territory regulator.

The majority of unsafe and substandard installations are attributed to water entry to direct current isolator switch enclosures, and installers failing to ensure that all direct current wiring in the building is enclosed in heavy duty conduit. Both relate to Australian Standards changes, effective from October 2012.

“THE UPTAKE OF COMMERCIAL-SCALE RENEWABLE ENERGY SYSTEMS, AND THEIR SIZE, IS EXPECTED TO GROW IN THE FUTURE.”

In February 2015 we convened a meeting of the Renewable Energy Target Inspection Advisory Committee (RIAC) to discuss the previously published results of our inspections with state and territory electrical safety regulators and peak industry bodies. The RIAC agreed that installation practices could be further improved and referred the matter to Standards Australia, and recommended Clean Energy Council installer guidelines should be updated to further improve system safety. The Clean Energy Council guidelines were revised, effective from September 2015.

The inspections program provides useful statistically significant information to electrical safety regulators and peak industry bodies to consider whether current standards and practices are adequate.

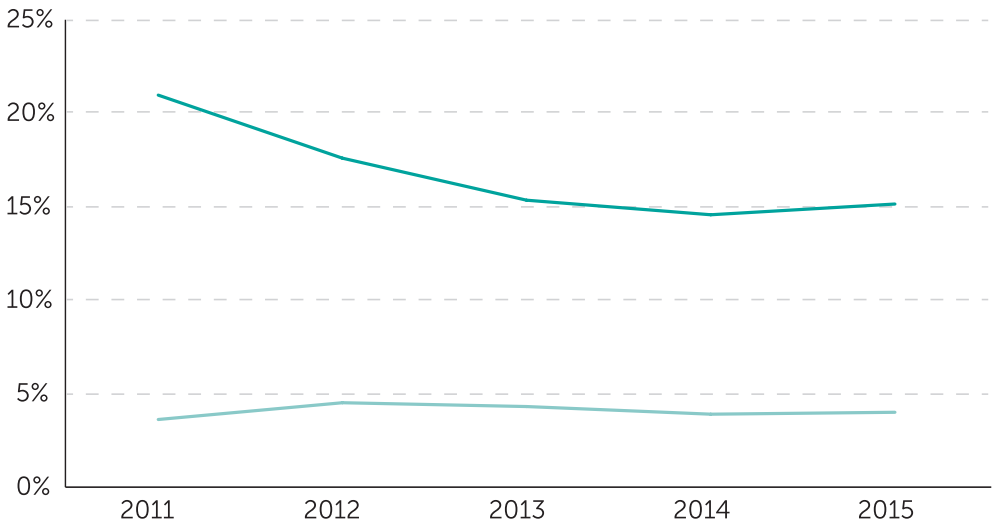
Table 1: Inspections of small-scale systems in 2015

State	Number of systems inspected	Systems safe	Systems unsafe*	Systems substandard*
ACT	8	6	0	2
NSW	387	296	27	64
QLD	754	503	54	197
SA	166	145	0	21
TAS	12	8	1	3
VIC	516	438	27	51
WA	237	148	18	71
Total	**2 080**	**1 544**	**127**	**409**

* As defined by the Clean Energy Regulator (see Glossary).
Note: Figures based on valid inspection reports first received. Due to the small sample size in any year, these figures should not be extrapolated. We publish total cumulative inspections data on our website.

Graph 4 shows a cumulative summary of results since the inspections program started in May 2011.

Graph 4: Cumulative inspections results since 2011



Investigations

We actively investigate allegations of breaches of the *Renewable Energy (Electricity Act) 2000*. In 2015, we received 134 matters related to possible breaches. We commenced 42 investigations, with 25 cases open as at 31 December 2015.

The majority of matters requiring further attention in 2015 related to the improper creation of certificates for solar panel installations, including providing false details, forging signatures and not installing systems.

In 2015 we closed 133 existing matters relating to the Act, including 41 investigations. These investigations resulted in:

- client education
- rectification of installations
- enforceable undertakings—two were agreed and two were closed in 2015 with a total of four remaining open as at 31 December 2015
- referrals to state police
- letters of advice/warning
- surrender of improperly created certificates—a total of 5 125 small-scale technology certificates were surrendered as a result of investigations, and
- suspended accounts—two REC Registry accounts were permanently suspended.

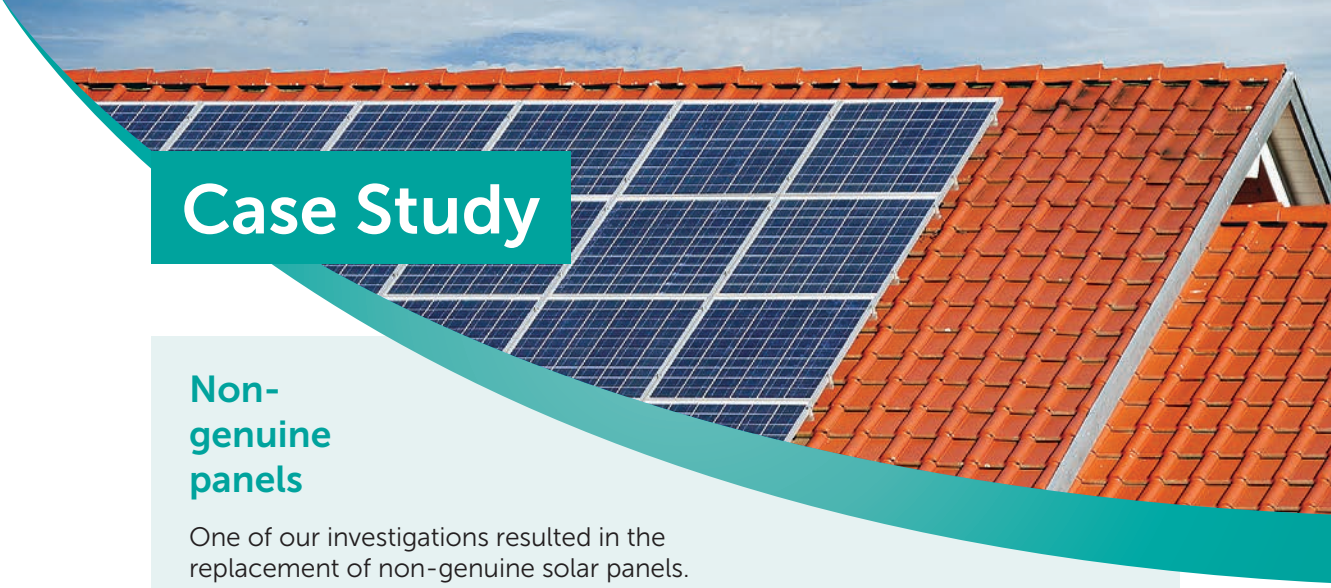
Photo acknowledgement: Clean Energy Council, small-scale solar installation

Our Compliance, Education and Enforcement Policy aims to achieve voluntary compliance. However, civil and criminal prosecutions are pursued where appropriate. During 2015 we referred one investigation to the Australian Federal Police for consideration and one investigation to the NSW Police Force.

No cases were referred to the Commonwealth Director of Public Prosecutions (CDPP) in 2015.

Two investigations referred to the CDPP in 2014 are still open:

- Mr Neville Voss has pleaded guilty to a number of charges under state and Commonwealth legislation, with sentencing in the Queensland District Court due in April 2016.
- In the other matter, the CDPP has indicated it is likely to issue a Court Attendance Notice in 2016 against a New South Wales individual involved in the improper creation of certificates.



Case Study

Non-genuine panels

One of our investigations resulted in the replacement of non-genuine solar panels.

After receiving a report from a Clean Energy Council accredited installer in May 2014 we investigated a Queensland-based solar system retailer that had gone into liquidation. The retailer is alleged to have sourced and supplied non-genuine (non-approved) solar panels, mislabelled them as approved Tier 1 solar panels, and installed them on 182 premises in New South Wales and Queensland.

Through the retailer, homeowners assigned the right to create certificates for their installations to Greenbank Environmental Pty Ltd. Greenbank—a registered agent trading small-scale technology certificates—paid the retailer around $500 000 for the right to the certificates. Greenbank then created approximately 14 000 small-scale technology certificates based on the false compliance information provided by the retailer.

Due to the nature of the retailer's actions, we released information to the New South Wales and Queensland Consumer Affairs and Electrical Safety authorities. We also inspected a sample of suspect installations to verify the panels and any issues concerning safety or non-compliance with installation standards and relevant laws.

We recognised the impact on the solar marketplace, and particularly on the system owners, of what appeared to be a deliberate act by the retailer to mislead system owners and Greenbank about the authenticity of the panels. We worked cooperatively with Greenbank and the solar panel manufacturer throughout the investigation to rectify the situation.

In November 2015, Greenbank entered into an enforceable undertaking with us, recognising that it had improperly created the certificates. Greenbank elected to replace the non-genuine panels with genuine panels, rather than surrender the certificates—agreeing to replace the panels within six months, or surrender equivalent certificates if the panels are not replaced within 12 months.

We are continuing our investigation into the operations and alleged fraudulent activities of the retailer. This case demonstrates that we consider claims of fraud seriously and take the actions necessary to ensure the integrity of the market.

Photo acknowledgement: Clean Energy Regulator, small-scale solar installation

Chapter 4

Large-scale Renewable Energy Target

Overview

During 2015 the Large-scale Renewable Energy Target continued to encourage investment in new large-scale renewable power stations, mainly solar. The total number of power stations accredited in 2015 was slightly less than 2014. The total power capacity of power stations accredited in 2015 was also slightly less than 2014.[13]

Renewable power stations

The Large-scale Renewable Energy Target creates a financial incentive to establish and expand renewable power stations such as wind and solar farms, and hydroelectric power stations. It also includes renewable power stations that use eligible forms of waste or by-products as energy sources.

HOW ARE WE TRACKING?

Renewable power stations in 2015:

- 41 accredited (38 were commercial and industrial scale with capacity less than 10 megawatts), and
- 296 megawatt capacity

Number and capacity

A total of 482 large-scale renewable power stations are now accredited under the Renewable Energy Target, with a combined capacity of approximately 13 652 megawatts. Together, they have the capacity to generate approximately 16.7 million megawatt hours of renewable electricity above baseline in a typical year.[14] For further information on baselines see page 46.

13 The data that informs this chapter is accurate as at 25 February 2016.

14 The estimation of megawatt hours of renewable electricity considers variables such as capacity factors for each renewable energy technology and other conditions that may affect capacity to generate electricity such as weather conditions.

The number of renewable power stations has increased each year since 2001. In recent years cumulative capacity has grown at a slower rate than the number of renewable power stations—highlighting a trend towards smaller renewable power stations. This trend is more pronounced from 2013 to 2015, as seen in Graph 5. A breakdown is in Appendix A.

There has been a 70 per cent rise in the number of accredited solar power stations since 2011. In 2015 solar power stations made up the majority of new accredited renewable power stations for the second year in a row and the total capacity of large-scale solar power stations almost tripled in the last 12 months.

In 2015, we accredited the two largest solar power stations in Australia—Broken Hill Solar Plant at 53 megawatt capacity and Nyngan Solar Plant at 102 megawatt capacity. These contributed to an increase of 172 megawatts of large scale solar power station capacity in 2015, with a total cumulative capacity of 232 megawatts across all years.

