origin



“HOW ARE YOU TACKLING CLIMATE CHANGE?

Amandine Denis-Ryan
ClimateWorks

Everything you want to know about how we’re tackling the big questions.

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The covers for this year's reporting suite feature some of our stakeholders who were invited to ask a question of Origin. Amandine Denis-Ryan is the Head of Research at ClimateWorks and appears on the front cover of our Sustainability Report. Amandine asks how Origin is supporting Australia's transition to net zero emissions, in line with the Paris Agreement on climate change. Information on how Origin is tackling climate change can be found in the *Energy and Climate Change* section.

IMPORTANT INFORMATION

Unless otherwise stated, Origin Energy's Sustainability Report provides a summary of Origin's performance on material social, environmental and economic sustainability aspects for the period 1 July 2016 to 30 June 2017.

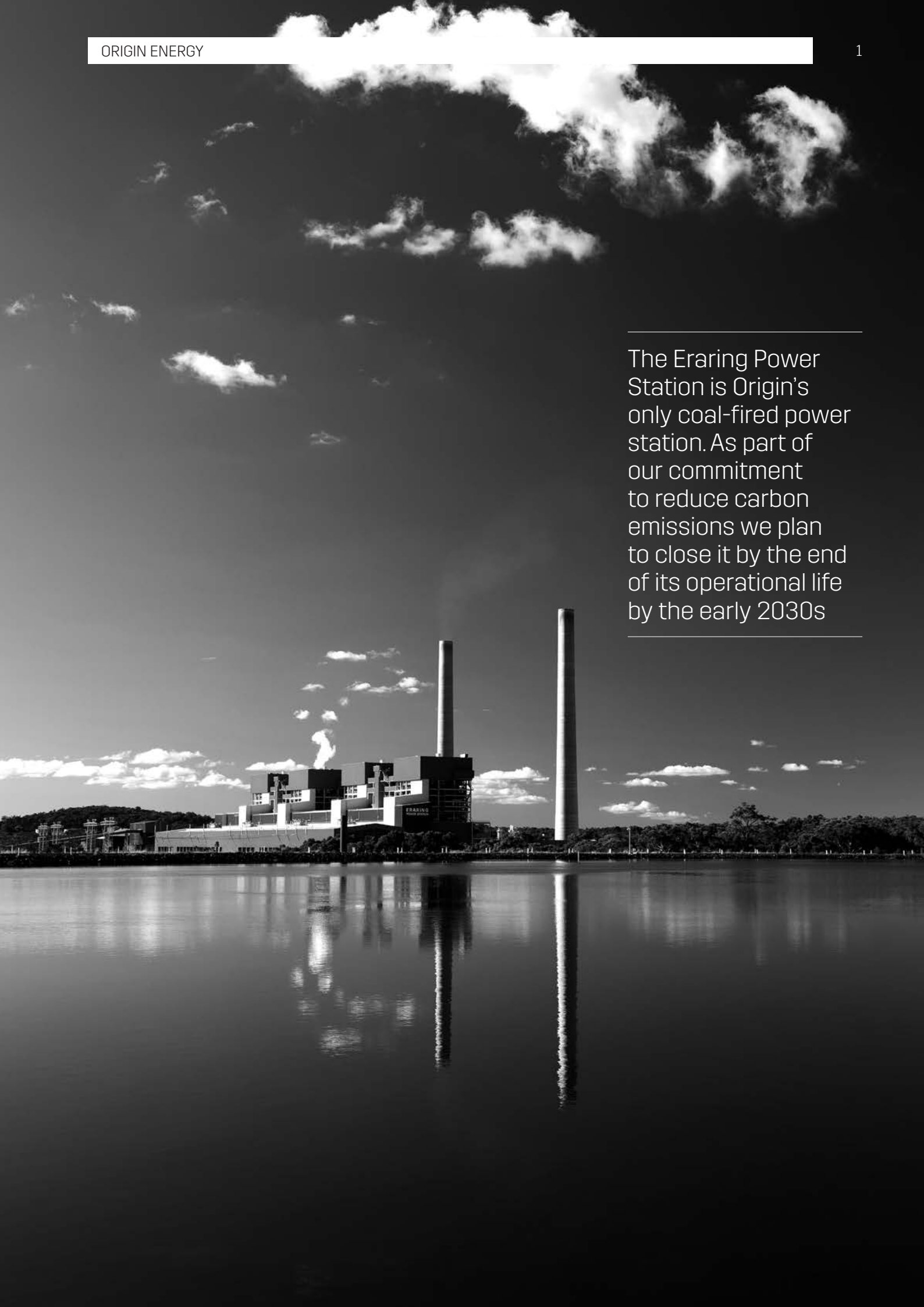
Its scope is limited to the assets we operate. The exception is emissions performance, which we report on an operated and equity basis in line with regulatory and reporting norms. Origin is the upstream operator of the Australia Pacific LNG project. This report may also reference significant events occurring after 30 June 2017.

Where this report contains forward looking statements, including statements of current intention, statements of opinion and predictions as to possible future events and future financial prospects, these statements are not statements of fact and there can be no certainty of outcome in relation to the matters to which the statements relate.

Forward looking statements involve known and unknown risks, uncertainties, assumptions and other important factors that could cause the actual outcomes to be materially different from the events or results expressed or implied by such statements, and the outcomes are not all within Origin's control. Statements about past performance are not necessarily indicative of future performance.

All monetary amounts are in Australian dollars unless otherwise stated. Due to rounding, numbers presented in this report may not add up precisely to the totals provided and percentages may not precisely reflect the absolute figures.

A dual track Initial Public Offering (IPO)/trade sale process is currently underway for Lattice Energy, the name given to Origin's upstream conventional business. On 10 August 2015, Origin divested its entire 53.09 per cent interest in Contact Energy. Origin has also undertaken the sales program of a number of infrastructure assets in recent periods. Lattice Energy, Contact Energy and other selected assets are treated as discontinued operations in Origin's financial statements within the Operating and Financial Review.



The Eraring Power Station is Origin's only coal-fired power station. As part of our commitment to reduce carbon emissions we plan to close it by the end of its operational life by the early 2030s



AS ORIGIN'S NEW CEO, I'M DELIGHTED TO PRESENT OUR 2017 SUSTAINABILITY REPORT

My team and I have spent much of my first year in the job listening and speaking to the many people whose lives Origin touches in some way – from our customers, landowner partners and those in communities where we operate, to environmental NGOs, our people and of course our shareholders, large and small.

While the questions we are asked are many and varied, they overwhelmingly follow the same theme – are we operating our business in a safe, responsible and sustainable way?

On that note, I'd like to thank Amandine Denis-Ryan from ClimateWorks, who appears on the front cover of this report. Interacting with people and organisations like this helps us better understand what's of most interest to our stakeholders, and enables us to change in response.

It's probably not surprising to hear that many of the questions we're asked relate to climate change.

The energy sector accounts for about two-thirds of carbon emissions globally. Closer to home, electricity generation accounts for about one-third of Australia's carbon emissions. Our stakeholders feel strongly about climate change and expect us to play a central role in delivering

We unequivocally support measures to progressively reduce global emissions and acknowledge the role the energy sector needs to play in transitioning to a lower carbon future

solutions to reduce emissions. But they also expect us to manage this transition in a way that maintains energy security and affordability for Australian homes and businesses.

Our position on climate change is absolutely clear. We unequivocally support measures to progressively reduce global emissions and acknowledge the role the energy sector needs to play in transitioning to a lower carbon future. We believe Australia can achieve net zero emissions for the electricity sector by 2050 or earlier.

This year, Origin has taken strong steps towards building a cleaner and smarter energy future. We've rapidly grown a low cost renewable energy portfolio, committing to an additional 1,200 MW of large scale solar and wind energy since March 2016. By 2020, we expect renewables to have grown to more than 25 per cent of our generation mix, up from approximately 10 per cent today. Bringing on substantial new supply is crucial to helping put downwards pressure on energy prices.

We've reiterated our commitment to closing our only coal-fired power station – Eraring – at the end of its operational life in the early 2030s, and confirmed we will not build any new coal plants. We're also making sure our fleet of lower emissions peaking gas-fired generators is ready to play an increasingly important role in maintaining energy security.

We have made a series of strategic steps to help us predict – and meet – future energy needs of customers, as well as operate our businesses more efficiently. We have created new teams dedicated to rapidly developing, prototyping and trialling new technologies to drive greater automation and efficiency, and better customer outcomes, across Origin. We know the future of energy will be much smarter and we're excited about what's on the horizon.

This year there has been a heightened level of public scrutiny on the energy sector in Australia, amid blackouts and rising prices. We believe that Australia has the necessary resources and technology to be able to deliver a secure energy supply that is both affordable and sustainable.

It is not acceptable that Australians should have to pay higher energy prices because governments and industry have not been able to solve the chronic policy uncertainty. We urgently need to rise above the politics for the benefit of all Australians. Origin will continue to advocate for the adoption of a Clean Energy Target as the critical action needed to stimulate further investment in new supply and deliver a genuine reduction in prices for Australians.

It's important to note that while we seek policy certainty, our ability to move forward is not dependent on it. Advances in technology and changing customer demands are far greater forces propelling us towards a cleaner, smarter and customer-centric energy future. We're committed to helping customers get the right energy deal and support measures across the entire industry to make energy offers clearer, simpler and easier to compare. We are writing to our customers so they are aware of the potential energy savings available to them.

In the meantime, we will continue to protect our most vulnerable customers from rising prices, as we did this year by making sure those in our hardship program were protected from the latest round of increases.

Against this backdrop, Origin has made good progress towards our commitments of reducing debt and improving returns for our shareholders. We reduced our debt by $1 billion with a closing adjusted net debt balance of $8.1 billion at 30 June 2017. We will continue to focus on further reducing our debt to below $7 billion by the end of FY2018 to help restore our financial flexibility so that in the future we can seize opportunities to grow.

We never lose sight of the critical role our people play in Origin's success and the importance of maintaining a safe working environment. We improved safety performance this year, meeting our target of reducing our total recordable injury frequency rate from 4.2 to 3.2, our best ever result. Core to our people commitments are gender diversity and flexibility. I am particularly proud of our efforts to offer greater flexibility to all our people via a new *All Roles Flex* initiative.

In order for Origin to rise to meet the challenges of an ever-changing world, we are also cognisant of the need to transform our culture to one that is more responsive, efficient and adaptable, but still focused on achieving our immediate priorities.

Our 16th Sustainability Report provides further details on this cultural change, and our performance across a range of social, environmental and economic aspects of our business. I hope it goes some way to answering the important question of whether we are managing our business safely, responsibly and sustainably.

We believe if we can meet the expectations stakeholders have of us, we are far more likely to be able to create and share value in the long term.



Frank Calabria
Chief Executive Officer

HOW WE REPORT

This Sustainability Report discloses our performance in material environmental and social aspects of Origin's activities during FY2017 and historically. To learn more about our Management Approach and view full details of our sustainability performance in FY2017, visit www.originenergy.com.au/sustainability

The sustainability aspects in this report align with the sustainability risks identified in our Operating and Financial Review.

We also engage with our stakeholders to identify what sustainability aspects are important to them. Visit www.originenergy.com.au/sustainability to learn more about our materiality assessment process.

The *Stakeholder Engagement* section of this report includes information on the key areas of interest to our stakeholders and how we engaged with them throughout the year.

This report references the Global Reporting Initiative (GRI). We also use the AA1000 Accountability Principles to inform our reporting. Our GRI Supplement is available online, at www.originenergy.com.au/sustainability

In addition to this report, we also report on sustainability aspects in various publications including the Annual Report, Shareholder Review, public submissions and online at www.originenergy.com.au

Our Corporate Governance Statement – available in our Annual Report and at www.originenergy.com.au/about/investors-media/governance – outlines our approach to governance and risk management.





Each year, we complete a materiality analysis. This involves examining each sustainability aspect according to its level of risk to the company, the level of stakeholder interest and the topicality of each aspect

FY2017 MATERIALITY ASSESSMENT OUTCOMES

Our sustainability reporting discloses our management of, and performance in, a number of sustainability aspects. In addition to those that are material to our business, we consider those that are of interest to our stakeholders[1].

Each year, we complete a materiality analysis. This involves examining each sustainability aspect according to its level of risk to the company, the level of stakeholder interest and the topicality of each aspect.

Our most material sustainability aspects include:

- climate change and emissions
- people and culture
- safety
- process safety
- water
- waste
- land access and coexistence
- communities
- supply chain
- customers
- policy

Each of these eleven topics is discussed in this report.

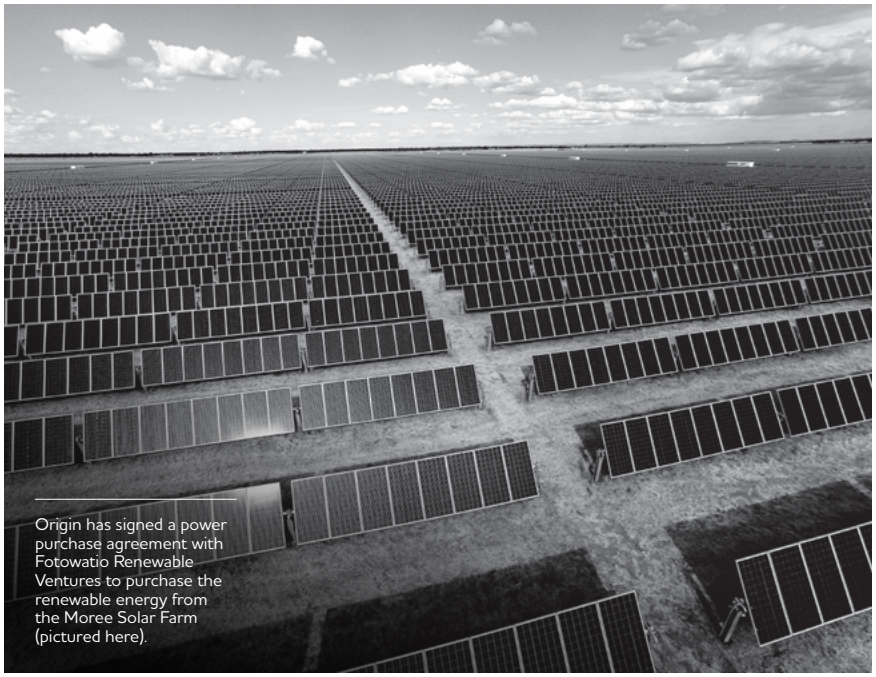
In addition, we discuss our views on the relevance of energy in climate change, and how this helps shape our strategy.

1 Drawn from investor, customer, employee and community feedback.

“HOW ARE YOU TACKLING CLIMATE CHANGE?

CLIMATE CHANGE PERFORMANCE AT A GLANCE

- Portfolio means minimal risk of stranding assets
- Rapidly growing renewables portfolio
- Flagged coal exit by early 2030s
- Commitment by the end of 2017 to publish analysis of the potential impact of a number of carbon reduction scenarios, and adopt a company-wide science based emissions reduction target consistent with the Paris Climate Accord’s 2°C goal



Origin has signed a power purchase agreement with Fotowatio Renewable Ventures to purchase the renewable energy from the Moree Solar Farm (pictured here).

Energy markets are in transition in Australia and around the world, driven by the shift to lower emissions energy supply.

Origin unequivocally supports the Paris Climate Accord and other measures to reduce carbon emissions. Electricity generation currently accounts for approximately one-third of Australia’s carbon emissions[2]. We believe the sector should be responsible for more than one-third of any national carbon reduction measure, because it has viable options at scale and the ability to help unlock abatement in other sectors for example, transport through electric vehicles.

We are also acutely aware of the need to transition to a carbon constrained world in a way that balances energy security, affordability and sustainability. We have advocated for clear government policies to achieve Australia’s 2030 target[3], and net zero emissions in the electricity sector by 2050 or earlier.

We believe that the transition to a low carbon future presents more opportunities than risks for Origin, given the resilience of our existing operations and a strategy focused on growth in renewables, gas and cleaner, smarter customer solutions.

RESILIENCE TO A CARBON CONSTRAINED WORLD

Origin maintains a short generation position, which means we produce less electricity than we sell to our customers. This gives us the flexibility to adapt to changing market dynamics and uniquely positions us to bring low cost renewables into our portfolio. As a result, we are at minimal risk of stranding existing assets.

Our generation portfolio has no exposure to high-emissions brown coal, and only includes one black coal-fired generation asset, the Eraring Power Station. As the largest power station in Australia, and one of the more efficient coal-fired power stations, Eraring plays a significant role in maintaining Australia’s energy security, as well as affordability, particularly as older and higher emissions-intensive coal-fired generators progressively retire.

2 Department of Environment and Energy. Quarterly Update of Australia’s National Greenhouse Gas Inventory: June 2016.

3 Australia is targeting a 26–28 per cent reduction in emissions on 2005 levels by 2030.

We own Australia's largest fleet of gas-fired peaking power stations which are already playing, and will continue to play, a significant role in supporting the growth of intermittent renewable energy. The capacity of our gas-fired peaking power stations is sufficient to support our increased uptake of renewable energy.

We are also a large producer of gas, which is a lower-emissions energy source than coal. Gas is the only fossil fuel whose demand grows under the International Energy Agency's (IEA) 450 scenario[4]. It is also an important fuel source for firm power generation to support increased renewable supplies into energy systems.

FIVE PILLARS OF DECARBONISATION

We recognise that energy is a critical part of the global climate change solution and we are taking decisive action to support efforts to reduce carbon emissions. We are taking a five pillar approach to drive the progressive decarbonisation of our business:

1 ___ exit coal-fired power generation by early 2030s;

2 ___ significantly grow renewables in our portfolio;

3 ___ leverage our strong gas position as a lower emissions firming fuel;

4 ___ empower customers with cleaner, smarter energy solutions; and

5 ___ demonstrate leadership in climate change advocacy.

1. Exit coal-fired generation by early 2030s

Eraring Power Station, Origin's only coal-fired power station, uses black coal and has a total capacity of 2,880 MW or approximately 7 per cent of capacity in the National Electricity Market (NEM). One way we plan to reduce carbon emissions is to close Eraring at the end of its operational life by the early 2030s.

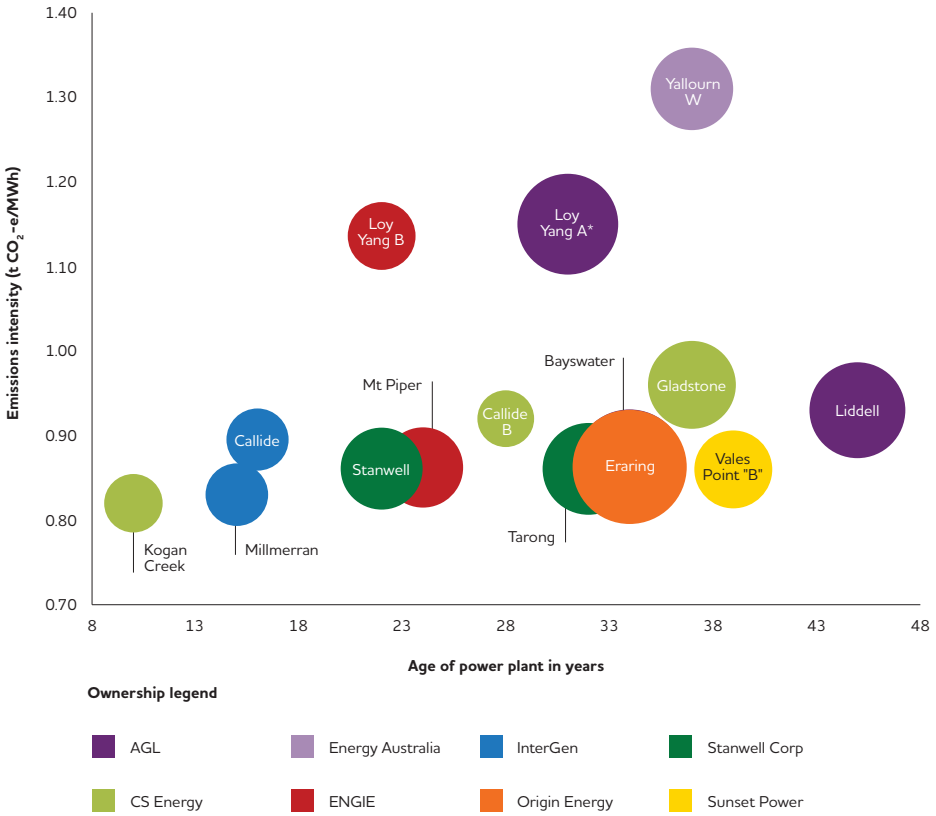
In FY2017, Eraring accounted for 8.5 per cent of Origin's revenue and represented approximately 4.2 per cent of Origin's total assets. In the near term, as Australia retires older, more emissions-intensive coal-fired generators, it is expected that a combination of renewables, gas and less emissions-intensive coal generators (such as Eraring) will become more prominent in the generation mix.

