

# GRI: ENVIRONMENT

## WATER

**G4- EN8** Total water withdrawn by source.

### Overview

In FY 2014, Origin withdrew a total of 2,451,202 ML of water. This volume includes:

- **Surface water** including water from wetlands, rivers, lakes, and oceans;
- **Ground water** including formation or produced water and other ground water;
- **Rainwater** collected directly and stored by the organisation, including storm water;
- **Waste water** from another organisation, including purchased recycled water; and
- **Municipal water** supplies and other water utilities, including desalination plants.

### Related Material Aspect

[Protecting water resources](#)

### Related topics

[Water](#)

### Detailed response

During FY 2014, 99.6 per cent of water withdrawn relates to the operation of our recently acquired Eraring Power Station (Eraring). At Eraring, daily withdrawals of water are made from neighbouring Lake Macquarie for cooling purposes. These withdrawals make up approximately 0.08 per cent of the daily average volume of the lake and approximately 95 per cent<sup>(1)</sup> of all water withdrawn is returned to Lake Macquarie.

Excluding Eraring, Origin's water withdrawal increased from 6,506 ML<sup>(2)</sup> to 9,215 ML during the 2014 financial year. This is directly attributable to increased withdrawal of formation or produced water and other water withdrawal associated with the Australia Pacific LNG project in which Origin is Upstream operator. As the Australia Pacific LNG project is in an expansionary phase, there was an increase in drilling activity and coal seam gas (CSG) well development. This resulted in increased withdrawal of formation or produced water, as well as an increased reliance on water for drilling and other project activities.

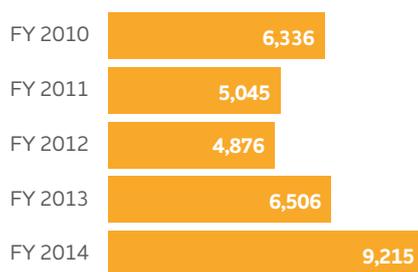
GRI-EN8 Total water withdrawal by source (ML)	FY 2013					FY 2014				
	LNG	Energy Markets	Exploration & Production	Corporate	FY13 Total	LNG	Energy Markets	Exploration & Production	Corporate	FY14 Total
Surface water	1	–	6	–	7	4	2,441,275	2	–	2,441,281
Ground water	5,184	97	452	–	5,733	7,087	98	490	–	7,675
Municipal water	136	151	9	66	362	601	880	13	77	1,571
Rainwater	355	47	–	–	402	665	4	3	–	672
Waste water	–	2	–	–	2	–	3	–	–	3
<b>Total Water Withdrawal</b>	<b>5,676</b>	<b>297</b>	<b>467</b>	<b>66</b>	<b>6,506</b>	<b>8,357</b>	<b>2,442,260</b>	<b>508</b>	<b>77</b>	<b>2,451,202</b>

See OG5 for more information on formation or produced water.

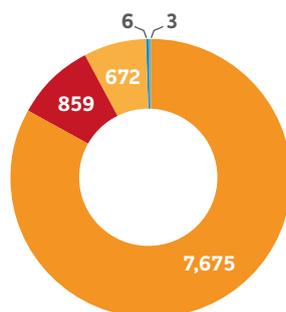
Further detailed information is provided below for total water withdrawal by source and Business Unit (excluding Eraring).

Data reported under this indicator is derived using the methodologies that reflect the nature of our operations. Methodologies include the use of calibrated instrumentation, derivations from mass balances and engineering calculations, as well as relevant estimation techniques. Some parameters may also be measured by appropriately qualified external third party service providers such as certified laboratories.

### Annual Water Withdrawal (excluding Eraring) (ML)

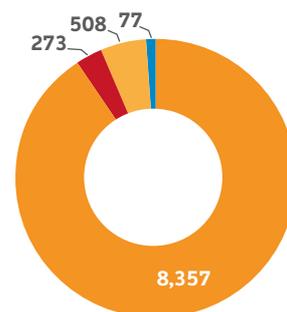


### FY 2014 Water Withdrawal by Source (excluding Eraring) (ML)



- Ground water
- Municipal water
- Rainwater
- Surface water
- Waste water

### FY 2014 Water Withdrawal by Business Unit (excluding Eraring) (ML)



- LNG
- Energy Markets
- Exploration & Production
- Corporate

(1) Evaporative losses from a once through cooling process are expected to be between 1 and 5 per cent.

(2) This number is different to that published in FY 2013 as the number reported water consumption only, not water withdrawal as defined by GRI. This number excluded formation or produced water.

**G4-EN9** Water sources significantly affected by withdrawal of water.

**Overview**

Origin water withdrawals do not significantly affect water systems by volume, or by impacting on protected waters or biodiversity values. The water we use though is important to local communities and we aim to minimise any impacts on other users of water. A small number of users may experience reduced water availability as a result of CSG production where we 'make good' any impacts on groundwater availability.

**Related Material Aspect**

[Protecting water resources](#)

**Related topics**

[Water](#)

**Detailed response**

Origin has no production plants or sites located in water-stressed areas, using the UNEP global map. In specific local areas where water usage is an issue, Origin's activities are designed to minimise impacts on other users of the water, such as agriculture. Origin takes into account water-related risks and issues at sites operating in all climates, including arid regions as well as water abundant regions.

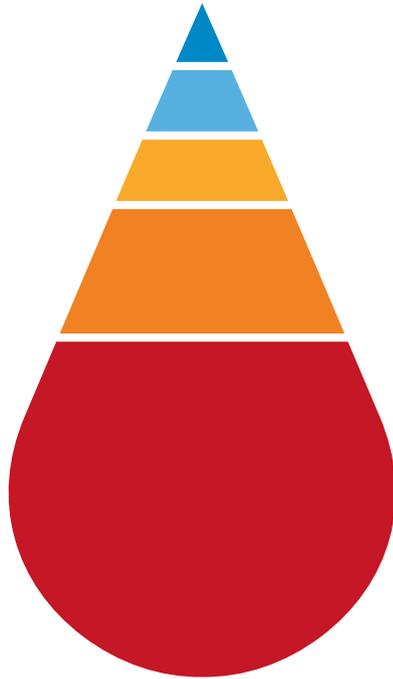
Origin's largest water withdrawal is from Lake Macquarie for use at Eraring, where daily withdrawals are made for cooling purposes. These make up approximately 0.08 per cent of the average volume of the lake and it is estimated that about 95 per cent<sup>(1)</sup> of all water withdrawn is returned.

Produced or formation water withdrawn in CSG production is from coal seams (not from aquifers which are commonly accessed by other water users) and is of brackish quality, which means it is generally not suitable without treatment for human consumption or for agriculture.

It is estimated that the Great Artesian Basin (GAB) has the enormous total storage capacity of 65,000 million mega litres of water. Each year it is naturally recharged with 920,000 mega litres<sup>(3)</sup> of water.

At their peak, all the proposed CSG to LNG operations combined will take approximately 0.0002 per cent of the total water that is stored in the GAB each year. Aquifer reinjection has the potential to return a significant proportion of this water directly back to the basin's aquifers. Any treated CSG water provided to existing users is likely to also directly reduce existing usage of GAB water.