Energy sources

We categorise renewable power stations according to the renewable energy source used to create most of the station's large-scale generation certificates.

Eligible sources include solar energy, wind, hydro, geothermal-aquifers, wood waste, agricultural waste, bagasse (sugar cane waste), black liquor (a by-product of the paper-making process) and landfill gas. The list of all eligible renewable energy sources is in section 17 of the *Renewable Energy (Electricity) Act 2000*.

HOW ARE WE TRACKING?

Energy sources in 2015:

- 12 different eligible energy sources used by renewable power stations, and
- capacity of accredited solar power stations increased significantly by 172 megawatts.

The 482 renewable power stations fall into 12 out of 19 eligible categories. There are 107 hydro, 136 solar, 85 wind, 62 landfill gas and 28 wood waste, with the remaining 64 renewable power stations using a range of other renewable energy sources. No large-scale generation certificates created in 2015 can be attributed to native forest wood waste, which was reintroduced as an eligible category in June 2015.[15] Native forest wood waste is a sub-category of wood waste.

Figure 3 shows the megawatt capacity of renewable power stations across Australia.

15 Regulation 8 (1)(e) of the Renewable Energy (Electricity) Regulations 2001 provide the definition for native forest wood waste.

Graph 5: Growth in the number of accredited renewable power stations and their cumulative capacity since 2011

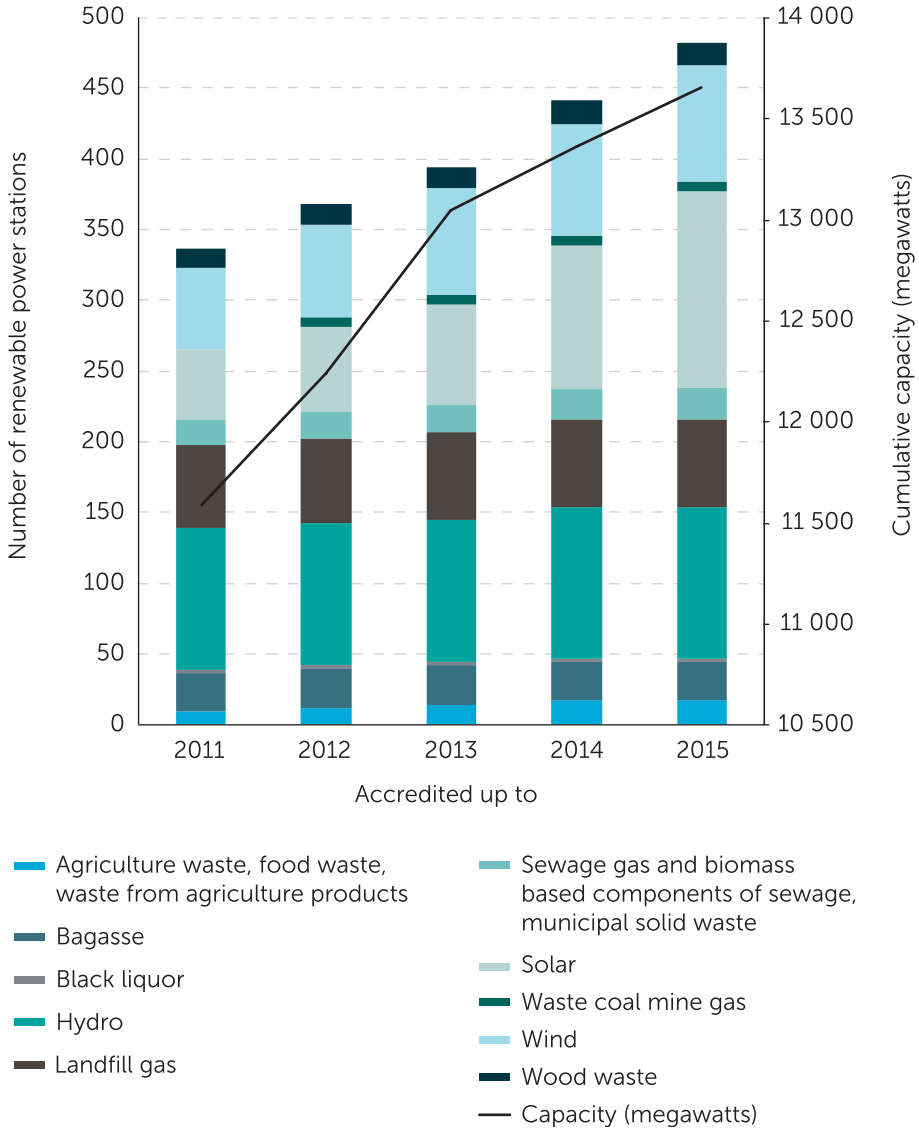
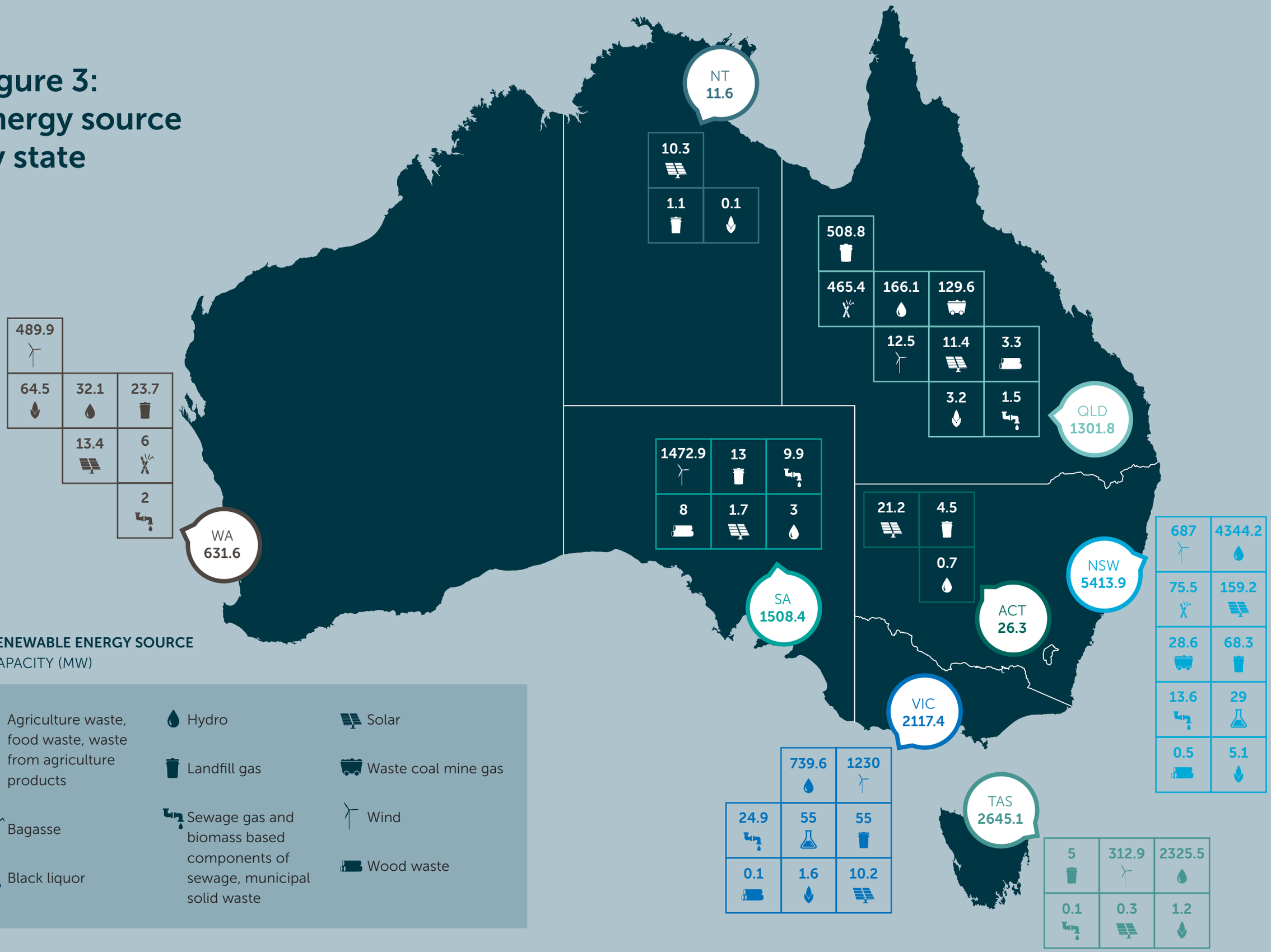


Figure 3: Energy source by state



RENEWABLE ENERGY SOURCE
CAPACITY (MW)

- Agriculture waste, food waste, waste from agriculture products
- Bagasse
- Black liquor
- Hydro
- Landfill gas
- Sewage gas and biomass based components of sewage, municipal solid waste
- Solar
- Waste coal mine gas
- Wind
- Wood waste

Baselines

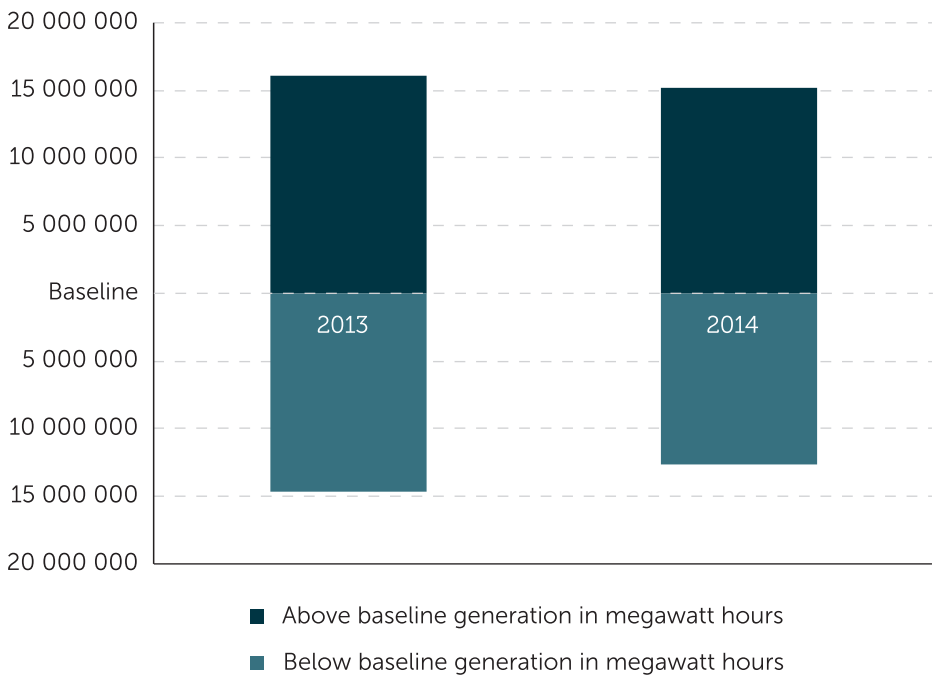
Accredited power stations are eligible to create certificates from electricity generation above their 1997 renewable power baselines (the baselines). Power stations with a baseline typically use hydro, bagasse and landfill gas as their eligible renewable energy sources.[16] The baseline for each power station is determined by the Clean Energy Regulator under the Regulations. The baseline for a renewable power station that was generating electricity before 1 January 1997 is determined by averaging the annual amount of electricity generated from eligible renewable energy sources by the power station over 1994, 1995 and 1996 years. Power stations which generated electricity for the first time after 1 January 1997 have a baseline of zero.

