



INDUSTRY SNAPSHOT

SHARED LANDSCAPES

APRIL 2021



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- Queensland Resources Council
- Queensland Treasury
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- Trade and Investment Queensland

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INTRODUCTION

Queensland has a long and pioneering history with natural gas.

The onshore gas industry has been a part of Queensland's landscape since the first natural gas field was discovered by accident in Roma in 1900, with natural gas rising from a well that was being drilled for water. Commercial petroleum and gas operations were not developed until the 1960s in the Cooper Basin and Moonie oil fields.

While the conventional gas industry has matured, the process of converting coal seam gas (CSG) to liquefied natural gas (LNG) was realised in 2014 with the first export cargo from the Curtis Island LNG facilities in Gladstone. This shipment marked a world first of converting CSG into LNG, opening Queensland gas resources to global export markets.

Queensland CSG is primarily produced from coal measures in the Surat and Bowen basins. CSG had been produced for a number of years supplying the east coast gas market, however to meet export demand the intensity of development exceeded anything that had been experienced to date. As the process of converting CSG to LNG was a world first, the full field development scenarios were based on modelling assumptions and learnings from established domestic projects. These scenarios included the drilling of thousands of wells and the construction of infield gas infrastructure. The agricultural producers in the Surat and Bowen basins had serious concerns regarding the gas industry's surface impacts on established farming operations, including potential impacts to groundwater aquifers in water-stressed areas, as well as social and economic challenges¹.

Current research now suggests that community attitudes towards CSG activity/development within rural areas is gradually improving, however numerous opportunities for increasing acceptance, building trust, and cultivating sustainable coexistence remain.

This Shared Landscapes – Industry Snapshot Report describes the state of Queensland's petroleum and gas industry as of end of Financial Year 2020 (FY20) and is part of GasFields Commission Queensland's (the Commission) function to obtain and publish information that can assist landholders and regional communities increase their knowledge and understanding of the onshore gas industry in Queensland. This report aims to briefly delineate the current state of the petroleum and gas industry, including development areas, groundwater management processes, compliance and the economic contributions made to regional communities and the State.

The Commission's purpose is to manage and improve the sustainable coexistence of landholders, regional communities and the onshore gas industry in Queensland. Drawing on its wealth of experience in the development of the gas industry, and by collaborating with other relevant entities, the Commission provides a range of support to landholders and communities, primarily through education and engagement activities. Another way the Commission works to realise its purpose is by providing transparency and independent assurances that the onshore gas industry is being appropriately regulated and held to account when needed.

It should be noted that the Commission does not engage in individual negotiations between landholders and resource companies, but rather provides communities and landholders with the information and support they need to make informed decisions and achieve good outcomes.

¹ An overview of the coal seam gas developments in Queensland – Journal of Natural Gas Science and Engineering





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1 QUEENSLAND'S PETROLEUM & GAS INDUSTRY



173M
hectares (ha) is the **total land area** of Queensland



4,504
Conduct and Compensation Agreements (CCA) were in place in Queensland in FY20, with more than **\$702 million paid in total cumulative compensation**

As of 30 June 2020:



3.6M ha
(2.1%) of Queensland is currently **under granted petroleum production licence (PL)**



12,331 km
of **petroleum pipeline licences (PPLs)** that have been constructed and are in operation



16M ha
(9.5%) of Queensland is under **granted authority to prospect exploration tenure (ATP)**



810,300 ha
of petroleum and gas tenures granted **must supply the Australian domestic gas market**

30%

of **Western Downs Regional Council** is under PL*

CSG and petroleum well footprint covers **0.16% of land surface**

23%

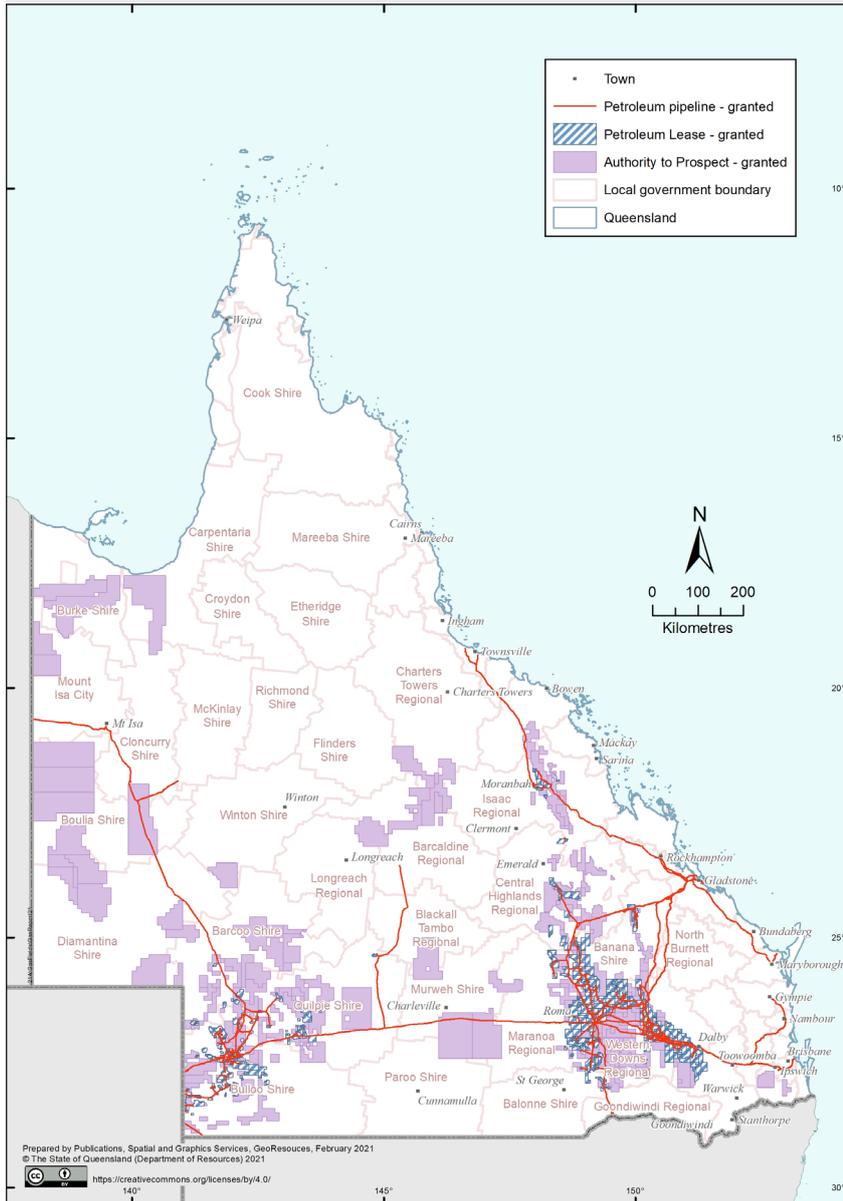
of **Maranoa Regional Council** is under PL*

CSG and petroleum well footprint covers **0.05% of land surface**

*granted and under application

The total land area of Queensland is approximately 173 million ha (1.73 million km²).

Approximately 3.6 million ha of Queensland is currently under petroleum lease (PL) production tenure, and 16 million ha of Queensland is under an authority to prospect (ATP) exploration tenure. The combined area covered by these tenures represents approximately 11.5% of Queensland, but the actual surface footprint of petroleum and gas development activities covers a much smaller area.



- As of 30 June 2020, around 800,000 ha of petroleum and gas tenures granted have a condition attached² whereby the gas produced must be supplied to the Australian domestic gas market; a condition introduced in 2016 to secure gas supply to the east coast gas market and for the manufacturing industry.

- Currently, Queensland has approximately 12,331 km of petroleum pipeline licences (PPLs) that have been constructed and are in operation, with another 42 km in the application stage. Pipeline coverage was expected to reach 12,815 km during FY20, but a collaborative arrangement between QGC and Arrow Energy resulted in the surrender of the planned 530 km Surat Gladstone Pipeline PPL. This pipeline will no longer be constructed.

- Currently, 29 local government areas (LGAs) have granted ATPs while 11 have granted PLs.

Figure 1. Coverage of land area in Queensland as defined by granted exploration tenures (ATPs), petroleum leases (PLs) and petroleum pipeline licences (PPLs) as of 30 June 2020. Source: Department of Resources.

² Petroleum and Gas (Production and Safety) Act 2004 – Part 2A, Prospective Gas Production Land Reserve, Section 175A

Table 1. Land area under petroleum and gas tenures (as of 30 June 2020).

Tenure type and status	Area (ha)	Area (km ²)	% of Queensland area
ATP granted	16,398,563	163,986	9.5%
ATP application	4,653,102	46,531	2.7%
PL granted	3,572,527	35,725	2.1%
PL application	891,064	8,911	0.5%
Total granted ATP and PL*	19,941,322	199,413	11.5%

* Total granted tenure area less than sum due to overlapping tenures.

Note: Areas calculated using Albers Equal Area with a Central Meridian of 146° and Standard Parallels of -14° and -26°.

Source: Department of Resources.

Maranoa and Western Downs LGAs in the Surat Basin host the majority of Queensland's CSG activities, whereas Bulloo, Barcoo and Quilpie LGAs host the majority of the activities associated with the Cooper Basin's petroleum developments. As the emerging areas develop further, increased activity can be expected in the Banana, Central Highlands, and Isaac LGAs (see *Emerging Areas of Petroleum & Gas Development*).

The terms conventional and unconventional refer to the techniques and technologies required to extract the gas from host rocks. Conventional resources are extracted using traditional methods,

drilling wells directly into a subsurface reservoir where oil and gas is trapped in a geological structure. Unconventional resources are those that require greater than industry-standard levels of technology or investment to extract.

 **FOR MORE INFORMATION**
For more information about unconventional gas and CSG, visit CSIRO's [What is unconventional gas? webpage](#).

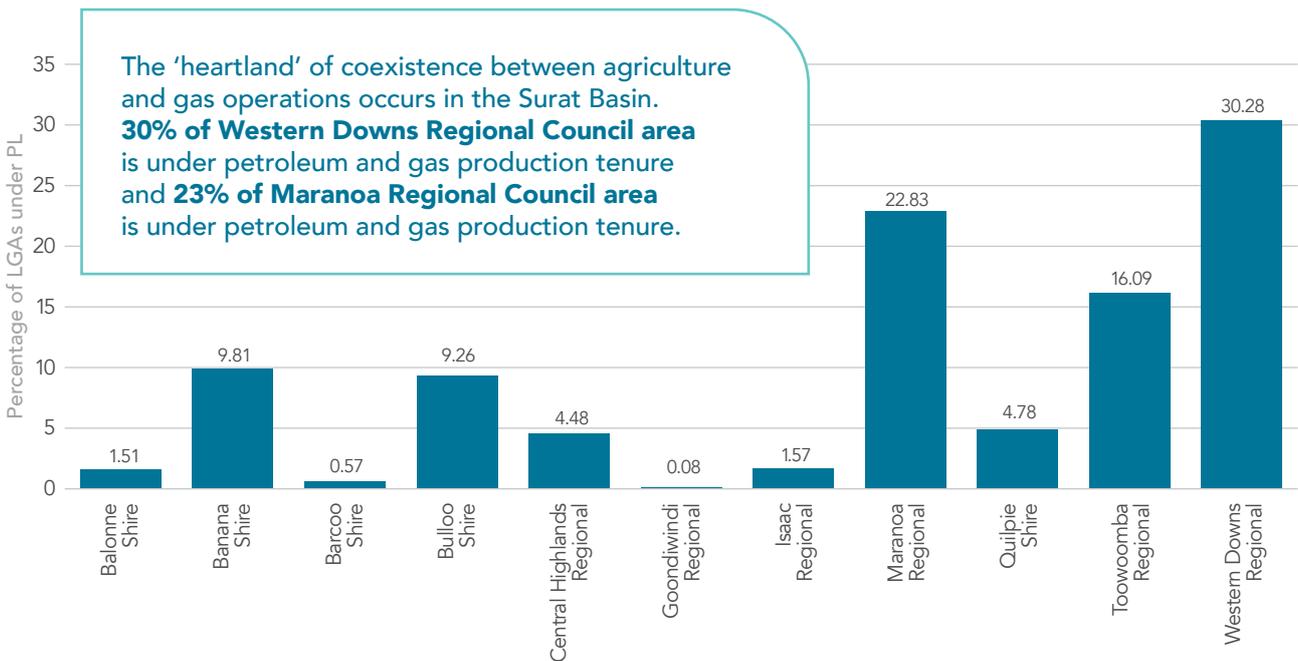


Figure 2. Percentage of LGAs under PL (granted and under application) as of 30 June 2020.