Modelling estimates indicate that the combined average water extracted from the Surat Basin section of the GAB for the proposed Queensland CSG to LNG industry is 75,000 mega litres per year. This is much less than the estimated 620,000 mega litres extracted from the GAB annually by other users, and about half the estimated average amount of groundwater taken for agriculture and other purposes across the Surat Basin section of the GAB.



**CSG Industry's Water Use in Context**

920,000ML	620,000ML	140,000ML	75,000ML	25,000ML
■ Annual recharge to the GAB	■ Total annual estimated groundwater use in the GAB	■ Current annual groundwater use in Surat Basin	■ Average annual water production by the CSG industry	■ Typical annual water production by Australia Pacific LNG post 2015

Source: Great Artesian Basin Coordinating Committee and industry estimates

There are a small number of users who may experience reduced water availability as a result of CSG production. For these users the CSG industry is required by law to make good any impacts on groundwater availability. For more information see [Protecting Water Resources](#).

Data reported under this indicator is derived using methodologies that reflect the nature of our operations. Methodologies include the use of calibrated instrumentation, derivations from mass balances and engineering calculations, as well as relevant estimation techniques. Some parameters may also be measured by appropriately qualified external third party service providers such as certified laboratories.

(3) Great Artesian Basin Coordinating Committee.

**G4-EN10** Percentage and total volume of water recycled and reused.

**Overview**

For the 2014 financial year, 2,823 ML of water was recycled by Origin. When including the water used by Eraring (which accounts for the vast majority of Origin's water use), the volume of water recycled as a percentage of the total water withdrawn is 0.12 per cent. Eraring employs a once through cooling process and as such about 95 per cent<sup>(1)</sup> of all water withdrawn is returned to Lake Macquarie. Excluding Eraring, recycling and reuse of water accounts for approximately 31 per cent of water withdrawn. Although the total volume recycled is 184 ML more than last year (when 2,639 ML<sup>(2)</sup> were recycled), as a percentage of total water withdrawn, it is lower than 41 per cent recorded in FY 2013.

**Related Material Aspect**

[Protecting water resources](#)

**Related topics**

[Water](#)

**Detailed response**

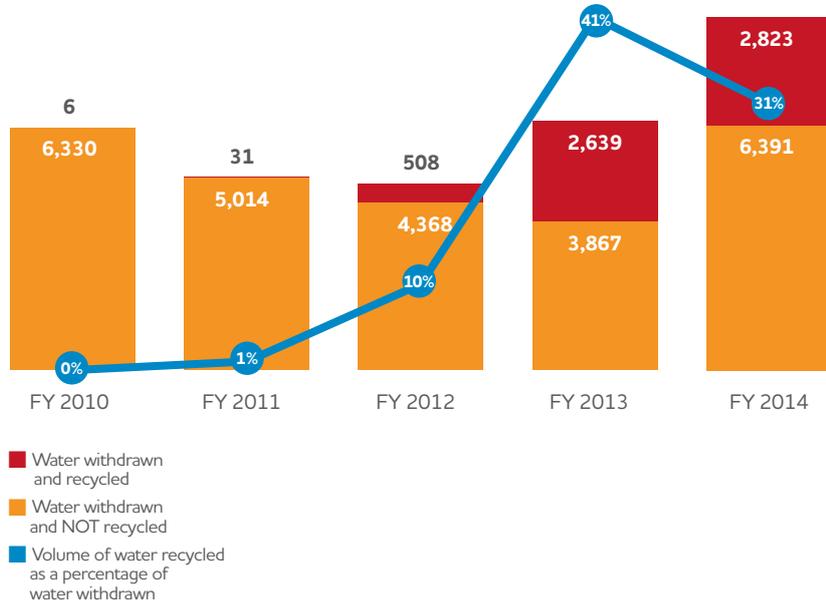
Further detailed information is provided for percentage and volume of water recycled over the past five years, excluding Eraring.

Wherever possible, Origin will reuse or utilise recycled water within its process operations. The majority of our recycled water is currently used for farm irrigation in Queensland (See OG5 for more information on the treatment and reuse of formation or produced water in our LNG operations). Recycling is also incorporated into the design and operation of our operated power stations. For example, the Mortlake Power Station, which cools its gas-fired generation equipment with treated wastewater sourced from the local municipal wastewater treatment facility. The treated water represents almost 70 per cent of the plant's total water usage.

Eraring also utilises waste water from the Dora Creek Wastewater Treatment Works, the onsite sewage treatment plant and the Myuna Bay Sport & Recreation Club which is treated before its use on site for plant washdown or in the power station units' high pressure boilers. During FY 2014, the reliance on potable water decreased as the volume of reclaimed water generated on site increased by 80 per cent from 1.4 ML per day to 2.4 ML per day.

Data reported under this indicator is derived using the methodologies that reflect the nature of our operations. Methodologies include the use of calibrated instrumentation, derivations from mass balances and engineering calculations, as well as relevant estimation techniques. Some parameters may also be measured by appropriately qualified external third party service providers such as certified laboratories.

**Percentage and Volume of Water Recycled (excluding Eraring) (ML)**



## BIODIVERSITY

**G4-EN11** Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.

### Overview

Some Origin sites and projects are located alongside, or near to, protected areas of high biodiversity values.

### Related Material Aspect

[Biodiversity](#)

### Related topics

[Environment](#)

### Detailed response

The following table indicates where Origin's sites operate adjacent to, or near, protected areas or areas of high biodiversity value.

Business Unit	Site/Project	Location	Area Of Biodiversity Value
Upstream	Bass Gas	Victoria, Australia	The closest marine protected areas to the Yolla offshore facilities are Wilsons Promontory Marine National Park and Bunurong Marine National Park which are approximately 70 kilometres and 20 kilometres to the east of the offshore pipeline, respectively, and Kent Group Marine Nature Reserve, which is 90 kilometres to the east of the offshore pipeline and 138 kilometres north east of the Yolla Offshore Platform. The onshore pipeline passes within approximately 4 kilometres of the Gurdies Nature Conservation Reserve. The onshore gas plant is not proximal to any formally recognised areas of conservation value.
	Beharra Springs	Western Australia, Australia	Adjacent to Yardanogo Nature Reserve.
	Jingemia	Western Australia, Australia	Near Bee Keepers Nature Reserve.
	Kupe	New Zealand	The Kupe wellhead is in a marine environment and the production plant is adjacent to the Kapuni Stream.
	Otway	Victoria, Australia	Near Port Campbell National park. The survey area for the Astrolabe 3D Seismic survey undertaken in the Otway Basin is close to a number of Marine Parks. The Twelve Apostles Marine National Park is approximately 40 kilometres north from the nearest boundary of the survey area, the Arches Marine sanctuary approximately 45 kilometres from the nearest boundary of the survey area, and the Marengo Reefs Marine sanctuary located over 40 kilometres from the nearest boundary of the survey area. Also the nearby construction of an access road, drilling pad, flare pit and accommodation camp pad for the Halladale Blackwatch and Speculant Drilling Project is located adjacent to the Bay of Islands Coastal Park.
	Rimu	New Zealand	Within 2 kilometres from conservation endemic bush land classified by the Queen Elizabeth Trust and the site is bordered by a river.
	Surat	Queensland, Australia	Some parts of the Surat are within Environmentally Sensitive Areas (ESAs).
LNG	Australia Pacific LNG project	Queensland, Australia	The project operates in areas including threatened ecological communities or fauna habitat listed in <i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i> as well as Queensland Environmentally Sensitive Areas (ESA) and Remnant Regional Ecosystems (RE) and a state forest. In addition, the main pipeline is adjacent to the World Heritage listed Great Barrier Reef Coastal Marine Park. For more information please see the <a href="#">Australia Pacific LNG Environmental and Social Reports</a> and the <a href="#">APLNG Environment and Social Management Plan</a> .
	Denison	Queensland, Australia	Terrestrial ecological values mapped within the area include National Parks, Endangered and Of Concern Regional Ecosystems, Essential Habitat, State Forests and Referable Wetlands as defined by the Queensland regulations. This includes habitat for listed flora and fauna.
	Peat	Queensland, Australia	Nearby areas include endangered dominate and sub-dominant vegetation within Environmentally Sensitive Areas (ESAs). This includes Endangered and Of Concern Regional Ecosystems and habitat for listed flora and fauna.
	Spring Gully	Queensland, Australia	Parts of the tenement are in a State forest and nearby Scotts Creek is a local habitat for the Squatter Pigeon, a species listed as vulnerable in State and Australian legislation. This includes essential habitat, nature refuges, areas of State Forest.
	Talinga	Queensland, Australia	Terrestrial ecological values mapped within the area include Endangered and Of Concern Regional Ecosystems, Essential Habitat and State Forests as defined by the Queensland regulations. Further areas identified include: <ul style="list-style-type: none"> <li>— Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant);</li> <li>— Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions;</li> <li>— Referable freshwater wetlands, and</li> <li>— Watercourse crossings.</li> </ul> Presence of protected vegetation including <i>Gonocarpus urceolatus</i> and <i>Acacia wardellii</i> , <i>Acacia tenuinervis</i> and habitat for listed species including the yakka skink and the golden tailed gecko.