Renewable power stations can create renewable energy certificates for each megawatt hour of renewable power they produce above their baseline.

The calculation of a renewable power station's baseline is an important part of calculating how much of the electricity produced is eligible for creating renewable certificates.

By the end of 2015, renewable power stations had reported generating around 15.2 million megawatt hours of renewable energy above their baselines.

Graph 6: Baseline data comparison from 2013–2014



16 A full list of eligible renewable energy sources is on the Clean Energy Regulator website.

Photo acknowledgement: Clean Energy Regulator, Albany Wind Farm WA

Accreditation

In 2015 we accredited 41 new renewable power stations, comprising 37 solar, three wind and one using sewage gas and biomass-based components of sewage.

This was similar to the increase in 2014, when 47[17] renewable power stations were accredited, with the majority also solar.

HOW ARE WE TRACKING?

Renewable power stations accredited in 2015:

- 41 new renewable power stations
  - » 37 solar (172 megawatt capacity)
  - » 3 wind (113 megawatt capacity), and
  - » 1 sewage gas and biomass-based components of sewage (10 megawatt capacity).

Number of large-scale generation certificates created

In 2015 a total of 16 463 463 large-scale generation certificates were validated[18].

Graph 7 shows valid large-scale generation certificates by renewable energy source since 2011. As Graph 5 shows, the number of accredited solar power stations now exceeds the number of wind power stations. However, wind power remains the dominant source of large-scale generation certificates. The significant decline in certificates generated from hydro sources is consistent with water resource availability in this time line.

HOW ARE WE TRACKING?

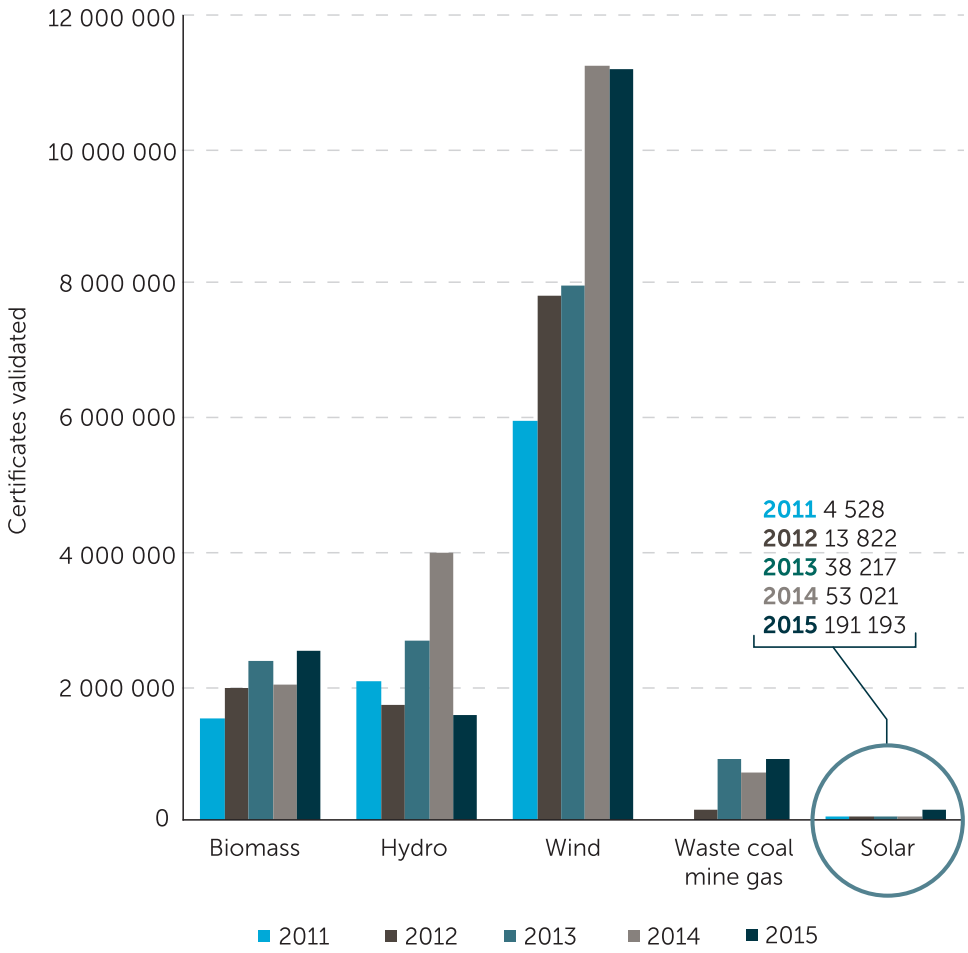
Large-scale generation certificates in 2015:

- 16.5 million validated.

17 The Renewable Energy Target *2014 Administrative Report* had 46 renewable power stations accredited in 2014. This has been revised to 47 because one renewable power station that was accredited in 2015 had an accreditation start date in 2014.

18 Some of these certificates relate to generation in 2014 and therefore the number of certificates validated differs to the megawatt hours of large-scale generation in 2015.

Graph 7: Valid large-scale generation certificates by renewable energy source since 2011[19]



In 2015, a total of 16.5 million large-scale generation certificates were validated. This is low as compared with 18.1 million large-scale generation certificates validated in 2014.

In 2015, hydro power stations generated less above-baseline electricity than the previous year as a result of lower rainfall and water releases. Consequently they created 1.7 million less certificates compared with 2014.

In contrast the number of certificates for electricity generated by wind has been increasing steadily for the last five years.

The largest percentage increase compared with previous years was from large-scale solar power generation. We expect this increase to accelerate in the coming years.

19 There was no waste coal mine gas generation in 2011 as it became an eligible generation source in 2012.

“THE TOTAL CAPACITY OF LARGE-SCALE SOLAR POWER STATIONS ALMOST TRIPLED IN THE LAST 12 MONTHS.”

Feature

Bagasse: recycling crop residue

One of Australia's pioneering rural industries has been generating and using renewable energy for more than 100 years.

The sugar cane industry has long been recycling crop residue to produce heat and electricity to power its factories. Known as bagasse, this by-product of sugar production is the fibrous material that remains after the cane is crushed to extract the juice.

The waste generated at the sugar mill is used onsite to power the sugar making process. This is a major benefit enabling mills to be self-sufficient in terms of energy generation. They can also sell excess electricity to the grid—most sugar cane mills export up to half of the power they generate from bagasse back into the national energy market.

Bagasse has zero greenhouse gas emission intensity. Using it as an energy source avoids having to transport the waste off-site or leave it to rot and breakdown, resulting in methane emissions.

Under the Renewable Energy Target, 28 renewable power stations are accredited with bagasse as their renewable fuel source, with a combined capacity of 539 megawatts. Most are located in Queensland and have been operating for over 100 years. Many were accredited at the start of the Large-scale Renewable Energy Target in 2001.

Electricity produced from bagasse contributes around five per cent of the large-scale generation certificates validated each year.

The use of bagasse to produce 'green' energy is estimated to reduce Australia's greenhouse gas emissions by over 1.5 million tonnes each year.[20]

Photo acknowledgement: Clean Energy Regulator, sugar cane harvest

20 Australian Sugar Milling Council, *Australian Sugarcane Industry Overview*, http://asmc.com.au/industry-overview/

Renewable power station monitoring inspections

We are authorised by the *Renewable Energy (Electricity) Act 2000* to perform monitoring inspections to substantiate information provided and determine compliance with the Act and the Renewable Energy (Electricity) Regulations 2001.

In 2015, we carried out a number of monitoring inspections of renewable power stations in addition to a range of checks to ensure validity of large-scale generation certificates. We selected these renewable power stations by applying a risk management approach following the submission of annual electricity generation returns.

All inspected renewable power stations were found to be compliant with the Act and Regulations.

In addition to monitoring inspections, our certificate validation activities also ensure power stations are complying with the Act and Regulations, and constitute another important component of maintaining the integrity of the Renewable Energy Target certificate markets.

Chapter 5

Liability under the Renewable Energy Target

Overview

Liable entities have an important role in achieving the Large-scale Renewable Energy Target of an additional 33 million megawatt hours of renewable electricity by 2020. They comply with their obligations by surrendering renewable energy certificates. In this way liable entities encourage generation of electricity from renewable energy sources within the Australian electricity sector.

For 2015, the compliance rate across both large-scale generation certificates and small-scale technology certificates was 99.7 per cent.

Liable entities

Liable entities are wholesale purchasers of electricity, mainly electricity retailers. They are the first to acquire electricity in a grid with an installed capacity of 100 megawatts or more.

HOW ARE WE TRACKING?

Liability compliance in 2015:

- 99.7% compliance with certificate surrender obligations.

To acquit their liability under the Renewable Energy Target, liable entities need to:

- lodge an energy acquisition statement and renewable energy shortfall statement (for the previous calendar year), on or before 14 February, and
- surrender enough large-scale generation certificates and small-scale technology certificates to meet their liability—in proportion to the amount of electricity they acquired during the year. If they don't surrender enough certificates they need to pay a shortfall charge of $65 for each certificate not surrendered.

The obligation for liable entities to surrender renewable energy certificates creates demand in the market.

Number of certificates required

Each year the Minister for the Environment sets the renewable power percentage (for large-scale generation certificates) and small-scale technology percentage (for small-scale technology certificates).

Renewable power percentage

The renewable power percentage for 2015 was 11.11 per cent. This means that to fully acquit liability in 2015, liable entities were required to surrender 18.9 million large-scale generation certificates.

The renewable power percentage establishes the rate of liability under the Large-scale Renewable Energy Target. It changes each year in proportion to the legislated annual targets as they increase to reach 33 million megawatt hours by 2020. Liable entities multiply their electricity acquisitions, minus any exemptions, by the renewable power percentage to determine how many large-scale certificates they must surrender each year.

The percentage takes into account:

- the legislated annual target (renewable electricity required for the year)
- certificates surrendered under or over the previous year's target
- the estimated amount of electricity that liable entities will acquire that year, and
- the estimated exemption in that year for emissions-intensive trade-exposed activities.

Small-scale technology percentage

The small-scale technology percentage for 2015 was 11.71 per cent. This means that to fully acquit liability in 2015 liable entities were required to surrender 20.6 million small-scale technology certificates.

The small-scale technology percentage establishes the rate of liability under the Small-scale Renewable Energy Scheme. It changes each year in proportion to the estimated supply of small-scale technology certificates. Liable entities multiply their electricity acquisitions, minus any exemptions by the small-scale technology percentage to determine how many small-scale technology certificates they must surrender each year.

The number of small-scale technology certificates that liable entities must surrender is based on the expected supply of small-scale technology certificates, rather than specified annual targets.

The small-scale technology percentage is calculated based on the:

- estimated value (in megawatt hours) of small-scale technology certificates that will be created for the year
- certificates surrendered that were under or over the previous year target
- accumulated excess or shortfall from previous years
- estimated amount of electricity that will be acquired by liable entities for the year, and
- estimated exemption for that year for emissions-intensive trade-exposed activities.

