

2020 ANNUAL RESERVES REPORT

For the year ended 30 June 2020

1. RESERVES AND RESOURCES

This *Annual Reserves Report* provides an update on the reserves and resources of Origin Energy Limited (Origin) and its share of Australia Pacific LNG Pty Limited (APLNG), as at 30 June 2020.

1.1 Highlights

APLNG (Origin 37.5 per cent share)

- Strong field performance resulted in an increase in reserves in operated areas. This enabled a decision to not participate in some low value non-operated fields. During FY2020, APLNG also delivered record production. A detailed breakdown of movements in Origin's share of APLNG 2P (proved plus probable) reserves is as follows:
 - 119 PJ upward revision of operated 2P reserves reflecting strong field performance and maturation of resources to reserves;
 - 48 PJ increase in operated 2P reserves due to the acquisition of Ironbark from Origin;
 - 104 PJ reduction in non-operated 2P reserves due to a decision to not participate in certain non-operated field developments (-149 PJ), balanced against a 45 PJ reserves increase in other non-operated areas.
 - 265 PJ of production (an increase of 4 per cent on 2019) and underpinned by improved operated and non-operated field performance. This was due to higher well availability and facility reliability as well as commissioning of the Eurombah Reedy Creek Interconnect pipeline, which improved utilisation of processing capacity;
- Excluding net reductions in non-operated developments, APLNG appraisal and development drilling, along with development feasibility assessment, has resulted in 2P reserves replacement of 90% of production in operated fields over the last three years.
- Origin's share of 1P (proved) reserves has continued to grow, with an increase of 10 per cent or 270 PJ before production as a result of development drilling. After taking into account production, 1P reserves increased 5 PJ to 2,769 PJ. 1P reserves represent 61 per cent of total 3P (proved plus probable plus possible) reserves as at 30 June 2020.
- APLNG also continues to mature its strong resource base with further exploration and appraisal activities, as well as technology trials and a continued focus on reducing operating and capital costs.

Origin (excluding share of APLNG)

- A 129 PJ decrease in other 2P reserves reflects the sale of Ironbark assets to APLNG on 5 August 2019. Ironbark reserves and resources are included within APLNG reserves at 30 June 2020, of which Origin owns 37.5 per cent.

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1.2 2P reserves (Origin share)

2P reserves decreased by 331 PJ (after production) to a total of 4,268 PJ, compared to 30 June 2019.

Origin 2P reserves by area

2P reserves by area (PJ)	2P 30/06/2019	Acquisition/ divestment	New booking /discovery	Revisions/ extensions	Production	2P 30/06/2020
Australia Pacific LNG	4,470	48	-	15	(265)	4,268
Surat/Bowen (unconventional)						
- Spring Gully & Denison asset	733	-	-	(70)	(39)	624
- Condabri, Talinga & Orana asset	1,405	48	-	59	(101)	1,411
- Reedy Creek, Combabula & Peat asset	1,475	-	-	131	(63)	1,542
- Non-operated assets	857	-	-	(104)	(62)	691
Other						
Ironbark (unconventional)	129	(129)	-	-	-	-
Total	4,599	(81)	-	15	(265)	4,268

Summary of 2P reserves movement - key changes include:

- 265 PJ decrease due to production;
 - net 81 PJ decrease due to the divestment of Ironbark by Origin to APLNG;
 - 119 PJ net positive revision in operated areas, reflecting:
 - o improved understanding of field behaviour, which resulted in an increase in estimated recovery from producing fields in Combabula, Condabri, Talinga and Orana, partially offset by a decrease in Spring Gully; and
 - o the inclusion of new areas to reserves including the Peat Flank asset (within Reedy Creek, Combabula and Peat) following successful appraisal activities; and
 - 104 PJ reduction in non-operated areas primarily due to the decision by APLNG to not participate in certain future field developments (149 PJ), offset by modest increases in reserves from other non-operated areas (45 PJ).
- As at 30 June 2020, developed 2P reserves represented 58 per cent of total 2P reserves.
 - As at 30 June 2020, 100 per cent of Origin's share of 2P reserves are unconventional gas.