Business Unit	Site/Project	Location	Area Of Biodiversity Value
Energy Markets	Bendeela Power Station	Southern Highlands, New South Wales	Bendeela site is adjacent to the Sydney Catchment Authority's Shoalhaven Special Area, the protected catchment lands surrounding water storages to ensure the supply of quality water to greater Sydney. These areas have minimal disturbance and are adjacent to water storages to assist control of surface water contamination.
	Cullerin Range Wind Farm	New South Wales, Australia	Some of the land includes sensitive vegetation and a selection of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland Endangered Ecological Community.
	Darling Downs Power Station	Queensland, Australia	Kogan Waxflower ( <i>Philothea sporadica</i> ) has been found on site. There are other endangered species within 4 kilometres of the site including the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grasslands.
	Eraring Power Station	New South Wales, Australia	Site activities have the potential to impact on Lake Macquarie and the Muddy Lake Catchment drains to a listed Ramsar Convention wetland. Recent threatened species surveys have confirmed the occurrence of Black-eyed Susan ( <i>Tetratheca juncea</i> ) and Stephen's Banded Snake ( <i>Hoplocephalus stephensii</i> ) on site.
	Ladbroke Grove Power Station	South Australia, Australia	Species or species habitat are likely to occur within a 2 kilometre site buffer zone. Listed species include the Red-tailed Black-Cockatoo (south-eastern), Southern Brown Bandicoot, Southern Bent-wing Bat, Blue Top Sun-Orchin, Dark Tipped Sun-Orchid, and the Metallic Sun-orchid. The site is also within the same catchment as RAMSAR wetlands ('Bools and Hacks Lagoon' and Lake 'Coorong, Lake Alexandria and Lake Albert') but there is significant distance separating the site from these wetlands.
	Mortlake Power Station	Victoria, Australia	Site includes Kangaroo Grass ( <i>Themedia</i> ), habitat for the Growling Grass Frog ( <i>Litoria raniformis</i> ) and the Pygmy Pearch ( <i>Dwarf galaxis</i> ).
	Quarantine Power Station	South Australia, Australia	Adjacent to Torrens Conservations Reserve and the Barker Inlet-St Kilda Aquatic Reserve. Located within 2 kilometres of the Peppermint Box Grassy Woodland of South Australia, a known habitat for the listed Orange Bellied Parrot. Other migratory seabirds are also listed as having habitat within the area.
	Shoalhaven Scheme Power Station	New South Wales, Australia	The Bendeela site is adjacent to the Shoalhaven Special Area where the Sydney Catchment Authority requires controls to mitigate surface water contamination.
	LPG depots and terminals	Various in Australia and the Pacific region	Some LPG depots and terminals are located close to coastal mangroves and sensitive environments.

**G4-EN12** Description of significant impact of activities, products and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas.

### Overview

Origin seeks to minimise any impact to biodiversity and initiates mitigation measures or offsets where biodiversity assessments indicate potential impacts.

In FY 2014, our Exploration & Production business unit did not undertake any activities or cause incidents that materially impacted biodiversity in project areas.

Origin is the Upstream operator of the Australia Pacific LNG project, responsible for development of the CSG resources and the processing and transportation of gas to the LNG Facility on Curtis Island, near Gladstone. The total disturbed area for the Upstream component is now 8,304.83 hectares (to 30 June 2014: and does not include reinstatement activity or offsets). In FY 2014, Origin notified government authorities of 39 instances of notifiable fauna deaths and injuries involving specimens in accordance with the relevant, approved Species Management Plan.

### Related Material Aspect

#### [Biodiversity](#)

### Related topics

#### [Environment](#)

#### Detailed response

Origin is committed to biodiversity conservation which involves analysis of potential impacts to biodiversity values as described in Origin's Biodiversity Management Directive. Where potential impacts are identified, mitigation measures or offsets are determined to reduce risks to acceptable levels.

#### Exploration & Production

In FY 2014, Origin's Exploration & Production business unit did not undertake any activities or cause incidents that materially impacted biodiversity in project areas.

#### Origin as Upstream operator of Australia Pacific LNG

At the time of reporting, Origin has reported that 8,304.83 hectares has been disturbed or cleared as the Upstream Operator of the Australia Pacific LNG project. Approximately 700.27 hectares of the disturbed area is classed as remnant vegetation, and 76.55 hectares of high value regrowth. None of the remaining disturbance took place in or adjacent to protected areas or areas of high conservation value outside of protected areas.

Origin has continued to develop and refine the Biosecurity Management Practices across the gasfields and have been working collaboratively with landowners at selected sites where declared weed species have been detected such as Parthenium and American Rats Tail Grass. Origin has undertaken monitoring and weed management practices where infestations have been detected adjacent to our activities on both private and state owned land.

There were no quarantine issues during the reporting period.

Government authorities were notified of 39 instances of fauna deaths and injuries involving specimens in accordance with the relevant, approved Species Management Plan. Species reported included: collared delma (*Delma torquata*), Brigalow scaly-foot (*Paradelma orientalis*), short-beaked echidna (*Tachyglossus aculeatus*), rough frog (*Litoria verrucosa*), grey snake (*Hemiaspis damelii*) and golden-tailed gecko (*Strophurus taenicauda*).

Fauna spotter catchers are located in the field to conduct pre-clearance inspections to potentially locate species prior to clearing activities. A measure of the success is the high number of relocations of fauna.

The Threatened Species Management Plans for the gas fields and pipeline activities of the project are available on the [project website](#).