Exemption from liability

Companies that carry out emissions-intensive trade-exposed activities may be eligible for exemption.

Emissions-intensive trade-exposed activities are specified in the Renewable Energy (Electricity) Regulations 2001. They include aluminium smelting, zinc smelting, petroleum refining and newsprint manufacturing. A complete list of emissions-intensive trade-exposed activities is available on our website.

Move from partial to full exemption

Previously, the *Renewable Energy (Electricity) Act 2000* provided for partial exemption for electricity used in defined emissions-intensive trade-exposed activities. In June 2015 the Act was amended to allow for full exemption from liability for emissions-intensive trade-exposed activities.

Full exemption applies for 2015 onwards. Therefore we re-issued full exemption certificates for 2015 after the corresponding change in the Regulations. This change will also result in an adjustment to the 2016 renewable power percentage and small-scale technology percentage.

Applications for exemption

HOW ARE WE TRACKING?

Exemption given in 2015:

- 162 exemption certificates issued, totalling 38 024 941 megawatt hours, and
- 46 emissions-intensive trade-exposed activities covered.

Under the *Renewable Energy (Electricity) Act 2000*, prescribed persons may apply for exemption certificates. These are usually the entities that carry out emissions-intensive trade-exposed activities.

Each exemption certificate states the amount in megawatt hours of electricity approved for exemption, provided to the liable entity named on the certificate (usually the retail electricity supplier). The exemption is for electricity used in the emissions-intensive trade-exposed activity during the year specified on the certificate.

In 2015, we received 164 exemption certificate applications by the legislated deadline. Applications spanned 46 of the 53 eligible emissions-intensive trade-exposed activities.

As at 31 December 2015, we had issued 162 exemption certificates covering all 46 activities and totalling 38 024 941 megawatt hours. The other two applications were found to result in a zero exemption.

Ten activities account for 87 per cent of the exemption issued. The aluminium smelting sector had the most exemptions, with 62 per cent of the exemption issued. This was followed by smelting zinc at 4.9 per cent and manufacture of newsprint at 2.9 per cent.

Full details of the exemption issued in 2015 for each emissions-intensive trade-exposed activity are in Appendix B.

Energy acquisitions reporting

A total of 120 liable entities were required to report for the 2015 assessment year, six more than in 2014.

Energy acquisition statements and renewable energy shortfall statements for the 2015 assessment year were due on 15 February 2016, the first business day after the legislative annual deadline of 14 February. The following figures are initial data for reporting and certificate surrender for the 2015 assessment year. Statements for 2015 will continue to be assessed during the 2016 calendar year.

HOW ARE WE TRACKING?

Energy acquisition reports in 2015:

- 120 liable entities required to report, and
- 211 386 151 million megawatt hours of relevant electricity acquisition reported.

Liable entities reported 173 605 009 million megawatt hours of reduced acquisitions for 2015, made up of 211 386 151 million megawatt hours of relevant acquisitions of electricity minus 38 020 129 million megawatt hours of exemptions.

“RENEWABLE ENERGY TARGET LIABLE ENTITIES ACQUIRED MORE THAN 211 MILLION MEGAWATT HOURS OF ELECTRICITY IN 2015.”

Large-scale generation certificates surrendered

In 2015, 19 287 514 large-scale generation certificates were surrendered to meet Large-scale Renewable Energy Target liability. This number is higher than the target surrender amount of 18.9 million large-scale generation certificates set under the renewable power percentage — due to higher than expected reported electricty acquisitions. Other factors, such as the introduction of full exemption from liability for emissions-intensive trade exposed activities, also contributed to this higher certificate surrender.

Liable entities had a 99.4 per cent compliance rate for surrendering these certificates. Based on submitted reports, 40 liable entities had an accumulated carried-forward surplus of 101 901[21] large-scale generation certificates (which can be used to acquit future large-scale generation certificate liabilities).

HOW ARE WE TRACKING?

Large-scale certificates surrendered in against 2015 liability:

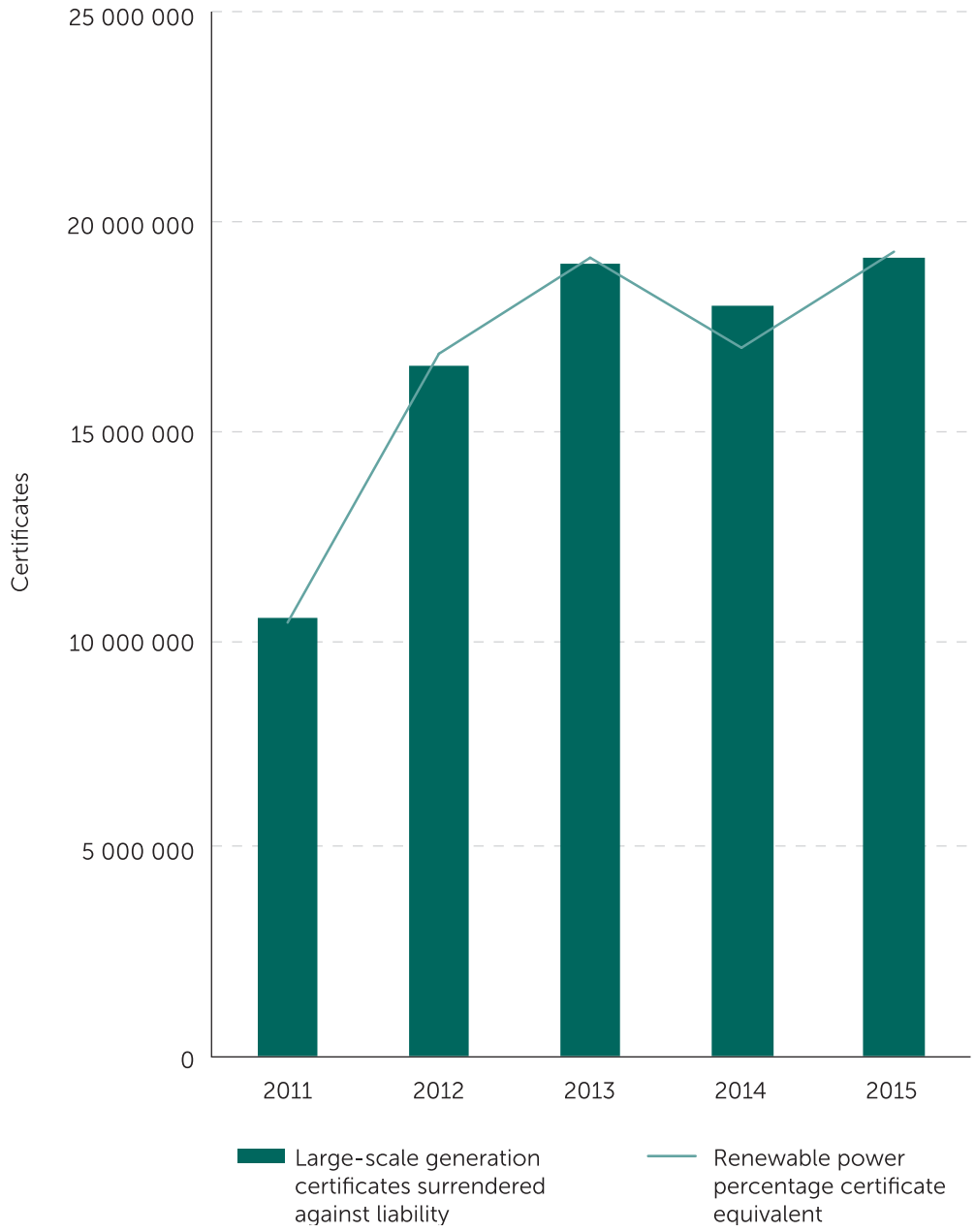
- 19 175 716 large-scale generation certificates surrendered—99.4% compliance rate
- 3 liable entities reported a shortfall—all within 10% which will be added to their 2016 liability, and
- 7 liable entities reported a shortfall greater than 10% and had to pay a shortfall charge for each certificate not surrendered.

A total of 10 liable entities were found to have a total shortfall of 115 658 large-scale generation certificates. Three liable entities had shortfalls within 10 per cent of their total large-scale generation certificate liability, totalling 47 201 certificates. The Renewable Energy Target allows some flexibility for liable entities to manage their obligations across years. If they surrender certificates within a range of 10 per cent of the required number, the amount not yet surrendered is carried forward and added to their 2016 large-scale generation certificate liability.

Seven liable entities reported a shortfall greater than 10 per cent, which resulted in total shortfall of 115 658 large-scale generation certificates. As at 15 February 2016, not all liable entities had paid their 2015 shortfall charges.

21 This does not include a surplus of 443 large-scale generation certificates attributed to five liable entities that are no longer liable.

Graph 8: Large-scale renewable energy certificates surrendered and required since 2011



Note: see further information at Appendix C.

Small-scale technology certificates surrendered

HOW ARE WE TRACKING?

Small-scale certificates surrendered against 2015 liability:

- 20 586 873 small-scale technology certificates surrendered—99.9% compliance rate,[22] and
- 1 liable entity required to pay shortfall charges for 4 small-scale technology certificates not surrendered.

In 2015, 20 329 145 small-scale technology certificates were surrendered to meet Small-scale Renewable Energy Scheme liability.