Origin 2P reserves by development type

2P reserves by development type (PJ)	Total 2P		Total 2P 30/06/2019	Total 2P		Total 2P 30/06/2020
	Developed	Undeveloped		Developed	Undeveloped	
Australia Pacific LNG	2,386	2,084	4,470	2,488	1,780	4,268
Surat/Bowen (unconventional)						
- Spring Gully & Denison asset	496	238	733	442	182	624
- Condabri, Talinga & Orana asset	935	469	1,405	976	435	1,411
- Reedy Creek, Combabula & Peat asset	577	898	1,475	676	866	1,542
- Non-operated assets	378	479	857	394	297	691
Other						
Ironbark (unconventional)	-	129	129	-	-	-
Total	2,386	2,213	4,599	2,488	1,780	4,268

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1.3 1P reserves (Origin share)

1P reserves increased by 270 PJ or 10 per cent (before production) and increased by 5 PJ after production to 2,769 PJ, when compared to 30 June 2019, due to development drilling.

As at 30 June 2020, developed 1P reserves represented 89 per cent of total 1P reserves. The remaining 11 per cent of 1P reserves represents wells that have been spudded but not connected and planned wells that are immediately adjacent to drilled wells. 100 per cent of 1P reserves are unconventional gas.

Origin 1P reserves by area

1P reserves by area (PJ)	1P 30/06/2019	Acquisition/ divestment	New booking /discovery	Revisions/ extensions	Production	1P 30/06/2020
Australia Pacific LNG	2,764	-	-	270	(265)	2,769
Surat/Bowen (unconventional)						
- Spring Gully & Denison asset	545	-	-	(49)	(39)	456
- Condabri, Talinga & Orana asset	967	-	-	160	(101)	1,026
- Reedy Creek, Combabula & Peat asset	651	-	-	173	(63)	761
- Non-operated assets	601	-	-	(14)	(62)	526
Other						
Ironbark (unconventional)	-	-	-	-	-	-
Total	2,764	-	-	270	(265)	2,769

Origin 1P Reserves by development type

1P reserves by development type (PJ)	Total 1P		30/06/2019	Total 1P		30/06/2020
	Developed	Undeveloped		Developed	Undeveloped	
Australia Pacific LNG	2,370	394	2,764	2,478	291	2,769
Surat/Bowen (unconventional)						
- Spring Gully & Denison asset	496	49	545	442	14	456
- Condabri, Talinga & Orana asset	935	32	967	975	51	1,026
- Reedy Creek, Combabula & Peat asset	577	74	651	674	87	761
- Non-operated assets	363	239	601	387	139	526
Other						
Ironbark (unconventional)	-	-	-	-	-	-
Total	2,370	394	2,764	2,478	291	2,769

1.4 2C Contingent Resources for Origin Energy

Beetaloo Basin

A material contingent resource announcement of 6.6 Tscf (gross) or 2.3 Tscf (net) for the Beetaloo Basin was provided on 15 February 2017 to the ASX:

<https://www.asx.com.au/asxpdf/20170215/pdf/43g0qhh87j71bb.pdf>

Origin increased its interest in the Beetaloo Joint Venture to 70 per cent in May 2017 by acquiring Sasol's 35 per cent share:

<https://www.asx.com.au/asxpdf/20170505/pdf/43j1ss71xqbxtc.pdf>

During FY2020 Origin further increased its interest in the Beetaloo Joint Venture to 77.5 per cent by acquiring 7.5 per cent of the interest owned by Falcon Oil and Gas:

<https://www.asx.com.au/asxpdf/20200407/pdf/44gs08yfdwfrjp.pdf>

Refer to the Operating and Financial Review, released on the same date as this report for details of the current status of the our Beetaloo Basin asset.