This is expected to drive emissions reduction across the sector. During the transition to a low emissions future, Eraring's flexibility will allow Origin to continue to provide support towards Australia's energy supply and help underpin domestic energy security and affordability. Accordingly, we believe that Eraring faces minimal stranding risk.

We are taking a five pillar approach to drive the progressive decarbonisation of our business

2017 NEM coal-fired emissions intensities (tonnes of CO_2-e/MWh sent-out)[5]

Australian Coal Generation Capacity by emissions intensity and age

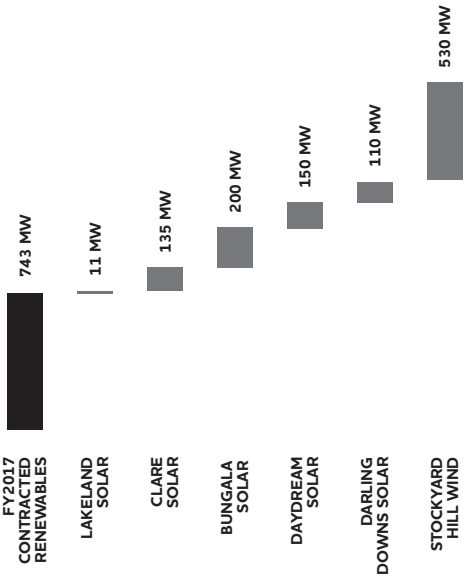


Source: Age of plants: AEMO, 2013 Planning Studies – Existing Generator Technical Data Summary. Emissions intensity: AEMO, 2016 Emissions Factor Assumptions Data (ACIL Allen).

4 Emissions reductions under this scenario provide a 60 per cent probability that global temperature rises are limited to 2°C. Based on International Energy Agency World Energy Outlook, 2016.

5 AEMO Carbon Dioxide Equivalent Intensity Index 2016. Power stations with a total nominal capacity of less than 400 MW have not been included.

Origin's growth in renewable capacity to 2020 (committed as at 30 June 2017)



Since March 2016, we have committed to approximately 1,200 MW of new renewable energy supply

2. Significantly grow renewables in our portfolio

Our short generation position and existing generation fleet allow us to accelerate the development of renewables and capture the benefit of falling technology costs.

We believe renewables represent the lowest cost investment in new electricity generation today. The majority of future investments in power generation are likely to be in renewable energy – firmed with natural gas, and by battery storage in the medium term – to maintain energy security.

Consistent with our public commitment to add up to 1,500 MW of new renewable energy by 2020, we have substantially increased renewables in our portfolio. Since March 2016, we have committed to approximately 1,200 MW of new renewable energy supply, which will come online progressively over the coming years and support a competitive cost of energy.

By 2020, we expect renewables to grow to more than 25 per cent of the energy in our generation mix[6], up from approximately 10 per cent today.

3. Leverage our strong gas position as a lower emissions firming fuel

Natural gas has long been recognised for its lower carbon profile and role in maintaining energy security. Its flexibility also makes it an ideal fuel to support the intermittency of renewables. It is the only fossil fuel forecast to increase under the IEA's 450 Scenario[7].

Origin is well placed to support the ongoing use of natural gas in helping to decarbonise Australia's economy while maintaining energy security.

In FY2017, we announced a gas supply agreement with ENGIE that will bring 240 MW of gas-fired generation back online to improve energy security in South Australia.

We will continue to supply natural gas to meet the needs of major industries including manufacturing and residential customers. As the owner of Australia's largest fleet of gas-fired peaking power stations, we also expect to play an increasingly significant role in supporting the growth of renewable energy within our own portfolio and across the NEM.

Australia Pacific LNG currently supplies approximately 20 per cent of Australia's total annual east coast gas demand, and will continue to play a role in meeting the needs of larger gas customers such as manufacturers. Through its long-term offtake contracts, Australia Pacific LNG will continue to export liquefied natural gas (LNG) to customers in Asia and will play an important role in supporting the carbon reduction efforts in this region.

4. Empower customers with cleaner, smarter energy solutions

As we look to the future, we expect the rapid decline in the cost of renewables and the emergence of new technologies to change the way our energy system operates. Importantly, these factors will also change the way Australians interact with energy in their homes and businesses.

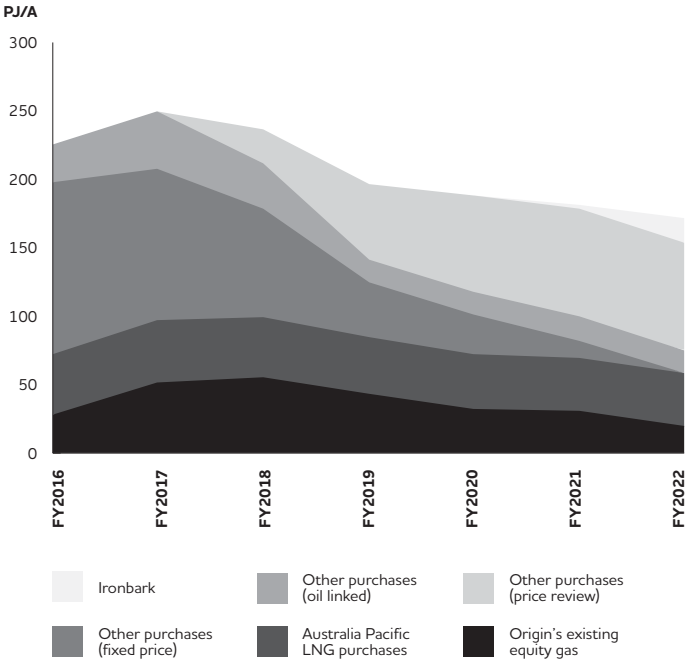
This provides enormous opportunities for Origin, and we intend to be one of Australia's leading providers of low carbon and energy-efficient solutions. Origin has a strong pedigree in this area, as we have been at the forefront of residential solar installations for more than a decade, and we also have a range of battery offerings in partnership with Tesla. We built on this experience in FY2017, rapidly growing to be Australia's largest commercial solar installer.

We have introduced our first Origin app, through which customers can pay their bills, check their energy usage (on an hourly basis for those customers with a digital meter) and set alerts to track changes in energy costs.

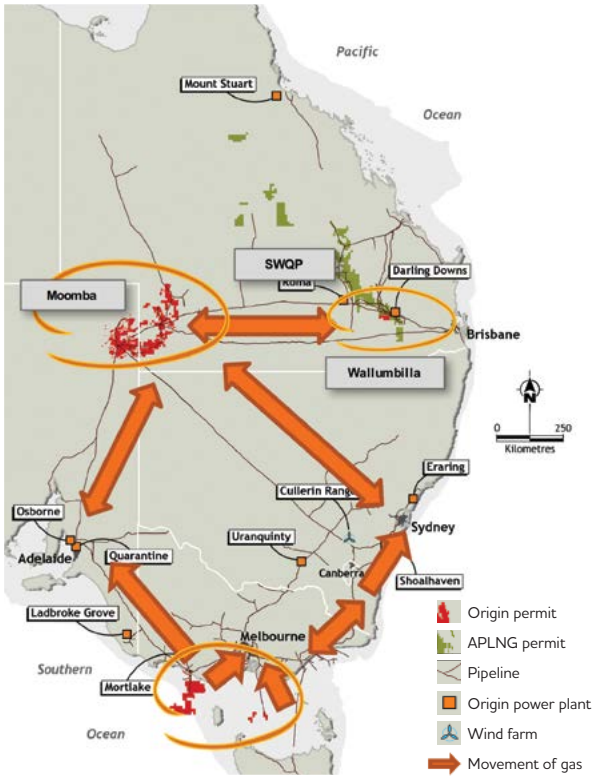
6 Consists of owned and contracted generation.

7 International Energy Agency (IEA) World Energy Outlook 2016. The 450 Scenario seeks to limit the concentration of CO_2e in the atmosphere to 450 parts per million, which is consistent with a 50 per cent chance of limiting global warming to 2°C above pre-industrial levels by 2100. This scenario represented the most aggressive decarbonisation scenario modelled by the IEA in 2016.

Origin's east coast gas supply portfolio



Origin's gas transportation flexibility



We are currently undertaking, or preparing to undertake, a number of technology trials and have taken some small, but important, steps to anticipate what our customers will want in the future. During FY2017, we invested US$1.2 million in the US-based software company People Power, which provides a connected home solution focused on home monitoring that uses real-time data and intelligent device connectivity.

We established 'O hub', a collaborative workspace for Origin teams to work alongside tech start-ups and in August 2017, we launched technology trials, in collaboration with California-based tech start-up Bidgely, focused on using smart meters to disaggregate and itemise energy usage for our customers.

We established a small presence in California's Silicon Valley to better connect Origin to the global epicentre of digital innovation. We also co-founded Free Electrons[8] – a global accelerator program that brings together eight forward-thinking utilities and 12 leading start-ups in the areas of renewables, smart grids, electric vehicles and home energy management.

8 Free Electrons (freelectrons.co/who-we-are/).

Closer to home, we have become the principal sponsor of EnergyLab, the new University of Technology Sydney-hosted home for clean energy innovation.

5. Consistently demonstrate leadership in climate change advocacy

For many years, we have been a leading advocate for climate change action and the progressive decarbonisation of the energy sector. Our portfolio decisions have positioned us well to meet today's demands and to take opportunities presented by national and global commitments to secure, reliable, affordable and sustainable energy.

During FY2017, we contributed strongly to the Australian energy debate that preceded the recommendations of the Independent Review into the Future Energy Security of the NEM (the Finkel Review). We support all 50 of the review's recommendations, and believe that a Clean Energy Target could be a workable solution for the industry.

In 2015, we were the first energy company in the world to sign up to seven of the We Mean Business coalition commitments on climate change made prior to the historic Paris Agreement. *Appendix 1* includes an overview of our progress against these commitments.

In June 2017, the G20 Financial Stability Board Task Force on Climate Related Financial Disclosure (TCFD) released its final recommendations on climate-change related risk disclosure. We believe our existing governance and reporting framework covers many of these recommendations and have made commitments for additional disclosures, including the adoption of a company-wide science-based emissions reduction target. We will review the TCFD recommendations in detail over FY2018 with a view to further improving our disclosures.

By December 2017, we aim to publish analysis of the potential impact of a number of global carbon reduction scenarios, including the 2°C scenario, on our wholesale electricity and generation portfolio. We also plan to commit to a company-wide science based emissions reduction target that will be consistent with the Paris Climate Accord's 2°C goal.

“WHAT ARE YOUR EMISSIONS?



EMISSIONS PERFORMANCE AT A GLANCE

- Emissions intensity fell in both Energy Markets and our Integrated Gas business
- Total emissions increased slightly, reflecting the ramp up of production at Australia Pacific LNG

Our emissions intensity fell in FY2017 compared to FY2016

Origin's total emissions and our emissions intensity are predominantly driven by our Energy Markets' power generation portfolio, and the Eraring Power Station in particular. Compared to the National Electricity Market (NEM) our generation portfolio has a higher proportion of renewables and gas and has been less emissions-intensive than the NEM for many years.

This year we saw gas production at Australia Pacific LNG increase as Train 2 came online. In line with this growth, both our Scope 1 and Scope 2 emissions increased. Notwithstanding this increase, we believe we are making an important contribution by helping to support the substitution of higher carbon-intensive fuels for lower carbon fuels such as natural gas. Australia Pacific LNG exports LNG to customers in Asia and these exports play an important role in supporting the carbon reduction efforts in this region.

In addition to exporting LNG to Asia, Australia Pacific LNG supplies approximately 20 per cent of Australia's total annual east coast gas demand.

HOW WE REPORT

In this section, we discuss our emissions performance. The majority of our carbon emissions result from our business operations and are categorised as Scope 1.

The remainder of our emissions result from the electricity that we purchase to undertake our activities and are categorised as Scope 2.

Our Scope 3 emissions are largely associated with the combustion by end users of fuels we deliver to domestic and international markets. We do not report our Scope 3 emissions.

This section sets out:

- carbon emissions across Origin
- carbon emissions from Energy Markets power generation portfolio
- carbon emissions from Integrated Gas
- other air emissions including oxides of nitrogen (NOx), sulphur oxides (SOx), volatile organic compounds (VOC) and particulate matter (PM)
- the Emissions Reduction Fund Safeguard Mechanism

More information on how Origin is transitioning to a carbon constrained world can be found in our *Energy and climate change* section.

Additional emissions data is contained in our FY2017 Sustainability Performance Data at www.originenergy.com.au/sustainability

CARBON EMISSIONS ACROSS ORIGIN

The following tables and charts show our absolute emissions for the total business, and highlights emissions intensities in key parts of our business.

Emissions intensity

Across our business, our emissions intensity fell in FY2017 compared to FY2016.

Our Scope 1 and Scope 2 emissions intensity in power generation fell marginally from 0.82 to 0.79 tonnes of CO_2-e per MWh between the two years.

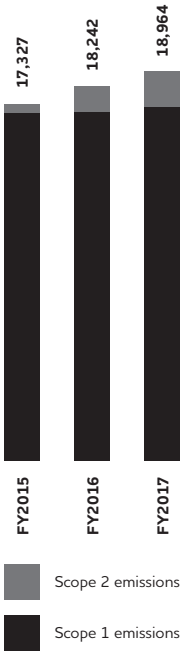
In Integrated Gas, Scope 1 and Scope 2 emissions intensity fell from 6.17 to 5.74 tonnes of CO_2-e per TJe, corresponding with increased gas production.

Absolute emissions

Our historical absolute emissions performance is shown in Graph 1. The increase in Scope 2 emissions reflects an increase in gas production by Australia Pacific LNG as the project transitioned from construction to full production.

Graph 1

GHG emissions by Scope (kt CO_2-e) – operational control basis



The breakdown of our FY2017 Scope 1 and Scope 2 greenhouse gas (GHG)[9] emissions are shown in Table 1.

The power generation activities of our Energy Markets business accounted for 91 per cent of Origin's Scope 1 emissions. The Eraring Power Station, is our only black coal-fired power station. It is our largest generator and accounts for the majority of emissions produced by our Energy Markets business.

Our Integrated Gas business accounted for 77 per cent of our Scope 2 emissions and primarily represents the increase of gas production at Australia Pacific LNG.

On an operational control basis, our FY2017 total Scope 1 and Scope 2 GHG emissions increased by 4 per cent compared to FY2016 (1 per cent on an equity basis).

Detailed, longer-term results can be found in FY2017 Sustainability Performance Data at www.originenergy.com.au/sustainability

The change in FY2017 emissions is largely due to:

- Eraring's Scope 1 emissions remained stable, consistent with generation outputs.
- extended safety flaring[10] activities at Reedy Creek Combabula, which contributed to increased Scope 1 emissions at our coal seam gas (CSG) operations.
- an overall increase in venting[11] at our CSG operations, consistent with increased gas production.
- an increase in Scope 2 emissions due to higher consumption of electricity associated with increased gas production at Australia Pacific LNG.

CARBON EMISSIONS FROM ENERGY MARKETS POWER GENERATION PORTFOLIO

Origin has invested in a relatively low carbon, cost competitive and flexible generation fleet. Our generation capacity represents approximately 15 per cent of total NEM capacity. We have a higher proportion of both gas and renewables, and a lower proportion of coal, when compared to the NEM as illustrated in Table 2.

Table 1

OPERATIONAL CONTROL	SCOPE 1 (kt CO_2-e)	SCOPE 2 (kt CO_2-e)	SCOPE 1 + 2 (kt CO_2-e)
Energy Markets	15,631	174	15,805
Integrated Gas	1,564	1,586	3,150
Corporate	–	9	9
Total FY2017	**17,195**	**1,769**	**18,964**

Table 2

	AUSTRALIAN NEM		ORIGIN PORTFOLIO (OWNED AND CONTRACTED)	
	MW	%	MW	%
Generation capacity	43,213		6,743	
Coal	21,607	50	2,880	43
Gas	8,815	20	2,438	36
Hydro	7,433	17	240	4[12]
Wind	3,803	9	732	11
Other	1,512	4	423	6

Source: Generation capacity and output by fuel source, Australia Energy regulator website.
Origin Energy, Full-year 2017 results (replicated from the OFR).

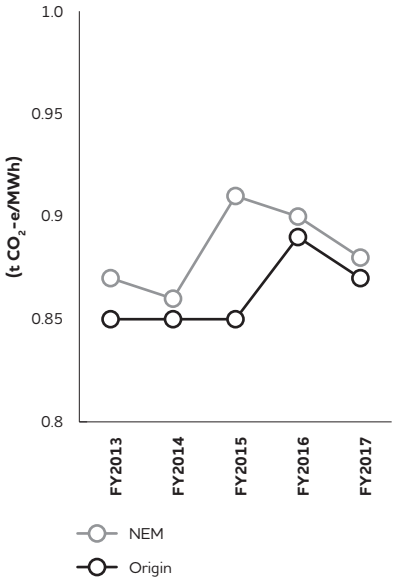
9 See the *Important Information* section at the front of the report.

10 See page 13 for an explanation of flaring.

11 See page 13 for an explanation of venting.

12 240 MW Shoalhaven (pumped hydro) power station.

Average emissions intensity – NEM vs Origin



In FY2017, our electricity generation portfolio operated at 0.87 tonnes[13] of CO_2-e per MWh; compared to the NEM average of 0.88 tonnes[14] of CO_2-e per MWh. Origin's portfolio has been less emissions intensive than the NEM for many years.

Consistent with previous years, the Eraring Power Station had an emissions intensity (Scope 1 only) of 0.90 tonnes of CO_2-e per MWh.

Gas-fired power stations are typically less emissions intensive when compared to coal-fired power stations. At the end of FY2017, gas represented 36 per cent of our internal generation capacity. Our gas generation fleet emissions intensity (Scope 1 only) was 0.49 tonnes of CO_2-e per MWh.

Our absolute Scope 1 and Scope 2 emissions from our generation fleet have grown over time, largely driven by increased electricity production into the NEM. Origin's emissions performance for Energy Markets, on an operational control basis is shown in Table 3.

CARBON EMISSIONS FROM INTEGRATED GAS

On an operational control basis, about half of the reported emissions from Integrated Gas in FY2017 occurred directly from our fuel production activities (Scope 1), and about half came from the electricity we used to run these operations (Scope 2). These are shown in Table 4.

Scope 1 emissions include emissions from gas field infrastructure, as well as drilling and exploration activities. These emissions are reported annually in our National Greenhouse and Energy Report[15].

During FY2017, emissions from venting, flaring and leakage at our oil and gas operations[16] totalled 942 kt CO_2-e[17] of the 1,564 kt Scope 1 emissions, an increase on the prior period associated with completion of the LNG plant and higher LNG production by Australia Pacific LNG. Of these emissions, about half are methane emitted to the atmosphere when reported as carbon dioxide equivalents. Within Australia Pacific LNG, methane emissions from venting and leaks is estimated to equate to approximately 0.1 per cent of FY2017 production from operated areas. The breakdown of flaring, venting and leaks is reported in Table 5.