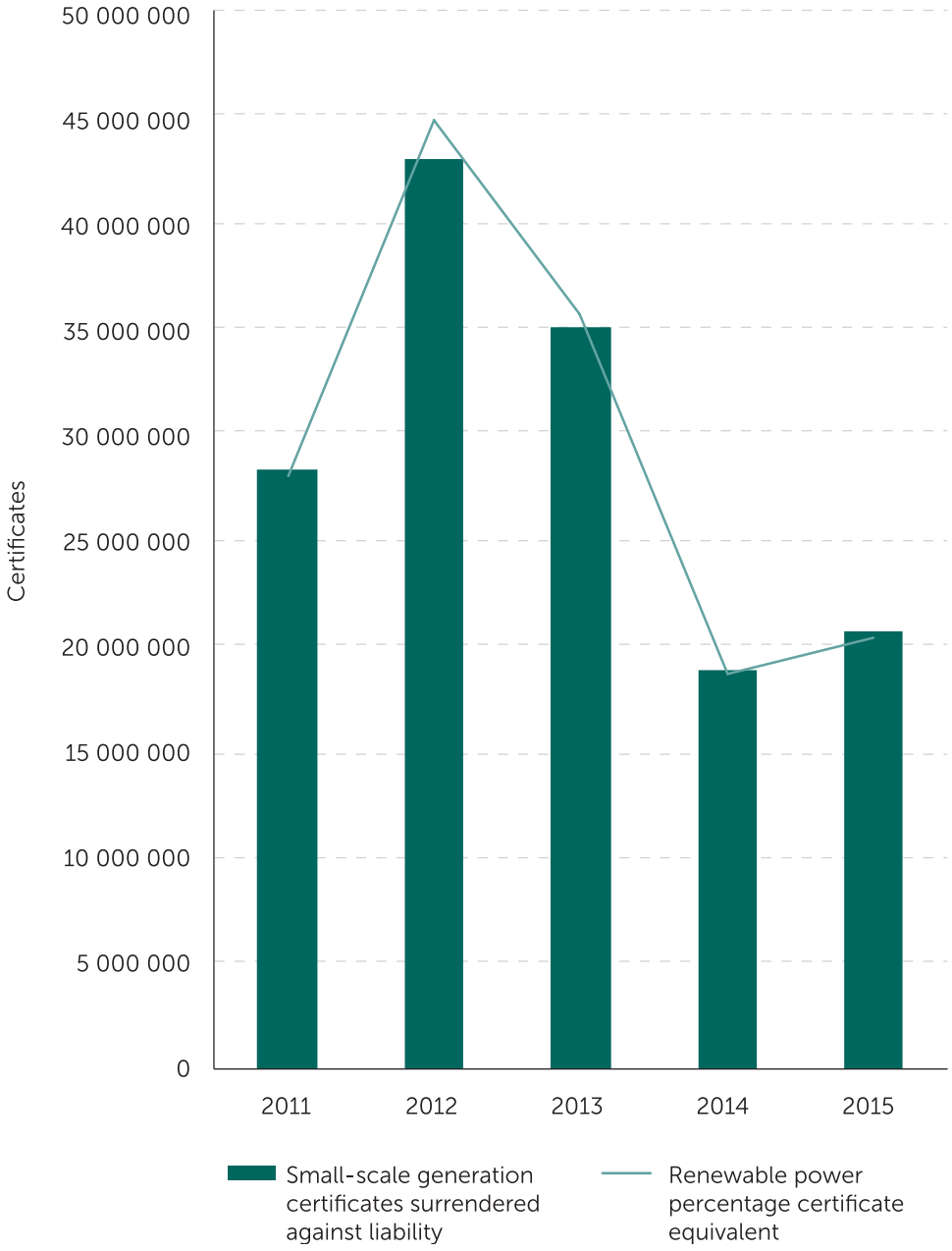
Liable entities had a 99.99 per cent compliance surrender rate for surrendering small-scale certificates. Based on submitted reports, there were 72 liable entities with an accumulated carried-forward surplus of 688 235 small-scale technology certificates (which can be used to acquit future quarterly small-scale technology certificate liabilities). This surplus does not include the surplus of 1 305 small-scale technology certificates attributed to four liable entities that are no longer liable.

One liable entity was found to have a total shortfall of four small-scale technology certificates. This entity was required to pay the shortfall charge because there is no provision to allow entities to carry forward small-scale technology certificate shortfalls.

The method to determine the amount of small-scale certificates to be surrendered for quarters one to three depend on the circumstances for the surrender, and is laid out in sections 38AF, 38AG, 38AH and section 40C of the Act.

22 This is calculated based on annual reporting for the year, not quarterly surrender requirements.

Graph 9: Small-scale renewable energy certificates surrendered and required since 2011



“PAYING THE RENEWABLE ENERGY SHORTFALL CHARGE, RATHER THAN SURRENDERING CERTIFICATES, IS NON-COMPLIANCE WITH THE LARGE-SCALE RENEWABLE ENERGY TARGET.”

Chapter 6

Progress toward the Large-scale Renewable Energy Target

Context

This chapter provides information and data to support the 2015 *Annual statement* which is on pages 8–10 of this report. The *Annual statement* excludes consideration of the Small-scale Renewable Energy Scheme.

Introduction

As explained on page 41, the Large-scale Renewable Energy Target creates an incentive for new generation of renewable electricity.

Voluntary schemes such as GreenPower, desalination offsets and the ACT Government's renewable electricity consumption target create demand for large-scale generation certificates beyond the legislated target of 33 million megawatt hours. We estimate that accredited power stations will need to generate approximately 37 million megawatt hours of renewable electricity in 2020 to satisfy the total demand (legislated and voluntary) for certificates (see Graph 9).[23]

The target of 33 million megawatt hours[24] will be met when 33 million large-scale generation certificates are surrendered in addition to any large-scale generation certificates that are voluntarily surrendered in that year.

Tracking progress

We have developed a potential growth trajectory and five indicators to track progress towards achieving the 2020 target.

The growth trajectory assumes the legislated target is achieved in 2020 and sets out the expected large-scale renewable energy generation required to meet this outcome (Graph 10). The trajectory is only one possible pathway to meet the target. It will be adjusted each year based on actual committed and accredited capacity. Inputs and assumptions for this trajectory have been independently reviewed by ACIL Allen Consulting and found to be fit for purpose. More detail on the 2015 trajectory is available in Appendix D.

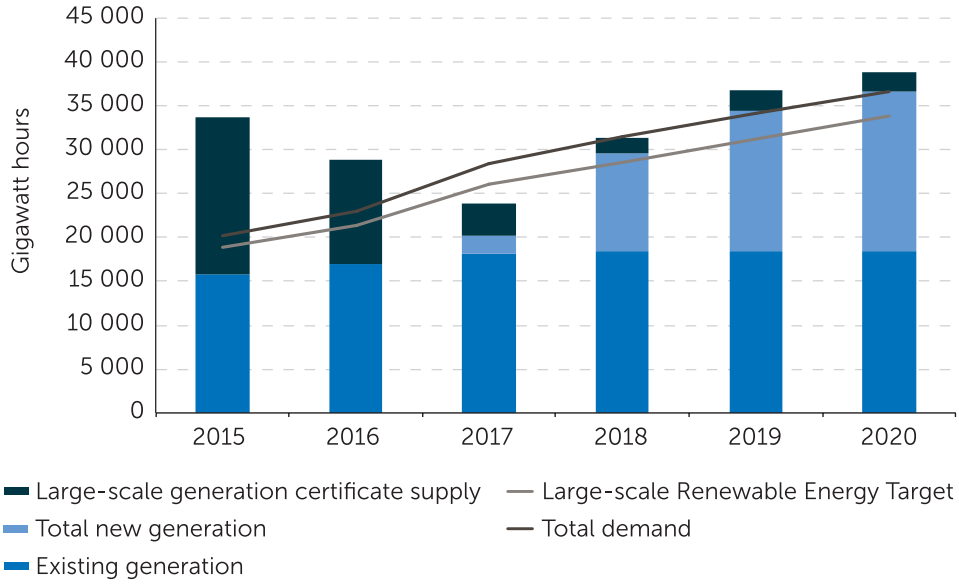
23 Estimate includes assumptions about demand for GreenPower, voluntary surrender and enforceable undertakings. Refer to Appendix D for more detail.

24 Comprising the 33 million megawatt hour target plus the 850 gigawatt hour target for waste coal mine gas fired generation.

The trajectory shows the following:

- During 2015 and 2016 the surplus supply of large-scale certificates in the market combined with generation from existing and committed power stations ensures the required gigawatt hours of renewable source electricity is achieved.
- In 2017, generation from new projects committed after 2015 also begins to contribute to the required gigawatt hours of renewable source electricity. As with 2015 and 2016, total demand is met by drawing on existing supply of large-scale certificates.
- From 2018 to 2020 there is an increasing reliance on new generation from projects committed after 2015 and a relatively small contribution from the surplus supply of large scale certificates.
- From 2016 to 2020 an estimated additional 47 million megawatt hours needs to be generated to meet total demand for large-scale generation certificates in 2020.

Graph 10: Supply, demand and required generation to achieve expected total demand in 2020



Note: Existing generation refers to generation from accredited power stations and projects committed in 2015. Total new generation refers to generation from projects committed post 2015 and is presented as a cumulative amount.

The indicators draw on data from the 2015 calendar year. While each indicator is presented separately (Table 2), in reality each indicator can influence, or be influenced by, one or more of the other indicators. Combined, the indicators provide an insight into the performance of the market in 2015 and its growth towards the 2020 target.

Table 2: 2015 progress indicators

2015 progress indicator	Description	Rationale
Committed projects	Capacity (megawatts) and estimated generation output in a full year (megawatt hours) of large-scale renewable projects that have received all development approvals and secured a final investment decision according to the commercial understanding of the term	Provides a firm lead indicator that build (construction) will occur in the future
Accredited renewable power stations (see note)	Capacity (megawatts) and estimated generation in a full year (megawatt hours) of renewable power stations accredited by the Clean Energy Regulator	Provides a firm date from which new build starts to supply large-scale generation certificates
Large-scale generation certificate spot prices	The 12 week average of large-scale generation certificate spot price as at end of the 2016 calendar year	Provides a lead indicator of the market's forward view of supply and demand dynamics
Supply and demand dynamics	Registered large-scale generation certificates available after the surrender date of 15 February 2016 and concentration of holdings	The number of surplus large-scale generation certificates and concentration of holdings illustrates the liquidity in the market to meet future compliance obligations
Shortfall	Proportion of Large-scale Renewable Energy Target liability for which the shortfall charge has been incurred	May indicate a risk of scheme non- compliance potentially leading to some unanticipated impact on household electricity bills

Note: Capacity accredited relates to total capacity of a renewable power station, not the capacity commissioned in that year. Windfarms can take up to two years until they are fully commissioned.

Further information on the objectives, administration and achievements of the Large-scale Renewable Energy Target in 2015 is on page 41–52.

Progress indicators

We have adopted a system to rate the status of each indicator as 'on track', 'within reach' or 'off track'. This takes into account the market context and the possible variations caused by external factors such as the weather.[25] We also provide commentary on the trajectory to 2020 for each indicator. In this context, 'acceptable' means consistent with a trajectory that would achieve the target of 33 million megawatt hours in 2020.

ON TRACK ✓	WITHIN REACH ↗	OFF TRACK ✘
Indicator is within expected and acceptable parameters	Indicator is outside expected parameters but acceptable at this time	Indicator is outside expected and acceptable parameters

Assessment of 'committed projects' indicator

WITHIN REACH ↗

	Capacity committed in 2015 (megawatts)	Estimated future full year generation from projects committed in 2015 (gigawatt hours)	Conclusion
Wind	362	1 160	Within reach
Solar	16	90	Modest capacity committed, as expected
Biogas	6	40	
Total	409 (see note)	1 290	

Note: Based on publically available information and as estimated by Clean Energy Regulator. Potentially, some of this capacity will not contribute to the achievement of the 33 000 gigawatt hour target as it has been procured by the ACT to satisfy its renewable electricity consumption target.

New renewable energy generation projects must secure a final investment decision before they can proceed to construction. At this stage of development the company usually makes a public announcement. We independently confirm financing status, at which stage the projects are considered 'committed'.

25 A portion of generation is sourced from hydro-electricity above baseline generation (see page 46), the availability of which is affected by rainfall.

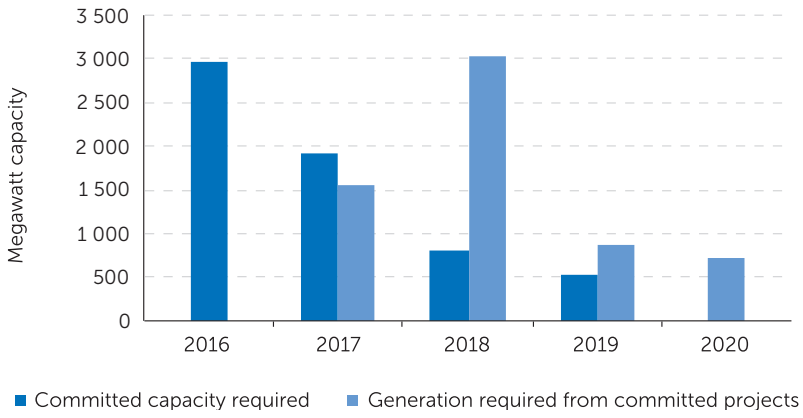
“AN ESTIMATED 6 000 MEGAWATTS IS REQUIRED TO MEET THE TOTAL CUMULATIVE DEMAND FOR LARGE-SCALE GENERATION CERTIFICATES THROUGH 2020.”