Appendix A: APLNG reserves and resources

Origin, as APLNG Upstream Operator, has prepared estimates of the reserves and resources held by APLNG for Operated Assets which are detailed in this report.

Netherland, Sewell & Associates, Inc. (NSAI) has prepared a consolidated report of the reserves and resources held by APLNG for non-operated assets. The reserves and resources estimates for the non-operated properties in their report have been independently estimated by NSAI.

The tables below provide 1P, 2P and 3P reserves and 2C resources for APLNG (100 per cent) and Origin's 37.5 per cent interest in these APLNG (operated and non-operated) reserves and resources.

Reserves and resources held by APLNG (100 per cent share)

Reserves / Resource classification	30/06/2019	Acquisition/ divestment	New booking /discovery	Revisions/ extensions	Production	30/06/2020
1P (proven)	7,372	-	-	719	(708)	7,384
2P (proven plus probable)	11,920	129	-	40	(708)	11,381
3P (proven plus probable plus possible)	12,820	192	-	(234)	(708)	12,071
2C (best estimate contingent resource)	3,107	497	-	375	-	3,980

Reserves and resources held by Origin (37.5 per cent in APLNG)

Reserves / Resource classification	30/06/2019	Acquisition/ divestment	New booking /discovery	Revisions/ extensions	Production	30/06/2020
1P (proven)	2,764	-	-	270	(265)	2,769
2P (proven plus probable)	4,470	48	-	15	(265)	4,268
3P (proven plus probable plus possible)	4,808	72	-	(88)	(265)	4,526
2C (best estimate contingent resource)	1,165	187	-	141	-	1,493

See details above for movements in 1P and 2P reserves.

The 234 PJ decrease in APLNG (100 per cent share) 3P reserves excluding production is due to decisions to not participate in some non-operated field developments (-441 PJ), partially offset by improved understanding of estimated recovery in other producing areas.

The 873 PJ increase in APLNG (100 per cent share) 2C resources is primarily due to the acquisition of Ironbark and the decision to not participate in some non-operated field developments. A number of appraisal activities are presently ongoing that if successful would convert some further resources to reserves.

Appendix B: Notes relating to this report

a. Methodology regarding reserves and resources

The Reserves Report has been prepared to be consistent with the Petroleum Resources Management System (PRMS) 2018 published by Society of Petroleum Engineers (SPE). This document may be downloaded from the SPE website: <https://www.spe.org/en/industry/reserves/>. Additionally, this Reserves Report has been prepared to be consistent with the ASX reporting guidelines. For all assets Origin reports reserves and resources consistent with SPE guidelines as follows: proved reserves (1P); proved plus probable reserves (2P); proved plus probable plus possible reserves (3P); best estimate contingent resource (2C). Reserves must be discovered, recoverable, commercial and remaining.

The CSG reserves and resources held within APLNG's properties have either been independently prepared by NSAI or prepared by Origin. The reserves and resources estimates contained in this report have been prepared in accordance with the standards, definitions and guidelines contained within the Petroleum Resources Management System (PRMS) and generally accepted petroleum engineering and evaluation principles as set out in the SPE Reserves Auditing Standards.

Origin does not intend to report Prospective or Undiscovered Resources as defined by the SPE in any of its areas of interest on an ongoing basis.

b. Economic test for reserves

The assessment of reserves requires a commercial test to establish that reserves can be economically recovered. Within the commercial test, operating cost and capital cost estimates are combined with fiscal regimes and product pricing to confirm the economic viability of producing the reserves.

Gas reserves are assessed against existing contractual arrangements, local market conditions, as appropriate. In the case of gas reserves where contracts are not in place a forward price scenario based on monetisation of the reserves through domestic markets has been used, including power generation opportunities, direct sales to LNG and other end users and utilisation of Origin's wholesale and retail channels to market.