## G4-EN13 Habitats protected or restored.

### Overview

Origin works to minimise any impact our activities may have on the biodiversity of the environments in which we operate, and implement offset initiatives for projects where a significant impact to a site's biodiversity is unavoidable.

### Related Material Aspect

[Biodiversity](#)

### Related topics

[Environment](#)

### Detailed response

Origin implements offset initiatives for projects where a significant impact to a site's biodiversity is unavoidable. These initiatives are designed to align with stakeholder interests and return a site's biodiversity value to a similar or better standard than before the project, and are guided by Origin's Biodiversity Management Directive. For more on this process, see our [Biodiversity Material Aspect](#).

### Exploration & Production

In FY 2014, the Exploration & Production business supported a number of ecological research programs. These included a study by the International Association of Oil and Gas Producers on the effects of sound generated by the offshore petroleum industry on marine life and a study by the Fisheries Research and Development Corporation on the impact of marine seismic surveys on southeast Australian scallop and lobster fisheries.

### Origin as Upstream operator of Australia Pacific LNG

Reinstatement is the process of bringing the construction earthen landscape back to the original profile of the surrounding environment, including the stabilisation of the disturbance site. Stabilisation can include seeding with grasses of a suitable species in their applicable environment, for example improved pasture returned where improved pasture was disturbed. The project has now reinstated 4,959.82 hectares along pipelines and other areas such as well leases and flowlines. This brings the total of reinstatement works carried out over the project lifetime to approximately 60 per cent of all areas disturbed. The main pipeline corridor has been completely reinstated.

Australia Pacific LNG adopts a strategic approach to providing environmental offsets for the Project, comprising both land-based sites (direct offsets) and contributions to other activities such as removing threatening processes and research (indirect offsets). As the Upstream Operator of Australia Pacific LNG, Origin is involved in the creation of three

strategic offset sites to compensate for the project's impact on:

- Brigalow and semi-evergreen vine thicket and fauna habitat;
- *Cycas megacarpa* (*cycads*); and
- World Heritage Areas that contain shorebirds, water mouse and fisheries.

To date, two direct offset sites (approximately 112 hectares) on properties owned by Australia Pacific LNG near Miles, Queensland, have been legally protected under the *Vegetation Management Act 1999* as habitat for threatened plants, *Rutidosis lanata* (an endangered daisy) and *Eleocharis blakeana* (a near-threatened sedge).

Australia Pacific LNG has also purchased leasehold interests for the 7,890-hectare Dukes Plain property, located near Theodore in Central Queensland, to protect areas of endangered vegetation (including Brigalow and semi-evergreen vine thicket) and habitat for threatened fauna. The property includes the 3,190-hectare Shankeen Nature Refuge and Origin is working towards legal protection for an additional 2,500 hectares by the end of 2014.

Additionally, as the Upstream Operator, Origin secured an agreement with the landholder for a part of their leasehold land to be used as an offset location for *Cycads* (relocated from the transmission pipeline easement), seedlings that have been germinating, and a *Wattle*.

Origin continues supporting its earlier success at eight Fitzroy River Turtle nest sites as part of the Fitzroy River Turtle nest protection project.

Australia Pacific LNG also continues supporting terrestrial and marine biodiversity research through the Gas Industry Social and Environmental Research Alliance (GISERA). Current projects with biodiversity impacts include:

- Priority threat identification, management and appraisal (terrestrial biodiversity);
- Fire ecology of grassy woodlands (terrestrial biodiversity); and
- An integrated study of the Gladstone marine system (marine environment).

Additional information regarding the offsets developed for the Downstream component of the Australia Pacific LNG project can be found in the project's Environmental and Social Reporting available [here](#).

### Generation

In FY 2009, Origin's Mortlake Power Station established a management plan committed to restoring native vegetation disturbed during the construction of the power station and the feed gas pipeline, as well as controls to protect the habitat for the growling grass frog, known to exist on and nearby the sites boundary.

The vast majority of the gas pipeline route traversed land that has been cleared and heavily modified for agricultural production. The actual construction of the Mortlake pipeline was

designed to locate the pipeline route such that it avoided remnant native vegetation as far as practicable. Where this was not feasible, Origin minimised impacts on native vegetation by horizontal boring under road reserves and native vegetation stands, horizontal directional drilling under significant waterways and narrowing the pipe laying pathway through important remnant native vegetation.

Net Gain Offsets have been secured to compensate for the losses in native vegetation cleared where native vegetation impacts could not be avoided. The net gain must ensure more native vegetation is protected and conserved than actually cleared. The amount of offsets required under Victoria's Native Vegetation Management Plan – A Framework for Action (DNRE 2002) must account for the residual effects of the gas pipeline construction on remnant native vegetation which is 1.030 Habitat Hectares of very high conservation vegetation to compensate for the actual losses of 0.99 Habitat Hectares. A total of four offsets, totalling 10.110 hectares, were identified along the Victorian Volcanic Plains and Warrnambool Plains.

In FY 2011, the Victorian Volcanic Plains – Mt Emu Creek site – 2.360 hectares offset was secured protecting very high conservation Swampy Riparian Woodland and Riparian Woodland dominated with Manna Gum (*Eucalyptus viminalis*) with overstorey of Blackwood (*Acacia melanoxylon*) and understorey of Wooley Tea Tree Swamp Scrub (*Leptospermum lanigerum*) and Hemp Bush (*Gynartix pulchella*). The site supports fauna Dwarf Galaxias (*Galaxiella pulsilla*) and Yarra Pygmy Perch (*Nannopara obscure*).

Two further offsets were registered in the 2014 financial year:

- Warrnambool – Trigg Site, a 3.20 hectares very high conservation area dominated by Herb Rich Foothill Forest and Riparian Forest; and
- The Scattered Trees Offset – Marnie site, Warrnambool Plains has a range of 19 large to very large old trees purchased. The trees dominated by Creekline Grassy Woodland and Escarpment Shrubland.

The fourth offset will be secured and registered in the 2015 financial year and comprises of a 4.43 hectare site of very high conservation Woolly Tea Tree Swamp Scrub vegetation. This site is dominated by Woolly Tea Tree Swamp Scrub (*Leptospermum lanigerum*) and Swamp Greenhood and also supports the fauna Dwarf Galaxias (*Galaxiella pulsilla*) and Yarra Pygmy Perch (*Nannopara obscure*).

### LPG

Origin's Pacific LPG terminals located near sensitive coastal areas continue to investigate mangrove restoration programs to minimise coastal erosion and restore natural habitats for local land and marine fauna.

**G4-EN14** Total number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level of extinction risk.

### Overview

In the 2014 financial year, Origin's Exploration & Production projects and our Generation sites, posed no material danger to threatened species and ecological communities identified by shires, councils, provinces and states within Australia; the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*; or IUCN Red List of Threatened Species.

The upstream component of the Australia Pacific LNG project, operated by Origin, covers approximately 570,000 hectares of the lower east corner of the Brigalow Belt in Queensland. This region contains 147 species and 100 ecological communities currently listed as threatened.

### Related Material Aspect

[Biodiversity](#)

### Related topics

[Environment](#)

### Detailed response

In the 2014 financial year, Origin's Exploration & Production projects and our Generation sites, posed no material danger to threatened species and ecological communities identified by shires, councils, provinces and states within Australia; the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*; or IUCN Red List of Threatened Species.