Table 3

GHG EMISSIONS – ENERGY MARKETS – OPERATIONAL CONTROL BASIS (kt CO_2-e)	FY2013	FY2014	FY2015	FY2016	FY2017
Scope 1 emissions (kt CO_2-e)	12,411	13,387	15,376	15,593	15,631
Scope 2 emissions (kt CO_2-e)	–	–	109	229	174
Total Scope 1+2 emissions (kt CO_2-e)	**12,411**	**13,387**	**15,485**	**15,822**	**15,805**

Table 4

GHG EMISSIONS – INTEGRATED GAS OPERATIONAL CONTROL BASIS (kt CO_2-e)	FY2013	FY2014	FY2015	FY2016	FY2017
Scope 1 emissions (kt CO_2-e)	1,249	1,544	1,539	1,382	1,564
Scope 2 emissions (kt CO_2-e)	–	–	282	1,025	1,586
Total Scope 1+2 emissions (kt CO_2-e)	**1,249**	**1,544**	**1,821**	**2,407**	**3,150**

Table 5

	FY2017	FY2016
Flaring (kt CO_2-e)	491	280
Venting (kt CO_2-e)	425	493
Leaks (kt CO_2-e)	26	22
Total emissions (kt CO_2-e)	**942**	**795**

13 Calculated using the Australian Energy Market Operator's (AEMO) approach; that is, intensity of Scope 1 + Scope 3 emissions.

14 Calculated as a ratio of total emissions to total sent out energy for the reporting period using Scope 1 + Scope 3 emissions. Source: AEMO, Carbon Dioxide Equivalent Intensity Index results.

15 In line with the Queensland *Petroleum and Gas (Production and Safety) Act 2004*, all Australia Pacific LNG's gas field infrastructure is routinely surveyed for methane leaks. Estimates of emissions volumes are undertaken in accordance with approved methodologies outlined under the Commonwealth National Greenhouse and Energy Reporting (NGER) scheme.

These emission estimation methodologies include the use of emissions factors, engineering calculations and direct measurement approaches. The estimation of emissions from CSG infrastructure is routinely reviewed, and if necessary revised, to ensure accurate emissions estimates.

16 Including as upstream operator of Australia Pacific LNG.

17 Includes emissions from flaring, venting and leakage calculated using regulatory methods outlined for the NGER Scheme and New Zealand Emissions Trading Scheme. These emissions are included in Origin's Scope 1 emissions as reported to the NGER schemes.



We have been working with the CSIRO and other scientific experts in our areas of operations to research landscape emissions and understand where changes might be attributed to gas development activities

The most recent independent study of emission estimation methodologies in Australia was carried out by the CSIRO, which confirmed that our current estimation practices are appropriate.

Emissions can also occur naturally from the surrounding landscape.

Venting

Intermittently, operations experience disruptions to production that are triggered by inbuilt safety systems. These systems protect people and equipment. When disruption occurs, there are established operational practices in place to manage gas in the infrastructure.

In some circumstances there is a need to relieve pressure in the system by releasing gas. This can be done by venting through engineered release points such as high point vents, pressure safety valves and from gas-pressured control valves. Emissions are calculated using emission factors and reported annually under the *National Greenhouse Energy Reporting Act 2007 (NGER Act)*.

Flaring

As an alternative to venting, gas can also be released by burning the methane in specially designed flares within the infrastructure, in a process known as flaring. Flaring converts methane to carbon dioxide, which is a less potent GHG than methane. We measure emissions from these practices using calibrated flow meters and report them annually under the NGER Act.

Leaks

Gas can leak from the infrastructure, particularly at pipe joints and valves. In line with the Queensland Government's regulatory requirements, Australia Pacific LNG's gas field infrastructure is regularly surveyed for methane leaks. We use emission factors to estimate leak rates and these factors are periodically reviewed in light of available scientific literature to increase the accuracy of our annual reporting under the NGER Act.

Methane emissions from the landscape

Most hydrocarbon-producing basins, including the Bowen and Surat basins that host the major Queensland CSG fields, have naturally occurring methane in the landscape.

These methane emissions have occurred for millennia, but there is little historical information on the quantities emitted. Gas development activities can change natural methane migration and emission patterns as we have observed in a localised area of the Surat basin. This may include increases in some areas or decreases in others, depending on geology, water levels and other factors.

There is no regulatory requirement to report emissions from the landscape. We have been working with the CSIRO and other independent scientific experts in the areas where we operate. Our aim is to research landscape emissions and understand where changes might be attributed to gas development activities.

These studies have improved our scientific understanding of natural emissions across the region, as well as the potential emissions associated with abandoned coal exploration bores and landholder bores.

In FY2017, CSIRO released a research report, which included Origin-operated gas fields as well as others. The report[18] estimated that fugitive emissions from gas production across Australia comprise 2.5 per cent of greenhouse gas emissions nationally, and observed that natural gas 'seeps' associated with fissures and fractures are likely to have been emitting methane for many millennia.

We continue to take a proactive approach to methane emissions from the landscape, and seek to further increase our understanding. Our program of research into these emissions from the areas of our operations will continue into FY2018.

One way of capturing methane emissions as they migrate through underground geology is to intercept them with gas wells. In FY2016 and FY2017 we trialled this methodology. Three trial gas intercept wells were drilled into geological structures adjacent to the main seep location near the Condamine River. These wells intercepted migrating gas, which was then flared.

FY2017 measurements of the main seep fell 60 per cent compared to early-to-mid 2016.

These trials are informing a program of well development in FY2018 where underground migrating gas can be intercepted and directed into gathering lines to form part of gas production.

18 CSIRO, *What does science tell us about fugitive methane emissions from unconventional gas?* May 2017.

OXIDES OF NITROGEN (NOx), SULPHUR OXIDES (SOx), VOLATILE ORGANIC COMPOUNDS (VOC) AND PARTICULATE MATTER (PM)

NOx, SOx, VOC and PM for Origin's operated Australian sites result mainly from electricity generation at our Eraring Power Station. These emissions are shown in Table 6.

Remedial works associated with air quality non-compliances at the Otway Gas Plant facility identified during FY2016 were completed during the FY2017 reporting period. These are in addition to ongoing and scheduled maintenance activities. An operating plan remains in place to manage and minimise these types of events.

To date, a discharge from the Thermal Oxidiser Bypass Vent has been considered to be a reportable incident. There are ongoing discussions with the Victorian Environmental Protection Authority (EPA) regarding future reporting requirements of such events to align with the operating plan.

During the period, Australia Pacific LNG's Talinga Pipeline Compression Facility exceeded its NOx emissions limits.

The current emissions levels from the facility are lower than the Environmental Protection Policy (Air) emissions guidelines. As the operator of this facility, we are reviewing the infrastructure, operation and engineering modifications. We are also updating our air emissions modelling based on these changes to ensure the Talinga facility does not exceed its NOx emissions limits in future.

EMISSIONS REDUCTION FUND SAFEGUARD MECHANISM

Energy Markets

Our electricity generation assets are covered by the sectoral baseline under the Federal Emissions Reduction Fund Safeguard Mechanism from 1 July 2016. Under this mechanism, facility emission baselines do not apply to electricity generators unless the total emissions from all Australian electricity generators exceed the sectoral baseline[19].

As this sector baseline was not exceeded during the reporting period, facility emissions baselines were not applied to Origin's electricity generation assets during FY2017.

Integrated Gas

Six of Australia Pacific LNG's Gas processing facilities[20] are participants in the Federal Emissions Reduction Fund Safeguard Mechanism for large emitters[21].

In this program, emissions baselines are set based on historical emissions between FY2010 and FY2014. If emissions from these facilities exceed the baseline during the reporting period, a regulatory review process is triggered with the potential to require Origin (on behalf of Australia Pacific LNG) to purchase and surrender domestic Australian Carbon Credit Units (ACCUs).

During FY2017, the Spring Gully, Talinga and Reedy Creek facilities exceeded their emissions baselines due to increased production and flaring activities associated with the completion of a major shut down.

In accordance with the regulations, as the upstream operator of Australia Pacific LNG we will apply to revise the emissions baselines of our facilities at Spring Gully, Talinga and Reedy Creek.

Table 6

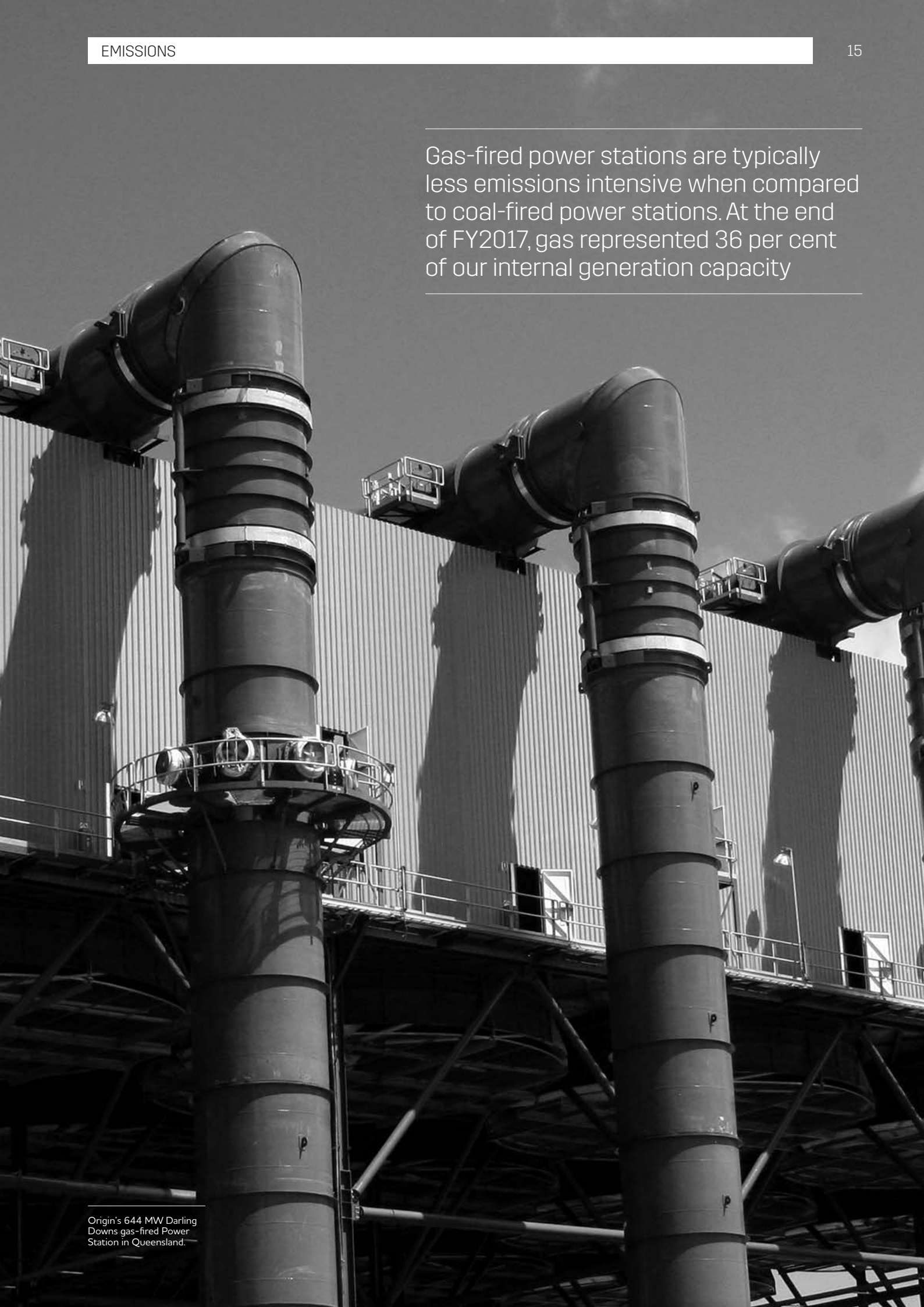
OTHER AIR EMISSIONS (TONNES)	FY2017	FY2016
NOx emissions from Origin's operated Australian sites	24,985	23,519
SOx emissions from Origin's operated Australian sites	30,574	28,417
VOC emissions from Origin's operated Australian sites	1,692	2,973
PM10 from Origin's Eraring Power Station	241	270

19 The sectoral baseline is set at 198 million tonnes CO_2-e, based on electricity sector's emissions from 2009–10 to 2013–14. The sectoral baseline will be in place until the sector's aggregated emissions exceed the baseline. After this point, electricity generation facilities will be required to comply with their own individual facility baseline, which will apply in the financial year after which the Clean Energy Regulator publishes the reported exceedances. (Source: Clean Energy Regulator.)

20 This excludes the Lang Lang and Otway facilities.

21 Emissions greater than 100kt CO_2-e.

Gas-fired power stations are typically less emissions intensive when compared to coal-fired power stations. At the end of FY2017, gas represented 36 per cent of our internal generation capacity



Origin's 644 MW Darling Downs gas-fired Power Station in Queensland.

“HOW ARE YOU MAKING ORIGIN A BETTER PLACE TO WORK?

PEOPLE AND CULTURE PERFORMANCE AT A GLANCE

- Engagement score improved from 53 per cent to 58 per cent
- 85 per cent of employees participated in the engagement survey
- Introduced All Roles Flex initiative making flexible work options available to all roles
- Recognised as an Employer of Choice for Gender Equality by the Workplace Gender Equality Agency

We are focused on aligning our people to a shared vision and purpose, putting in place effective leaders at all levels of the organisation, supporting diversity and instilling a greater focus on our customers and the communities in which we operate. We place a high priority on conducting business in an ethical manner.

ABOUT OUR WORKFORCE

At the end of FY2017, Origin employed 5,894 people representing a 1 per cent increase on the prior period. Our headcount remained stable over the period, reflecting the transition of Australia Pacific LNG from development to operational support for the project following completion of cost reduction and restructuring activity.

	FY2017	FY2016
Number of employees	5,894	5,811
Percentage of females	35%	35%
Percentage of males	65%	65%

At the end of 2016, we announced our intention to divest our conventional oil and gas assets. This business is now known as Lattice Energy. The expected completion of this process in FY2018 will reduce workforce numbers.

Our workforce gender split has remained unchanged in FY2017 and is currently 35 per cent female and 65 per cent male.

DIVERSITY

Origin is recognised as an Employer of Choice for Gender Equality by the national Workplace Gender Equality Agency. This citation reflects the focus of the *Workplace Gender Equality Act 2012* to promote and improve gender equality outcomes for both men and women.

Our Corporate Governance Statement in our Annual Report – available at www.originenergy.com.au – outlines our FY2017 disclosures on diversity and inclusion policy, gender diversity outcomes and FY2018 diversity targets.



In 2015, we began formally focusing on the diversity and inclusion of Aboriginal and Torres Strait Islander people in our workplace and communities



CULTURAL DIVERSITY AND INDIGENOUS PEOPLE

In 2015, we began formally focusing on the diversity and inclusion of Aboriginal and Torres Strait Islander people in our workplace and communities. This program is available as part of our Reconciliation Action Plan[22].

We are focusing our efforts on cultural awareness, employment, Indigenous businesses (as further outlined in the *Supply Chain* section) and engagement with Indigenous communities. This is complemented by our efforts through the Origin Foundation[23], which conducts philanthropic activities with a substantial focus on Aboriginal and Torres Strait Islander children.

In FY2017, 84 per cent of Origin employees had completed our online cultural awareness training program, *Reconciliation in Origin*.

Origin entered the *CareerTrackers 10x10* program in 2015, joining 11 other Australian companies to strengthen the pipeline of Indigenous tertiary graduates. The program commits us to finding temporary work placements for a minimum of 10 Indigenous graduates each year, for 10 years.

We continue to exceed this goal each year, and provided nearly 20 work placements in FY2017.

The aim is to transition students into full-time employment upon completion of their degree.

EMPLOYEE ENGAGEMENT

Each year we commission an independent employee engagement survey[24].

Executive remuneration is tied to Origin's performance in this survey, as measured by the company's overall engagement score.

In FY2017, 85 per cent of Origin employees participated in this survey. Our overall score was 58 per cent, which is an improvement on our score in FY2016. While this places the organisation within reach of the Australian and New Zealand average benchmark of 59 per cent, we recognise there is more to be done.

Our employee engagement score over the last few years is illustrated in the table below.

Origin Engagement Score

	FY2017	FY2016	FY2015	FY2014
Employee engagement score	58%	53%	52%	47%

ETHICAL BUSINESS

We are committed to conducting business in an ethical manner at all times.

Our *Code of Conduct* guides us in meeting both ethical standards and legal requirements, and all employees are required to complete a training program to understand its requirements. Origin encourages employees to report known or suspected breaches of the *Code of Conduct* and of our other policies and directives.

The Code of Conduct includes an *Anti-Bribery and Corruption* program that covers all aspects of our business.

During FY2017, we updated our *Escalating a Concern* procedure to include an option for our people to raise concerns via an independent external party. This avenue is available at all times and allows concerns to be reported anonymously or in confidence.

Further information in relation to Origin's *Code of Conduct* and ethical behaviour can be found in Principle 3 of our *Corporate Governance Statement*.

22 Origin Energy Reconciliation Action Plan (www.originenergy.com.au/about/community/reconciliation-action-plan.html).

23 Origin Foundation (www.originfoundation.com.au).

24 Conducted by Aon Hewitt.

CASE STUDY

ORIGIN RECOGNISED FOR INDIGENOUS INTERNSHIP PROGRAM

In recognition of our commitment to creating opportunities for Indigenous students, we recently received the prestigious Corporate Plus Award. The award was bestowed by national Indigenous internship program CareerTrackers, with whom Origin has been a close partner since 2014.

"We have been impressed with Origin's commitment to developing a unique program that goes above and beyond," says CareerTrackers founder and CEO, Michael Combs. "Origin's program creates the best possible experience and career development opportunities for their Aboriginal and Torres Strait Islander employees."

Our partnership with CareerTrackers is more than a pledge to provide internships for Indigenous students, helping prepare them for leadership in the workplace and community. It's also part of building a culture of respect, promoting diversity across our business and demonstrating our commitment to reconciliation.



The 2016 CareerTrackers Summer Program cohort at Binda-Nalkana, the Regional Learning Central located at Condabri Central, Queensland.

As a CareerTrackers partner and a member of the 10x10 program, we offer internships to at least 10 students each year for 10 years. This year we provided nearly 20 work placements. The aim is to transition students into full-time employees upon completion of their degree



“WHAT ARE YOU DOING TO REDUCE INJURIES AT WORK?

SAFETY PERFORMANCE AT A GLANCE

- TRIFR of 3.2, an improvement from 4.2 and our best ever result
- SACIFR of 0.8, compared to a target of 1.2
- Met our target to close 40,000 observations

We believe that every one of our employees has the right to return home safely at the end of every work day. We also believe good safety management underpins good business performance.

Origin's Health, Safety and Environment (HSE) policy is available on our website. It includes our HSE principle of due care and HSE aspiration. It also describes how we think about, plan and manage HSE impacts and initiatives across our business. The policy is supported by our HSE Management System and HSE System and Risk Controls Directives, which outline the minimum requirements for managing HSE risks and impacts.

The Board's HSE Committee supports and advises the Board on HSE matters and HSE-related risks. Further information on how we recognise and manage HSE-related risks can be found in our Operating and Financial Review, and Corporate Governance Statement.

MANAGING PERSONAL SAFETY

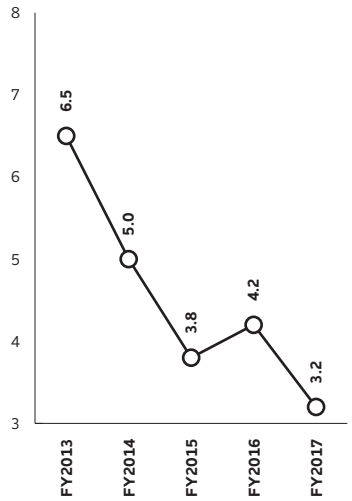
We set annual targets against several safety metrics and track our performance throughout the year. Our primary measure for managing personal safety is our total recordable injury frequency rate (TRIFR).