While the level of the Large-scale Renewable Energy Target was under review, commercial negotiations to commit new renewable power stations slowed. Since the new target was legislated in mid-2015, market participants (developers, investors, financiers and liable entities) have been reconsidering their business models and risk allocation. These commercial processes take time and have resulted in a modest total capacity of 409 megawatts of new build being committed in 2015. More details on committed projects are in Appendix E.

For 2015 the committed projects indicator has been assessed as 'within reach' because there is still time to commit and construct sufficient new build in future years to meet the 2020 target (see Graph 10). There is evidence that new commitments are in the pipeline. For example in recent months, both private and state-owned energy businesses have announced tenders or finance models for renewable energy or large-scale generation certificates. These businesses include AGL Energy, Alinta Energy, Ergon Energy (Queensland Government) and Synergy (Western Australian Government), and state-owned entities in Victoria, New South Wales and South Australia, and the City of Melbourne. The strong level of interest in the Australian Renewable Energy Agency's (ARENA) large-scale solar competitive round in 2015 also indicates strong prospects for projects to become committed.

In addition to the 409 megawatts committed in 2015, an estimated additional 6 000 megawatts is required to meet the total cumulative demand for large-scale generation certificates through to 2020[26]. Ideally the majority of this additional 6 000 megawatt capacity would be committed in 2016 and 2017 to avoid a shortage of large-scale generation certificates on the path to the 2020 target (see Graph 11).

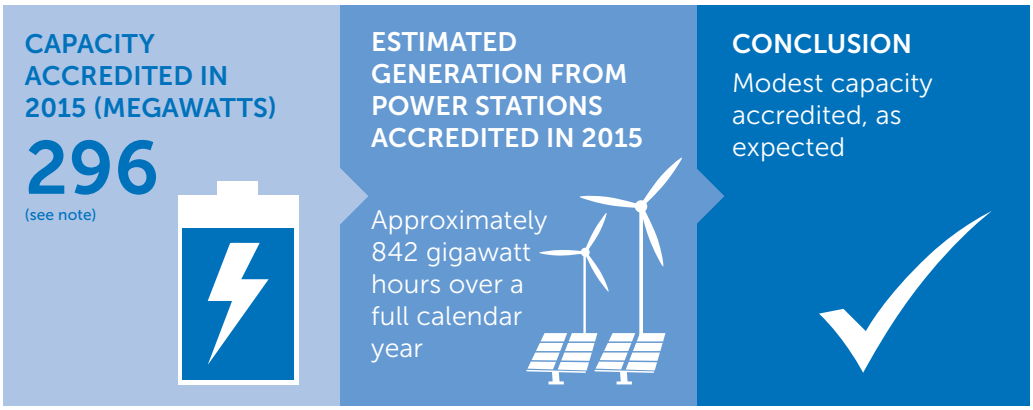
Graph 11: Estimate of committed capacity and associated generation required to meet the 2020 target



26 Between 2016 and 2020 the 6 000 megawatts will be delivered through a mix of approximately 25 per cent solar and 75 per cent wind. If there is materially less than 3 000 megawatt capacity committed in 2016, the difference will need to be made up in 2017 with a higher proportion of solar because it is quicker to build.

Assessment of 'accredited renewable energy power stations' indicator

ON TRACK ✓



Note: See Appendix E for a list of large-scale renewable energy projects committed in 2015.

As explained on page 48, renewable power stations must be accredited to create a large-scale generation certificate for each megawatt hour of renewable electricity they generate.

We accredit power stations based on their total proposed installed capacity, which may be constructed in phases. Estimates of electricity generated in 2015 from a renewable energy power station accredited in that year assume the most probable generation over a full calendar year.[27]

Considering the lead time for construction, the projects we accredited in 2015 that delivered the 296 megawatts of capacity in 2015 were likely to have been committed in 2013 and 2014.

While accreditations were modest in 2015 we have concluded that the accredited renewable power stations indicator is 'on track' for 2015 given the uncertainty at the time these projects were committed.

Based on projects committed in 2014 and 2015 that are yet to be accredited, we anticipate approximately 230 megawatts of capacity (which will generate around 630 gigawatt hours annually) will be accredited as renewable power stations in 2016.

27 The conversion from megawatt capacity to megawatt hours is based on capacity factors supplied by each plant on accreditation.

Assessment of 'large-scale generation certificate spot prices' indicator

ON TRACK ✓

12 WEEK AVERAGE PRICE

$71.73

CONCLUSION

A STRONG PRICE SIGNAL FOR NEW BUILD. HIGHER THAN THE $65 SHORTFALL PRICE BUT WELL BELOW THE POST-TAX EQUIVALENT SHORTFALL OF $93

Note: The 12 week average price referred above is the average spot price over the last 12 weeks of 2015, up to the final day of 2015 trade.

The market price for large-scale generation certificates at any point in time is known as the spot price and can be volatile, reflecting low trading volumes and sensitivity to changing sentiment about future supply and demand.

A 12 week average large-scale generation certificate spot price is used in this report to illustrate price trends and smooth out market volatility.

Importantly, large-scale generation certificate spot prices do not typically reflect the average cost of certificates purchased for the purpose of acquitting liability. This is because relatively small volumes of large-scale generation certificates are purchased through the spot market compared with alternatives such as agreements where liable entities directly source large-scale generation certificates from renewable power stations. Details of these commercial agreements are confidential.

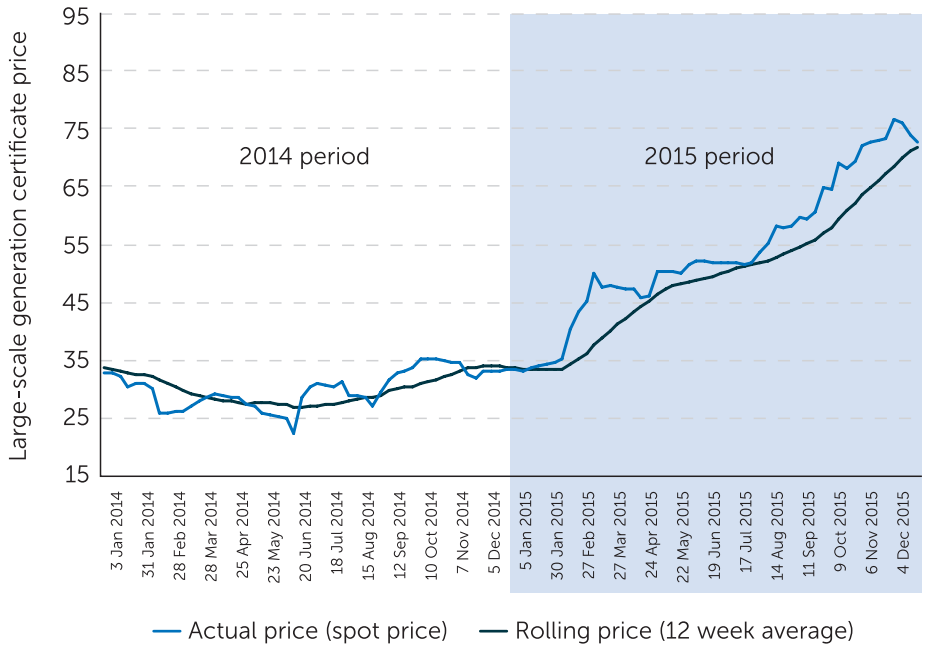
The large-scale generation certificate spot price was around $33 at the start of 2015 and had been at similar levels for the previous two years. This price was not sufficient to incentivise substantial new build as evidenced in the relatively low levels of committed projects and accredited renewable power stations in 2015.

In the lead up to the new target being legislated the large-scale generation certificate spot price rose to over $40 and continued to rise to over $70 as shown in Graph 12. At the end of 2015 the large-scale generation certificate spot price was $72, which was above the non-tax deductible shortfall charge of $65 but below the post-tax equivalent shortfall cost of close to $93.[28] The rising price indicates that demand for existing certificates is increasing and signals that the market expects new build is necessary to meet the target. Liable entities can avoid unfavourable price peaks by investing in renewable power stations and negotiating agreements for large-scale generation certificates.

The average large-scale generation certificate spot price over the 52 weeks of 2015 was $54.

28 The shortfall charge for the Large-scale Renewable Energy Target is fixed at $65 per megawatt hour. Costs incurred by purchasing and surrendering certificates are tax deductible, while the payment of the shortfall charge is not. Paying the shortfall charge is equivalent to paying a 'tax-incorporated' price of around $93, if an entity was paying the full corporate tax rate of 30 per cent.

Graph 12: Price fluctuation of large-scale generation certificates from 2014–2015

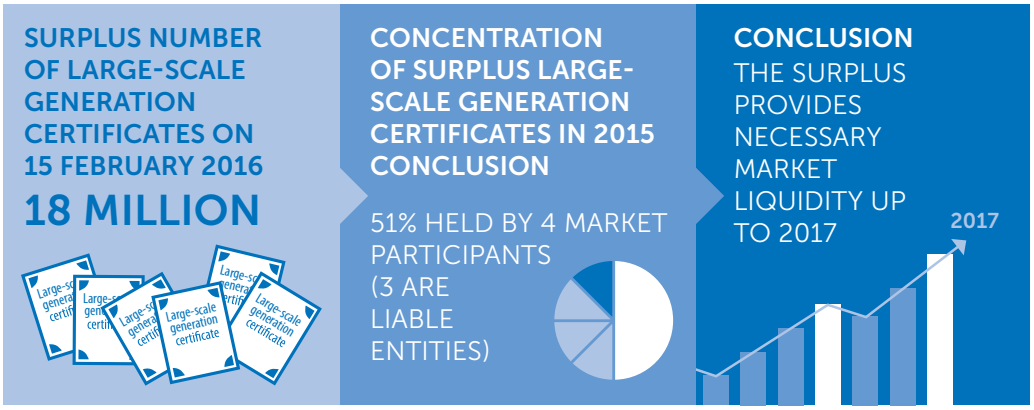


This indicator has been assessed as 'on track' as the last quarter provides a strong price signal for parties to commit to the scale of new generation required.

Ideally, the large-scale generation certificate spot price in 2016 will be at a similar level to the end of 2015 so it continues to incentivise the market to commit and build new projects.