Source: Department of Resources.

Industry Footprint

The actual footprint of gas industry activity and infrastructure is much smaller than the area under PL or ATP due to resource companies concentrating their production in certain areas. Infrastructure is built to expand into new regions before production activity progresses into that region; it includes high-pressure pipelines and low-pressure gathering pipelines, field compression stations, water treatment and gas processing facilities, storage facilities and well pads.



Pipelines

For safety reasons all pipelines (large-diameter, high-pressure transmission pipelines and gathering lines that transport gas over long distances) are positioned underground. Only under certain circumstances will sections of pipeline be positioned above ground (such as for ongoing maintenance purposes).



Well pads

Well pads are typically comprised of well heads, separator, and compressors (this varies amongst resource companies). Well pads are easily visible due to their positioning on a cleared area, typically measuring 100 m x 100 m in size³ during drilling operations. For the purpose of this report, the well footprint refers to the area directly under a well pad.

CSG and petroleum well footprint only covers approximately 0.16% of land surface in the Western Downs area (where there is an average of 1.6 wells per 1,000 ha). The density is even lower in the Maranoa LGA, where there is an average of less than one well per 1,000 ha (see Table 2).

Table 2. Total number of petroleum and gas wells and percentage (%) well footprint for selected LGAs.

Local Government Area (LGA)	LGA area (ha)	Total number of wells*	Area of well pads (ha)**	% Well footprint over LGA
Maranoa Regional	5,870,936	2,782	2,782	0.05%
Western Downs Regional	3,794,274	6,079	6,079	0.16%
Banana Shire	2,854,908	810	810	0.03%
Central Highlands Regional	5,983,575	357	357	0.01%

* Wells include CSG and petroleum wells only (including exploration, appraisal and development wells), that have not been decommissioned.

** Well pads are typically 1 to 1.5 ha in area and provide the working area for drilling operations (GISERA, 2018), with most being closer to 1 ha. 1 ha is used here for simplicity. A well pad footprint is generally smaller once a well is constructed and in production.

NB: This does not include the footprint of associated infrastructure, e.g. pipelines, gas treatment plants, water treatment plants, water storage dams, access roads etc.

Source: Queensland Government's Open Data Portal (downloaded November 2020).

³ See page 61 of 'Gas Guide 2.0 – Full edition' (<https://www.gfcq.org.au/gasguide>) – Types of gas wells and well pads

Production Areas

Development and production areas are not static – they continuously change based on factors that influence resource companies' development scenarios (e.g. market demand, production performance, resource quality, capital investment).

Based on October 2020 data, the Office of Groundwater Impact Assessment (OGIA) reported the planned development area in the Surat Cumulative Management Area (Surat CMA) had expanded by approximately 7% when compared to the 2018 development scenarios, reported in May 2019 (see Figure 3). The expansion of the production area is primarily driven by an increase in planned production in the Roma and Arcadia fields operated by Santos.

APLNG and QGC production areas are essentially unchanged, while the Arrow Energy production area is slightly smaller than planned.

Whilst in the long-term it is expected there will be an increase in planned production areas, in the short term there has been a slowdown in development. This is likely to be in response to factors resulting from the COVID-19 pandemic and global market conditions.

INSIGHTS

For the purpose of groundwater impact assessment, OGIA compiles the changes to development profile within the Surat CMA on an annual basis and then uses this information to predict impacts and provide relevant commentary on changes. The most recent compilation from OGIA is reported in their Annual Report 2020⁴.

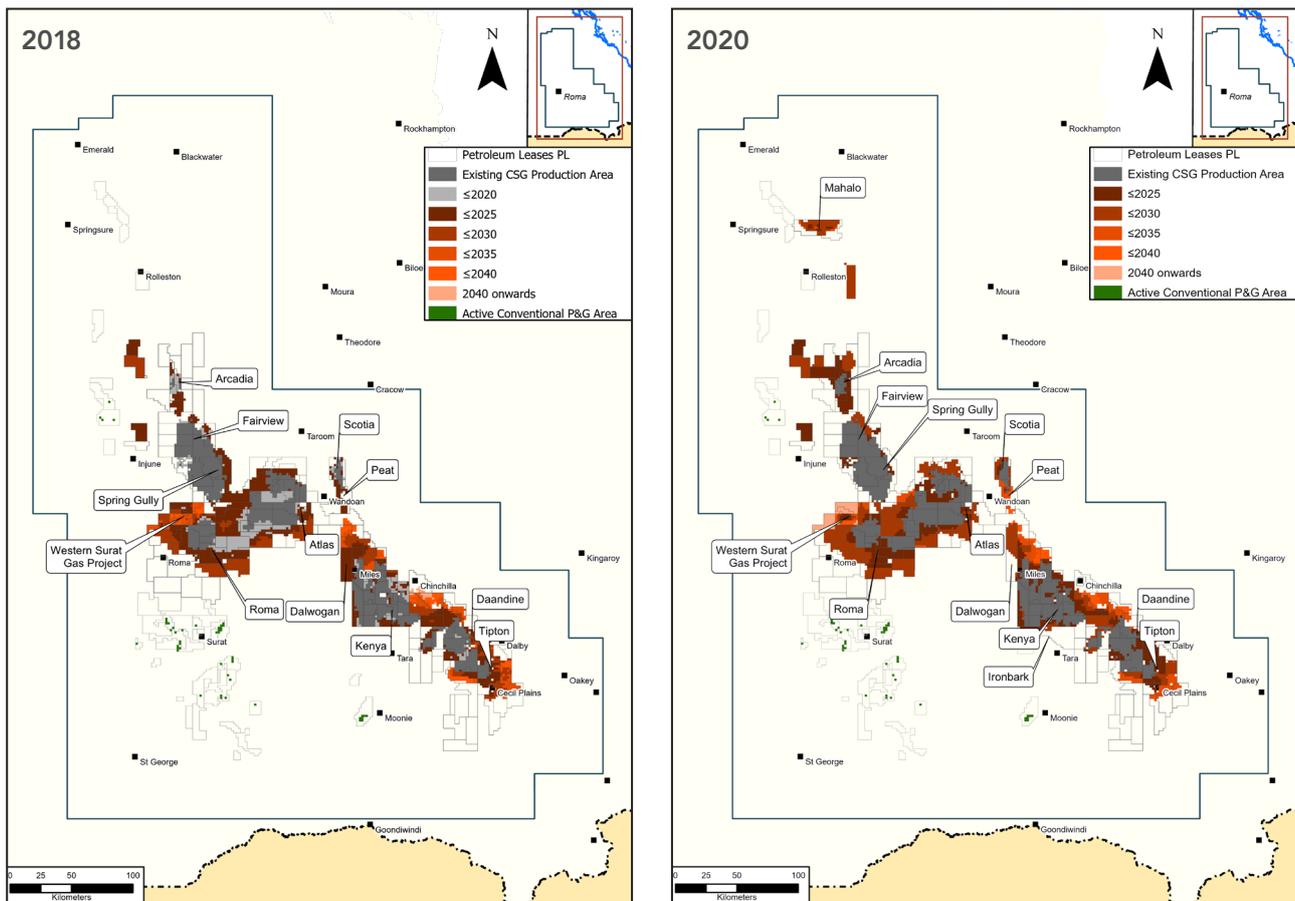


Figure 3. CSG development comparison between 2018 and 2020 within the Surat CMA.
Source: Office of Groundwater Impact Assessment.⁵

4 Office of Groundwater Impact Assessment 2020 – Annual Report 2020 for the Surat Underground Water Impact Report 2019. OGIA, Brisbane

5 Office of Groundwater Impact Assessment 2020 – Page 4 of Annual Report 2020 for the Surat Underground Water Impact Report 2019. OGIA, Brisbane

Outside the Surat CMA, production areas become less intensive. The density of development is different between conventional and unconventional field developments (see Figure 4), as unconventional resource production typically requires more wells to extract the resource.