TRIFR measures the company-wide number of work-related injuries per million hours worked. This year, we met our safety target of 3.2. Since FY2013, we have significantly improved our safety performance as demonstrated by a 51 per cent improvement in our TRIFR. Our performance reflects Origin's focus on safety leadership and risk management, as well as empowering employees and contractors to focus on improving safety in the workplace.

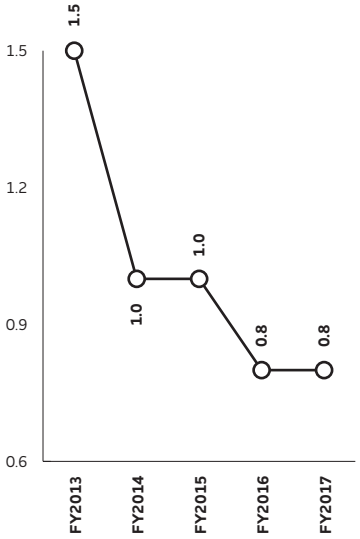
The lost time injury frequency rate (LTIFR) is another measure we use to track our personal safety performance. LTIFR is a subset of TRIFR and measures the frequency of injuries that result in an employee missing at least one full shift, or work day per million hours worked. In FY2017, our LTIFR was 0.77, which is a reduction from 0.8 in FY2016 and continues a downward trend over the past five years.

In FY2017, we introduced a new metric for measuring and managing the number of HSE incidents classified as 'serious'[25] or above (per million hours worked). We set the target for our serious actual consequence incident frequency rate (SACIFR) at 1.2, with a stretch target of 0.9.

Total recordable injury frequency rate
(TRIFR)



Lost time injury frequency rate
(LTIFR)



25 Consequence rating serious and above (safety) defined in the *Glossary*.



Origin's SACIFR in FY2017 of 0.8, was 0.4 lower than our target, and lower than our stretch target. This performance was due to our focus on ensuring the effectiveness of our controls for material HSE risks.

FY2018 TARGETS

In FY2017 we achieved all of our HSE company performance targets.

We have further developed HSE metrics and set FY2018 targets to align with our ongoing priority areas for HSE improvement. These targets will direct our HSE performance improvement effort into the following four areas:

- Significant incidents: Reduce the total number of significant incidents for our material HSE risks such as land transport, aviation and construction. Our significant incident target has been set at six;
- Process safety events: Strengthen process safety management across both Integrated Gas and Energy Supply and Operations. Our process safety target for Tier 1 and 2 events has been set at eight;
- Recordable Injuries TRIFR: Prevent injury, illness and psychosocial health impacts to our people. Our TRIFR target has been set at 2.9; and
- Environmental reportable incidents: Prevent environmental harm and comply with our environmental conditions. Our environmental reportable incident target has been set at 35.

EMPLOYEE SAFETY INCENTIVES

Origin operates a general employee share plan in which eligible employees can be awarded up to $1,000 worth of company shares on an annual basis. In FY2017, the award was tied to the achievement of our HSE Action and Observation targets. Observations are a key tool we use every day to recognise safe and unsafe behaviours, and address observations relating to health and environmental practices. Employees are required to record observations, and take action where appropriate to make their work environment safer, healthier and more environmentally conscious.

In FY2017, our HSE Actions target was to close 85 per cent of HSE Actions by the original due date, while our Observations target during the period was close 40,000 HSE observations. As both targets were met, the board awarded $1,000 of Origin shares to eligible employees.

Origin's short term incentive program for executives operates on a financial year scorecard basis, consisting of business and personal key performance indicators (KPIs). Business KPIs are weighted 80 per cent for the CEO and 75 per cent for other key management personnel. Safety metrics form part of the business KPIs, include both TRIFR and SACIFR, and are equally weighted.

Origin's Remuneration Report contains further information about our safety incentives.

LAND AND AIR TRANSPORT

Our business involves a substantial amount of transport, reflecting the nature of our operations and the geographic spread of our assets. Transport includes moving people and materials by both land and air. Directives, systems and plans help us mitigate identified HSE risks and/or impacts associated with this travel.

During the period, there were two significant land transport incidents in our Integrated Gas operations, compared with zero in the previous period. These incidents involved light vehicle roll-overs resulting in injuries. We investigated these incidents and implemented relevant actions.

In addition, the business is undertaking a general review of its land transportation activities with the aim of reducing driving exposure (i.e. by reducing total kilometres driven), managing fatigue and focusing on driving behaviours.

Origin's aviation operations recorded no significant incidents during the period.

“HOW DO YOU MAKE SURE YOUR OPERATIONS ARE SAFE?

PROCESS SAFETY PERFORMANCE AT A GLANCE

– Declining trend in the total number of process safety events over the past three years

The safe operation of our plant and equipment is essential to protecting our people, the communities in which we operate and our environment. It also reduces downtime and improves operating efficiency.

PROCESS SAFETY PLANNING

Our Process Safety Management (PSM) Improvement Plan, which commenced in 2014, entered its final phase in FY2017. During the period, we identified a set of common process safety management performance indicators and used them to develop a PSM dashboard.

We used these indicators across our entire business to measure process safety performance and manage risk. The information we obtain from monitoring these indicators helps us adjust our safety process procedures to help prevent incidents.

Our process safety requirements are contained in our Health, Safety and Environmental (HSE) Management System and other company directives, which we benchmark against industry guidance including from the International Association of Oil and Gas Producers (IOGP)[26]. The IOGP classifies process safety events within four tiers or levels of severity[27], rating a Tier 1 process safety event as the most severe.

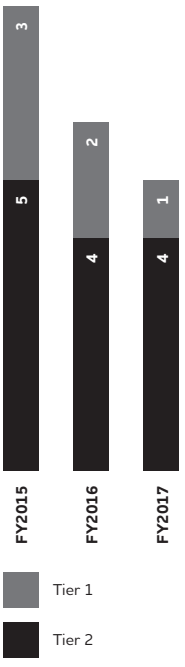
PROCESS SAFETY PERFORMANCE

Origin registered one Tier 1 event during the period. This event occurred at our Eraring Power Station and involved a fire in a coal mill that caused damage at the mill and associated pipework, but did not result in any injuries. The fire was extinguished promptly and the mill was taken out of service to complete repairs. We also experienced four Tier 2 events at other power stations and facilities.

The past three years have seen a declining trend in the total number of Tier 1 and Tier 2 process safety events. This is attributed to targeted initiatives and programs, managing safety critical elements well, and a continued focus on operational discipline.

Origin thoroughly investigates all Tier 1 and Tier 2 events and where appropriate an independent review is undertaken. We put in place measures to reduce any immediate operating risk, and complete longer-term actions to mitigate the risk of recurrence.

Process safety events



26 IOGP (www.iogp.org/)

27 IOGP Process Safety Recommended Practice on Key Performance Indicators, Report No. 456.

The past three years have seen a declining trend in the total number of Tier 1 and Tier 2 process safety events



The Spring Gully injection bore.

“HOW DO YOU PREVENT WATER CONTAMINATION?

WATER PERFORMANCE AT A GLANCE

- Eraring accounted for 99 per cent of Origin water withdrawals (of which 99.9 per cent was returned to Lake Macquarie)
- 79 per cent of CSG water directed to beneficial use
- 211 groundwater monitoring bores in place
- Bores ‘made good’ per regulatory requirements: 41



99.9%

More than 99.9 per cent of the water we draw for Eraring from Lake Macquarie is returned to the lake

We primarily use water in electricity generation and we also extract water in the development of natural gas for Australia Pacific LNG.

We view water as a valuable resource. Our operations seek to responsibly manage our consumption of water, protect water resources in the natural environment, and ensure water is available for other users near our operations.

ORIGIN'S WATER USE

In electricity generation, most of our water is drawn from surface sources (such as rivers and lakes). Our Eraring coal-fired power station uses water from Lake Macquarie for cooling purposes. While this represents the majority of water use in our Energy Markets business, more than 99.9 per cent of the water we draw at Eraring is returned to the lake in accordance with regulated water quality standards.

Our gas-fired power stations require much less water than Eraring. In addition, our Darling Downs Power Station uses air-cooled condensers, which reduces its water use by more than 95 per cent when compared to a typical gas-fired power station.

As the upstream operator of Australia Pacific LNG, we extract groundwater from coal seams allowing gas to be produced. This water is directed to water treatment facilities, where through reverse osmosis process, it is converted to fresh water. Treated water that is not returned to its source, is put to beneficial use.

Table 7 shows how we use water across our diverse portfolio.

Table 7

OPERATION	WATER CYCLE OVERVIEW (ML)	WATER EXTRACTED FROM SOURCE	WATER RETURNED TO SOURCE	WATER CONSUMED	WATER DIRECTED TO BENEFICIAL USE
Eraring Power Station	Water is drawn from Lake Macquarie for cooling, with more than 99 per cent returned to the lake, and the remainder lost as steam.	2,594,661	2,593,836	825	–
Shoalhaven Power Station (pumped hydro)	Water is allocated to Origin from the Shoalhaven catchment.	5,556	–	5,556	–
Australia Pacific LNG	CSG water is extracted to depressurise the coal seams. The depressurisation allows coal seam gas to be produced. Most of the water extracted is provided for beneficial uses (see *Water for Other Users* section on page 28). The remainder either contributes to brine production, or is treated and released to rivers.	25,118	–	5,360	19,758
Other	Gas-fired power stations, municipal water, minor operational uses.	331	–	331	–
Totals		**2,625,666**	**2,593,836**	**12,072**	**19,758**
Compare: totals in FY2016		2,741,691	2,711,016	11,978	18,698

PROTECTION OF WATER RESOURCES

Our operational water management systems seek to ensure that water quality in the environment is not adversely affected by our activities.

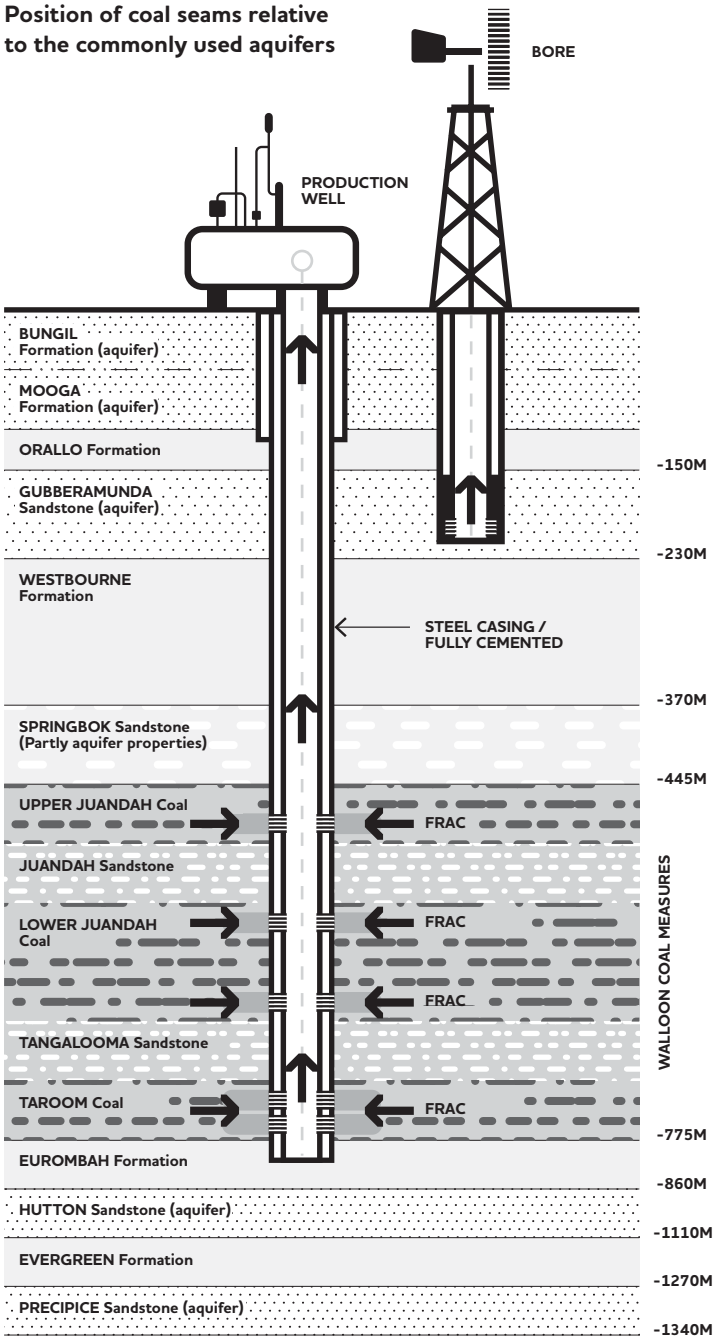
During FY2017 we experienced the following regulatory non-compliances with our licences and reportable incidents.

- Within our electricity generation operations, at Eraring, a coal combustion products (CCP) mixing tank overflow occurred in July 2016. We reported the incident to the EPA and as a remedial measure, we moved the operation of the plant from manual to automatic control, and reviewed plant logic more generally, to remove the possibility of the mixing tank overflowing in the future.
- Within our gas operations, treated CSG water released to Eurombah Creek exceeded electrical conductivity limits by 3 µS/cm (< 1 per cent of regulatory limit) in June 2017. Australia Pacific LNG was not issued with a fine. Changes in operating procedures were made to prevent future occurrences.

Within our gas operations, production wells are installed in coal seams to access gas reserves. These wells are situated below the water aquifers used by other users. As part of installation, and in accordance with state regulation, wells are cemented into place to minimise the likelihood of aquifer interconnection during operation. Aquifer interconnection is detected by observing changes in groundwater levels of shallower aquifers surrounding the production well and/or changes in quality of water pumped from the well.

There were no reportable incidents that could have resulted in aquifer interconnections or contamination in the reporting period.

Position of coal seams relative to the commonly used aquifers



- Water aquifers are generally separated from the coal seams by over 30 metres of impermeable rock
- Production wells are encased with steel and cement to ensure gas and any additives do not enter water aquifers

Hydraulic fracture stimulation

Stringent regulatory requirements cover hydraulic fracture stimulation in all areas in which we undertake this activity, and we comply with all regulations.

As the upstream operator of Australia Pacific LNG, we hydraulically fractured 12 wells as part of our CSG operations in FY2017. This compared to one well in the prior period.

Australia Pacific LNG uses water-based fluids in the hydraulic fracture stimulation process. The fluid primarily comprises water and sand (approximately 99 per cent). The remaining fluid contains other additives found in common household items, which are considered safe in small quantities. The majority of the hydraulic fracture fluid is recovered from the well during the initial production phase as part of normal CSG operations. However, a small component (i.e. sand/proppant) remains within the reservoir by design. A comprehensive list of the ingredients in our hydraulic fracturing fluids can be found in *Appendix 2*.

During the period, we continued our exploration program for shale gas in the Beetaloo Basin of the Northern Territory. Origin's acreage covers 18,000 square kilometres and is located 500–700 kilometres south-east of Darwin. Origin commenced drilling operations in 2015 following a significant period of public consultation. We hydraulically fractured one well during the period, before the introduction of a territory moratorium on hydraulic fracture stimulation in September 2016.

There were no reportable incidents related to hydraulic fracture stimulation at any of our operations during the period.

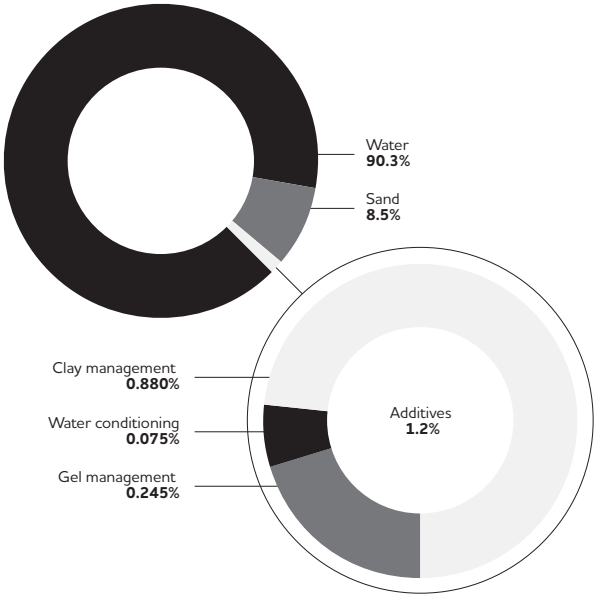
HYDRAULIC FRACTURE STIMULATION – FAST FACTS

- Used in Australia for 40 years to improve the flow of coal gas seams
- Wells are constructed and tested to confirm integrity, ensuring isolation of groundwater aquifers
- Fluid-carrying sand is pumped under pressure into the targeted rocks (coal seams)
- Pressure temporarily opens natural rock fissures by 1–20mm and the sand remains in place to prop these open and enable the gas to flow
- Around 5.5 per cent of our wells were hydraulically fractured in FY2017. This will increase over time as we access less permeable coal seams

HYDRAULIC FRACTURING FLUID ADDITIVES

- Additives make up 0.33 - 1.2 per cent of hydraulic fracturing fluid
- All additives used are found in a typical household, in items such as food and cleaning products, and are assessed, tested, and registered to ensure they are safe
- We use varying combinations of additives to suit the specific geological formation and the water in the coal seams
- A table of the additives we use, their concentrations in hydraulic fracturing fluids and their common uses in household products is provided in *Appendix 2*
- Groundwater quality is measured before and after hydraulic fracture stimulation

Composition of hydraulic fracturing fluid

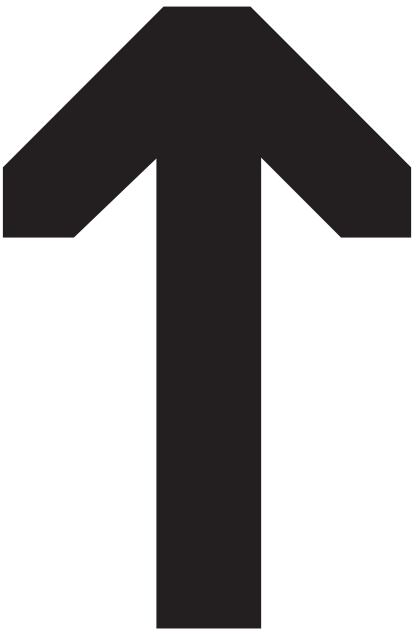


WATER FOR OTHER USERS

Our gas operations coexist with landholders and communities across a large area in the Surat Basin of Queensland. In these communities, access to water from local natural resources is of great importance.

The volume of groundwater extracted from the coal seams in the Surat Basin in Australia Pacific LNG's CSG operations increased by 6 per cent from the previous year, to 25,000 ML in FY2017. This was due to extracted water associated with increased gas production from the coal seams. This is different to the groundwater used by landholders or used for construction purposes in our western fields, where surface water resources were scarce.

Since FY2015, we have increased the volume of water available for beneficial use



Make good agreements

Where a reduction in groundwater availability is identified, potentially as a result of CSG production, we are required to make good any impacts. With 211 monitoring bores installed to date, we regularly monitor groundwater levels and water quality in the CSG areas. We submit our results to the Queensland Government, which aggregates information from all CSG operations as part of its regional monitoring and management program[28].

In September 2016, the Queensland Government's *Underground Water Impact Report* (UWIR) was updated. The report identified 49 existing water supply bores on Australia Pacific LNG tenements that have, or are likely to have, impaired conditions as a result of CSG activity.

In addition to the bores identified in this report, Australia Pacific LNG has proactively identified a further 109 bores that may require make good activities in the future and is voluntarily entering into agreements with landholders relating to these bores. Including the 49 bores previously addressed by the UWIR, a total of 158 bores are confirmed or under assessment of make good for the current life of the project, out of an estimated 1,072 existing water supply bores on Australia Pacific LNG's tenements.