Assessment of 'supply and demand dynamics' indicator

ON TRACK ✓



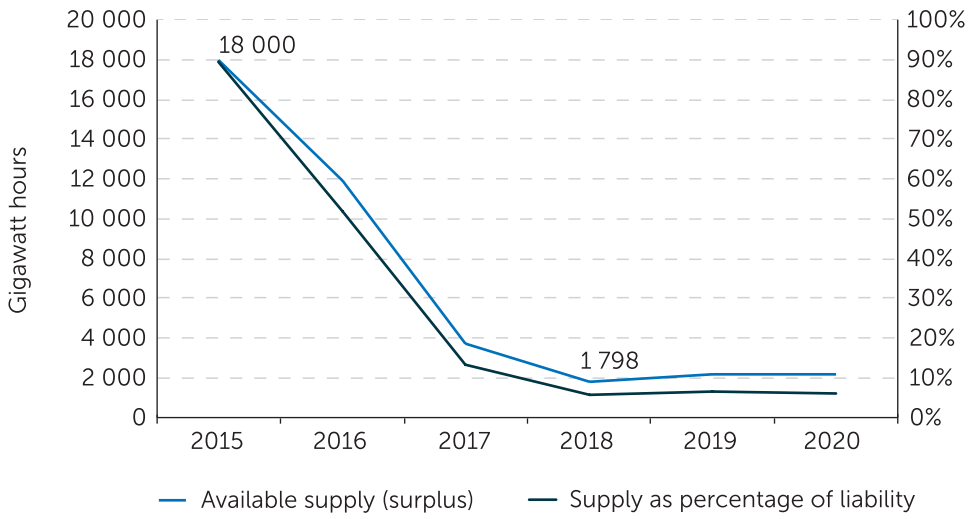
A surplus of certificates provides a buffer for liable entities to avoid incurring shortfall charges, as it allows time for new renewable projects to be committed, constructed and commence generation to provide a supply of large-scale generation certificates.

Approximately 16.5[29] million large-scale generation certificates were validated in 2015. Following the 15 February 2016 deadline for liable entities to acquit their liability for the 2015 calendar year, a surplus of approximately 18 million large-scale generation certificates was held in REC Registry accounts. Accordingly this indicator has been rated as 'on track'.

A moderate amount of surplus supply or liquidity is a normal aspect of environmental certificate markets and is necessary for the market to function efficiently. We estimate that the surplus supply of large-scale generation certificates in 2016 to 2018 will diminish further, as demand for large-scale generation certificates outstrips supply owing to the time required to commit new projects and for those projects to reach full generation (Graph 13).

29 For further information on large-scale generation certificates validated in 2015 see page 48.

Graph 13: Estimated available surplus supply of large-scale generation certificates relative to amount needed to meet total demand



Note: This is based on the trajectory described on page 64.

Holdings of large-scale generation certificates are concentrated in relatively few hands. This means that as the surplus reduces there may not be sufficient liquidity in the market in future years for liable entities to meet their obligations through spot purchases. It would be prudent for liable entities to take steps to secure sufficient forward deliveries of large-scale generation certificates to acquit their future Large-scale Renewable Energy Target liability.

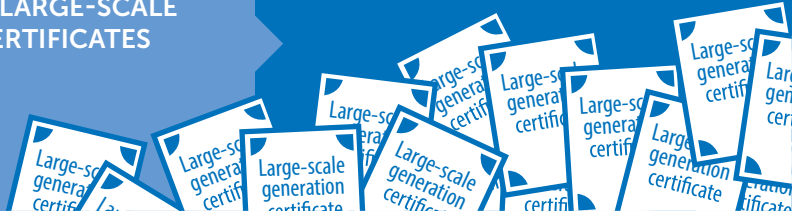
Assessment of 'Shortfall' indicator

ON TRACK ✓

2015 SHORTFALL AS A PROPORTION OF ANNUAL SURRENDER OF LARGE-SCALE GENERATION CERTIFICATES

0.6%

CONCLUSION
SHORTFALL WAS IMMATERIAL



Since 2011 when the Large-scale Renewable Energy Target commenced, liable entities have had an almost perfect compliance record for surrendering large-scale generation certificates.

In 2015, a total of 99.4 per cent of large-scale generation certificate liability was acquitted on time. As there was only a small amount of large-scale generation certificate shortfall, this indicator is rated 'on track' for 2015.

“2015 LARGE SCALE CERTIFICATE SHORTFALL WAS IMMATERIAL.”

Although the level of large-scale generation certificate shortfall was not material, we observed that it had increased slightly from 2014, and that some electricity retailers may have taken a commercial decision to pay a shortfall charge rather than obtain large-scale generation certificates to acquit their liability. As mentioned in the previous indicator, there were more than sufficient certificates in the market for all liable entities to secure certificates to surrender against their liability for the 2015 calendar year.

Paying the renewable energy shortfall charge, rather than surrendering certificates, is non-compliance with the Large-scale Renewable Energy Target. Shortfall charges are paid into consolidated revenue and do not incentivise new renewable projects. Failure to surrender sufficient certificates to cover an entity's liability is non-compliance with the Large-scale Renewable Energy Target.

For 2016 we expect those with a shortfall charge in 2015 to consider options to return to compliance.

Impact on electricity prices

Meeting the statutory demand target of 33 million megawatt hours in 2020 may have a modest impact on household electricity bills. We used the quantity of shortfall as an indicator of whether the rate of progress towards meeting the target had any unanticipated impacts for 2015.

The impact of the Renewable Energy Target on household bills is difficult to quantify accurately because the cost of certificates is only one of many factors influencing electricity prices. The Australian Energy Market Commission estimated that in 2015, the Large-scale Renewable Energy Target accounted for 1.9 per cent of electricity prices or an average of $7.13 per quarter for an average household electricity bill.[30]

The overall impact is likely to be less than this estimate because the Large-scale Renewable Energy Target can place downwards pressure on wholesale costs of electricity. According to the Expert Review Panel, the price-supressing effect in the wholesale market outweighs the direct cost of certificates.[31]

Where liable entities incur a non-tax deductible shortfall charge of $65 per large-scale generation certificate, the extent to which they will pass these costs through to customers in the form of higher electricity prices is unknown. Factors such as operating costs of liable entities, current contractual arrangements and the competiveness of the marketplace will influence the actual impact on electricity prices. In any case, the amount of shortfall charge was immaterial for the 2015 calendar year.

30 Australian Energy Market Commission report- *2015 Residential Electricity Price Trends*. Estimates for 2015 price impacts are an average of the 2014-15 and 2015-16 financial year estimates.

31 Renewable Energy Target Report of the Expert Panel Review, 2014.

The large-scale generation certificate spot price has continued to increase since the end of 2015. As a result, a watch point in 2016 will be whether it remains at levels comparable to the shortfall charge, continues to increase or falls to levels more consistent with the price required to make new projects viable. Projects are viable where revenue from large-scale generation certificates fill the gap between the wholesale electricity revenue and project costs.

Our finding

Overall, we have found that progress under the circumstances is adequate towards meeting the Large-scale Renewable Energy Target in 2020 and that there was no unanticipated impact on household electricity bills in 2015. We estimate 6 000 megawatts of installed capacity is required to meet the total cumulative demand for large-scale generation certificates through to 2020.

Table 3: Summary of 2015 progress indicators and status

Progress indicator	2015 status
Committed projects	WITHIN REACH
Accredited projects	ON TRACK
Large-scale generation certificate spot prices	ON TRACK
Supply and demand dynamics	ON TRACK
Large-scale generation certificate shortfall	ON TRACK

Chapter 7

Appendices

Appendix A: Accredited renewable power stations

Table 4: Growth in the number of accredited power stations 2011–2015.
Further information available at page 43.

	Accredited up to				
Renewable energy source	2011	2012	2013	2014	2015
Agriculture waste, food waste, waste from agriculture products	9	12	14	17	17
Bagasse	28	28	28	28	28
Black liquor	2	2	2	2	2
Hydro	100	100	101	107	107
Landfill gas	59	60	62	62	62
Sewage gas and biomass based components of sewage, municipal solid waste	18	19	19	21	22
Solar	49	60	71	102	139
Waste coal mine gas	0	7	7	7	7
Wind	58	65	75	79	82
Wood waste	13	15	15	16	16
Total number of power stations	336	368	394	441	482

Appendix B: 2015 exemption details

Table 5: Total amount of 2015 exemption given for each emissions-intensive trade-exposed activity as at 31 December 2015. Further information available at page 56.

Activities	Exemption (megawatt hours)
Alumina refining	1 285 785
Aluminium smelting	23 637 990
Cartonboard manufacturing	0
Dry pulp manufacturing	0
Integrated iron and steel manufacturing	822 723
Integrated production of lead and zinc	148 959
Manufacture of carbon steel from cold ferrous feed	595 505
Manufacture of newsprint	1 115 227
Manufacture of reconstituted wood-based panels	368 663
Packaging and industrial paper manufacturing	1 020 523
Petroleum refining	941 784
Printing and writing paper manufacturing	124 938
Production of ammonia	155 427
Production of ammonium nitrate	104 223
Production of bulk flat glass	39 775
Production of carbamide (urea)	77 639
Production of carbon black	0
Production of ceramic floor and wall tiles	16 912

Activities	Exemption (megawatt hours)
Production of chlorine gas and sodium hydroxide (caustic soda) solution	338 318
Production of clinker	400 232
Production of coal char	0
Production of coke oven coke	296
Production of copper	789 191
Production of dried distillers grains with solubles	9 890
Production of ethene (ethylene)	66 688
Production of ferrovanadium	0
Production of fused alumina	0
Production of fused zirconia	20 055
Production of glass beads	2 291
Production of glass containers	310 618
Production of glass wool	110 316
Production of helium	31 499
Production of high purity ethanol	41 344
Production of hydrogen peroxide	16 303
Production of iron ore pellets	130 101
Production of lime	68 634
Production of liquefied natural gas	4 106
Production of magnesia	114 723
Production of magnetite concentrate	434 338

Activities	Exemption (megawatt hours)
Production of manganese	955 387
Production of methanol	36 081
Production of nickel	625 122
Production of polyethylene	141 332
Production of polymer grade propene (polymer grade propylene)	0
Production of rolled aluminium	0
Production of silicon	579 325
Production of sodium carbonate (soda ash) and sodium bicarbonate	0
Production of sodium silicate glass	368
Production of synthetic rutile	64 047
Production of white titanium dioxide (Tio2) pigment	95 301
Rendering of animal by-products	50 467
Smelting zinc	1 866 486
Tissue paper manufacturing	266 009

Note: In accordance with regulation 22E(3), the total amount of exemptions given for each emissions-intensive trade-exposed activity must be published by 1 October in the year to which the exemptions relate.

Appendix C: Liability data

Table 6: Large-scale generation certificate liability, target and certificates surrendered, 2001–2015. Further information available at page 58–59.

Year	Large-scale generation certificate liability (reduced acquisitions)	Large-scale generation certificate target	Large-scale generation certificates surrendered
2015	19 287 514	18 850 000	19 175 716
2014	17 964 699	16 950 000	17 941 021
2013	19 002 645	19 088 000	18 964 665
2012	16 395 394	16 763 000	16 515 684
2011	10 493 658	10 400 000	10 507 091
2010	12 424 445	12 500 000	12 424 111
2009	7 843 851	8 100 000	7 828 207
2008	6 759 639	6 800 000	6 760 170
2007	5 756 238	5 600 000	5 756 646
2006	4 518 857	4 500 000	4 519 106
2005	3 343 109	3 400 000	3 343 675
2004	2509651	2600000	2 509 631
2003	1 716 092	1 800 000	1 716 167
2002	1 182 481	1100000	1182443
2001	337 300	300 000	336 928

Table 7: Small-scale technology certificate liability, target and certificates surrendered, 2011–2015. Further information available at page 60–61.