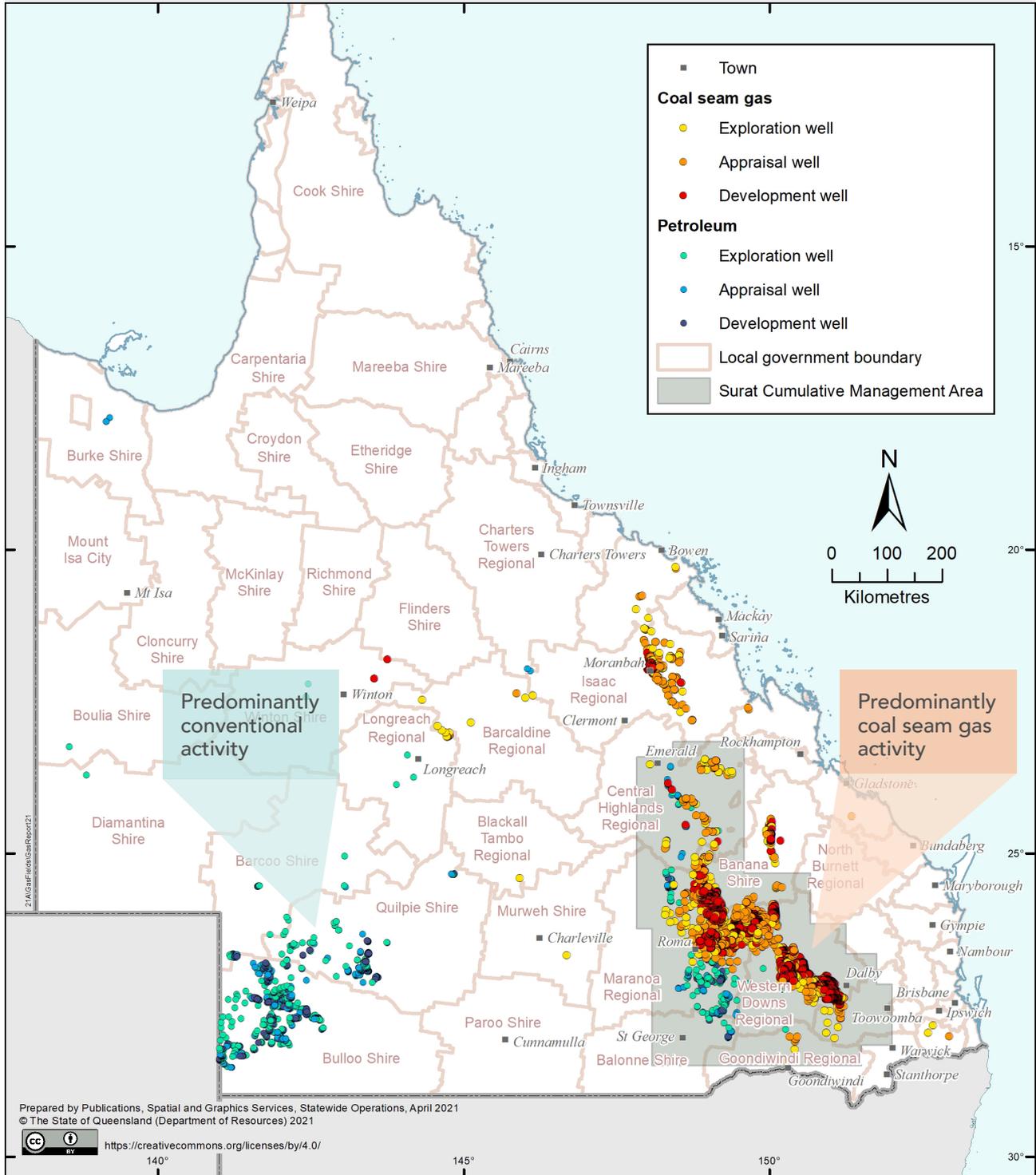


Figure 4. The predominance of conventional activity in the west of Queensland compared to CSG activity in the east. *Source: Department of Resources.*

Note: Wells plotted include CSG and petroleum wells only (including exploration, appraisal and development wells), that are operational (producing or capped/suspended/shut-in).

Land Access and Compensation

Under Queensland's land access laws, resource companies have the right to access and undertake petroleum and gas activities on a landholder's property, provided that all legal requirements are complied with.

The legal requirements depend on the type of activities that are to be carried out on the landholder's property⁶.

A CCA⁷, Deferral or Opt-out agreement is required for any advanced activities. These are legally binding documents that specify the company's activities and behaviours, respective obligations and protections. A CCA (the most commonly used agreement) also ensures the landholder is compensated for the effects and impacts of the advanced activities.

All CCAs are registered on the property's land title. If a property is sold, any registered CCAs are transferred with it.

As of 30 June 2020, a total of 4,504 CCAs were in place in Queensland, with more than \$702 million paid in total cumulative compensation. During

FY20 alone, approximately \$104.9 million in compensation was paid. Approximately 11 CCA negotiations were referred to alternative dispute resolution (ADR). None involved Land Court proceedings (not including arbitration or mediation)⁸.

It is not possible to calculate an indicative individual CCA value based on this data as:

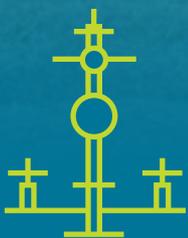
- every property, land value, business operation and profitability is different
- the type and extent of company activity on each property, and impact to a landholder's operations is different
- the total number of CCAs include agreements that are signed before the commencement of company activities, and payments are not yet due
- apportionment of payments vary significantly between agreements, from a large proportion of total compensation paid up front to annual compensation payments over the life of the agreement.



6 Page 18 of 'Gas Guide 2.0 – Full edition' (<https://www.gfcq.org.au/gasguide>) – Engagement Phase
 7 Page 34 of 'Gas Guide 2.0 – Full edition' (<https://www.gfcq.org.au/gasguide>) – Land Access Agreements
 8 M. Paull, 'Data' [email to W. Squire], 20 April 2021, <mpaull@appea.com.au>, (accessed 20 April 2021)

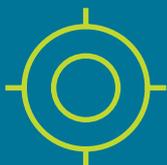


2 CSG & PETROLEUM WELLS



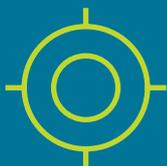
15,890

CSG and petroleum wells had been drilled in Queensland as of 30 June 2020



12,356

targeted CSG with a total of 8,314 CSG wells currently producing in Queensland



3,534

targeted conventional and other unconventional resources



In total, approximately

22,000

wells projected to be drilled by 2050

975

petroleum and CSG wells were drilled in Queensland in FY20

12% of the 912 CSG wells drilled were hydraulically fractured

41% of the 63 petroleum wells drilled were hydraulically fractured



The majority of wells hydraulically fractured during FY20 occurred in the Banana, Central Highlands, Maranoa and Bulloo Shire LGAs

The infrastructure associated with wells and well pads present the greatest surface disturbance.

As of 30 June 2020, a total of 15,890 CSG and petroleum wells had been drilled in Queensland (across all tenure types) since records began in the 1960s. Of these:

- **12,356 target CSG** with 96% of these located within the Bowen and Surat basins, with the remainder (514 wells) found in other basins
- **3,534 target conventional and other unconventional resources (non-CSG)** with 51% of these located in the Cooper-Eromanga basins; 44% in Bowen-Surat basins, and 5% located in other basins.

In FY20 alone, there were 975 petroleum and CSG wells drilled in Queensland⁹.

INSIGHTS

It is important to note that at any point in time not all wells that have been drilled are in production. Some wells have been decommissioned (plugged and abandoned), some have been repurposed (converted into water bores, reinjection wells, or monitoring bores) while others are capped/shut-in/suspended¹⁰.

Therefore, at any given time the total number of producing wells is far fewer than the total number of wells drilled.

The data presented below reflects the status of each well as it was entered into the Geological Survey of Queensland's (GSQ) database. A resource company can bring capped/shut-in/suspended wells back into production, or cap, shut-in or suspend producing wells at any time without notifying the Department of Resources (DoR). Therefore, the term 'operational' in Table 3 encompasses those that are in production and those that are classified as capped/shut-in/suspended.

LGA	Plugged and abandoned		Operational (producing and capped/shut-in/suspended)	
	CSG	Petroleum	CSG	Petroleum
Banana Shire	0	0	76	0
Bulloo Shire	0	11	0	44
Central Highlands Regional	0	0	48	1
Charters Towers Regional	0	0	0	2
Isaac Regional	0	0	12	0
Maranoa Regional	1	0	445	2
Quilpie Shire	0	0	0	3
Toowoomba Regional	0	0	13	0
Western Downs Regional	7	0	310	0
Total	8	11	904	52

Table 3. Number of wells drilled and their status in FY20 as grouped by LGAs (also see Figure 7). Source: Department of Resources.

⁹ Department of Resources

¹⁰ The status 'capped/shut-in/suspended' refers to wells that are on standby to come into production. It can also refer to producing wells that have been turned off. This can happen for a number reasons, e.g. waiting for a workover, uneconomic to produce, waiting for abandonment etc.

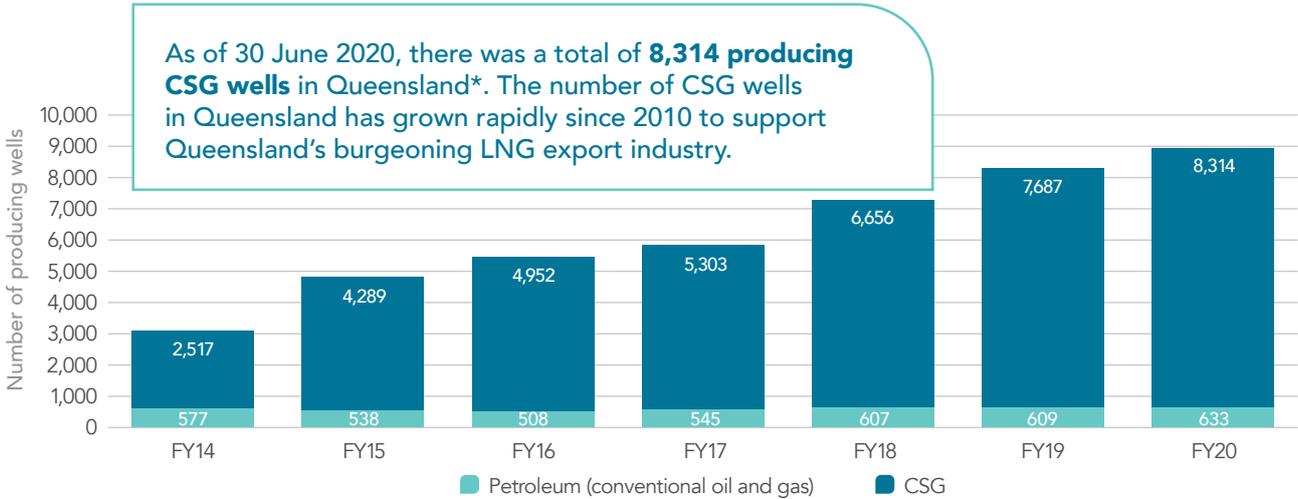


Figure 5. The growth in the number of producing CSG wells since FY14.

Source: Resources Safety and Health Queensland.

* Note: This is the number of petroleum and gas wells within petroleum leases that have produced petroleum and/or gas in each financial year and for which a safety and health fee was paid.

INSIGHTS

As technology has improved over the years, many changes have occurred, particularly in the time it takes to drill wells¹¹ and with resource companies adapting and introducing new practices to minimise the impacts and surface disturbance for landholders¹². These include the use of multi-well pads that allow multiple wells to be drilled on a pad¹³, co-location and grouping of infrastructure, negotiating with landholders to locate infrastructure in areas that will least affect their existing farming practices, and increasing use of constraints mapping.

Future Well Projections

With the increase in the net production area footprint in the Surat CMA (see *Production Areas*), the total number of projected wells has also increased slightly – from approximately 21,000 wells reported in May 2019, to approximately 22,000 wells by 2050¹⁴. Since 2012, when the gas fields increased production to supply the LNG facilities at Curtis Island, between 1,000 to 1,500 wells have been drilled and completed annually. This trend is forecast to continue until approximately 2023¹⁵.