Where there is potential that make good activity will be required in future UWIRs, Australia Pacific LNG seeks to enter into proactive agreements with landholders. These agreements are similar to make good agreements and provide greater certainty for both landholders and the upstream operator. These proactive agreements to make good bring forward associated benefits to the landholder and normally include continued use of these bores until impacts could potentially occur. In the vast majority of cases where water supply from bores could potentially be affected, it is possible to install a replacement bore to reinstate an equivalent water supply at a nearby location that accesses an alternative aquifer.

28 Surat UWIR Water Monitoring Strategy (www.dnrm.qld.gov.au/__data/assets/pdf_file/0003/345684/uwir-section8.pdf).

Beneficial use

The majority of water extracted from our coal seam gas fields is treated using Reverse Osmosis. The water treatment process results in approximately 87 per cent treated water (of significantly improved quality) and 13 per cent brine (a waste product). Additional information about our brine management approach is in the *Waste* section.

In FY2017, 20,200 ML of treated water was delivered from Australia Pacific LNG's four water treatment facilities. We recognise that treated water is a valuable resource and have invested in making this water available to other users, both now and into the future.

Since FY2015, we have increased the volume of water available for beneficial uses[29] – irrigation and aquifer injection – while also reducing the volume of water released into rivers.

Our irrigation program comprises two parts.

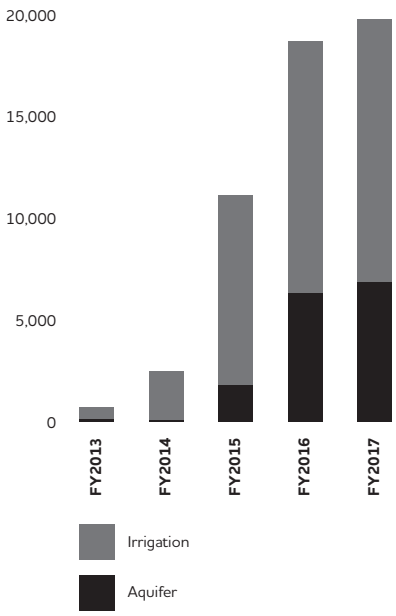
- In April 2014, our purpose-built Fairymeadow Road Irrigation Pipeline started delivering treated water to participating landholders.
- Our 285 ha Pongamia plantation, next to the Spring Gully water treatment facility, has used treated CSG water since 2010. Pongamia can be used as a biodiesel fuel and as a protein meal for stock, among other potential uses.

Aquifer injection, in which treated CSG water is injected into aquifers, was pioneered in the Surat Basin by Origin. In FY2017, we operated two aquifer injection schemes at Spring Gully and Reedy Creek. In 2015, the initial Spring Gully scheme became the first of its kind to be approved by the Queensland Department of Environment, Heritage and Protection using treated CSG water. It has a daily capacity of 8.1 ML. The Reedy Creek aquifer injection scheme has a daily capacity of 40 ML. When it first commenced operation in January 2015, the Reedy Creek scheme was the largest treated water injection scheme in Australia.

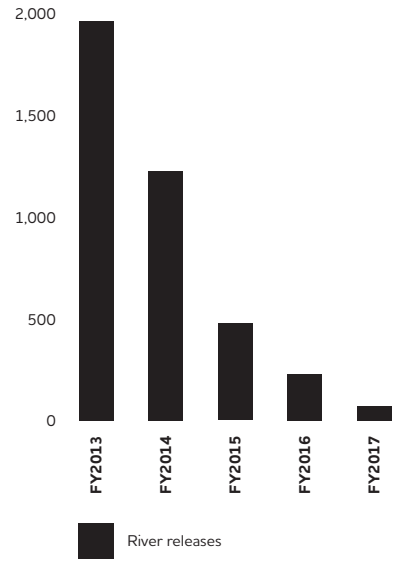
In FY2017, we put to beneficial use 19,758 ML of water. This continues a three-year trend of increasing the amount of water we have put to beneficial use.

29 Beneficial uses of the extracted water are "of value to the environment, existing or new water users, and existing or new water dependent industries". A list of such uses is provided by the Queensland Government (www.ehp.qld.gov.au/management/non-mining/csg-water).

CSG water supplied for beneficial use (ML)



CSG water released to rivers (ML)



CASE STUDY

WATER FOR LIFE

Our Water to Landholders program is making a big impact on agriculture.

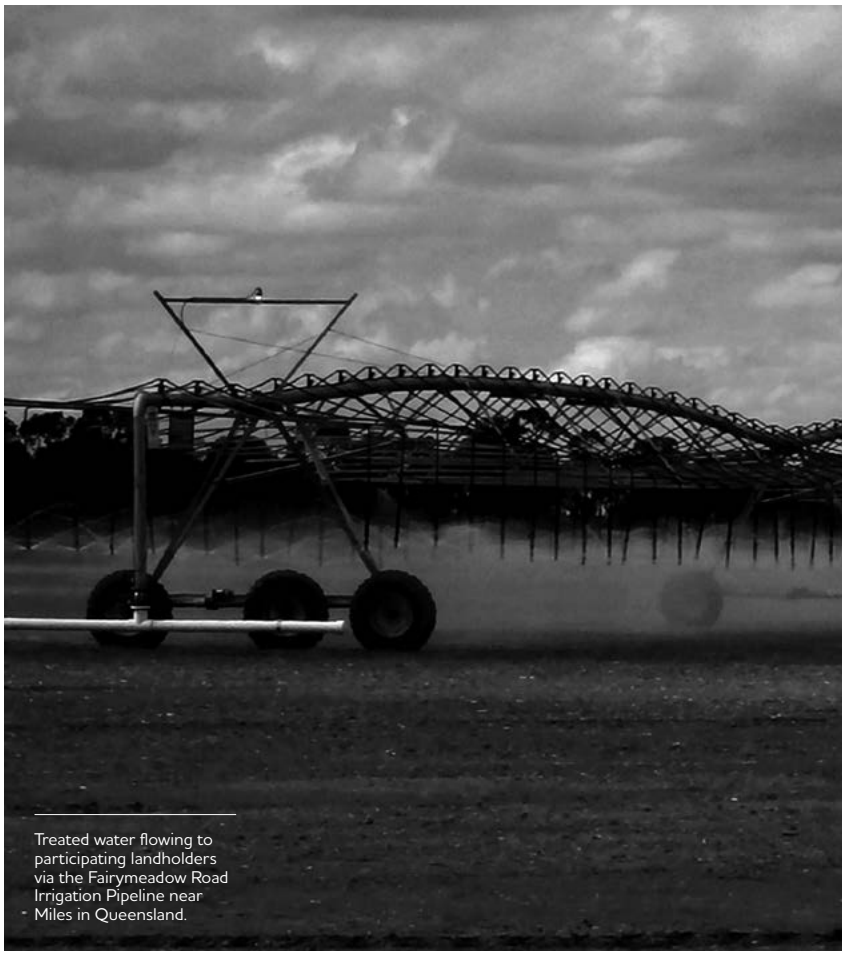
The program was developed in 2014, in our role as the upstream operator of Australia Pacific LNG. Through the program we supply high-quality, treated CSG water to landholders via the Fairymeadow Road Irrigation Pipeline near Miles in Queensland. The water is used for irrigation and livestock drinking water.

Since inception, volumes have nearly quadrupled from 2,927 ML in FY2014 to 11,668 ML in FY2017, maximising the beneficial use of treated water produced from Australia Pacific LNG's Condabri and Talinga gas facilities.

Local landholders participating in the scheme use the water to develop new or expanded irrigated cropping and watering for stock, boosting agricultural production and leading to economic flow-on opportunities.

CSG water is treated to Australian irrigation standards at the Condabri and Talinga Water Treatment Facilities by Reverse Osmosis. The water is then distributed through the pipeline that runs along Fairymeadow Road, and is either provided to participating landholders, or sent to Origin's Monreagh storage dam, to be used at a later time.

The program, which is aligned with the Queensland Government's CSG Water Management Policy, demonstrates how the agricultural and resources industries can work together to develop shared benefits.



Treated water flowing to participating landholders via the Fairymeadow Road Irrigation Pipeline near Miles in Queensland.

“ HOW DO YOU MANAGE WASTE?

WASTE PERFORMANCE AT A GLANCE

- Ash produced that is recycled: 27.6 per cent
- Brine in ponds 5,553 ML vs 8,664 ML capacity

We are committed to the safe and effective management of waste across our entire business. Our two most significant waste generating activities are at the Eraring Power Station and the upstream operations in Australia Pacific LNG.

ERARING ASH MANAGEMENT

The primary waste output at Eraring Power Station is ash – a solid waste from the process of burning coal. The ash that is produced is either recycled to ash customers who use the material in other products, or deposited in our ash dam. Over the last four years, the trends in these amounts are shown below. The ash produced has remained consistent since FY2015, and recycling rates have varied.

This year, the availability of Eraring's mills, which crushes coal prior to combustion, resulted in lower ash quality. This in turn reduced the amount of ash recycled. As a result, the net average tonnes of ash deposited per GWh of electricity generated increased in FY2017 compared to previous years.

In September 2016, strong winds blew ash from the power station's ash dam facility, resulting in a fine of $15,000 from the New South Wales Environmental Protection Authority (EPA).

We immediately notified the relevant authorities and took action to address the issue. Water was sprayed from ground level and helicopters to suppress the ash. Subsequently, we worked closely with the EPA to implement a comprehensive plan to prevent a reoccurrence. This included installing additional permanent spray irrigation at the site; capping a large portion of the dam with soil to prevent dust mobilisation; and installing an ash dam dust monitoring network.

ASH PRODUCED AND RECYCLED AT ERARING (TONNES)	FY2017	FY2016	FY2015	FY2014[30]
Ash produced	1,312,987	1,382,315	1,328,114	1,192,715
Ash deposited	951,148	876,693	782,787	707,056
Ash recycled	361,839	505,622	545,327	485,659

Ash deposited at Eraring per GWh of generation
(tonnes / Gwh)



30 Origin assumed operational control of Eraring Power Station on 1 August 2013.

AUSTRALIA PACIFIC LNG BRINE MANAGEMENT

Brine is the primary waste product of Australia Pacific LNG's upstream operations. Australia Pacific LNG extracts groundwater from CSG wells, and the water contains salt. We treat this groundwater through Reverse Osmosis so the majority of it can be made available for beneficial use (see the *Water* section). The waste product from this process is brine, and this is stored in engineered brine ponds built to regulatory standards and periodically reviewed by certified engineers. During FY2017, there were no reportable loss of containment events at the brine ponds.

Each water treatment facility has multiple brine ponds. The total available storage capacity in brine ponds at the end of the reporting period was 8,664 ML, and the total volume of stored brine was 5,553 ML.

Brine can be transferred between brine ponds to optimise storage use. Brine levels are monitored daily, and monthly assessments are carried out to reforecast storage requirements for the following two years. Additional ponds can be constructed as required.



“ARE LANDHOLDERS TREATED FAIRLY?

LAND ACCESS AND COEXISTENCE PERFORMANCE AT A GLANCE

- 85 compensation and conduct agreements were signed with landholders for APLNG
- 32 complaints from landholders relating to APLNG activities were received, with 75 per cent of these resolved

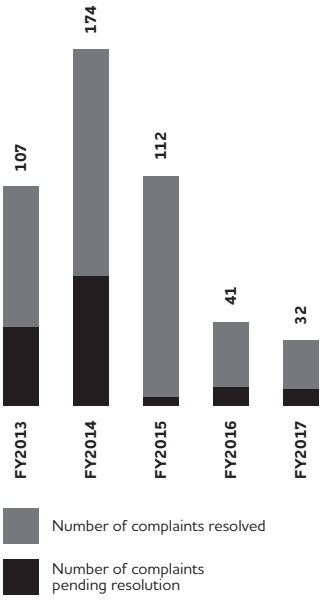
Many of our activities require access to land owned by others. Our approach to land access is based on trust and respect, and we always negotiate with landholders in good faith. In FY2017, our most significant land access requirements related to the upstream activities of Australia Pacific LNG. We also engaged in land access activities associated with our Crowes Foot Seismic Survey off the coast of Victoria.

CSG LAND AGREEMENTS

Compensation and conduct agreements (CCAs) between Origin and landholders set out the details of how land access rights will be agreed and how landholders will be compensated.

During FY2017, we signed 85 CCAs with landholders in connection with our upstream activities at Australia Pacific LNG. All of these agreements were concluded via negotiation. Since commencement of the project we have not needed to conclude any agreements via court resolution.

Landholder complaints as at the end of the period



LAND ACCESS AND COMPENSATION AGREEMENTS	FY2017	FY2016	FY2015
Concluded through negotiation	85	91	59
Concluded through alternative dispute mechanisms	0	0	0
Concluded through court resolution	0	0	0



Landholder John Chaplain says Gate Mate is in everyone's best interest.

RESPONDING TO CSG LANDHOLDER FEEDBACK

During the period, we received 32 complaints from landholders with whom we have negotiated or are negotiating a CCA. More than two-thirds of these complaints related to the way Origin contractors or staff members had accessed their land, including leaving gates open and driving heavy vehicles in certain areas. At the end of the period, we had resolved 24 complaints from landholders and we are in discussions with landholders to resolve the remaining eight complaints.

The ways in which Origin staff and contractors enter and leave landholders' properties has been a source of recurring landholder complaint in recent years. Different landholders have different preferences, and a standard process across our workforce does not adequately meet individual preferences. Under our new 'Gate Mate' initiative, introduced this year, we work with landholders to create simple gate signs that communicate what is expected at each property. We expect this initiative to drive improved performance in this area.

CSG CULTURAL HERITAGE MANAGEMENT

Cultural Heritage Management Plans (CHMPs) set out processes and plans of how we will protect Indigenous cultural heritage in areas where we operate, including upstream operations of Australia Pacific LNG.

During FY2017, there were no incidents of non-compliances with Native Title Agreements or with CHMPs in association with Australia Pacific LNG.

CROWES FOOT SEISMIC SURVEY

During FY2017, the commencement of the Crowes Foot seismic survey off Cape Otway in Victoria coincided with the start of the lobster fishing season in the area. To minimise the potential impacts from displacement of commercial rock lobster fishermen, we reduced the survey area over the more popular fishing grounds, commenced that area first and communicated with fishermen daily to advise areas available for fishing.

We also consulted with stakeholders in the development of a compensation package for local commercial rock lobster fishers with a history of fishing in the area, and who were directly impacted by the survey. Recognising our stakeholders' business operations were very sensitive to cash flow implications from disruption of fishing at the beginning of their season, we adapted our claim and payment procedures at the commencement of the fishing season to ensure a simple and rapid process.

CASE STUDY

GATE MATE… AN OPEN AND CLOSED CASE

Leave the gate as you found it. It's a simple saying, but one that landholders take very seriously. An open gate provides livestock access to valuable water supplies, while a closed gate keeps livestock separated for a myriad of reasons, including pest control and breeding.

Opening and closing gates is part of the job description for our employees who require access to the rural properties of landowners we work side by side with. Their job sees them checking wells, and working with infrastructure development and operating facilities as the upstream operator for Australia Pacific LNG.

And although our employees are 'gate-aware', we recognised the need to take the guesswork out of good gate management. This is where our Gate Mate solution is invaluable, helping to do just that.

Designed in collaboration with each individual landowner, Gate Mate sees a simple sign – easily secured on gates that our employees will be using – communicating to everyone exactly how the gate should be left.

As a vital element of Origin's best-practice gate procedures, Gate Mate shows our respect for each of our landholder's properties, and the importance of gates in country life.

"Right from the start, as a kid growing up on a property, you learn when you come to a gate that's closed, you close it behind you, and when you come to a gate that's open, you leave it that way," says grazier and butcher John Chaplain.

With the support of his family, John runs beef cattle on Iola, a property near Miles, a small town 340 kilometres west of Brisbane. "Gate Mate is in everyone's best interest. Because Origin is looking after me, I'm looking after Origin."

“HOW ARE YOU REDUCING THE IMPACT OF YOUR ACTIVITIES ON THE COMMUNITIES YOU ENGAGE WITH?

COMMUNITIES PERFORMANCE AT A GLANCE

- Community complaints received: 71
- Community complaints resolved: 62

Our operations involve the construction and operation of large-scale infrastructure such as power stations, gas processing facilities, pipelines and gas wells. The life of our assets can span several decades, which means we have a long-term presence in the communities in which we operate. Origin's two most significant interactions with communities occur at our upstream CSG operations through Australia Pacific LNG and at our power stations, the largest of which is the Eraring Power Station.

SOCIO-ECONOMIC IMPACTS OF CSG OPERATIONS

During FY2017, Australian Pacific LNG transitioned from a project to full operations after the commencement of LNG exports from Train 2. Local community feedback has focused our efforts on supporting stable regional communities and on stimulating the local economy. We have approached these objectives through two key programs:

- transitioning our workforce from the Condabri Central and Talinga accommodation camps to nearby town-based accommodation and encouraging our people to live locally; and
- promoting our Regional Buy program.

The transition of our workforce from the Condabri Central and Talinga camps to town-based accommodation progressed through FY2017 and is scheduled for completion in December 2017. By this time, it is expected that our entire Eastern Surat workforce – both staff and contractors – will stay closer to local communities including Miles and Chinchilla while they are on shift. Eligible employees receive support and allowances to assist with living locally.

We believe our regional workforce can contribute in an economic capacity and truly integrate into local communities through our live local initiatives.

Our employees located in remote areas, including Spring Gully, Denison, Reedy Creek and Combabula, will continue to reside at onsite camp accommodation.

Locally based liaison officers provide support for local businesses to bid for work at Australia Pacific LNG. During the coming year, this will extend to working with our major contractors to also encourage them to procure locally. We launched our Regional Buy program in November 2016 to improve access to business opportunities for small to medium-sized local businesses. See the *Supply Chain* section for more about our Regional Buy program.

ENVIRONMENTAL IMPACTS OF CSG OPERATIONS

Communities near Australia Pacific LNG's operations have told us that one of their main areas for concern is the potential for Australia Pacific LNG's activities to impact groundwater levels and quality. Australia Pacific LNG forms part of an extensive regional groundwater monitoring program and management plans and regularly submits test results to the Queensland Government. See the *Water* section for more information on this program.

In addition to the water monitoring network, Origin supported a grants program in FY2017, CSG Net – a network of private bores monitored by landholders that provides continuous online water data. The program also enables landholders to contribute water data to the government's online database.

ENVIRONMENTAL IMPACTS AT THE ERARING POWER STATION

During FY2017, community members near Eraring Power Station raised concerns regarding dust from the site's ash dam. In September 2016, a dust plume occurred during extreme weather.

Immediate steps were taken in accordance with our incident response procedures and onsite management systems, and helicopters and additional water trucks were deployed to suppress the dust. Furthermore, we took proactive measures to manage dust from the site's ash dam. See the Waste section for more information.

We regularly monitor water quality in Lake Macquarie and publish our environmental monitoring results on our website[31]. During the year we upgraded Lake Macquarie's drainage systems to provide better protection to the lake.

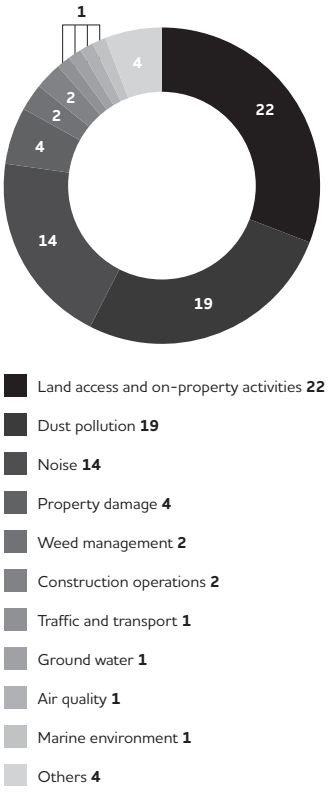
RESPONDING TO COMMUNITY COMPLAINTS

We monitor complaints from community members, as well as our response times and resolutions. The following table shows our results for FY2017 compared to FY2016.