### Origin as Upstream operator of Australia Pacific LNG

Origin operates the Upstream component of the Australia Pacific LNG project, covering approximately 570,000 hectares of the lower east corner of the Brigalow Belt in Queensland. This region contains 147 species and 100 ecological communities currently listed as threatened.

Under the *Environmental Protection and Biodiversity Conservation 1999 (Cth)*, the Australia Pacific LNG project's gas fields have set disturbance limits for two ecological communities listed as threatened being the endangered ecological community of brigalow (*Acacia harpophylla* dominant and co-dominant) and the endangered ecological community of semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar bioregions.

We have encountered flora and fauna of conservation significance as defined under the *Nature Conservation Act 1992 (Qld)* and *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*. In accordance with these Acts and other environmental authority requirements, we have commissioned intensive surveys to map the presence of Endangered, Vulnerable and Near Threatened (EVNT) flora.

These surveys have resulted in greater understanding of EVNT flora within the project area and the identification of greater instances of *Rutidosia lanata*, *Eleocharis blakeana* and *Acacia tenuinervis*. As a result, under the Nature Conservation (Wildlife) Regulation 2006 (Qld) the Queensland Government has reclassified *Rutidosia lanata* from endangered to vulnerable, and *Eleocharis blakeana* and *Acacia tenuinervis* from near-threatened to least concern.

The Boggomoss Snail (*Adclarkia dawsonensis*) and Dulacca Woodland Snail (*Adclarkia dulacca*) are of local significance and we avoid their habitats where possible. Where vegetation clearing is required in a known snail habitat, we employ spotter/catchers to collect snails from areas zoned for clearance and relocate them to nearby vegetation. This exercise has resulted in the relocation of more than 100 snails from one property.

The [Management Plans](#) for these threatened ecological communities, flora and fauna can be downloaded from the Australia Pacific LNG website.

**OG4** Number and percentage of significant operating sites in which biodiversity risk has been assessed and monitored.

### Overview

All of Origin's projects or sites are required to carry out an assessment of biodiversity-related risks and opportunities in accordance with the Biodiversity Management Directive and the Risk Management Directive.

### Related Material Aspect

[Biodiversity](#)

### Related topics

[Environment](#)

### Detailed response

All of Origin's projects or sites are required to carry out an assessment of biodiversity-related risks and opportunities in accordance with the Company's Biodiversity Management Directive and this is integrated into Origin's multi-disciplinary company-wide risk management process. This process includes the need to identify biodiversity values that can be affected by Origin's activities by taking into account:

- legally protected or recognised areas and species;
- species, ecosystems and natural areas that have special conservation status, such as conservation-significant flora and fauna, and rare and threatened species listed regionally, nationally and/or under the International Union for Conservation of Nature Red List of Threatened Species;
- ecosystem diversity, including vegetation and habitat diversity, fauna movement corridors and wetland processes;
- species diversity and species assemblages;
- unlisted biodiversity values that are considered significant; and
- views of relevant external and internal stakeholders.

### EMISSIONS

Origin's Australian Greenhouse Gas (GHG) emissions have been calculated in accordance with the Australian Government's *National Greenhouse and Energy Reporting Act 2007* (the NGER Act), while emissions from our Exploration & Production facilities in New Zealand are calculated using the New Zealand Climate Change Response Act 2002. Our NGER submission is independently verified to a 'reasonable assurance' level.

We report direct emissions from assets owned or operated by the Company (Scope 1 emissions). Energy indirect emissions are reported for Australian operations (Scope 2 emissions). In addition, other indirect emissions are included to a limited extent and include Company air, car and taxi travel only (Scope 3 emissions).

Origin's GHG emissions performance for FY 2014 is summarised in the table below.

	Operational Control Basis	Equity Basis
Scope 1 (kt CO <sub>2</sub> -e)	14,934	16,283
Scope 2 (kt CO <sub>2</sub> -e)	130	116
Scope 3 (kt CO <sub>2</sub> -e)	25	–
Emissions intensity:		
– of electrical energy production (t CO <sub>2</sub> -e/MWh)	0.77	0.62
– of oil and gas production (t CO <sub>2</sub> -e/TJ)	6.84	7.75

**G4-EN15** Direct Greenhouse Gas (GHG) emissions (Scope 1).

### Overview

Origin's total direct GHG emissions (Scope 1) for the 2014 financial year were 14,934 Kt CO<sub>2</sub>-e, an increase of 9 per cent from the previous period. This increase is largely due to increased output from Eraring.

### Related Material Aspect

[Emissions](#)

### Related topics

[Environment](#)

### Detailed response

On an operational control basis, our Scope 1 emissions for 2014 were 14,934 kt CO<sub>2</sub>-e. This represents a 9 per cent increase and is largely due to increased output from the Eraring Power station. Of our gas fired power stations, Darling Downs, Mortlake, Quarantine, Ladbroke Grove and Roma also produced an increased output, and Uranquinty produced less.

### Direct Greenhouse Gas (GHG) Emissions (Scope 1), (kt CO<sub>2</sub>-e)

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
<b>Operational Control Basis</b>						
Energy Markets, of which:	486	1,160	1,662	1,676	12,411	13,387
– Eraring <sup>(3)</sup>	–	–	3,909	10,137	9,826	10,583
– Generation (exc. Eraring)	435	1,097	1,606	1,618	2,528	2,749
– LPG	51	56	48	48	45	40
– Cogent	–	7	8	10	12	15
LNG <sup>(4)</sup>	–	–	–	–	657	892
Upstream Oil and Gas	811	801	1,189	1,050	592	652
Others	10	7	5	3	3	3
<b>Total Scope 1 – operational control</b>	<b>1,307</b>	<b>1,968</b>	<b>6,765</b>	<b>12,866</b>	<b>13,663</b>	<b>14,934</b>
<b>Equity Basis</b>						
Energy Markets, of which:	2,043	2,682	3,277	3,598	4,740	15,182
– Eraring <sup>(3)</sup>	–	–	–	–	–	10,583
– Generation (exc. Eraring)	1,992	2,619	3,221	3,540	4,684	4,544
– LPG	51	56	48	48	45	40
– Cogent	–	7	8	10	12	15
LNG <sup>(4)</sup>	–	–	–	–	295	390
Upstream oil and gas	1,139	1,006	1,076	1,012	741	708
Others	10	7	5	3	3	3
<b>Total Scope 1 – equity basis</b>	<b>3,192</b>	<b>3,695</b>	<b>4,358</b>	<b>4,613</b>	<b>5,780</b>	<b>16,283</b>

(3) Origin assumed operational control of Eraring Power Station on 1 August 2013. Prior to this, Origin owned the output of Eraring Power station from March 2011 under the previous GenTrader Arrangement with the New South Wales Government. Scope 1 and Scope 2 GHG Emissions for FY 2011 and FY 2012 are included in these emissions calculations. In FY 2013, the emissions for these assets were transferred under a Financial Control Liability Transfer Certificate to an Origin owned entity and are included to align with our obligations under the *Clean Energy Act 2011*.

(4) LNG emissions data is reported under the Upstream Oil and Gas Business Unit up until 2012. Excludes downstream emissions from the Australia Pacific LNG project.