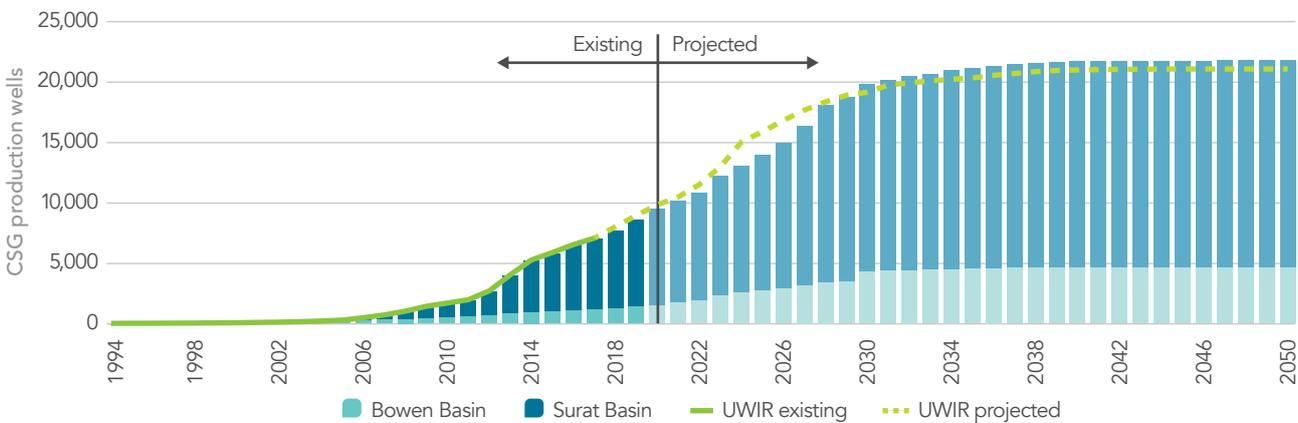


Figure 6. Existing and projected CSG wells to 2050. Source: Office of Groundwater Impact Assessment.

11 Page 63 of 'Gas Guide 2.0 – Full edition' (<https://www.gfcq.org.au/gasguide>) – Days development drilling

12 Page 65 of 'Gas Guide 2.0 – Full edition' (<https://www.gfcq.org.au/gasguide>) – Noise, light & dust

13 Page 63 of 'Gas Guide 2.0 – Full edition' (<https://www.gfcq.org.au/gasguide>) – Types of gas wells & well pads

14 Office of Groundwater Impact Assessment 2020 – Annual Report for the Surat Underground Water Impact Report 2019. OGIA, Brisbane

15 Office of Groundwater Impact Assessment 2019 – Underground Water Impact Report for the Surat Cumulative Management Area 2019. OGIA, Brisbane

Hydraulic Fracturing

The process of hydraulic fracturing (fracking or fracing) is used to stimulate gas production from geological formations with a low permeability.

Only a small fraction of wells drilled in Queensland are hydraulically fractured, as this process adds considerable expense to the cost of gas production. It is only undertaken when absolutely necessary based on challenging geological conditions.



INSIGHTS

The majority of petroleum and gas wells drilled during FY20 that were hydraulically fractured lie within Banana, Central Highlands, Maranoa and Bulloo Shire LGAs (see page 13).

Out of the total 975 CSG and petroleum wells drilled in FY20, 14% were hydraulically fractured. Overall, 12% of CSG wells drilled in Queensland during FY20 were hydraulically fractured. There were far fewer petroleum wells drilled during FY20, and 41% of those drilled were hydraulically fractured.

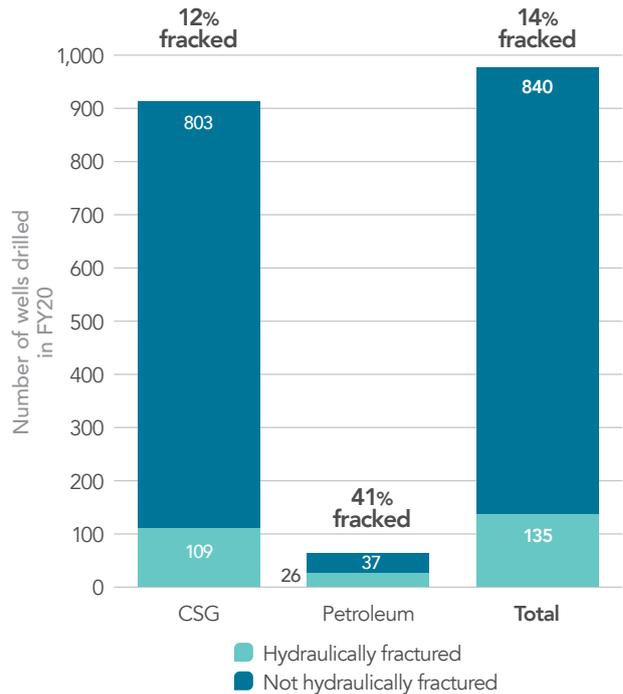
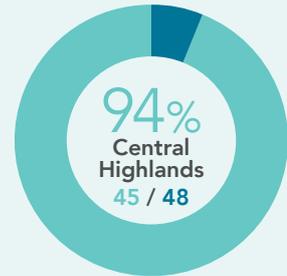
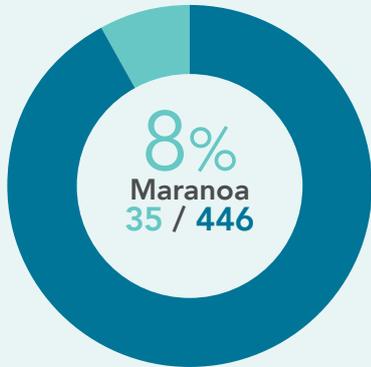


Figure 7. Total number of CSG and petroleum wells drilled and those that were hydraulically fractured* during FY20. Source: Department of Resources.

* This does not include the number of hydraulic fracturing events that occurred in wells drilled prior to this period.

Percentage of CSG wells drilled in FY20 that were hydraulically fractured

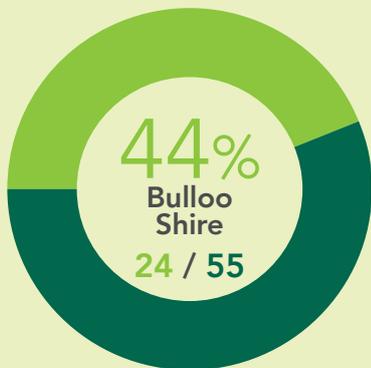


- CSG wells drilled in FY20
- CSG wells drilled AND hydraulically fractured in FY20

Nearly half of all CSG wells drilled in FY20 were in the Maranoa LGA, but only 8% of these were hydraulically fractured. During the same period, only 1% of wells drilled in the Western Downs LGA were hydraulically fractured.

In contrast, Central Highlands LGA accounted for only 5% of CSG wells drilled in FY20, with 94% of these being hydraulically fractured.

Percentage of petroleum wells drilled in FY20 that were hydraulically fractured



- Petroleum wells drilled in FY20
- Petroleum wells drilled AND hydraulically fractured in FY20

Hydraulic fracturing occurred in petroleum wells completed in the Cooper, Galilee and Bowen basins for those drilled during FY20 in these LGAs.

Far fewer petroleum wells were drilled during FY20, however a higher percentage were hydraulically fractured due to the geological formations.

Research

Hydraulic fracturing has been the subject of multiple government scientific reviews around Australia. Studies to date have indicated that the practice is safe and has minimal environmental impact. Australia's leading scientific agency, [CSIRO](#) has recently conducted an [independent review](#) and found there were no negative impacts from hydraulic fracturing in the wells that were included in the research. Furthermore, the current management process, existing regulation and industry operating standards adequately managed the risks.



3 GROUNDWATER TAKE & IMPACT MANAGEMENT



Groundwater take within the Surat CMA has decreased over the last year by

5,000 megalitres per year (ML/yr)

despite an increase in the net development footprint, and a marginal increase in well numbers



593 water bores

predicted to be impaired over the life of the CSG industry



Make Good Agreements have been successfully negotiated for

117 of the IAA bores



224 water bores

likely to be impaired by 2021 (immediately affected area [IAA] bores)



112 supplementary agreements

have been signed through proactive initiatives by some resource companies for bores not yet identified as IAA bores



369 water bores

predicted to be impaired over the life of the CSG industry (long-term affected area [LAA] bores)

Under Queensland’s current regulatory framework, resource companies have the right to extract groundwater as part of the process of extracting petroleum and gas.

Extracted groundwater is known as ‘produced water’ or ‘associated water’ and is treated and re-used for a variety of applications including farm irrigation, town water supply, reinjection into aquifers and various industrial applications.

Despite an increase in the net development footprint (see *Production Areas*), and a marginal increase in well numbers, the overall groundwater take within the Surat CMA has decreased over the last year by 5,000 ML/yr to its current level of 55,000 ML/yr¹⁶. This is reported to be due to:

- slower industry growth rate
- reduction in the extracted water over time from existing wells¹⁷
- infilling of new wells in areas where partial depressurisation has already occurred.

INSIGHTS

Resource companies operating outside the Surat CMA are required to submit an underground water impact report (UWIR) every three years, which includes an assessment of the water level decline in aquifers and any impacts to springs in both the long and short term. Within the Surat CMA, this responsibility rests with OGIA¹⁸. The UWIR does not detail the bores that have been impacted, but rather identifies bores accessing water from an aquifer that is predicted to experience an impact or drawdown of more than the trigger threshold.

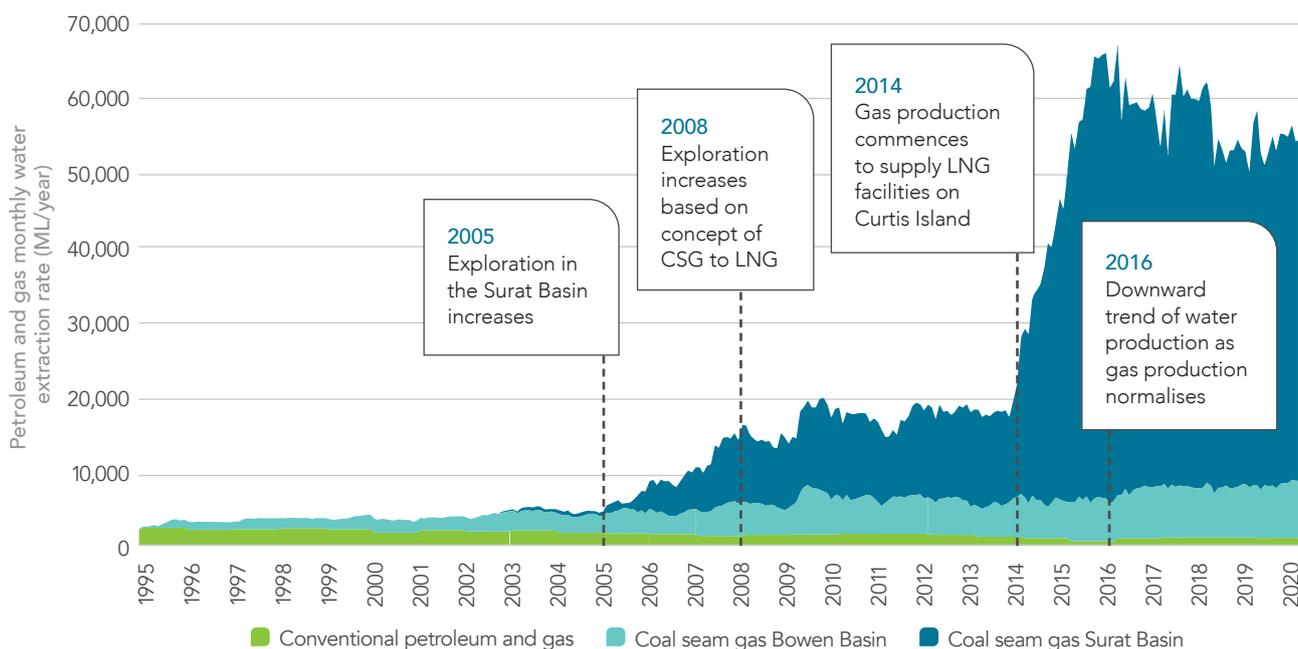


Figure 8. Petroleum and gas industry groundwater extraction rates within the Surat CMA.