During FY2017, the majority of the complaints in Energy Markets related to dust (see the *Waste* section for details) and most of the complaints in Integrated Gas related to land access (see the *Land access and coexistence* section for details).

	FY2017	FY2016
Community complaints received	71	91
– Energy Markets	20	8
– Integrated Gas	51	83
– LNG	35	48
– Exploration & Production	16	35
Community complaints resolved[32]	62	83
– Energy Markets	20	8
– Integrated Gas	42	75
– LNG	26	44
– Exploration & Production	16	31

Number of community complaints received by category, FY2017



31 Eraring Environmental Monitoring Data (www.originenergy.com.au/about/who-we-are/what-we-do/generation.html).

32 This includes complaints from prior periods during the year.

CASE STUDY

THE ONES THAT GOT AWAY

There was a very happy ending to this fishy tale. We enlisted local fishermen at the Eraring Power Station to ensure the safe relocation of fish from the station's canal network.

In order to cool steam at the power station, Eraring's canals draw water from Lake Macquarie which is then discharged back into the lake. In the process, small fish sometimes pass through the metal grates that are designed to stop the larger species.

Prior to commencement of the one-in-20-year maintenance program at Eraring, Origin's team worked closely with specialists from the New South Wales Department of Primary Industries (DPI) Port Stephens Fisheries Institute, to develop an effective method to relocate the fish back into the lake.

After partially draining the canals, local commercial fishermen from Nelson Bay helped guide the fish into specially designed containers, which were then transferred safely to the release point beside Lake Macquarie.

Research conducted by the DPI found the canal network contained the same group of popular recreational species found in the adjacent lake system, including bream, whiting and luderick. The fish were found to be in good condition and in many cases larger than individuals from these species found in Lake Macquarie, likely due to the absence of fishing and the abundance of food.

Following the careful removal of the fish, our staff and specialist contractors successfully completed canal inspections and repairs, which formed part of the largest maintenance overhaul conducted at Eraring since 1999.

GIVING BACK TO SOCIETY

Our Origin Foundation is one of the main vehicles through which we give back to society. It helps to create better lives for young Australians by supporting good causes in education.

Our employees play a crucial role by volunteering their time to support many of the Foundation's partners. And, when employees donate to causes close to their heart, we match that contribution dollar for dollar.

Since it was established in 2010, the Foundation has supported the community to the tune of more than $20 million

CASE STUDY

SUPPORTING GOOD CAUSES

What do wooden stakes, a toilet plunger and a piece of charcoal have in common? These are used in the classroom to help students understand the positive difference engineering can have on people's lives.

In 2016, our Foundation worked with Engineers Without Borders (EWB) to offer 'Regioneering Roadshows' to more than 1,000 students in regional Queensland and New South Wales. We had 32 Origin employees with a background in engineering and science volunteer their time and expertise to bring engineering to life for primary and secondary students.

The workshops demonstrated the humanitarian benefits of engineering, by drawing on real-world challenges and getting students to find solutions that improve lives and strengthen communities. Students made water filters, prosthetic legs, floating houses and solar-powered fans, using limited materials.

Origin chemical engineer Liana Bonnette said, "It was really interesting to see that the kids' view of engineers didn't go past building bridges and roads, and to change their perspective on engineering."

Approximately 88 per cent of students involved said they are now more interested in studying engineering.



Student's from St John's Catholic School in Roma participating in workshops as part of a Regioneering tour of South West Queensland.

“HOW DO YOU MONITOR WHAT YOUR SUPPLIERS DO?

SUPPLY CHAIN PERFORMANCE AT A GLANCE

- 27 per cent of APLNG’s workforce is regionally based
- Contracts to indigenous suppliers: $0.6 million

Origin’s supply chain encompasses suppliers and contractors, as well as those commercial parties that directly or indirectly help them meet our needs. We consider our supply chain to be an extension of our business.

MANAGING RISK

We recognise the risk that companies in our supply chain may conduct their business in ways that are not aligned to Origin policies or expectations. To address this risk, we have introduced a supply chain control framework that includes anti-bribery and anti-corruption policies, and health, safety and environment requirements.

This year, we revised our procurement processes and issued an updated Procurement Directive, which sets out the minimum requirements for purchasing goods and services across Origin.

BUY LOCAL

Procuring goods and services from local suppliers and hiring local employees is one of the best ways we can share economic value in the local communities where we operate.

Our Regional Buy program in Queensland’s Surat Basin identifies opportunities for local suppliers to directly and indirectly participate in our supply chain. Where applicable, we also require our major contractors to have a plan for maximising local business participation and employment, and we review their performance against these plans.

During the period, we introduced two roles based in the Surat region dedicated to supporting the Regional Buy program, regional suppliers and our operations.

We also continued to improve our understanding of indirect economic impacts by measuring the regional spend of suppliers associated with Australia Pacific LNG.

EMPLOY LOCAL

Australia Pacific LNG is a major regional employer in the Surat Basin. At the end of FY2017, we directly employed 157 people from the local community, representing 27 per cent of our regionally based workforce.

This represents a 7 per cent decrease in the number of local employees compared to in FY2016, when we directly employed 168 people. The bulk of this reduction occurred when we sold Australia Pacific LNG-owned farm properties and outsourced property management on remaining farms.

During FY2017, we began to transition permanent operational employees from company-run camps on Australia Pacific LNG operational sites to town-based accommodation in the Western Downs region of Queensland. See the *Communities* section for more detail on our live local initiative.

INCREASING INDIGENOUS PARTICIPATION

During 2017, we continued to maximise business and employment opportunities for Aboriginal and Torres Strait Islander people in our supply chain through our Indigenous Participation Plan.

This year we improved our supplier database so that we can more easily identify Indigenous businesses.

We engaged Indigenous businesses during FY2017 to provide goods and services, including office stationery, rehabilitation and environmental services, and security maintenance. Our direct spend was $575,000 across 16 Indigenous businesses.

Compared to the prior year, this represents a 45 per cent increase in the number of Indigenous businesses engaged but a 93 per cent reduction in spending due to a declining amount of civil works at the project.

We continued to partner with Many Rivers, a not-for-profit micro enterprise development organisation that provides support and advice primarily to small Indigenous businesses.

Our *People and culture* section contains information on cultural diversity and Indigenous participation in our workforce, including our Reconciliation Action Plan and the work of the Origin Foundation.



CASE STUDY

LIVING LOCALLY

We are a big supporter of our employees living and thriving in the community where they work - employees such as Anna and Glen, work for Origin in Miles, 340 kilometres west of Brisbane.

"We love it here," says Anna, a Land Access Advisor. "When Glen (a Landholder Relations Manager) first moved out here we considered whether I should stay in Toowoomba, but we decided to both move, and that was definitely the right decision."

As the gas fields and pipeline operator for Australia Pacific LNG, Origin is a major regional employer. There are ongoing, long-term roles in communities such as Miles, Chinchilla and Roma in Queensland. For staff based in regional communities, we provide support and allowances to assist eligible employees with living locally.

Anna and Glen and Gus the horse.

“WHAT ARE YOU DOING TO IMPROVE CUSTOMER SATISFACTION?

CUSTOMER PERFORMANCE AT A GLANCE

- Customer satisfaction improved:
  - Interaction Net Promoter Score up by 4-points to 16.1
  - Less Ombudsman complaints per 1,000 customers, falling from 3.4 to 2.5
- Improved digital platforms making it easier for customers to connect with us, including a new app
- Customers in hardship program not paying recent price increases
- Advocating for policy certainty, particularly the adoption of a Clean Energy Target to deliver a genuine reduction in prices

OUR APPROACH

We never forget that our customers – Australian households and business – rely on us to provide an essential daily service. Continuing to improve our relationships with customers remains a key priority for Origin.

Customers expect us to provide a reliable, affordable and sustainable energy supply. These objectives were out of balance this year, with blackouts in South Australia and many customers experiencing a significant rise in electricity prices as the wholesale cost of energy almost doubled, following the retirement of one of Australia’s largest brown coal generators.

We’re focused on helping customers manage their energy use and costs by providing energy saving advice and through innovations like *Predictable Plan* which allows customers to lock in a set amount for their energy each month or fortnight. Also, the onus is on all retailers to simplify communication for customers and make sure offers are transparent and can be easily compared – the current style of offers in the market is confusing and difficult for consumers to navigate and have confidence in their choice of retailer.

Protecting people in financial hardship continues to be a priority, and we have made sure that our customers on hardship programs did pay not the recent price increase. We’re also working closely with community partners to support these customers in other ways, with an investment of more than $12.9 million in our *Power On program*.

We believe that delivering a genuine and lasting reduction in energy prices will require a whole-of-industry response, including networks, generators and retailers. Origin is taking action to put downwards pressure on prices by increasing the supply of low-cost renewables to more than 25 per cent of our generation mix within three years, and boosting generation from Eraring.

We will continue to advocate for policy certainty, particularly the adoption of a Clean Energy Target as the critical action needed to stimulate further investment in new supply and deliver a genuine reduction in prices for Australians.

CUSTOMER EXPERIENCE SNAPSHOT

We are a leading electricity, gas and LPG retailer to homes and businesses across Australia, with more than 4.2 million customer accounts. At the end of FY2017, this included 2.7 million electricity customer accounts, 1.1 million natural gas accounts and 382,000 LPG customer accounts.

WHAT WE’VE DELIVERED

In FY2017, we launched a number of initiatives to improve customer experience. These included overhauling the moving house experience by:

- offering next-day moves online;
- streamlining the online sign-up process;
- extending our opening hours to seven day trading for movers’ support; and
- guaranteeing to answer the phone in under two minutes on our dedicated moves number 13MOVE – making it faster and easier than ever before for customers to move with us.

We aim to be available to our customers when they need us in the channels that suit them. Origin leads the utilities market in Facebook page engagement[33] based on the number of likes, shares, comments and views of content published on our Facebook page. Since launching the Facebook messenger widget on our website, the number of contacts in this channel grew by 76 per cent. Messenger interactions now account for up to 80 per cent of all social interactions with our customers. Our social media community team consistently responds in less than 30 minutes to service queries received via social channels.

High energy bills can be a cause for concern for many customers, and we're working to tackle this through a range of piloted communications campaigns – including sending our customers energy saving tips before and after seasonal or usage spikes, alerting customers that their bills were higher and providing an explanation, as well as calling selected customers to guide them through bills when they are significantly higher than usual. This foundational work has been instrumental in setting our approach and plans to provide customers with ongoing usage alerts and information via a range of channels.

We continue to approach our product and service innovation with a 'digital first' mindset to improve customer experience. We've made it easier for our customers to change or renew their plan and complete self-service processes online, expanding the functionality of our My Account customer portal and making it simpler to use. We simplified and extended our core energy products to meet customer needs, introducing new whole-of-bill discounts and extended energy plan periods.

Our *Predictable Plan* product is an industry first, allowing customers to manage their energy bills by paying the same amount for their energy each month or fortnight for 12 months. Responding to positive feedback from existing customers who have taken up *Predictable Plan*, we have now made it available to new customers joining Origin.

We've introduced our first Origin app, through which customers can pay their bills, check their energy usage and set alerts to track changes in energy costs. We're also trialling new technology that will allow us to provide customers with a detailed breakdown of where energy is being used in their home – crucial to helping them use less energy and save.

HELPING CUSTOMERS COMPARE OFFERS

We are focused on making energy simpler for customers and helping them more easily access and compare offers. We believe it's important for our customers to be on the right energy deal, and have committed to doing even more to help existing and new customers achieve this.

We are committed to driving the adoption of an industry-wide comparator rate that makes it easy for customers to compare apples with apples on offers. We will continue to promote our competitive offers to existing and new customers and encourage customers to visit our website or call us to make sure they're on the best deal possible.

As we have done for some time, we will continue to write to customers before their plans end to advise what they need to do to get a new offer. We will also write to customers on expired discounts to provide yet another opportunity to get a better deal. We've also committed to writing to customers on standing offers to let them know what other offers are available.

ENERGY AFFORDABILITY AND HARDSHIP

In July 2017, Origin reset residential gas and electricity tariffs in Queensland, New South Wales, South Australia and the ACT. We took steps to protect our most vulnerable customers, by ensuring those participating in our hardship program in those markets did not pay the recent price increase.

Since 2003, through *Power On* we've been helping hardship customers with personalised case management support, matched incentive payments, tailored payment plans, free energy audits, and energy efficiency information to help customers manage their energy bills. A customer entering this program works with us to reduce energy usage to sustainable levels while repaying their debt over a longer period.

At the end of FY2017, 32,277 customers were being supported through this program and 5,777 customers had paid their debts and successfully completed the program during the reporting period.

We are one of 10 partners to work with Kildonan Uniting Care's *Care Ring* program which provides holistic support to individuals and families experiencing financial issues in Victoria. The program provides energy efficiency advice to enable customers to make sustainable changes in their energy usage and better manage their energy costs, while also building the capability to manage their affairs through a crisis. We also support customers in South Australia, New South Wales, Queensland and the ACT through community partnerships.

Innovative products like *Predictable Plan* which help customers better plan and manage their household budget, are also an important part of our response to the challenge of energy affordability.

We also joined the Financial Inclusion Action Plan (FIAP) program and committed to the launch of a FIAP program to make energy accessible and affordable for all Australians.

The FIAP program is run by Good Shepherd Microfinance and was developed in partnership with the Australian Government, EY and the Centre for Social Impact. It aims to deliver on Australia's 2015 commitment to the G20 FIAP and the United Nation's Sustainable Development Goals. It also has the support of an advisory group of experienced professionals from across the government, corporate and community sectors. We expect to launch our program by the end of 2017 calendar year.

In March 2017, the Australian Competition and Consumer Commission (ACCC) commenced an inquiry into retail electricity supply and prices. The *Policy* section contains further information about Origin's policy response to this inquiry.

INNOVATIVE AND LOW CARBON PRODUCTS

Energy retailing in Australia is highly competitive, and customers are interested in exploring new, innovative products. Decarbonisation, decentralisation and digitisation will have a transformative impact on the energy sector, and will also empower customers.

We continue to make strong progress in helping our customers take up renewable energy and we strive to make renewable energy solutions more accessible to our customers. Our *Solar Flex* offering gives customers access to renewable energy at a low solar contract rate without the

33 Q1 Australian Facebook Performance Report 2017.

customer purchasing a solar system. Origin owns, installs and maintains the solar system throughout the life of the contract, while the customer purchases the energy produced at a price generally lower than their conventional grid tariff.

Business customers in particular, find this product appealing because it answers their need for access to affordable renewable energy, as do other other customers who have a large consistent daytime need for energy. We are the leading installer of commercial solar systems in Australia[34] with over 12,000 kW of capacity installed. Our *Solar Flex* offering makes up 80 per cent of those sales.

In FY2017, we launched a new integrated solar feed-in-tariff offering in conjunction with our roll-out of digital meters to many of the 90,000 Origin customers affected by the closure of government-sponsored Solar Bonus schemes in New South Wales, Victoria and South Australia. We also launched a Solar Savings Calculator to assist customers in deciding on their solar power purchase.

We have been at the forefront of battery storage products for more than a decade. Our Solar + Powerwall energy solution combines our extensive experience in relation to energy and solar photovoltaics with Tesla Energy's leading knowledge in energy storage systems.

At the end of FY2017, 422,795 Origin customers had solar installations at their properties.

We continue to offer our residential and business customers flexible *GreenPower* options, where customers can nominate the percentage of power they would like Origin to match with *GreenPower*-accredited renewable sources. The proportion of renewable energy sources can range from 25 per cent to 100 per cent. For Green Gas, we purchase greenhouse gas offsets that are equal to the customer's estimated emissions.

At the end of FY2017, we had around 184,000 green energy customer accounts, making us one of the largest providers of *GreenPower* products.

During FY2017, we invested in emerging technologies and potential future energy solutions. These are discussed in our *Energy and climate change* section. We also established an Innovation Hub in Australia, and will trial new propositions in home energy management, connected homes and integrated renewable energy.

HOW DO WE KNOW WE'RE GETTING IT RIGHT?

One of our key measurement tools is the Net Promoter Score (NPS), which measures customer advocacy and helps us understand what our customers are saying about their experience with us. We measure NPS as a business (at the strategic level) and after a customer has a conversation or digital experience (at the interaction level). We finished the financial year leading our Tier 1 peers at the strategic level with an NPS of -16. Customers who are on our *Predictable Plan* offering have an NPS of up to +43.

At the interactive level, our NPS improved from +12.3 at the end of FY2016 to +16.1 at the end of FY2017. Since we began reporting this measure in August 2015, our performance has improved by 93 per cent thanks in part to our focus on implementing a 'right for customer' and 'right first time' ethos, and our proprietary needs-based 'Connect Methodology'.

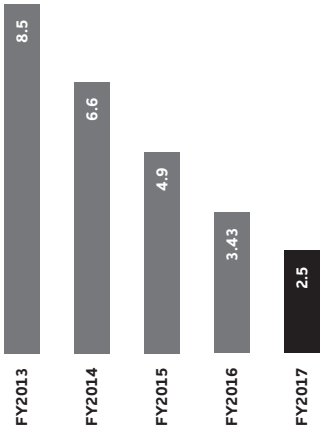


34 Sunwiz, July 2017,

Interaction Net Promoter Score



Ombudsman complaints per 1,000 customers



WHAT IF THE CUSTOMER IS UNHAPPY?

If a customer feels that despite our best efforts we haven't addressed their issue or concern, they can have the matter reviewed by the relevant Ombudsman in their state or territory.

The number of Ombudsman complaints per 1,000 Origin customers continued to drop during the year. In the five years to the end of FY2017, Ombudsman customer complaints declined from 8.5 per 1,000 customers to 2.5 per 1,000 customers.

PRIVACY AND COMPLIANCE

We're committed to protecting our customers' privacy, and managing their personal and credit related information in accordance with the requirements of the Commonwealth *Privacy Act 1988*.

Our *Privacy Policy* explains in detail how we manage personal information, as set out by the *Privacy Act* and the Australian Privacy Principles. Our Credit Reporting Collection Statement is contained in our Credit Reporting Policy, and explains how we collect, use, hold and disclose customers' credit related information.

For more information visit: www.originenergy.com.au/privacy.

Throughout FY2017, we refreshed our *Privacy Policy* and Credit Reporting Collection Statement, as well as centralising how we track privacy incidents, enquiries, complaints and advice. We also updated the guidance we provide to teams performing privacy impact assessments, and supplemented privacy training with additional sessions for teams that have an increased exposure to privacy related matters.

In February 2017, the *Privacy Act* was amended to introduce a mandatory reporting regime, which will require privacy breaches to be reported to the Australian Information Commissioner and any potentially affected individuals. The mandatory breach notification scheme will be implemented in February 2018.

Origin is required to submit quarterly performance indicator reports to both the Australian Energy Regulator (AER) and the Essential Services Commission of Victoria (ESCV). We are also required to report compliance breaches according to a prescribed schedule.

In FY2017, Origin reported issues to the AER and ESCV relating to, in general terms, the timeliness of billing and provision of contract information, wrongful disconnections, bill contents, hardship assistance and explicit informed consent. Origin received a $20,000 infringement notice from the AER associated with our small customer regulatory obligations for submitting market performance data reports that contained errors associated with Queensland customer numbers.



“HOW ARE YOU MANAGING POLICY UNCERTAINTY?

POLICY PERFORMANCE AT A GLANCE

– We support all 50 of the Finkel Report recommendations, including the proposed Clean Energy Target (in principle) as a balanced and practical way to achieve energy security, reduce carbon emissions and deliver a genuine improvement in energy affordability for all Australians

Given the central role energy plays in almost every aspect of the economy and our everyday lives, the energy industry is of considerable interest to governments. It is also highly regulated.