**G4-EN16** Indirect Greenhouse Gas (GHG) emissions (Scope 2).

**Overview**

Origin's total Scope 2 GHG emissions for the 2014 financial year were 130 kt CO<sub>2</sub>-e, down from 202 ktCO<sub>2</sub>-e, largely due to lower usage at the Shoalhaven pump storage hydro scheme.

**Related Material Aspect**

[Emissions](#)

**Related topics**

[Environment](#)

**Detailed response**

Origin's operational control Scope 2 emissions decreased from 202 Kt CO<sub>2</sub>-e to 130, a decrease of 36 per cent, largely due to lower usage from the Shoalhaven pumped hydro scheme.

**Energy Indirect Greenhouse Gas (GHG) Emissions (Scope 2), (kt CO<sub>2</sub>-e)**

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
<b>Operational Control Basis</b>						
Energy Producing Sites <sup>(3)</sup>	12	26	50	42	184	113
Non-Energy Producing Sites	24	27	21	19	18	17
<b>Total Scope 2 – Operational control basis</b>	<b>36</b>	<b>53</b>	<b>71</b>	<b>61</b>	<b>202</b>	<b>130</b>
<b>Equity Basis</b>						
Energy Producing Sites	12	26	22	28	56	99
Non-Energy Producing Sites	24	27	21	19	18	17
<b>Total Scope 2 – Equity basis</b>	<b>36</b>	<b>53</b>	<b>43</b>	<b>47</b>	<b>74</b>	<b>116</b>

**G4-EN17** Indirect Greenhouse Gas (GHG) emissions (Scope 3).

**Overview**

In FY 2014, Origin's total Scope 3 GHG emissions from operated facilities were 25 kt CO<sub>2</sub>-e.

**Related Material Aspect**

[Emissions](#)

**Related topics**

[Environment](#)

**Detailed response**

Origin's Scope 3 emissions increased marginally in the 2014 financial year to 25 kt CO<sub>2</sub>-e.

**Other Indirect Greenhouse Gas (GHG) Emissions (Scope 3), (kt CO<sub>2</sub>-e)<sup>(9)</sup>**

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Scope 3	13	16	28	28	23	25

**G4-EN18** Greenhouse Gas (GHG) Emissions Intensity.

**Overview**

The GHG emissions intensity for Origin's operated Generation sites was 0.77 t CO<sub>2</sub>-e/MWh, marginally up from the previous reporting period largely driven by the increased output from Eraring.

The GHG emissions intensity for Origin's operated Upstream and LNG sites was 6.84 t CO<sub>2</sub>-e/TJ down from 7.0 t CO<sub>2</sub>-e/TJ on the previous period.

**Related Material Aspect**

[Emissions](#)

**Related topics**

[Environment](#)

**Detailed response**

**Greenhouse Gas (GHG) Emissions Intensity, (t CO<sub>2</sub>-e/MWh and t CO<sub>2</sub>-e/TJ)<sup>(5)</sup>**

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
<b>Operational control basis</b>						
Generation (t CO <sub>2</sub> -e/MWh)	0.62	0.52	0.44 <sup>(6)</sup>	0.75	0.74	0.77
Upstream Oil and Gas and LNG (t CO <sub>2</sub> -e/TJ)	9.2	8.5	6.0	5.7	7.0	6.84
<b>Equity Basis</b>						
Generation (t CO <sub>2</sub> -e/MWh)	0.25	0.35	0.33	0.33	0.39	0.62
Upstream Oil and Gas and LNG (t CO <sub>2</sub> -e/TJ)	10.9	9.7	8.0	7.8	8.4	7.75

(5) In previous years, we have reported emissions intensities in kt CO<sub>2</sub>-e/PJ both for electricity generation and oil and gas production. This year we are reporting our emissions intensities for electricity generation in t CO<sub>2</sub>-e/MWh to facilitate comparison with the National Electricity Market intensities. Emissions intensities for Upstream Oil and Gas production are reported in t CO<sub>2</sub>-e/TJ.

(6) Excludes Eraring Power Station.

**G4-EN20** Emissions of ozone depleting substances (ODS).

**Response**

In FY 2014, Origin produced no emissions of ozone depleting substances (ODS). Where required by local applicable law, sites have ODS management plans for approval for the use of ODS in air conditioning and refrigeration units. Some LPG facilities located in the South Pacific region are working with their relevant government departments aimed at phasing out the import of ODS.

**Related Material Aspect**

[Emissions](#)

**Related topics**

[Environment](#)

**G4-EN21** NOx, SOx and other significant air emissions.

**Overview**

In FY 2014, emissions of nitrogen oxides (NOx) and sulphur oxides (SOx) from Origin's operated Australian sites totalled 23,237 tonnes and 27,630 tonnes respectively. This movement reflects the commencement of operational control of Eraring by Origin in August 2013.

**Related Material Aspect**

[Emissions](#)

**Related topics**

[Environment](#)

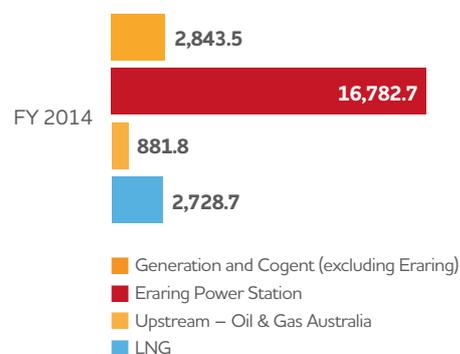
**Detailed response**

As part of the Australian National Pollutant Inventory scheme, Origin's significant operating sites continue to track emissions of nitrogen oxides (NOx) and sulphur oxides (SOx), which arise primarily from the combustion of fuels such natural gas, kerosene, diesel and coal.

In FY 2014, emissions of NOx from Origin's operated Australian sites totalled 23,237 tonnes as shown in the chart below. This movement

reflects the commencement of operational control of Eraring by Origin in August 2013.

**FY 2014 Nitrogen Oxides (tonnes)**



In FY2014, emissions of SOx totalled 27,629.6 tonnes. More than 99 per cent of FY 2014 emissions of SOx were attributed to Eraring. As there is more sulphur in coal compared to natural gas, the combustion of coal results in greater relative emissions of SOx.

**Sulphur Oxides by Business Unit (tonnes)**

	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Generation and Cogent (excluding Eraring)	10.1	12.1	8.9	12.9	15.5
Eraring Power Station	-	-	-	-	27,574.9 <sup>(7)</sup>
Upstream - Oil & Gas Australia	0.2	21.1	16.1	16.2	37.1
LNG	0.2	0.2	0.2	1.9	2.1
<b>TOTAL</b>	<b>10.5</b>	<b>33.4</b>	<b>25.2</b>	<b>31.0</b>	<b>27,629.6</b>

Information about Origin's particulate emissions can be found in the [Emissions Material Aspect](#).

Data reported under this indicator is derived using the methodologies that reflect the nature of our operations. A combination of direct measurements, derivations from mass balances and engineering calculations, as well as relevant estimation factors are used to calculate the NOx and SOx emissions. Some sites may also employ appropriately qualified external third party service providers such as certified laboratories.

(7) FY 2014 is the first year of Origin's operational control of Eraring requiring reporting of other air emissions.