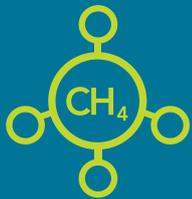
Source: Office of Groundwater Impact Assessment.

¹⁶ Office of Groundwater Impact Assessment 2020 – *Annual Report for the Surat Underground Water Impact Report 2019*. OGIA, Brisbane

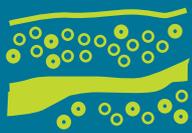
¹⁷ See page 112 of ‘Shared Landscapes – Industry Trends’ (<https://www.gfcq.org.au/shared-landscapes>) – Effects of groundwater take

¹⁸ See page 48 of ‘Gas Guide 2.0 – Full edition’ (<https://www.gfcq.org.au/gasguide>) – Water

4 GAS INDUSTRY SUPPLY & DEMAND



1,548 PJ
of gas was produced in Queensland during CY19



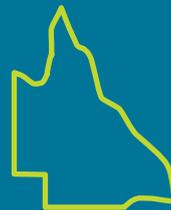
97.1%
was CSG



34.6 PJ
(2.2%) of gas produced in Queensland was used in **gas-fired power generation**



109.4 PJ
(7.1%) of gas produced in Queensland was used for **industrial (mining and manufacturing) purposes**



89.3%
of all gas produced in Queensland during CY19 was **used to produce LNG**



1,264.9 PJ
(81.6%) was exported

Top four major LNG export destinations include:

- China
- Malaysia
- Japan
- South Korea



4 PJ
(0.3%) of gas produced in Queensland was used for **residential and commercial purposes**

Like other jurisdictions around the world, Queensland has established a target to reduce emissions and considers natural gas as a vital part of the energy mix. Queensland has a 50% renewable energy target by 2030. Natural gas-fired power generation will be used for peak demand periods to maintain supply stability in the electricity network as coal-fired power generation is retired over time.

In calendar year 2019 (CY19), the International Energy Agency reported that developing economies in Asia were one of the main reasons for global LNG growth. The energy market share for LNG use in Asia is forecast to grow from 20% in CY18 to 40% by CY40. In real terms, natural gas demand from Asia is forecast to increase from 30,500 petajoules (PJ) to 56,700 PJ, which is significant given Queensland currently has approximately 35,000 PJ of known reserves.

Notwithstanding that the global economic conditions experienced today are vastly different to what occurred in CY20 as a result of the COVID-19 pandemic, demand from Asian markets for Queensland LNG is recovering strongly. The Gladstone Port Corporation has registered record export volumes during October-December CY20.

Whilst demand may be showing signs of recovery, the same cannot be said for revenue. Many LNG contract prices are linked to the oil price. When the oil price crashed in the second half of FY20, it is estimated that Queensland LNG export revenues fell by approximately 40%. Average realised prices dropped between 40% and 57% quarter on quarter between Q2 FY20 and Q3 FY20. However, it looks as though the worst effects of the demand shock experienced in CY20 are over, with early signs of production and revenue recovering in CY21.

Over the same time period the short-term spot prices in export markets have also fallen. As pricing in short-term markets are volatile by nature, it could be argued that as a result of soft spot market prices in the markets where Queensland's gas is exported, there should be more cheaper gas available to the east coast domestic market. This is the immediate case, with domestic short-term gas prices falling by more than 50% between the CY19 and CY20 September quarters respectively.

The Australian Energy Market Operator (AEMO) and the Australian Competition and Consumer Commission (ACCC) have both voiced concerns that the east coast gas market is heading for a supply shortfall in the coming years and additional gas supplies are required. The shortfall is a combination of gas production being forecast to decline in Victoria and the Cooper Basin from CY23 and CY26 respectively. Gas from Queensland will increasingly be expected to fill this supply shortfall, meaning more gas will need to be produced in Queensland to meet forecast demand.

To avoid the forecast supply shortfall, the volume of new gas discoveries needs to be greater than the volume of gas being extracted. This is often referred to as the 'reserve-replacement ratio'. In recent years, east coast gas reserves have been declining quicker than they are being replaced, which is one of the causal factors driving a potential gas supply shortfall to the east coast domestic market.



Image sourced from Woodside Energy Ltd. This image is subject to the intellectual property rights of Woodside Energy Ltd. and other parties.

What is a Petajoule?

A petajoule is a measure of energy.

1 Petajoule =



The energy used by
19,000 homes
in a year

The average home uses approximately 50 gigajoules of energy in 2014–15



The electricity used by
868,000 refrigerators
in a year

A typical 2.5 star fridge uses 320 kWh of electricity per year



The electricity used by
2,354,000 televisions
in a year

A 50 inch 5 star label television uses 320 kWh of electricity per year



INSIGHTS

1,548 PJ of gas was produced in Queensland during CY19, of which 97.1% was CSG.

89.3% of all gas produced in Queensland during CY19 was used to produce LNG, of which 1,264.9 PJ (81.6%) was exported.

Source: <https://www.energy.gov.au/sites/default/files/2016-australian-energy-statistics-info3.pdf>

Supply and Demand for Queensland Gas

1,503.0 PJ
CSG
production

SUPPLY

45.3 PJ
Non-CSG
gas production



1,548.3 PJ



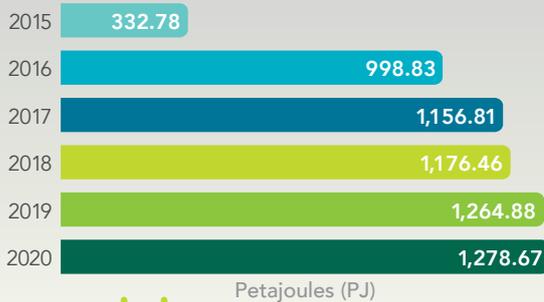
1,264.9 PJ
LNG exports
(81.7%)

DEMAND

117.0 PJ
Gas used to
produce LNG (7.6%)



Annual LNG exports from Gladstone



LNG export destinations



109.4 PJ
Industrial (mining and
manufacturing) (7.1%)

34.6 PJ
Gas-fired power
generation (2.2%)

9.6 PJ
Net inter-state
exports* (0.6%)

8.8 PJ
Flared/vented during
gas production (0.6%)

4.0 PJ
Residential and
commercial (0.3%)

**Net inter-state exports equals the gas volume exported to the southern States minus the gas volume imported from the NT*

Gas production in Queensland, including flaring/venting (Petroleum and Gas Statistics (December 2019), Queensland Government open data portal)
 Inter-state exports to southern States (AEMO 2020 Gas Statement of Opportunities, report figures and data, Figure 15)
 LNG Production (Gladstone Port Authority – conversion factor used = 1 million tonnes of LNG : 57.17 PJ)
 Domestic Use in Queensland (AER, State of the Energy Market 2020, Figure 4.2, page 180)
 Imports from the NT (AEMO 2020 Gas Statement of Opportunity, report figures and data, Figure 16)



5 ECONOMIC & SOCIAL CONTRIBUTIONS



In FY20, the gas industry's **direct contributions** to Queensland's GSP

\$5.1B

(or 1.4% of total GSP)



31,969

direct and indirect jobs were supported by the petroleum and gas industry during FY20



\$3.8B

spent on local goods and services, benefiting:

2,883 local businesses

250 community organisations



\$718M

in wages were paid to



4,560

full-time employees



\$466.3M

in royalties were paid to the Queensland State Government in FY20

Every Queensland resident benefits from the resources sector. The money that the Queensland Government requires to effectively fund schools, hospitals, infrastructure projects and other vital services comes, in part, from the resources sector. In addition, those people who work in the resources sector spend their wages and salaries buying such things as produce that is farmed in Queensland.

It is not possible to track where every dollar generated by the gas industry is spent, but this chapter provides an overview of the gas industry's economic contribution to the State.

Queensland's petroleum and gas industry is a significant contributor to the State's economy. Queensland's Gross State Product (GSP) is an aggregate measure of the total economic production of goods and services, including international and interstate trade, that is reported quarterly.

In FY20, the gas industry's direct contributions to Queensland's GSP was \$5.1 billion (or 1.4% of total GSP) and its total added value (including consumption induced effects) was \$11.1 billion (or 3.0% of total GSP)¹⁹.

The petroleum and gas industry supported 31,969 direct and indirect jobs during FY20²⁰. Furthermore, the petroleum and gas industry paid a total of \$466.3 million in royalties to the Queensland State Government in FY20²¹.

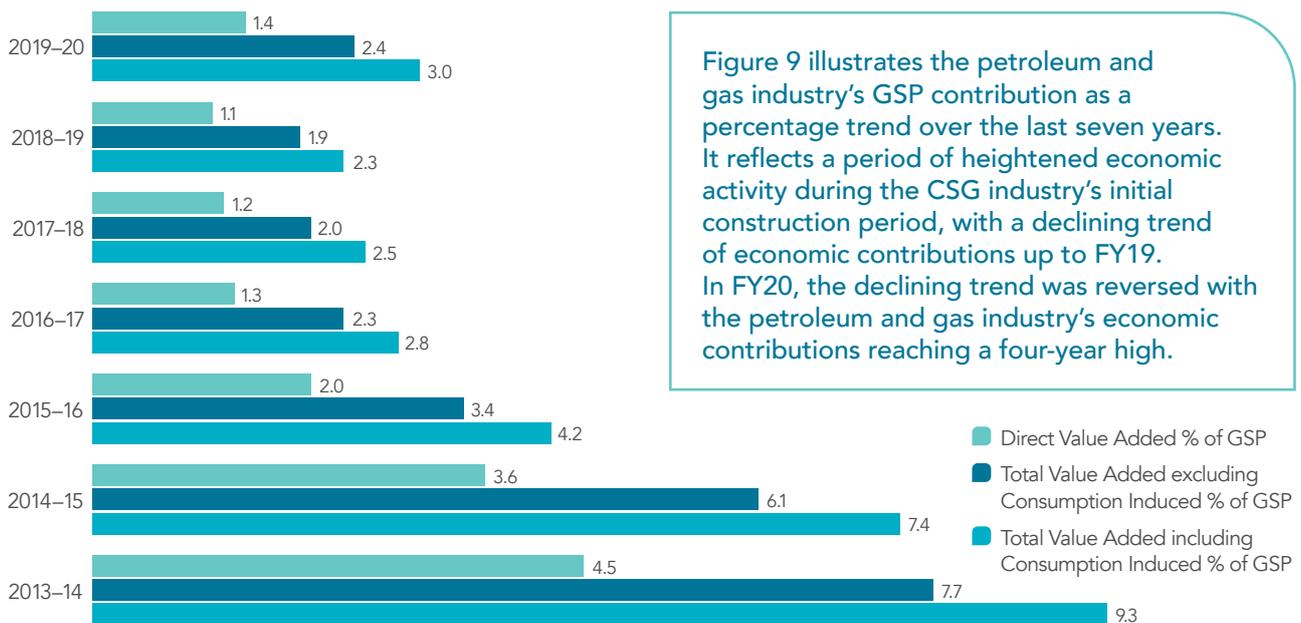


Figure 9 illustrates the petroleum and gas industry's GSP contribution as a percentage trend over the last seven years. It reflects a period of heightened economic activity during the CSG industry's initial construction period, with a declining trend of economic contributions up to FY19. In FY20, the declining trend was reversed with the petroleum and gas industry's economic contributions reaching a four-year high.