In the past year, a state-wide blackout in South Australia and a substantial rise in wholesale electricity and gas prices heightened public scrutiny of the energy sector and raised questions about Australia's energy security and affordability. At the same time Australia made commitments under the Paris Climate Accord. As a result, energy and climate policy are more prominent issues for governments and the community than ever before.

FY2017 POLICY LANDSCAPE

Over the past decade, there has been continued energy policy uncertainty. A variety of policies with the objective to reduce emissions and combat climate change have been introduced, changed and removed. At the same time, ageing coal-fired power stations have been retired, the domestic gas market has tightened and significant investment has been made in the poles and wires, all of which have contributed to upward pressure on electricity prices. Other than projects underpinned by the state and federal renewable energy targets, companies have generally been unwilling to invest in renewable projects given the absence of long-term carbon policy.

The resulting imbalance between energy security and its affordability prompted a number of government interventions. The South Australian government – where a state-wide blackout occurred in September 2016, developed its own energy security plan – proposing a government owned 250 MW gas generator to be used as a last resort if the market fails as well as a 100 MWh large scale battery. The Commonwealth Government also announced a domestic gas security mechanism with potential to limit LNG exports and a feasibility study into a 2,000 MW capacity capacity expansion of the Snowy Hydro scheme.

There have been a number of policy reviews and inquiries across the energy industry, ranging from gas, retail price and competition inquiries, to energy and climate change policy. In FY2017, we have taken a leadership role in many of these policy discussions. This year, we continued to put forward policy recommendations and advocate these recommendations publicly, to help restore energy security, improve affordability and build sustainability at a national level.

GAS POLICY

As discussed in the *Energy and climate change* section, natural gas has a key role to play in the transition to a carbon constrained world. While Australia has an abundance of gas reserves on the east coast that could supply both domestic and international markets, some states continue to impose restrictions on gas development and exploration.

During the year, the tightness of the domestic gas supply market and the resulting price impact on both gas and electricity markets saw the Commonwealth Government introduce the Australian Domestic Gas Security Mechanism (ADGSM). The ADGSM is designed to maintain domestic gas supply at competitive prices by directing certain LNG exporters to increase sales of gas to the domestic market. It is only activated in the event there is deemed to be a shortfall of gas in the domestic market and only applies to LNG exporters who are not 'net contributors' to the domestic market (i.e. exporters that purchase more gas from the domestic market than they supply to it).



Every year since its establishment, Australia Pacific LNG has been a net contributor to the domestic gas market - supplying around 20 per cent of demand from east-coast industrial companies and retailers with more than 100 PJ of gas per year until 2020, and more than 80 PJ of gas until 2030

Australia Pacific LNG completed more than 100 domestic gas transactions in FY2017, delivering more than 20 PJ in domestic sales – many with Queensland manufacturers.

Origin is also a major supplier of gas to businesses and homes on the east coast of Australia.

We continue to advocate against market interventions such as the ADGSM, as well as a gas reservation policy and moratoriums on the development of gas resources. These policies are counterproductive to the objective of increasing investment in gas supply, which is crucial to improving energy security, affordability and sustainability.

During FY2017, Origin's competitive gas position enabled us to contribute to improved energy security in South Australia. We signed an agreement to supply gas to ENGIE to bring the second generation unit at Pelican Point power station (240 MW) back online.

RETAIL PRICE AND COMPETITION INQUIRIES

On 27 March 2017, the Commonwealth Government instructed the Australian Competition and Consumer Commission (ACCC) to commence an inquiry into retail electricity supply. The terms of reference are broad and cover competition, costs, profitability, vertical integration and wholesale market issues. The inquiry is expected to hand down its preliminary report in September 2017 and the final report by 30 June 2018. During the 2017 reporting period, the Victorian Government and Australian Energy Market Commission (AEMC) also conducted retail competition reviews.

Over time, retail electricity markets across the National Electricity Market (NEM) have become highly competitive. Governments have privatised state-owned electricity retail businesses, introduced contestability and removed price controls. Successive reviews into retail markets have consistently found competition to be effective. Today, deregulated electricity markets continue to exhibit strong and increasing levels of competition; with the market characterised by low barriers to entry and high levels of switching.

The emergence of new technologies such as solar photovoltaics, digital metering and battery storage is driving the development of new business models which is further intensifying competition. In response, Origin is working to improve its customer service and product development. A range of innovation and technology development initiatives are described in the *Customers* section. We also recognise the importance of energy affordability, and support vulnerable customers through our hardship program, *Power On*. We have also protected our hardship customers from recent price increases.

Origin continues to advocate for a whole-of-industry response to bring down energy prices. We are taking action to put downwards pressure on prices by increasing the proportion of low-cost renewables in our generation mix and by also boosting generation from the Eraring Power Station.

ENERGY AND CLIMATE CHANGE POLICY

As discussed in the *Energy and climate change* section, Origin recognises that climate change is a global challenge and unequivocally supports the Paris Climate Accord and other measures to reduce carbon emissions, including Australia's emissions reduction target of a 26-28 per cent decrease on 2005 levels by 2030 as a minimum. This will require a reduction in the nation's annual emissions from 2015 levels of about 527 Mt CO_2 to about 428 Mt CO_2 in 2030[35]. In our submission to the 2017 Review of climate change policies, we noted that Australia's current suite of emission reduction policies all have a shorter-term focus, and are therefore unlikely to deliver the required emissions reduction.

Origin continues to advocate that Australia adopt a long-term national target that contributes to the 2°C scenario. For the electricity sector, we continue to advocate for net zero emissions by 2050. We have also committed to We Mean Business, a coalition of committed investors and companies seeking to implement climate change initiatives (see *Appendix 1* for details).

A major policy development during the year occurred when Australia's Chief Scientist Alan Finkel released the findings of the Independent Review into the Future Security of the National Electricity Market (the Finkel Report). The report notes that Australia's electricity system is in transition and focuses on four key outcomes for the NEM. It includes 50 recommendations

35 This assumes all reductions are made domestically. Emissions levels based on *Australia's emissions projections 2016*, Commonwealth of Australia 2016.

in total, including a Clean Energy Target that would act as an overarching policy to drive emissions reductions over time. The report also recommended that the Council of Australian Governments Energy Council develop and maintain a strategic energy plan by 2018 and that a new Energy Security Board be established to drive implementation of the report's recommendations.

We support all 50 of the Finkel Report recommendations, including the proposed Clean Energy Target (in principle) as a balanced and practical way to achieve energy security, reduce carbon emissions and deliver a genuine improvement in energy affordability for all Australians. We continue to encourage governments, businesses and other stakeholders to support the timely and full implementation of these recommendations.

FINKEL REPORT – 4 OUTCOMES	
1	Increased security
2	Future reliability
3	Rewarding consumers
4	Lowering emissions

KEY CLIMATE CHANGE RECOMMENDATIONS BY DR FINKEL	
1	Whole-of-economy emissions reduction target
2	Emissions reduction trajectory for the electricity sector
3	Adopt a Clean Energy Target

CASE STUDY

BEETALOO: A SIGNIFICANT GAS FIND IN THE NORTHERN TERRITORY

The first material shale gas discovery in Australia could be a boon to the economy of the Northern Territory. We identified the shale gas resource earlier this year, in the Territory's Beetaloo Basin, and immediately realised its significance.

The safe and carefully regulated development of gas resources, such as those at Beetaloo, have the potential to transform local economies and provides a valuable contribution to energy security.

The discovery could not have come at a better time, given the current balance between energy supply and demand in the Australian market.

Despite gas being a critical element of the Australian energy mix, feeding many important manufacturing industries, work on Beetaloo has been stalled following the July 2017 Scientific Inquiry into Hydraulic Fracturing in the Northern Territory.

We have contributed to this inquiry, and respect the thorough and scientific approach being adopted by the panel.

The Inquiry will assess the common community concerns about gas development and particularly hydraulic fracture stimulation. Among the questions asked will be: Does hydraulic fracture stimulation use dangerous chemicals? Will it contaminate underground aquifers? And does it make less water available to others?

Over many years, we have demonstrated the safe and responsible development of gas, including hydraulic fracture stimulation. Substantial misinformation and fear has been spread about this process - one that involves pumping water mixed with sand (and some common household chemical additives) under pressure to fracture the shale, creating pathways in the rock that allow the gas to flow into the well and be brought to the surface.

Hydraulic fracture stimulation is a well-established technical practice in Australia that's highly regulated and tightly controlled. We have been doing it safely for almost two decades.

Numerous international and Australian studies and reports, including the Northern Territory's Hawke Report, have found that hydraulic fracture stimulation is safe when properly regulated.

While it's early days, the development of this natural resource at Beetaloo Basin, with its large reserves of natural gas, could boost the NT economy – offering financial benefits for pastoralists and traditional owners, as well as providing jobs and business opportunities for the local community.

We look forward to the outcome of the inquiry in late 2017.



Origin's Unconventional Exploration Manager and Chief Geologist, David Close is standing on the Amungee NW-1H well pad in the Beetaloo Basin. David is holding a rock sample – a piece of the Velkerri Formation B Shale from about 2,450 metres below the earth's surface. The Velkerri Formation is a 1.4 billion year old formation that is rich in organic material and the shale gas target of our exploration programs in the Beetaloo Basin.

“DID YOU MEET YOUR COMMITMENTS FOR THE YEAR?

FINANCIAL PERFORMANCE AT A GLANCE

- Statutory loss of $2.2 billion, including impairments of $3.1 billion
- EBITDA ↑ 49 per cent to $2.5 billion
- Underlying Profit ↑ 51 per cent to $550 million
- Net debt ↓ by $1 billion to $8.5 billion

FINANCIAL PERFORMANCE FY2017

During the 2017 financial year, Origin made good progress towards our commitments, delivering a $1 billion reduction in debt and improving business performance.

Looking ahead, Origin will continue to focus on meeting the challenges of energy affordability and security, while improving our operational efficiency and reducing debt and improving returns to shareholders. We are well positioned to adapt our business to the rapidly evolving market, as we transition to a cleaner and smarter energy future.

FY2017 PERFORMANCE

Origin reported a statutory loss of $2.2 billion, driven by non-cash impairment charges of $3.1 billion primarily reflecting a reduction in the carrying value of Australia Pacific LNG and Lattice Energy.

At the underlying level, Origin reported a solid operational result. Underlying EBITDA increased $834 million or 49 per cent to $2.5 billion, driven primarily by an improvement in the electricity and gas portfolios, the ramp up of LNG earnings and commencement of production at the Halladale/Speculant field.

Underlying Profit of $550 million increased by $185 million or 51 per cent primarily due to higher Underlying EBITDA. Net cash flow from operating and investing activities (NCOIA) increased by $163 million or 13 per cent to $1.4 billion.

DIVIDEND

Given Origin’s primary focus on reducing debt, the Board determined not to pay a dividend for the second half of FY2017. The Board is acutely aware of the importance of dividends to many of our shareholders and did not take this decision lightly. The Board is of the view that the suspension of the dividend is in the best interests of all shareholders at this time.

ENERGY MARKETS

The Energy Markets segment delivered a solid performance with a 12 per cent or $162 million increase in underlying EBITDA to $1.5 billion.

One of Origin’s core strengths is its gas portfolio, and the volume of gas sold to customers increased by 12 per cent. In electricity, volumes increased by 4 per cent and Origin was also able to maintain a competitive cost of energy as wholesale prices rose sharply.

Origin continues to focus on improving the customer experience, and delivered a 4-point increase in our Interaction Net Promoter Score to 16.1 and a decline in Ombudsman complaints. This has been enabled by a customer-led digital transformation program, which aims to improve customer relationships, create new revenue streams and reduce operating costs.

Origin has rapidly grown a large, low cost renewable portfolio, committing to 1,200 MW of new solar and wind projects since March 2016. These projects are expected to come online between now and 2020. Renewable energy now represents the lowest cost investment in new generation.

INTEGRATED GAS

During FY2017, the Integrated Gas segment delivered a $718 million increase in Underlying EBITDA to $1.1 billion. This was offset by an increase in interest, tax, depreciation and amortisation and the recognition of financing costs associated with the funding of Origin's investment in Australia Pacific LNG.

Production increased by 40 per cent due to the ramp up of operations at Australia Pacific LNG and the commencement of production at Halladale/Speculant in the Otway Basin.

Australia Pacific LNG production increased by 46 per cent as Train 2 came online, and the operational phase of a 90-day two train Lenders' Test was completed. Australia Pacific LNG continues to meet export commitments and play a major a role in supplying gas to Australia's east coast, where it meets approximately 20 per cent of annual demand.

In response to the low oil price environment, Australia Pacific LNG is focused on improving productivity and significantly reducing its cost base by adopting a lean operating model, implementing advanced analytics and delivering well productivity improvements.

Lattice Energy assets achieved a 27 per cent increase in production. The Yolla compressor was successfully commissioned and is expected to maximise production over the life of the field.

Origin also identified a material shale gas contingent resource in the Beetaloo Basin during FY2017, and increased its interest in this highly prospective joint venture to 70 per cent.

OUTLOOK

Origin's FY2018 guidance is underpinned by growth in Energy Markets and Integrated Gas, subject to market conditions and the regulatory environment.

Energy Markets Underlying EBITDA for FY2018 is expected to be $1.7 billion to $1.8 billion, representing a 14 to 21 per cent increase on FY2017.

Origin's share of Australia Pacific LNG production is expected to be 245 to 265 PJ in FY2018, reflecting an increase of 7 to 16 per cent on FY2017.

Earnings contribution from Lattice Energy is expected to be driven by production of 76 to 86 PJe for FY2018. Origin will cease recognising earnings from Lattice Energy upon completion of the expected divestment.

Debt reduction remains a key priority and Origin is targeting adjusted net debt of below $7 billion by the end of FY2018, pending the divestment of Lattice Energy.



As a leading integrated energy company, we buy and sell power, natural gas, coal and carbon emission-related products.

“HOW ARE YOU ENGAGING WITH YOUR STAKEHOLDERS?

To be a sustainable business, we believe we must demonstrate how we are meeting the needs and expectations of those who are most interested in our business – our investors, customers, people and communities.

To understand the potential impacts and opportunities our activities create for our stakeholders, we actively listen to their feedback. What we learn through directly engaging with them is supplemented by research, which helps us determine the activities that are most important to both our business and stakeholders.

This is how we engaged with our stakeholders in 2017.

OUR INVESTORS

OUR COMMITMENT

Deliver market-leading performance for shareholders by identifying, developing, operating and growing value-creating businesses.

AREAS OF INTEREST

- Financial performance
- Identification and management of risks
- Climate change and emissions
- Future energy solutions
- Water

HOW ORIGIN ENGAGED

- We hosted an annual general meeting as well as various investor, analyst and media briefings, and investor roadshows.
- We responded to regular investor, analyst and media queries.
- We undertook surveys to garner investor feedback.
- We responded to sustainability-related information requests and participated in benchmark surveys.
- We distributed price-sensitive information to investors and media via the Australian Securities Exchange.

OUR CUSTOMERS

OUR COMMITMENT

Our customers want their interactions with us to be simpler, and to have greater visibility and control of their energy use and cost.

AREAS OF INTEREST

- Quality of our service
- Energy affordability
- Ease of interacting with Origin

HOW ORIGIN ENGAGED

- We improved the online experience across sales and service.
- We proactively worked with consumer protection regulators, consumer advocacy groups and ombudsmen to better understand and meet the needs of customers.
- We continued to gain insights about customer needs, priorities and perceptions through our Market Research Programs.
- We continued to provide customers with valuable information to help them manage their energy use through the Origin blog, with 750,000 unique visitors.
- We grew our social media channel, allowing customers to interact with us whenever they want – customer interactions up 55 per cent.
- We created an ‘always on’ approach to communicating our leadership in sustainability.

OUR PEOPLE

OUR COMMITMENT

Health and safety remains paramount. Employees require an inclusive workplace, fair and equitable remuneration, and recognition of good performance, career development, and training to encourage personal development.

AREAS OF INTEREST

- Health and safety
- Inclusive workplace

HOW ORIGIN ENGAGED

- We undertook an annual engagement survey to provide employees with a voice so they can help shape their working environment. We also undertook an Organisational Health Index survey and ran Uncovering our Culture workshops across our key locations, including regional sites. This completed our biggest every employee listening and involvement ever – providing the foundation to refresh our Compass with a new purpose, values and behaviours.
- We undertook manager-led toolbox talks with employees as a regular way to communicate about safety.
- We communicated face-to-face, including through executive-led roadshows for all employees, informal talks and visits from senior leaders.
- We hosted regular teleconferences for Origin's top 300 managers.
- We conducted bi-annual formal performance assessments.
- We distributed corporate and site-specific newsletters, updates, videos and announcements to our employees through our company-wide intranet.

OUR COMMUNITIES

OUR COMMITMENT

Our communities are interested in the public safety, environmental and social impacts of our operations, and the opportunities for jobs and economic development.

AREAS OF INTEREST

- Public policy as it relates to climate change and emissions
- Water
- Land access and coexistence
- Impact on communities
- Sharing economic benefits

HOW ORIGIN ENGAGED

- We communicated with communities and the traditional owners of the land around our operations and developments.
- We interacted with intermediaries such as governments, regulators, media and non-government organisations that reflect community interests, both in Australia and internationally.
- We actively participated in industry and business associations such as the Australian Petroleum Production and Exploration Association, the Business Council of Australia, the Australian Energy Council, the Clean Energy Council and the Queensland Resources Council.
- Our Community Relations Advisors convened meetings in various locations and communicated with communities through targeted newsletters and public information centres.
- We undertook scientific research in partnership with communities and scientific organisations.

RATINGS AND BENCHMARKS

RECOGNITION

2009–2011, 2013–2017
Australian Council of Superannuation Investors Leading Rating for disclosure of sustainability risks

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CDP
DRIVING SUSTAINABLE ECONOMIES

ORIGIN ENERGY SCORE LEVEL
B – Management

MEMBER OF
Dow Jones Sustainability Indices
In Collaboration with RobecoSAM

2013–2016
Dow Jones Australia Index

FTSE4Good

2004–2017
FTSE4Good Index

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vigeo eiris

2016
Euronext Vigeo World 120 Index

Linked in
TOP COMPANIES
WHERE AUSTRALIA WANTS TO WORK NOW
2017

2017
Ranked # 20; only energy company in list of 25 Australian companies

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CareerTrackers
Indigenous Internship Program

2017
Corporate Plus Award

Linked in
TOP COMPANIES
WHERE AUSTRALIA WANTS TO WORK NOW
2017

LINKEDIN TOP COMPANIES

Origin's *All Roles Flex* initiative was one of the key reasons cited for LinkedIn's rating of Origin in Australia's Top 25 companies to work for. Origin was the only energy company to make this list.

CareerTrackers
Indigenous Internship Program

CAREERTRACKERS CORPORATE PLUS AWARD

CareerTrackers is an organisation that supports pre-professional and Indigenous university students and links them with private sector employers to participate in paid, multi-year internships.

Up against more than 80 other corporate partners from around Australia, Origin was recognised for truly embracing the CareerTrackers vision.

LEADING SUSTAINABILITY DISCLOSURE

Origin's level of sustainability disclosure was reviewed by the Australian Council of Superannuation Investors (ACSI) and assessed at a 'Leading' level within the Energy and Utilities sector. This year, for the first time, ACSI examined companies on their disclosure of climate-related risks[36].

A rating of 'Leading' demonstrates to investors that the company is assessing, monitoring and seeking to improve performance regarding material sustainability risks in a measurable way over a specific time period. This level of reporting gives investors valuable information to inform their investment decisions.

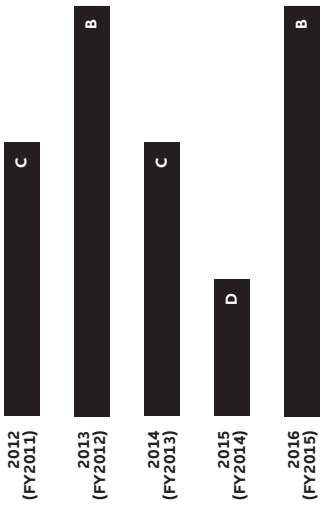
CARBON DISCLOSURE PROJECT

Origin has participated in the Carbon Disclosure Project (CDP) climate change survey since 2006.