## EFFLUENTS AND WASTE

**G4-EN22** Total water discharge by quality and destination.

### Overview

In FY 2014, the total volume of water discharged across all business units was 2,445,717.2 ML. This movement reflects the commencement

of operational control of Eraring by Origin in August 2013. Eraring is designed to use and return the water from Lake Macquarie as cooling water, minimising the reliance on municipal or other fresh water sources.

### Related topics

[Water](#)  
[Environment](#)

### Related Material Aspect

[Protecting water resources](#)

### Detailed response

#### Wastewater Discharge (ML)

	FY 2010	FY 2011	FY 2012 <sup>(8)</sup>	FY 2013	FY 2014
to Ocean	120.3	14.8	5.7	30.3	32.9
to Surface Waters, Wetlands/river/lake	474.5	2,608.4	3,228.1	1,826.1	2,441,741.2
to Ground water	837.8	1,116.8	255.4	239.0	323.0
to Offsite Municipal treatment plant	54.2	81.6	71.6	253.8	66.6
to Other (e.g. evaporation, seepage from evaporation ponds, irrigation, sent off-site for other uses)	3,537.0	746.8	570.3	831.0	3,553.5
<b>TOTAL</b>	<b>5,023.8</b>	<b>4,568.4</b>	<b>4,131.1</b>	<b>3,180.2</b>	<b>2,445,717.2</b>

Water discharge is managed to meet strict water quality standards specified in applicable laws and operating licences, or in Origin's Water Management Directive.

**G4-EN23** Total weight of waste by type and disposal method.

### Overview

Origin is committed to minimising the consumption of resources and generation of waste materials wherever possible and across all business units. In FY 2014, Origin generated 19,813 tonnes of drill muds and cuttings,

2,548 tonnes of waste oil, 1,206,870 tonnes of other hazardous waste (including fly ash from Eraring) and 7,942 tonnes of general waste. Over the past five years, Origin has worked to increase our recycling rates in an effort to reduce the waste generated by our activities.

### Detailed response

Origin's projects and operational activities generate hazardous and non-hazardous wastes. The quantity and nature of waste generated varies based on the activities being conducted as illustrated in the following table.

### Related topics

[Environment](#)

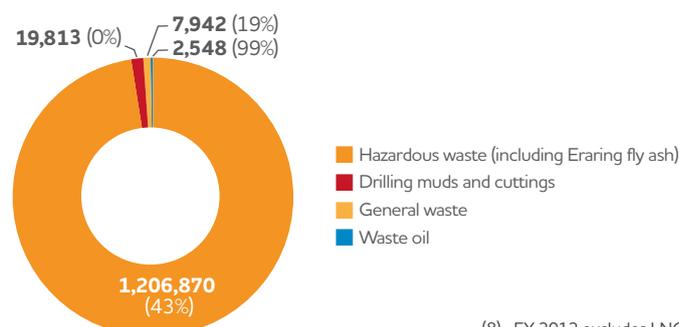
	Units	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Drill Muds and Cuttings	Tonnes	19,249.9	11,159.1	15,611.7	7,494.1	19,813
Naturally Occurring Radioactive Materials (NORM)	Tonnes	9.0	-	-	-	-
Waste Oil	Tonnes	3,318.6	2,140.2	4,192.4	1,123.9	2,548
% Recycled	%	56	100	100	82	99
Other Hazardous Waste (including Eraring fly ash)	Tonnes	208.1	2,989.5	14,296.7	5,974.1	1,206,870
% Recycled	%	72	96	92	92	43
General Waste	Tonnes	9,514.2	4,146.1	4,636.5	9,954.9	7,942
% Recycled	%	19	23	32	12	19

Over the past five years, our total waste produced has increased, however we have worked to increase recycling rates in an effort to reduce the waste generated by our activities. In FY 2014, Origin commenced operational control of Eraring which significantly increased the amount of hazardous waste due to the fly ash associated with electricity generation at the plant. This year we have also reported waste generated from the management of our legacy sites (contaminated site remediation).

The reduction in the percentage of hazardous waste recycling in FY 2014 can be attributed to an increased volume of waste from our legacy sites which cannot be recycled, and a smaller proportion of LNG's hazardous waste being recycled.

The following chart indicates the waste generated in FY 2014 as well as the recycling rates.

#### FY 2014 Waste Quantity (tonnes) and Recycle Rates (%)



(8) FY 2012 excludes LNG.

Drill muds and cuttings increased in FY 2014 compared to the prior reporting period reflecting planned drilling activities associated with the Australia Pacific LNG project. Generally, the amount of drilled cuttings generated depends on the nature and intensity of drilling activities. While the amount of waste oil increased in FY 2014, more than 99 per cent waste oil was recycled, an increase from 82 per cent in FY 2013.

General waste includes inert industrial and office wastes such as paper and cardboard, metals, glass, plastics, compostable organic residues, and non-hazardous building and construction debris or office furniture and equipment. There was a decrease in the quantity of general waste and the recycling rates continue to increase.

**G4-EN24** Total number and volume of significant spills.

**Response**

Spills and leaks that occurred in FY 2014 as a result of the Company's operations and activities were recorded and assessed. The majority of these spill events were classified as minor and only one incident was recorded as serious. The later incident involved the loss of integrity of a flare pit during work on a well resulting in the loss of the produced water. Approximately 25,000 litres of the produced water was released and a small proportion entered a nearby waterway.

**Related topics**

[Environment](#)

**G4-OG5** Volume of formation or produced water.

**Overview**

The quantity of formation or produced water increased substantially this financial year to 6,929 ML, from 4,988 ML<sup>(9)</sup>. Based on the nature of the planned activities, approximately 97 per cent of this was withdrawn by Origin as the Upstream operator of the Australia Pacific LNG project. The remaining 3 per cent was withdrawn in our Exploration & Production business.

Around 73 per cent of the Australia Pacific LNG Project produced water was treated, of which 75 per cent was used for beneficial purposes including displacing fresh water required for the project, injection into depleted aquifers and agriculture irrigation. This is a 185 per cent increase on the prior reporting period, when only 40 per cent of treated water was used for beneficial purposes. The remaining treated water is released to rivers.

**Related Material Aspect**

[Protecting water resources](#)

**Related topics**

[Water](#)

[Environment](#)

**Detailed response**

Formation or produced water is water that occurs naturally in oil and gas reservoirs and is brought to the surface as part of Origin's conventional and CSG activities. Typically, the water is of brackish salinity and contains traces of inorganic and organic contaminants, as well as residual additives (such as corrosion inhibitors) added during hydrocarbon extraction and production processes.

As illustrated in the chart below, Origin's activities have resulted in annual produced water volumes between 4,000 ML and 5,000 ML from FY 2010 to FY 2013. In FY 2014, Origin's activities generated 6,929 ML of produced formation water reflecting the additional wells coming online with the planned APLNG project activities.