Year	Small-scale technology certificate liability (reduced acquisitions)	Small-scale technology certificate target	Small-scale technology certificates surrendered
2015	20 329 145	20 567 438	20 586 873
2014	19 074 977	18 657 338	18 753 566
2013	35 150 434	35 700 000	35 093 739
2012	42 932 638	44 786 000	43 126 272
2011	27 634 521	28 000 000	28 192 501

Appendix D: Progress towards the target—trajectory assumptions

Further information available at page 63–65.

Progress towards the target

To track progress toward meeting the 2020 target, we analyse expected future supply and demand of large-scale renewable energy generation using a modelled trajectory. The trajectory sets out a realistic scenario that ensures enough large-scale generation certificates are available to meet expected total demand required through to 2020.

Key inputs, assumptions and outputs of the trajectory are set out below.

Trajectory assumptions

Demand

GreenPower and desalination are assumed to remain steady until 2020. Estimates of megawatt hours associated with the various ACT auctions are assumed to increase between 2016 and 2020. Assumptions about voluntary surrender will be reassessed each year. By incorporating all demand from voluntary surrender sources, the total demand figure in 2020 is approximately 37 million megawatt hours.

Existing supply

Existing supply between 2016 and 2020 incorporates expected above baseline generation, known generation and the build that has been committed in 2015. It includes assumptions about ongoing variability of hydro and other sources of generation. The above baseline supply will be updated each year to incorporate new actual and committed generation.

Additional generation required

By contrasting existing supply against expected total demand we estimate how much additional generation is required each year to meet the annual target. These estimates are based on the assumptions outlined in Table 8.

Table 8: Inputs and assumptions for trajectory

Input	Assumption
Wind capacity factor	38%
Solar capacity factor	25%
Percent of future build that will be wind	75%
Percent of future build that will be solar	25%
Build time for wind	18 months
Build time for solar	12 months

Conclusion

The current trajectory predicts that approximately 6 000 megawatts of additional capacity is required meet the 2020 total demand target.

Appendix E: Large-scale renewable energy projects committed in 2015

Table 9: Date, project name, state and capacity of projects committed in 2015. Further information available at page 69.

Date of financing	Project name	State	Megawatt capacity
5 March	Infratech Industries' floating photovoltaic plant	SA	3.2
28 April	Coonooer Bridge wind farm	VIC	20
26 June	Ararat wind farm	VIC	240
10 July	Landfill Gas Industries' biogas-fired generators	QLD	6
15 July	Juwi Degrussa photovoltaic plant	WA	10.6
19 August	Neon Hornsdale wind farm phase I	SA	102
8 September	Epuron Uluru photovoltaic plant	NT	1.8
9 December	Barcaldine Remote Community Solar Farm	QLD	25
2015 total			408.6

Appendix F: Summary of significant outcomes in 2015

Small-scale systems

- 8.9 million megawatt hours of electricity generated or displaced by small-scale renewable energy installations (see page 16)
- 188 902 new small-scale systems installed in 2015—total now more than 2.4 million (see page 25)
- 137 468 solar panel system installations (see page 25)
- 42 525 solar water heater installations (see page 25)
- 8 898 air source heat pump installations (see page 25)
- 11 small-scale wind installations (see page 25)
- 15.9 million small-scale technology certificates validated (see page 29)
- Small-scale technology percentage set at 11.71%, equivalent to 20.6 million small-scale technology certificates (see page 54)

Large-scale systems

- 15.2 million megawatt hours of electricity generated by renewable power stations (see page 16)
- 41 renewable power stations accredited in 2015—representing capacity of 296 megawatts (total now 482) (see page 41)
    - » 37 solar (172 megawatt capacity) (see page 48)
    - » 3 wind (113 megawatt capacity) (see page 48), and
    - » 1 sewage gas and biomass-based components of sewage (10 megawatt capacity) (see page 48)
- 12 different ecologically sustainable energy sources used to generate renewable power (see page 42)
- 16.5 million validated large-scale generation certificates (see page 48)
- Renewable power percentage set at 11.11%, equivalent to 18.9 million large-scale generation certificates (see page 54)

Liability under the Renewable Energy Target

- 211 386 151 million megawatt hours of relevant electricity acquisition reported (see page 56)
- 120 liable entities (see page 56)
- 99.7% overall compliance rate (see page 53)
- 20 586 873 small-scale technology certificates surrendered—99.9% compliance rate (see page 60)
- 19 175 716 large-scale generation certificates surrendered—99.4% compliance rate (see page 58)
- 1 liable entity required to pay shortfall penalty charge (see page 60)
- 3 liable entities with a shortfall within 10% (see page 58)
- 7 liable entities with a shortfall greater than 10% (see page 58)
- 162 exemption certificates issued, covering 46 emissions-intensive trade-exposed activities (see page 55)

Market operation

- 159 more registered persons can create certificates (total now 7 585) (see page 24)
- 72 more registered agents can create certificates (total now 1 575) (see page 24)
- 32.3 million renewable energy certificates were validated (see page 19)
- 123.4 million renewable energy certificates were transferred (see page 19)
- 1.3 million renewable energy certificates were voluntarily surrendered (see page 19)
- 6 219 809 small-scale technology certificates traded through the clearing house valued at $248.8 million (see page 32)

Compliance and safety

- 2 080 inspections of small-scale installations (see page 34)
  - » 127 of systems were found to be unsafe or substandard (see page 34)
  - » 409 were found to be substandard (see page 34)
- 42 investigations into possible breaches commenced (see page 37)
- 133 matters closed, including 41 investigations (see page 37)

Chapter 8

Glossary

Bagasse

Bagasse is the fibrous waste left from the crushing of sugar cane, which is used as a fuel source to generate renewable energy under the Renewable Energy Target.

Baseline

The amount of electricity above which an accredited power station can begin to create large-scale generation certificates, which we determine under the Regulations for each power station.

Biomass

Biomass includes landfill gas, food waste, food processing waste, agricultural waste, wood waste, sewage gas and biomass based components of sewage, energy crops, waste from processing of agricultural products and biomass based components of municipal solid waste, bagasse, bagasse co-generation, biomass-based components of municipal solid waste, energy crops, wood waste and black liquor.

Carbon abatement

Carbon abatement refers to both reducing carbon emissions released into the atmosphere and reducing carbon already in the atmosphere through carbon sequestration.

Certificate spot price

Large-scale generation certificates are traded through the wholesale market with minimum parcel sizes of 5 000 certificates. Certificate spot price refers to the current market price for a single parcel of certificates.

Committed generation

Committed generation refers to large-scale renewable energy projects that have been committed by developers, or investors, to commence renewable energy generation in the future.

Direct current isolator switch

Direct current isolators are switches that are used to stop electrical currents from being supplied to certain equipment, such as solar panels, during installation and repairs.

Displacement

The estimated reduction in demand for electricity from the grid that results from the installation of a solar water heater.

Energy acquisition statement

Entities liable under the Renewable Energy Target are required to report to us all relevant acquisitions of energy they have made throughout the previous calendar year to the Clean Energy Regulator. These energy acquisition statements are due between 1 January and 14 February each year.

Enforceable undertaking

An enforceable undertaking is a voluntary binding agreement that allows an individual or organisation to settle a contravention of the law, without going through a legal prosecution.

Gigawatt

A gigawatt is a measurement of power and is one thousand megawatts.

Gigawatt hour

A gigawatt hour is a measurement of energy and is one thousand megawatt hours.

Greenhouse gas emissions

Naturally occurring gases such as water vapour (H_2O) insulate the Earth, preventing the sun's heat from escaping and keep the Earth at liveable temperatures. This is called the greenhouse effect.

When emitted into the atmosphere, gases produced from human activity, such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) alter the natural greenhouse effect and encourage atmospheric warming.

GreenPower

GreenPower is the only voluntary state and territory government accredited program that enables electricity providers to purchase renewable energy on behalf of households or businesses. A joint initiative of the governments of the Australian Capital Territory, New South Wales, South Australia, Victoria and Tasmania, GreenPower guarantees that the renewable electricity consumers buy from energy suppliers meets stringent environmental standards. GreenPower relies on the voluntary surrender of large-scale generation certificates to the Clean Energy Regulator and requires new generation additional to the Renewable Energy Target.

Kilowatt

A kilowatt is a measurement of power (the rate at which the energy is generated or used), and is one thousand watts.

Kilowatt hour

A kilowatt hour is a measurement of energy and is one thousand watt hours.

Megawatt

A megawatt is a measurement of power (the rate at which the energy is generated or used), and is one thousand kilowatts.

Megawatt hour

A megawatt hour is a measurement of energy and is one thousand kilowatt hours.

Offtake agreement

See *Power purchase agreement*.

Power purchase agreement

A power purchase agreement is a contract between two parties, one which generates electricity (the seller) and one which is looking to purchase electricity (the buyer). Under the Renewable Energy Target the seller is often the operator of a renewable power station, and the buyer is a power retailer.

REC Registry

The REC Registry is an online system that facilitates transactions for renewable energy certificates.

Reduced acquisitions

Relevant acquisitions of electricity minus exemption certificates. This is used to calculate how many certificates they need to surrender to acquit their liability.

Registered person

To create renewable energy certificates, apply for accreditation of a power station, or apply to be an agent, individuals and companies must apply to us to become a registered person.

Registered agent

Retailers, traders and installers who wish to help individuals and small businesses install a small-scale renewable energy system at their premises must first apply to us to become a registered agent.

Renewable energy certificate

Renewable energy certificates refer to both large-scale generation certificates and small-scale technology certificates.

Renewable power percentage

The basis, set out in the Regulations, for calculating the number of large-scale generation certificates that a liable entity must purchase in a given year.

Shortfall charge

Liable entities who fail to meet their compliance obligations under the Renewable Energy Target are required to pay a shortfall charge. This charge is non-tax deductible, and must be paid at the rate of $65 per megawatt hour of the shortfall amount.

Small-scale technology percentage

The basis, set out in the Regulations, for calculating the number of small-scale technology certificates that a liable entity must purchase in a given year.

Solar credits multiplier

A mechanism that provided an additional financial incentive for solar panel installations by multiplying the number of certificates the systems could create. It operated between 9 June 2009 and 30 June 2013.

Solar panels

A photovoltaic system, also known as a solar PV power system or PV system, is a power system designed to supply usable solar power by means of photovoltaics.

Substandard

A substandard small-scale system does not meet key clauses in the standards and requirements for installation and may lead to premature equipment failure or other issues. The inspector advises the relevant state or territory regulatory authority of the nature and extent of the identified issues. The installation work and or equipment should be improved. The system owner should contact the installation company or a qualified installer to rectify the items listed for improvement.

Unsafe

An unsafe system has a safety hazard which poses an imminent risk to a person or property. The inspector shuts down the system or renders it safe. The inspector also advises the relevant state or territory regulatory authority of the nature and extent of the safety risk. The system owner should contact the installation company or a qualified installer to rectify the items listed for improvement.

1300 553 542
www.cleanenergyregulator.gov.au