The survey is conducted globally and is reported in arrears. Origin's 2016 performance (covering FY2015) has improved to a score of 'B' which indicates advancement to 'management' level from 'disclosure' level in 2015.

This year we participated in both the CDP climate change and water surveys, which covers our performance during the FY2016 reporting period. These responses will be available on the CDP website from September 2017.

CDP climate change performance[37]



Ratings and benchmarks

36 ACSI Corporate Sustainability Reporting in Australia (acsi.org.au/publications-1/research-reports).

37 In 2016 CDP revised its scoring methodology and merged its disclosure and management scores into a single rating. Therefore, historical scores are not comparable.

APPENDIX 1: WE MEAN BUSINESS

In 2015, Origin was the first energy company in the world to sign up to seven of the We Mean Business coalition commitments on climate change. Progress against our commitments can be found in the table opposite.

COMMITMENT	WHAT WE DID IN FY2017
1 Report climate change information in mainstream reports	Origin voluntarily participates in the annual Carbon Disclosure Project (CDP) questionnaire and we report climate change information in our annual Sustainability Report. Climate change risk is discussed in our risk disclosures in the Annual Report.
2 Undertake responsible corporate engagement in climate policy	FY2017 has been a significant year for climate change policy in Australia. Origin was actively involved with State and Federal Governments, the Opposition, industry experts and NGOs to help shape Australia's energy future. We made formal submissions to: – 2017 Federal Government Review of Climate Change Policies – Independent Review into the Future Security of the National Electricity Market (Finkel Review) – Various State Government consultations on renewable energy and climate change policies
3 Adopt a science-based emissions reduction target which will see the emissions intensity of the energy we deliver through our fuel and generation portfolio reduce over time, in line with the IEA 450 Scenario	During the year, we continued our work on developing a science-based emissions reduction target. As part of the We Mean Business (WMB) commitment, the target must be formally reviewed and approved by the Science Based Target Initiative (SBTi[38]). SBTi provides sector benchmarks but is yet to develop guidance for the upstream oil and gas sector. As an integrated energy company, we understand the requirements of our generation portfolio and have been working with SBTi to develop an acceptable upstream Oil and Gas methodology, which will see our emissions reduce in line with the International Energy Agency (IEA) 450 Scenario. We remain committed to formalising a target by December 2017.
4 Set measures to factor in a cost of carbon internally to materially affect investment decisions to drive down carbon emissions.	We continue to test carbon scenarios up to $80 per tonne within our strategic planning process and for consideration in investment decisions.

38 The SBTi is the only WMB authorised body that can verify the scientific and mathematical validity of the decarbonisation targets – that is, it confirms our trajectory is in line with the Paris objective of a 2°C goal.

COMMITMENT	WHAT WE DID IN FY2017
5(a) Become Australia's leading renewable and low-carbon energy provider, helping our customers to procure electricity from renewable sources	(a) We are one of the largest contractors of solar power in Australia. Our FY2017 renewable capacity, owned and contracted, was 732 MW, and we signed just over 1,200 MW of additional Power Purchase Agreements which will come in to production by 2020. We are also number one in commercial solar across Australia[39]. We continue to pursue innovative low-carbon product solutions in the retail market.
5(b) Procure 100 per cent of energy from renewable sources for our office premises and, where possible, all of our other operations by 2050	In FY2017, we purchased 100 per cent GreenPower for our eligible[42] CBD offices in Sydney, Brisbane[41] and Adelaide. In addition, we reviewed our non-CBD operational sites across Energy Markets to better understand electricity usage and green power availability. An analysis is now underway to determine the most cost-effective way to progressively convert these sites, where possible, to renewable electricity from FY2018 onwards.
6 Reduce short-lived climate pollutants (SLCPs)	We continued to report emissions associated with our short-lived climate pollutants via the National Greenhouse Emissions Reporting Scheme. We are prioritising SCLP sources for investigation to identify what lower emissions options are feasible.
7 Remove commodity-driven deforestation from all supply chains	During FY2017, a dedicated project was completed within Energy Markets to review our largest 100 procurement (non-sales related) suppliers and their exposure to the four key commodities driving deforestation – palm oil, cattle products, timber and soy. The review identified our primary exposure point related to timber and pulp products used in customer correspondence and office supplies. Detailed investigation confirmed that in the majority of cases these suppliers use accredited sources of renewable timber. Across Origin, we released a new Procurement Directive further encouraging ethical, environmental and socially sustainable procurement activities.

39 Sunwiz, July 2017.

40 An office location is eligible if it is CBD based, the lease arrangements allow for electricity negotiations, and the building does not include an equivalent grid energy product, e.g. cogeneration plants.

41 The lease arrangements for Coronation Drive require a nomination of GreenPower supply volume in advance, therefore minor differences arise between actual consumption and nominated. In FY2017 this difference resulted in Origin's GreenPower consumption being 95 per cent of total consumption.

APPENDIX 2: LIST OF INGREDIENTS IN HYDRAULIC FRACTURING FLUIDS[42]

				COMMON USE	RANGE OF VOLUMES IN FRAC FLUID	
GROUP/ FUNCTION	**CAS NUMBER**	**CHEMICAL TYPE OR NAME**	**COMMONLY FOUND/USED IN HOUSEHOLD PRODUCTS**	**VOLUME OF CHEMICAL IN HOUSEHOLD ITEMS (%)**	**GROUP PERCENTAGE BY VOLUME (AVERAGE) (%)**	**VOLUME RANGE OF CHEMICAL IN FRAC FLUID (%)**
Sand (proppant)/ water	7732–18–5	Water	Irrigation, drinking, bathing, cooking	1 to 100	98.79 to 99.9	88 to 97.6
	14808–60–7	Silicon dioxide (quartz/sand)	Hand cleaner, arts and crafts, glass	1 to 100		2.3 to 12
Water conditioning (microbial/pH control)	7681–52–9	Sodium hydroxide (caustic soda)	Disinfectant, bleaching agent, cleaners, cleaning of milking equipment, water treatment, medical use, mildew remover, anti-bacterial cleanser	0.1 to 20	0.075 to 0.1	0.01 to 0.02
	1310–73–2	Sodium hydroxide (caustic soda)	Food preparation, soaps, detergents, toothpaste, aftershave, face mask, teeth whitening strips, eau de cologne, body wash, face-cleaning pad, hair remover, cocoa processing	0.1 to 5		0.002 to 0.1
	497–19–8	Sodium carbonate	Household and laundry/dishwasher cleaners, toothpaste, fish aquarium, hair care products, spa water clarifier	0.5 to 85		0 to 0.025
	144–55–8	Sodium bicarbonate	Baking powder, cakes, household cleaners, vegetable cleaner, toothpaste, fish aquarium, baby powder, deodoriser	1 to 100		0 to 0.006
	64–19–7	Acetic acid	Vinegar, food preparation and manufacturing, salad dressings, pickled onions, relishes and spreads, household cleaning products	1 to 5		0 to 0.1
Clay management	7447–40–7	Potassium chloride	Table salt substitute, medical use, hair products, pet supplements, African violet food	0.5 to 40	0 to 0.91	0 to 0.91

42 Origin Hydraulic fracture stimulation fact sheet available at www.originenergy.com.au/about/sustainability

				COMMON USE	RANGE OF VOLUMES IN FRAC FLUID	
GROUP/ FUNCTION	**CAS NUMBER**	**CHEMICAL TYPE OR NAME**	**COMMONLY FOUND/USED IN HOUSEHOLD PRODUCTS**	**VOLUME OF CHEMICAL IN HOUSEHOLD ITEMS (%)**	**GROUP PERCENTAGE BY VOLUME (AVERAGE) (%)**	**VOLUME RANGE OF CHEMICAL IN FRAC FLUID (%)**
Gel/Viscosity Management	6410–41–9	CI pigment red 5	Food colouring, colour pigment in cosmetics, soaps ink, paint	0.01 to 30	0.0 to 0.25	0 to 0.00009
	100–43–52–4	Calcium chloride	Detergents, cosmetics, deodorant, pet products, desiccant, food additive, sports drinks, pickles	0.1 to 90		0 to 0.0002
	Natural Mixture	Walnut husk	Hair dye, polishing material, exfoliate in facial and body scrubs, aquarium and aquaculture	3 to 50		0 to 0.006
	9000–30–0	Guar gum	Cosmetics, baked goods, ice cream, toothpaste, sauces, salad dressing, substitute for wheat intolerant people to use instead of flour, cattle food, and medical use	0.5 to 20		0 to 0.2
	14808–60–7	Silica	Hand cleaner, arts and crafts, glass	1 to 100		0 to 0.02
	9025–56–3	Hemicellulase enzyme	Wine additive, soybean paste, fibre additive, commercial baking and food processing, farm feed additive	0.1 to 25		0 to 0.0005
	26038–87–9	MEA borate	Cosmetics, hair texturiser, hairspray, antiseptic, laundry detergent	0.1 to 5		0 to 0.1
	Proprietary Information	Acrylic resin	Disinfectant cleaner, FDA approved colourant, paint, food packaging, medicinal chemistry	<0.01 to 2		0 to 0.002
	7647–14–5	Sodium chloride	Food production, table salt, food additive, detergents, hair products, water softener and medical saline drips	0.03 to 99		0 to 0.004
	Proprietary Information	Enzyme	Laundry detergent, laundry stain remover, silverware cleaner, agricultural feeds, instant coffee production	~0.1		0 to 0.0002
	7772–98–7	Sodium thiosulfate	Personal care, food production, home aquarium health/commercial aquaculture, medical use for over 100 years	0.1 to 30		0 to 0.04



GLOSSARY

2°C scenario (2DS)
An energy system deployment pathway to facilitate an emissions trajectory consistent with at least a 50 per cent chance of limiting average global temperature increases to 2°C, by limiting the total emissions between 2015 and 2100 to 1,000 Gt CO_2.

2P reserves
The sum of Proved plus Probable Reserves. Probable Reserves are those reserves which analysis of geological and engineering data indicate are less likely to be recovered than Proved Reserves but more certain than Possible Reserves. There should be at least a 50 per cent probability that the quantities actually recovered will equal or exceed the best estimate of Proved Plus Probable Reserves.

AEMO
Australian Energy Market Operator (AEMO) is the body corporate responsible for the administration and operation of the wholesale national electricity market in Australia in accordance with the National Electricity Code.

Aquifer injection
Process of recharge of purified water to suitable aquifers.

Aquifer interconnection
Any mechanism by which a pathway between two aquifers is formed. This can be natural, where aquitards separating two aquifers become thin or non-existent or a geological fault connects the aquifers, or it can be man-made via mechanisms such as historically uncemented well casing.

Ash dam
A pond used for disposal of coal ash generated from the burning of coal at power plants.

Beneficial use of CSG water
The reuse or recycling of waste water produced during the coal seam gas extraction process in a way that protects the environment and maximises its productive use as a valuable resource.

Brine
A residual saline solution derived from the water treatment process.

Coal Combustion Product (CCP)
By-products generated from burning coal in coal-fired power plants.

Collective bargaining agreement
Defined under the *Fair Work Act 2009* as the process where employers, employees and bargaining representatives (including employee organisations) bargain for a collective agreement made at the enterprise level.

Compensation and Conduct Agreement
An agreement negotiated between companies and landholders setting out details of how access rights will be exercised and landholders compensated. A Compensation and Conduct Agreement (CCA) records the compensation the petroleum authority holder will pay to a landholder to compensate for the activities it carries out on the land and that have an impact on the land, the landholder's business or how the landholder uses the land. A CCA also records how the petroleum authority holder will conduct itself when it enters the land to conduct activities on the land.

Consequence rating serious and above (environmental)
An environmental rating that includes medium long term reversible impacts to low risk or listed species, habitats, ecosystems or areas of cultural significance; extensive long term partially reversible damage to vulnerable species, unique habitats, ecosystems or areas of cultural significance; or extensive permanent damage to endangered species, habitats, ecosystems or area/s of cultural significance.

Consequence rating serious and above (safety)
A safety rating that includes injury or illness to one or more persons resulting in a fatality, permanent partial or total disability, life threatening illness, hospitalisation, five or more days lost time or alternative/restricted duties for one month or more.

CSG
Coal seam gas. Natural gas contained within coal seams.

CSG water
Water released from underground coal seams to the surface in the process of drilling wells to extract coal seam gas (CSG).

CSIRO
Commonwealth Scientific and Industrial Research Organisation, the Australian Government agency for scientific research in Australia.

Decarbonisation
The reduction or removal of carbon dioxide from energy sources.

Downstream
Operations and activities that take place after gas has been delivered via pipeline to the LNG facility. These operations and activities include dehydration and compression of gas into liquid form, storage in LNG tanks, transfer to LNG shipping tankers, which transport LNG to Asia, and end-use customers for heating, cooking and the generation of electricity.

Electricity measures:

- **Watt (W)**
  A measure of power when one ampere of current flows under one volt of pressure.
- **Kilowatt (kW)**
  One kW = 1,000 watts.
  Kilowatt Hour (kWh) Standard unit of electrical energy representing consumption of one kilowatt over one hour. Megawatt (MW) One MW = 1,000 kW or one million watts.
- **Gigawatt hour (GWh)**
  One GWh = 1,000 megawatt hours or one million kilowatt hours. Terawatt hour (TWh) One TWh = 1,000 gigawatt hours, or one million megawatt hours.

Energy Markets
Origin's Energy Markets business is an integrated provider of energy solutions to both retail and wholesale markets in Australia and the Pacific.

Environmental and social impact assessment
A tool used to identify the environmental, social and economic impacts of a project prior to decision-making and identifying options to minimise potential environmental damage.

Environmental authority
Authority granted under the Queensland *Environmental Protection Act 1994* which imposes conditions to mitigate environmental impacts associated with approved activities.

Fugitive emissions
Fugitive emissions are the gases that leak or are vented or flared during the extraction, production, processing, storage, transmission and distribution of fossil fuels such as coal, crude oil and natural gas. They can also be released from the landscape. The Australian regulatory definition for fugitives emissions, which has been applied to this report including for New Zealand, includes flaring but excludes landscape emissions.

GHG emissions
Greenhouse Gas emissions. A greenhouse gas primarily refers to carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons and perfluorocarbons.

GHG emissions intensity
The level of GHG emissions per unit of economic activity.

Green Gas
An Origin product where an equivalent amount of greenhouse gas emissions from a customer's natural gas use is offset through Origin Energy's independently audited Carbon Reduction Scheme.

GreenPower
A government accredited renewable electricity product, generated from a source like solar or wind and built since 1997.

HSE Management System
Provides the means through which Origin's health, safety and environment policy commitments are implemented.

Hydraulic fracture stimulation
Creation and enhancement of fractures in rock using a gas or fluid injected at high pressure. It increases the ability of water and gas to flow through a coal seam, which enhances the removal of water and extraction of CSG.

IEA 450 Scenario
An energy pathway consistent with limiting the global increase in temperature to 2°C by limiting the long term concentration of CO_2 to 450 parts per million (a higher peak may occur around 2050).

IEA New Policies Scenario
An energy pathway consistent with the intended nationally determined contribution submissions from countries prior to COP21.

Integrated Gas
Origin's Integrated Gas business is focused on finding and developing oil and gas (conventional) and coal seam gas (unconventional) reserves across Australia and New Zealand.

Interaction Net Promoter Score (NPS)
How customers feel about Origin after a recent interaction or contact with Origin. It provides a diagnostic evaluation at the most granular level and primarily looks at tactical process and service improvements.

kt
One kilotonne equals 1,000 tonnes.

LNG
Liquefied Natural Gas.

LPG
Liquefied Petroleum Gas.

LTIFR
Lost Time Injury Frequency Rate.

Make good agreement
An agreement between a landholder and petroleum tenure holder that implements measures to make good potential impairment of private bore water supplies that result from CSG water extraction or gas impairment.

National Electricity Market (NEM)
The wholesale electricity market for the electrically connected states and territories of eastern and southern Australia – Queensland, New South Wales, the Australian Capital Territory, Victoria, South Australia and Tasmania.

Native title
Native title is a form of land title that recognises the unique ties some Indigenous groups have to land.

NGER
National Greenhouse and Energy Reporting scheme.

NOx
Oxides of nitrogen (NOx) – a mixture of gases that are composed of nitrogen and oxygen.

Paris Agreement
An agreement within the framework of the United Nations Framework Convention on Climate Change (UNFCCC) that sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C.

PJ
A petajoule is equal to one million gigajoules.

PJe
A petajoule equivalent – an energy measurement Origin Energy uses in its Annual Report to represent the equivalent energy in different products so the amount of energy contained in these products can be compared. The factors used by Origin Energy to convert to PJe are: one million barrels of crude oil = 5.8 PJe; one million barrels of condensate = 5.4 PJe; one million tonnes of LPG = 49.3 PJe; one TWh of electricity = 3.6 PJe.

PM10
PM10 is particulate matter 10 micrometers or less in diameter.

Power Purchase Agreement
Contract to buy electricity and/or Renewable Energy Certificates from a generator.

Power On
Origin Energy's hardship program which provides payment options for customers experiencing financial difficulty.

Process safety event
An unplanned or uncontrolled Loss of Primary Containment (LOPC) of any material, including non-toxic and non-flammable materials (e.g. steam, hot condensate, nitrogen, compressed CO_2 or compressed air) from a process, or an undesired event or condition that under slightly different circumstances, could have resulted in LOPC.

Reconciliation Action Plan (RAP)
A framework for organisations that enables them to commit to implementing and measuring practical actions that build respectful relationships and create opportunities for Aboriginal and Torres Strait Islander people.

Renewable Energy Certificate
A tradeable certificate that creates an incentive for additional generation of electricity from renewable sources.

Renewable Energy Target
An Australian Government scheme designed to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources.

Reverse Osmosis
A process that uses a membrane under pressure to separate relatively pure water (or other solvent) from a less pure solution.

SACIFR
Serious Actual Consequence Incident Frequency Rate. This includes all health, safety and environmental incidents that result in an overall actual consequence of serious (or above) and Tier 1 process safety events.

Scope 1 GHG emissions
Greenhouse gas released into the atmosphere as a direct result of an activity or series of activities (including ancillary activities) that constitute a facility.

Scope 2 GHG emissions
Greenhouse gas released into the atmosphere as a direct result of one or more activities that generate electricity consumed (purchased) by a facility but that do not form part of the facility.

Scope 3 GHG emissions
All indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

SOx
Sulphur oxide. Industry sources can include fossil fuel combustion sites particularly coal-burning power plants; industrial processes such as wood pulping, paper manufacture, petroleum and metal refining and metal smelting.

Strategic NPS
A high level measure of customers' sentiment (relationship) with the brand 'Origin'. It is based on customers' experience and assumptions about the brand, as well as sentiment towards the market and any long-held prejudices.

Supply chain
A network between a company and its suppliers to produce and distribute a specific product, or service to the customer.

Surat Underground Water Impact Report (UWIR)
A document produced by the Office of Groundwater Impact Assessment (OGIA) that assesses impacts and establishes integrated management arrangements in the Surat Cumulative Management Area.

TRIFR
Total Recordable Injury Frequency Rate. This measures the total number of fatalities and injuries resulting in lost time, restricted work duties or medical treatment per million hours worked.

VOC
Volatile Organic Compounds. These are chemical compounds based on carbon chains or rings with a vapour pressure greater than 0.01 kilopascak (kPA) at 293.15 Kelvin (K) (i.e. 20°C), that participate in atmospheric photochemical reactions.

Well integrity
Application of technical, operational and organisational solutions to reduce risk of uncontrolled release of formation fluids throughout the life cycle of a well.

Water measures:

- **One kilolitre**
  One KL = one thousand litres (1,000 L).
- **One megalitre**
  One ML = one million litres (1,000,000 L).

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