Direct Value Added*
The compensation of employees plus gross operating surplus plus other taxes less subsidies on production.

Total Value Added excluding consumption induced
The direct value added (left) plus indirect value added generated by business supply chain expenditure in each region.

Total Value Added including Consumption Induced
The total value added plus consumption-induced spending in each region.

Figure 9. Percentage contribution to Queensland's Gross State Product by the petroleum and gas industry. Source: Queensland Resources Council.

* Note: A precise measure of direct value added for the minerals and energy sector is not available from the data; an estimated value added of \$37.8 billion – equivalent to the sum of input and labour costs, or total direct spending – has instead been adopted.

¹⁹ Economic Impact of Minerals and Energy Sector on the Queensland Economy 2019/20 – November 2020

²⁰ Economic Impact of Minerals and Energy Sector on the Queensland Economy 2019/20 – November 2020

²¹ Queensland Treasury – Royalty Statistics (30 June 2020)

During FY20, the Queensland petroleum and gas industry provided (direct economic impact²²) \$718 million in wages paid to 4,560 full-time employees.

Figure 10. Petroleum and gas industry full-time employment and salary contributions. Source: Queensland Resources Council.

Note: Contract employee data was not collected prior to 2016-17.



Petroleum and Gas Industry – FY20 Direct Expenditure by Region

Queensland's petroleum and gas industry direct expenditure included \$3.8 billion²³ spent on local goods and services, benefiting 2,883 local businesses and 250 community organisations across Queensland.

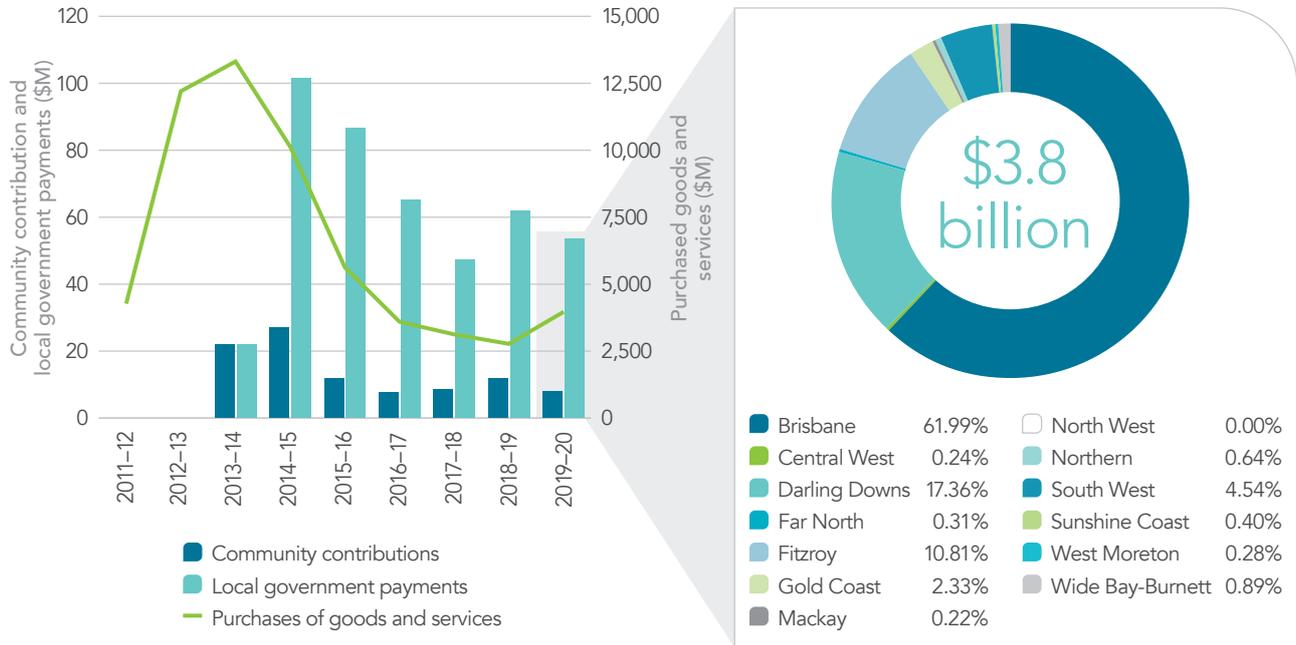


Figure 11a. Total petroleum and gas industry direct expenditure. Source: Queensland Resources Council.

Figure 11b. FY20 petroleum and gas industry direct expenditure (community contributions, local government payments and purchases of goods and services) by region. Source: Queensland Resources Council.

22 Economic Impact of Minerals and Energy Sector on the Queensland Economy 2019/20 – November 2020
 23 https://www.qrc.org.au/wp-content/uploads/2020/11/2020_OilandGas.pdf

Queensland Petroleum Royalties

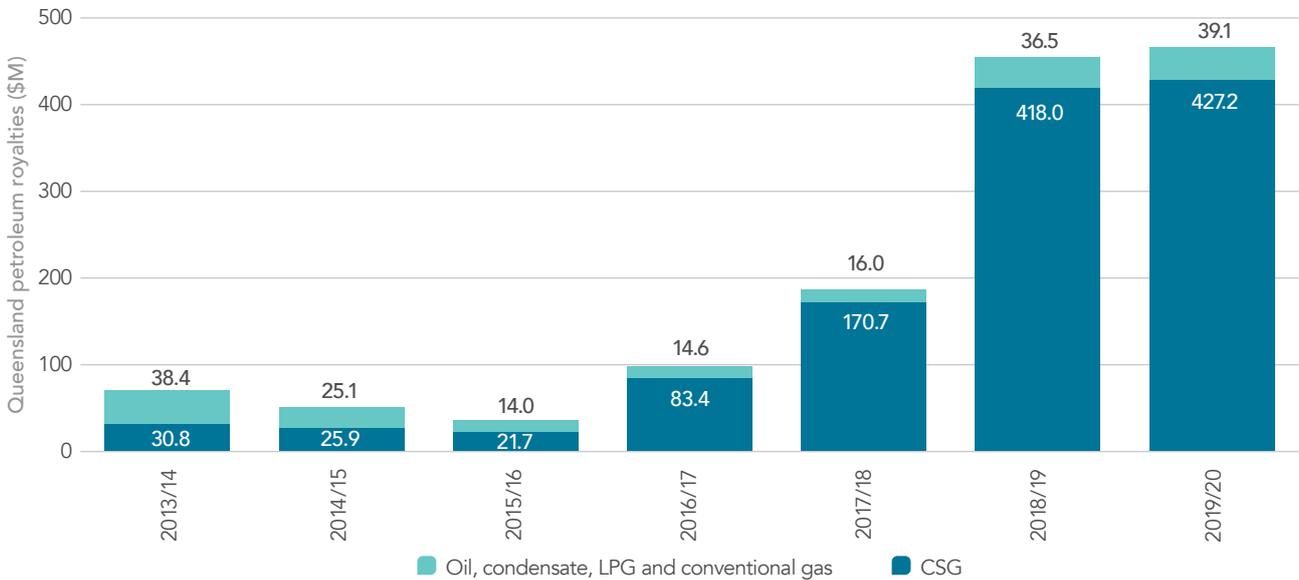
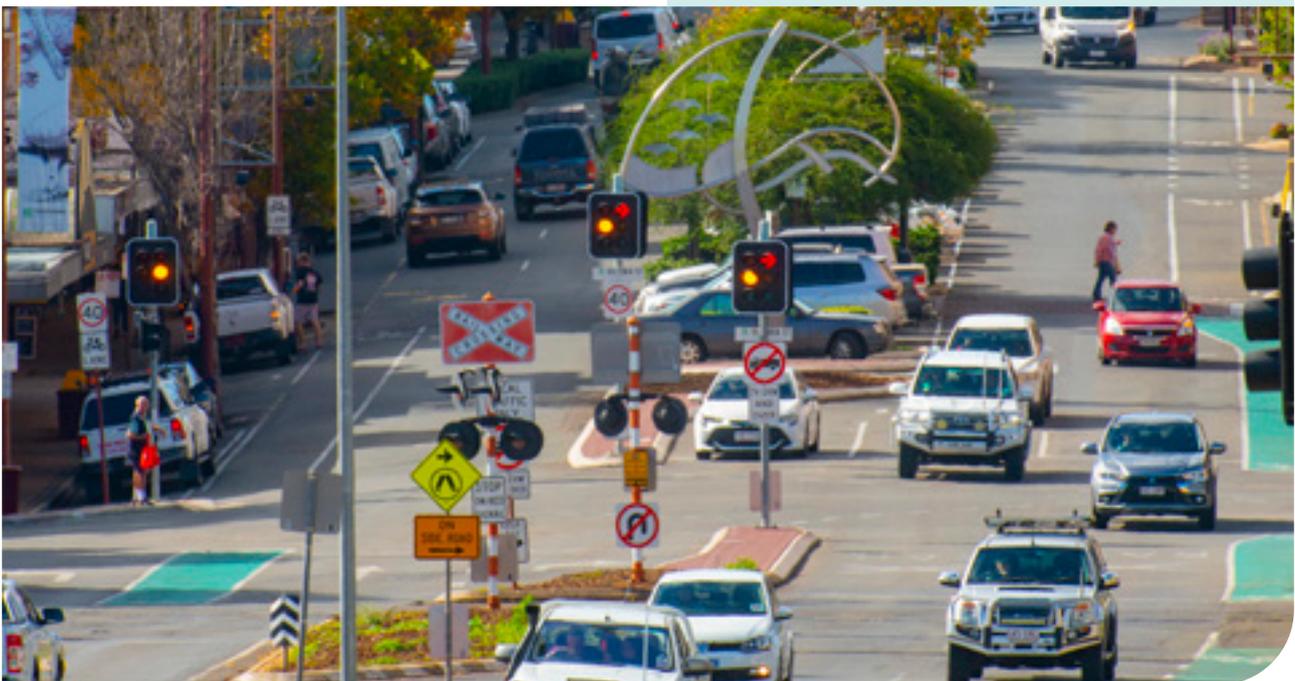


Figure 12. Annual breakdown of petroleum royalties. Source: Queensland Treasury.

Petroleum royalties (which include CSG, oil, condensate, LPG, and conventional gas) represent approximately 10% of the total royalties collected in Queensland. These royalties are then shared across Queensland’s education, health, transport and roads and policing sectors.

INSIGHTS

From 1 October 2020, Queensland’s petroleum royalties will be calculated based on applying a tiered royalty rate to the volume of petroleum produced (rather than the previous system of royalties being calculated as 12.5% of the determined ‘wellhead value’ of petroleum disposed of), with a tiered royalty rate based on the reference price for the producer.