For CSG reserves that are intended to supply the APLNG CSG to LNG project, the economic test is based on a weighted average price across domestic, spot and LNG contracts, less short run marginal costs for downstream transport and processing. This price is exposed to changes in the supply/demand balance in the market through oil price-linked LNG contracts.

c. Reversionary rights

The CSG interests that Australia Pacific LNG acquired from Tri-Star in 2002 are subject to reversionary rights. If triggered, these rights will require Australia Pacific LNG to transfer back to Tri-Star a 45 per cent interest in those CSG interests for no additional consideration. Origin has assessed the potential impact of these reversionary rights based on economic tests consistent with the reserves and resources referable to the CSG interests and based on that assessment does not consider that the existence of these reversionary rights impacts the reserves and resources quoted in this report. Tri-Star has commenced proceedings against Australia Pacific LNG claiming that reversion has occurred. Australia Pacific LNG denies that reversion has occurred and is defending the claim.¹

d. Information regarding the preparation of this Reserves Report

The CSG reserves and resources held within APLNG's properties have either been independently prepared by NSAI or prepared by Origin. All assessments are based on technical, commercial and operational data provided by Origin on behalf of APLNG.

The statements in this Report relating to reserves and resources as of 30 June 2020 for APLNG's interests in Non-Operated assets are based on information in the NSAI report dated 4th August 2020. The data has been compiled by Mr. John Hattner, a full-time employee of NSAI. Mr. John Hattner has consented to the statements based on this information, and to the form and context in which these statements appear.

The statements in this Report relating to reserves and resources for other assets are based on, and fairly represents, information and supporting documentation prepared by, or under the supervision of qualified petroleum reserves and resource evaluators who are employees of Origin.

This Reserves Statement as a whole has been approved by Mr Simon Smith FIEAust CPEng NER RPEQ, who is a full-time employee of Origin. Mr Simon Smith is Chief Petroleum Engineer, a Qualified Petroleum Reserves and Resources Evaluator, a member of the Society of Petroleum Engineers and has consented to the form and context in which these statements appear.

¹ Refer to section 7 of the Operating and Financial Review released to the ASX on 20 August 2020 for further information.

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e. Rounding

Information on reserves is quoted in this report rounded to the nearest whole number. Some totals in tables in this report may not add due to rounding. Items that round to zero are represented by the number 0, while items that are actually zero are represented with a dash “-”.

f. Abbreviations

bbl	barrel
Tscf	trillion standard cubic feet
CSG	coal seam gas
kbbbls	kilo barrels = 1,000 barrels
ktonnes	kilo tonnes = 1,000 tonnes
mmbobe	million barrels of oil equivalent
PJ	petajoule = 1×10^{15} joules
PJe	petajoule equivalent

g. Conversion factors for PJe

CSG	1.038 PJ/Bscf
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h. Reference point

Reference points for Origin’s petroleum reserves and contingent resources are defined points within Origin’s operations where normal exploration and production business ceases, and quantities of the produced product are measured under defined conditions prior to custody transfer. Fuel, flare and vent consumed to the reference points are excluded.

i. Preparing and aggregating petroleum resources

Petroleum reserves and contingent resources are typically prepared by deterministic methods with support from probabilistic methods. Petroleum reserves and contingent resources are aggregated by arithmetic summation by category and as a result, proved reserves may be a conservative estimate due to the portfolio effects of the arithmetic summation. Proved plus probable plus possible may be an optimistic estimate due to the same aforementioned reasons.

j. Methodology and internal controls

The reserves estimates undergo an assurance process to ensure that they are technically reasonable given the available data and have been prepared according to our reserves and resources process, which includes adherence to the PRMS Guidelines. The assurance process includes peer reviews of the technical and commercial assumptions. The annual reserves report is reviewed by management with the appropriate technical expertise, including the Chief Petroleum Engineer and Integrated Gas General Managers.