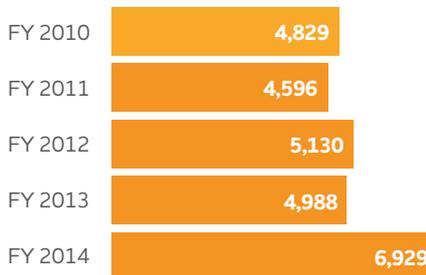
Formation or produced water brought to the surface during CSG extraction is separated from the gas and pumped to treatment facilities where most of it is treated via filtration and Reverse Osmosis (RO) to remove dissolved salts and impurities. After treatment, two streams of water remain:

- The treated water, or permeate is very clean and can be used for construction water, as potable drinking water to supply the Australia Pacific LNG project, for agriculture irrigation, injection into depleted aquifers and approved releases to rivers.
- The residue saline water is called RO reject water, or brine. This is stored in specifically designed and lined brine ponds, which provide a stable solution while other brine management options are evaluated.

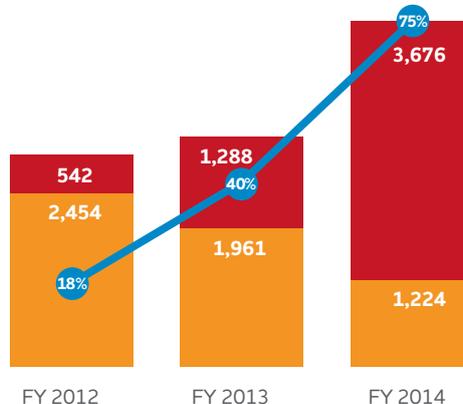
In the 2014 financial year, 6,929ML of water withdrawn, of which 97 per cent was withdrawn by the Australia Pacific LNG project, with the remainder used by the Exploration & Production business.

On the Australia Pacific LNG Project, 73 per cent of the produced water was treated. Of the treated water, 75 per cent was used for beneficial purposes including displacing the need to use fresh water for the project, aquifer injection and agriculture irrigation. This is a 185 per cent increase on the prior year, when only 40 per cent was used for beneficial purposes. The remaining treated water was released to rivers in accordance with our environmental licences, and other factors such as facility capacity, facility upset, weather, environmental flows in the water course and beneficial use availability.

**Total Volume of Formation or Produced Water (LNG and Exploration & Production) (ML)**



**% Treated Formation or Produced Water Used For Beneficial Purposes (LNG only) (ML)**



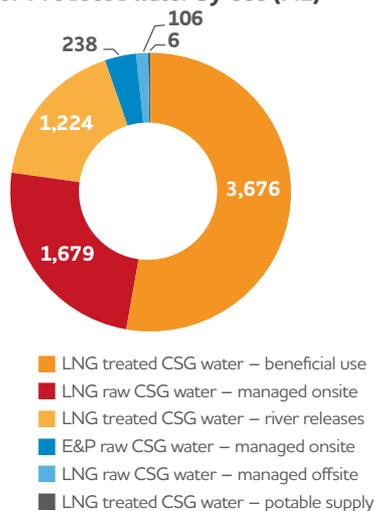
■ Beneficial purposes  
 ■ Released to rivers  
 ● % released to rivers

(9) This number is different to that published in FY 2013 as the number reported water consumption only, not water withdrawal as defined by GRI. This number excluded formation or produced water.

The pie chart below shows the total formation or produced water withdrawn at Origin during the 2014 financial year by end use.

The graph below shows that for the Australia Pacific LNG project, Origin uses a combination of treated water management options including supplying irrigation and livestock watering, construction and project purposes and aquifer

**FY 2014 Treated Formation or Produced water by Use (ML)**

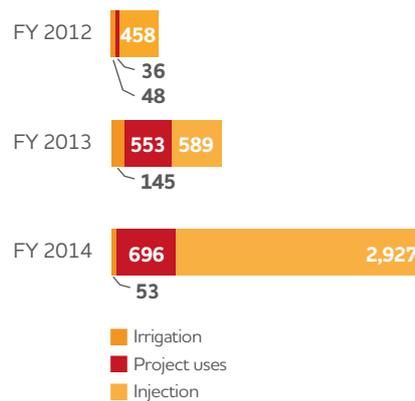


injection. A decreasing proportion is being released to rivers. The bar chart below demonstrates the end use of treated water for Origin's LNG business over time. Our focus has been to direct treated water towards beneficial uses such as irrigation.

Data reported under this indicator is derived using the methodologies that reflect the nature

of our operations. Methodologies include the use of calibrated instrumentation, derivations from mass balances and engineering calculations, as well as relevant estimation techniques. Some parameters may also be measured by appropriately qualified external third party service providers such as certified laboratories.

**Annual Water Withdrawal (excluding Eraring) (ML)**



**G4-OG7** Amount of drilling waste (drill mud and cuttings) and strategies for treatment and disposal.

**Overview**

In FY 2014, 19,813 tonnes of drilling waste was generated, primarily by our LNG business unit. Drilling fluids are recycled or transported

to a third party disposal facility. During sump rehabilitation, the residual solids are characterised to ascertain the most appropriate disposal method.

**Related topics**

[Environment](#)

**Detailed response**

Waste from drilling activities conducted by Origin's Exploration & Production and LNG business units consists of naturally occurring clays and rock removed during the drilling process, as well as spent drilling fluids and mud used to assist the drilling process.

	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Drill Muds and Cuttings (tonnes)	19,249.9	11,159.1	15,611.7	7,494.1	19,813.0

In FY 2014, Origin produced and disposed of 19,813 tonnes of drilling muds and cuttings. The quantity of drilling waste varies based on the nature and extent of Origin's drilling program. The bulk of these activities occurred in the LNG business unit in FY 2014, reflecting an increase in the planned activities during the reporting period associated with the Australia Pacific LNG project.

Drilling by-products consisting of drilling fluids, mud, cuttings and cement returns are stored in sumps. During sump rehabilitation, the residual solids are characterised to ascertain the most appropriate disposal method.

Origin's response to the discovery of white asbestos (*chrysotile*) in a drilling mud product in March 2014 involved the temporary suspension of drilling operations, environmental sampling, expert analysis of potential health risks and setting up a health surveillance program. See the "[Rapid response to drilling mud incident](#)" case study on our website.

**COMPLIANCE**

**G4-EN29** Monetary value of significant fines and total number of non-monetary sanctions for, non-compliance with environmental laws and regulations.

**Response**

The Company's operations are subject to environmental regulation under Commonwealth, State and Territory legislation. The Company received a small number of fines totalling \$7,400. Appropriate remedial actions have been taken or are being undertaken in response to each issue.

**Related topics**

[Environment](#)

**ENVIRONMENTAL GRIEVANCE MECHANISM**

**G4-EN34** Number of grievances about environmental impacts filed, addressed, and resolved through formal grievance mechanisms.

**Overview**

In FY 2014, 127 grievances including those resulting in environmental impacts were filed, addressed, and resolved through formal grievance mechanisms.

**Related Material Aspect**

[Impacts on communities](#)

**Related topics**

[Environment](#)

**Detailed response**

In FY 2014, 127 grievances including those resulting in environmental impacts were filed, addressed, and resolved through formal grievance mechanisms.

Complaints relate to traffic, noise, land erosion, weeds and rehabilitation, odour and dust emissions.

Energy Markets received complaints relating to noise emissions from generation plants as well as LPG transport related concerns.

All grievances, complaints and concerns are treated seriously and with due respect. Wherever possible, contact is made with the person(s) raising the concern, and Origin works actively with the community members to ensure issues are addressed in a timely manner. Some complaints received late in the 2014 financial year may not have been closed out by the end of the reporting period.

**FY 2014 Environmental Complaints by Business Unit**