6

INDUSTRY REGULATION, COMPLIANCE & ENFORCEMENT



94 Community reports and company self-reporting

of incidents were received by DES in FY20



15 Enforcement measures

(6 infringement notices and 9 warnings) have been implemented by DES in FY20



311 Performance reviews

of production leases resulted from the Department of Resources' audit of all petroleum production leases in the Surat and Bowen basins in FY20



122 Petroleum and gas enquiries and complaints

were received by the Department of Resources since FY19



156 CSG well inspections were completed

by the Petroleum and Gas Inspectorate in FY20

28 Petroleum and gas complaints were received: most common subjects of complaints were related to land access agreements, environmental nuisance, land access and safety

As of 30 June 2020, all **outstanding enquiries and complaints had been resolved**

50 Statutory Notifications were submitted and 59 issues were identified during inspection

All non-compliance issues were resolved after testing and remediation

The effective regulation of petroleum and gas activities is essential to ensure that landholders, regional communities, and the onshore gas industry can coexist, with both the benefits maximised and risks managed and mitigated. Regulators have a range of compliance and enforcement options to address non-performance across the petroleum and gas industry.

Petroleum and gas activities in Queensland are regulated by the Department of Resources with respect to tenure and land access, and the statutory body Resources Safety and Health Queensland (RSHQ) which regulates the safe operation of the resources sector. The Department of Environment and Science (DES) protects and manages the State’s environment and natural resources. These regulating agencies manage and monitor risk through a range of assessment, compliance, investigation, and enforcement activities.

Department of Environment and Science

DES’s compliance strategy is based on a targeted and transparent approach, supported by a strong and contemporary enforcement capability. The Department publishes compliance and enforcement-related information via its Environmental Regulatory Update newsletter.

Compliance Planning

As part of its compliance planning, DES prepares and publishes its Annual Strategic Compliance Priorities. During FY21, one of the strategic focus areas targeted CSG industry activities in relation to storage, management, and treatment of CSG water, the re-injection of groundwater, management of salt and brine waste, hydraulic fracture stimulation and air quality monitoring.

It is the responsibility of environmental licence or permit holders to comply with the strong environmental standards and obligations required by law and, where a potential environmental risk has been identified, to have appropriate and effective control measures in place to minimise the potential for environmental harm.

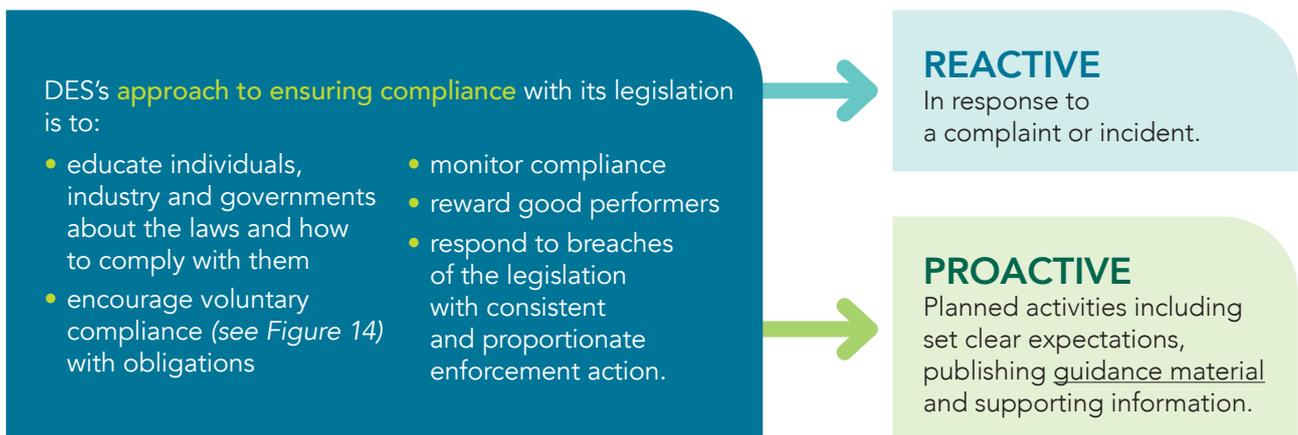


Figure 13. The Department of Environment and Science’s approach to compliance. Source: Department of Environment and Science.

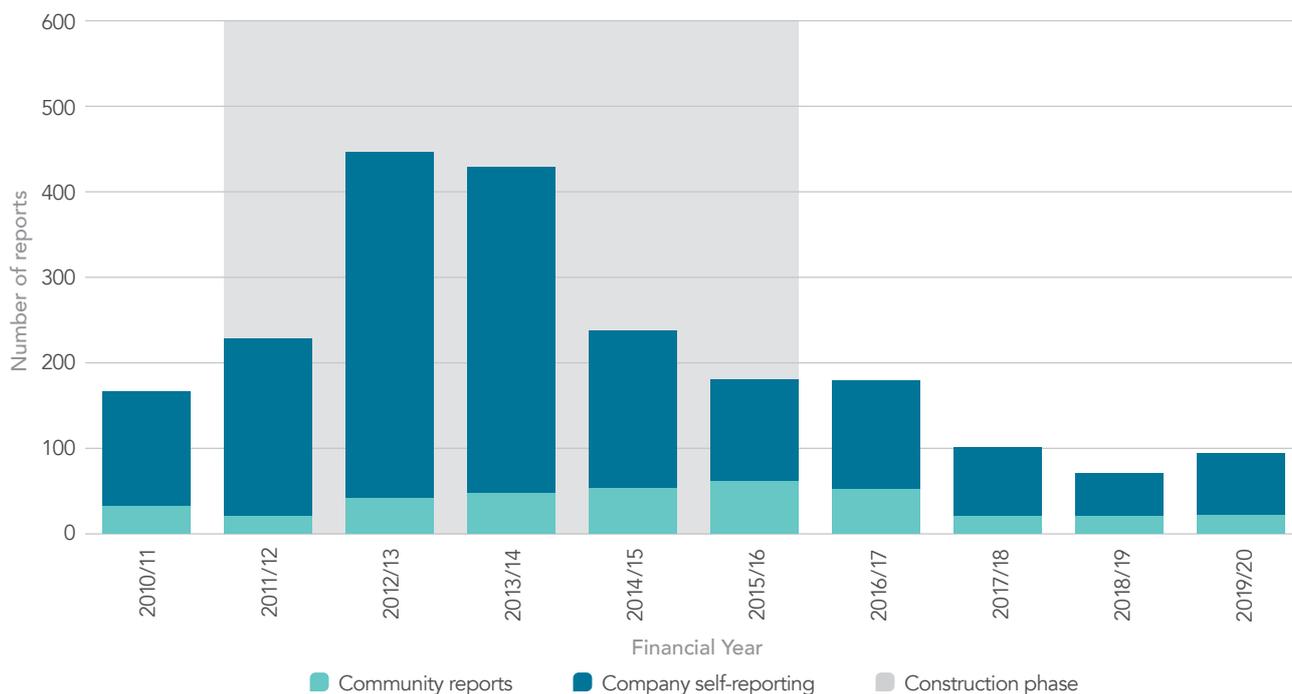


Figure 14. Community reports and resource company self-reporting.
Source: Department of Environment and Science.

Figure 14 illustrates the number of community reports and resource company self-reporting received since FY11. The reports from resource companies and landholders illustrate a correlation with construction activity for major infrastructure such as pipelines (collection headers, laterals, export), gas processing and water treatment facilities, water storages and construction camps. Many community reports and notifications during the construction or rehabilitation stages involve the disturbance of environmentally sensitive areas, watercourse crossings, and failures in erosion and sediment control measures. These types of reports are occurring less frequently now that the peak construction phase has passed.

Drilling of wells and completion activities may result in community reports about noise or light intrusion (environmental nuisance). However, these activities are often subject of a [CCA](#) or [alternative arrangements](#) between the [Environmental Authority](#) (EA) holder and landholders.

Following completion of construction work for major infrastructure items, reports are more likely to relate to produced water released from failed water pipeline valves, vents and well head separators and seals. As the resource companies have identified items at higher risk of failure, strategies have been applied to replace those items or implement

improved servicing and maintenance procedures to minimise this risk.

Enforcement Measures

Enforcement measures can range from education activities, working with resource companies to rectify potential non-compliance matters, issuing warnings through to prosecution (details can be found in the [DES Enforcement Guidelines](#)). These measures can be used individually or in combination, depending on the nature of the infringement[s] and the outcome sought.

DES has set clear expectations about acceptable standards of environmental performance and can prosecute individuals and/or resource companies who breach their obligations to protect the environment and natural resources when it is in the public interest to do so.

A selection of DES's enforcement actions are summarised in [prosecution bulletins](#) outlining the facts and outcomes of finalised prosecutions. Since 2012, there have been two published prosecution bulletins relating to CSG (January 2015, September 2018), both relating to offences of contravening a condition of the resource companies' EA. This emphasises the importance of EA holders needing to abide by the appropriate environmental obligations.

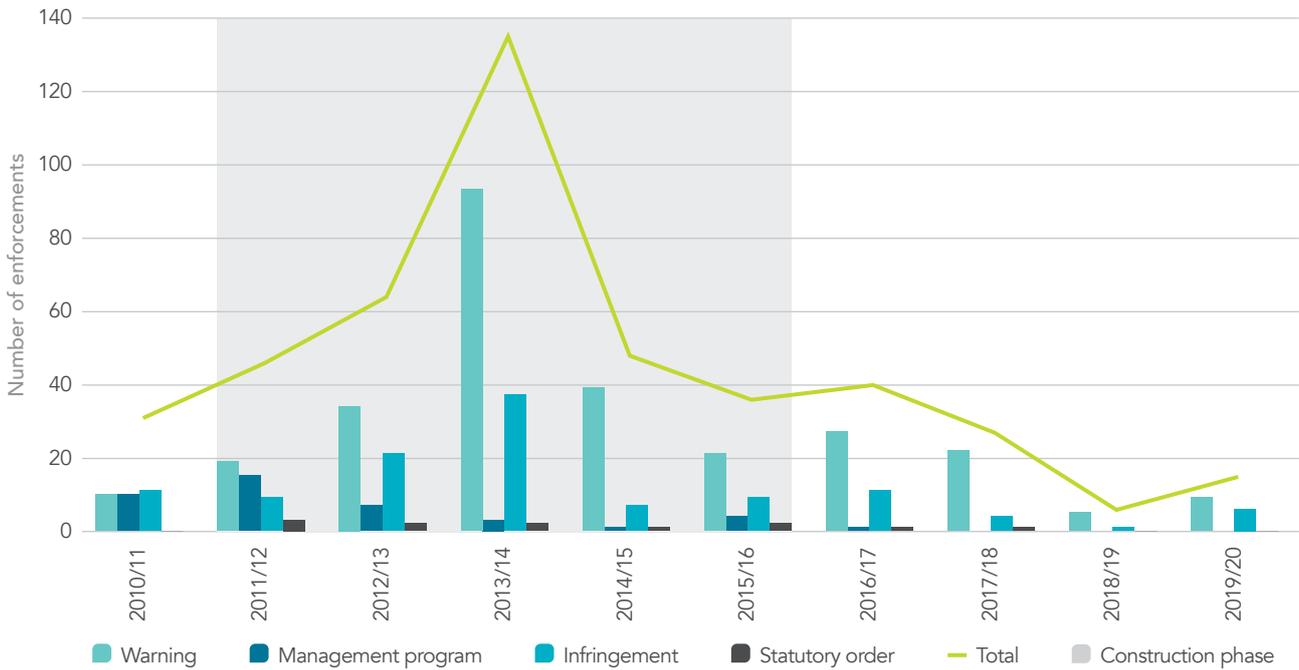


Figure 15. Enforcement measures taken by the Department of Environment and Science since FY11.
 Source: Department of Environment and Science.

The highest frequency of enforcement measures being applied coincides with the peak of industry construction activity, and correspondingly the peak of incident reporting during FY13. The overall decline in both reports/notifications and enforcements can be attributed to the progression from construction to the commissioning and start-up phase for the CSG upstream facilities of the major LNG export consortiums to the operational phase.

Each of these project teams have identified changes in their activities, from managing many contracts and contractors/employees in the construction

phase to fewer contractors/employees during the operational phase. These changes have coincided with closures of work camps, lay-down areas, and other associated field services. Gas and water produced by new wells is now typically processed in existing facilities.

Statutory notices, directions and penalties are usually applied to higher environmental impact, higher culpability, unresolved and more complex or wide-spread issues which, in turn, have become less common as defects from new infrastructure are addressed.

Department of Resources

The Department of Resources administers a range of legislation that makes up the regulatory frameworks used to manage the use of, and access to Queensland's mineral and energy resources. These regulatory frameworks are in place to ensure the laws are complied with.

The Department of Resources' compliance framework sets out the Department's approach to compliance and guides how compliance is delivered consistently and professionally, whilst establishing the principles of how regulatory functions are undertaken. The framework is supported by a compliance strategy, policies, procedures and guidelines. Each year, the department has a risk-based approach to plan where to focus its compliance efforts (DNRME Compliance Plan 2020–21), resulting in the highest priorities and areas of greatest risk being addressed, and ensuring responses to non-compliance are targeted and proportionate.

In FY20, all petroleum production leases in the Surat and southern Bowen basins were audited by the Department of Resources, resulting in 311 performance reviews of production leases.

EXAMPLE OF FOCUS AND TARGETED ACTIVITY FOR FY21

Target for Petroleum and Gas:
Audit performance of all petroleum production leases in the Surat and southern Bowen basins using the Petroleum Lease Compliance framework.

Activities include:

- undertaking proactive desktop audits including audits of production reporting for petroleum leases
- undertaking proactive field inspections
- providing reactive, targeted responses to incoming complaints and intelligence from external sources
- undertaking performance audits for petroleum and gas production leases.

The Engagement and Compliance Unit (ECU), a business unit of the Department of Resources' Georesources Division, handles enquiries and complaints made about mineral and energy resource activities in Queensland. The following is a summary of data related to petroleum and gas enquiries and complaints reported and managed by the ECU.

Since FY19, the ECU has received 122 petroleum and gas enquiries and complaints. A total of 2,009 petroleum and gas enquiries and complaints were received by ECU over the last eight years.

- The most common subjects of enquiries through FY19 and FY20 were policy, groundwater impacts, community engagement and communication.
- The most common subjects of complaints were related to land access agreements, environmental nuisance, land access and safety.
- There was a total of 28 petroleum and gas complaints received by ECU during FY19 and FY20:
 - 21 complaints resulted in no compliance/enforcement action following the provision of further evidence, and were concluded with advice to the complainant.
 - ECU facilitated three formal dispute resolution conferences²⁴ between the complainant and the resource authority holder to address concerns raised.
 - Four complaints were referred to other Queensland Government agencies.
- As of 30 June 2020 all outstanding enquiries and complaints had been resolved.

²⁴ These formal dispute resolution processes occurred prior to the commencement of the *Mineral, Water and Other Legislation Amendment Act 2018*, which included the removal of departmental conferences from the Conduct and Compensation Agreement negotiation and dispute resolution statutory process (commenced 19 April 2019)

Information Requests/Complaints

Since FY13, the ECU has recorded a decline in petroleum and gas-related enquiries and complaints, which is considered to be the correlation of several inter-related factors.

During this time, there has been a transition of the CSG industry from construction to the operational phase, and a broad maturing of industry practices and supporting regulatory framework, resulting in improved standards and fewer complaints.

In recent years, the ECU has recorded a steady decline in enquiries and complaints related to petroleum and gas, whilst also noting a shift away from high frequency/low complexity enquiries and complaints to those that are generally more complex in nature and require multi-agency input and liaison.

INSIGHTS

Stakeholder awareness and understanding of the petroleum and gas industry has also matured, with communities and industry becoming better informed through the successful delivery of engagement and compliance initiatives by the ECU, other government agencies, private organisations, and the gas industry itself.

As a result, information is now more readily available and stakeholders are better informed, consulted and supported regarding petroleum and gas activities. Additionally, industry and community now have better access to alternative avenues for CSG-related enquiry and complaints: for example, the Commission and the [Land Access Ombudsman](#).

Information Requests

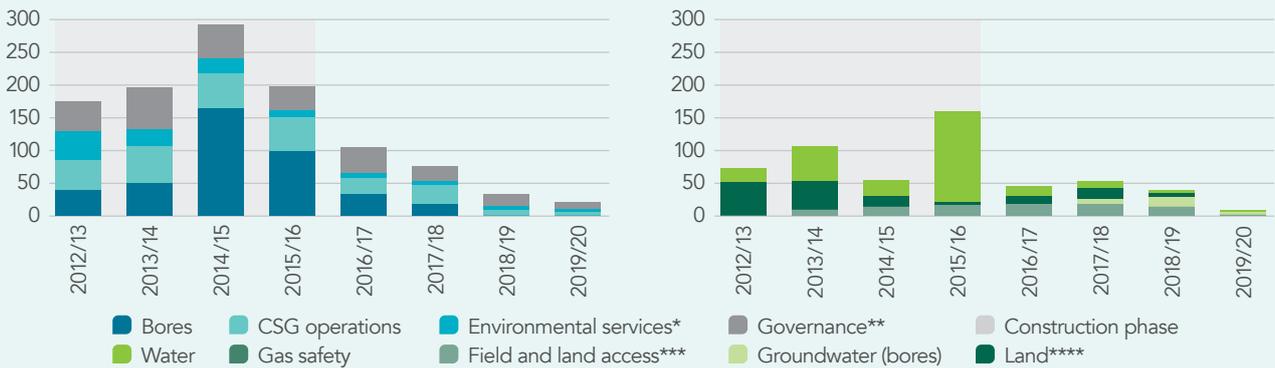


Figure 16. Information requests received by Georesources' Engagement and Compliance Unit. Source: Department of Resources.

Complaints



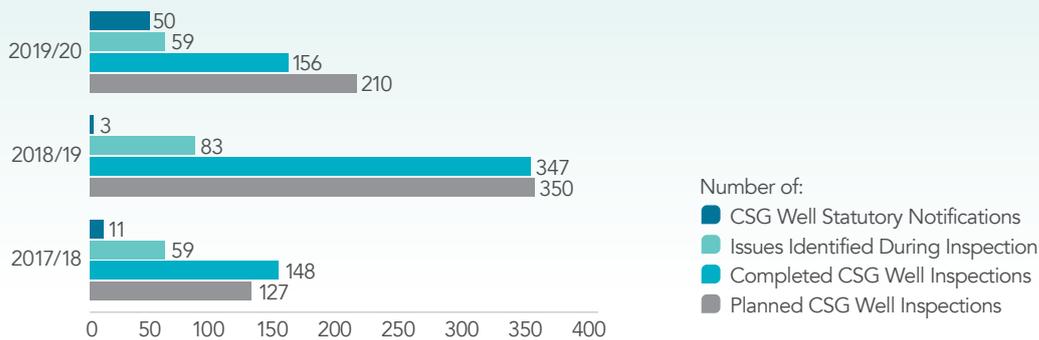
Figure 17. Complaints received by Georesources' Engagement and Compliance Unit. Source: Department of Resources.

* Environmental Services: referrals to Department of Environment and Science
 ** Governance: includes, but is not limited to, matters concerning legislation, the regulatory framework, government initiatives, public reports and communications
 *** Field and Land Access: includes property entry and access issues, and the land access code
 **** Land: includes cultural heritage, erosion and vegetation clearing

Petroleum and Gas Inspectorate

The Petroleum and Gas Inspectorate (the Inspectorate) is part of the newly formed RSHQ. It has adopted a risk-based approach to regulate workplace health and safety for the CSG industry and carries out a compliance assurance program each year covering all aspects of safety and health in upstream operations. The Inspectorate uses its analysis of risks to inform its compliance plan and to identify specific focus areas. It also publishes newsletters, annual reports, and other important updates. The Inspectorate engages with industry and stakeholders to educate them on its findings, and to promote better practices.

CSG Well Compliance



Number of CSG Well Statutory Notifications

During FY20, these are made up of 31 notifications for failure to meet cementing objectives and the 19 well integrity notifications which are a new requirement in the latest version of the construction and abandonment code of practice. Some of the increase is due to operators who have proactively been re-interpreting and re-reviewing cement bond logs and some of the well integrity notifications are for issues that occurred before the requirement came in but operators have decided to report anyway.

Number of CSG Well Completed Inspections

Issues range from areas for improvement around general housekeeping and signage, through to some leaks and the requirement for additional monitoring under the operator's well integrity management system.

All non-compliance issues were resolved after testing and remediation

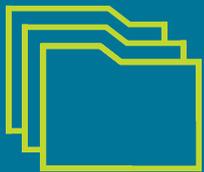
The Petroleum and Gas Inspectorate undertook enforcement actions in line with the Resource Safety and Health Compliance Policy. Issues were communicated to operators along with requests for them to rectify the identified non-compliances. Non-compliances have since been closed out by the Inspectorate.

Figure 18. Overview of CSG well compliance under the construction and abandonment code of practice through FY18, FY19 and FY20. *Source: Resources Safety and Health Queensland.*



7

EMERGING AREAS OF PETROLEUM & GAS DEVELOPMENT



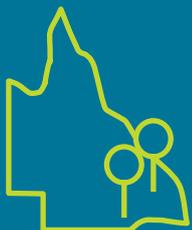
Since 2016, there have been

11 tender releases



Of the 7.01 million ha released, around

30% were awarded



The 2020 Queensland Exploration Program (QEP) included

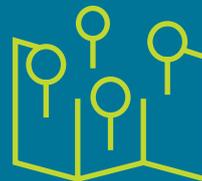
13 tender areas across the Bowen and Surat basins

totalling 682,200 ha



Only

6 were awarded



Emerging areas

are considered to be:

Galilee Basin

Expansion of the Denison Trough
(near Rolleston)

Southern end of the Northern Bowen Basin
(between Blackwater and Banana)

Tight gas reserves in the Taroom Trough
(between Moonie and Roma)

The previous sections of this report have demonstrated the important contribution of the petroleum and gas industry to the Queensland economy, regional communities and how the industry forms a vital part of the energy mix.

As a result of the contribution, the Queensland Government has committed to ensuring the gas industry continues to develop and as such the government periodically releases new areas for gas exploration and development.

Over the last decade the majority of gas development activity has been focused in the Surat Basin. However, as the industry matures and technology changes, new and emerging areas have the potential to become gas producing regions. It is anticipated that the scale and intensity of development experienced in the Surat Basin will not be seen again in these emerging areas. Also, the emerging areas have not been explored to the same extent as the Surat Basin and therefore it is likely that it will be several years before any production activities commence.

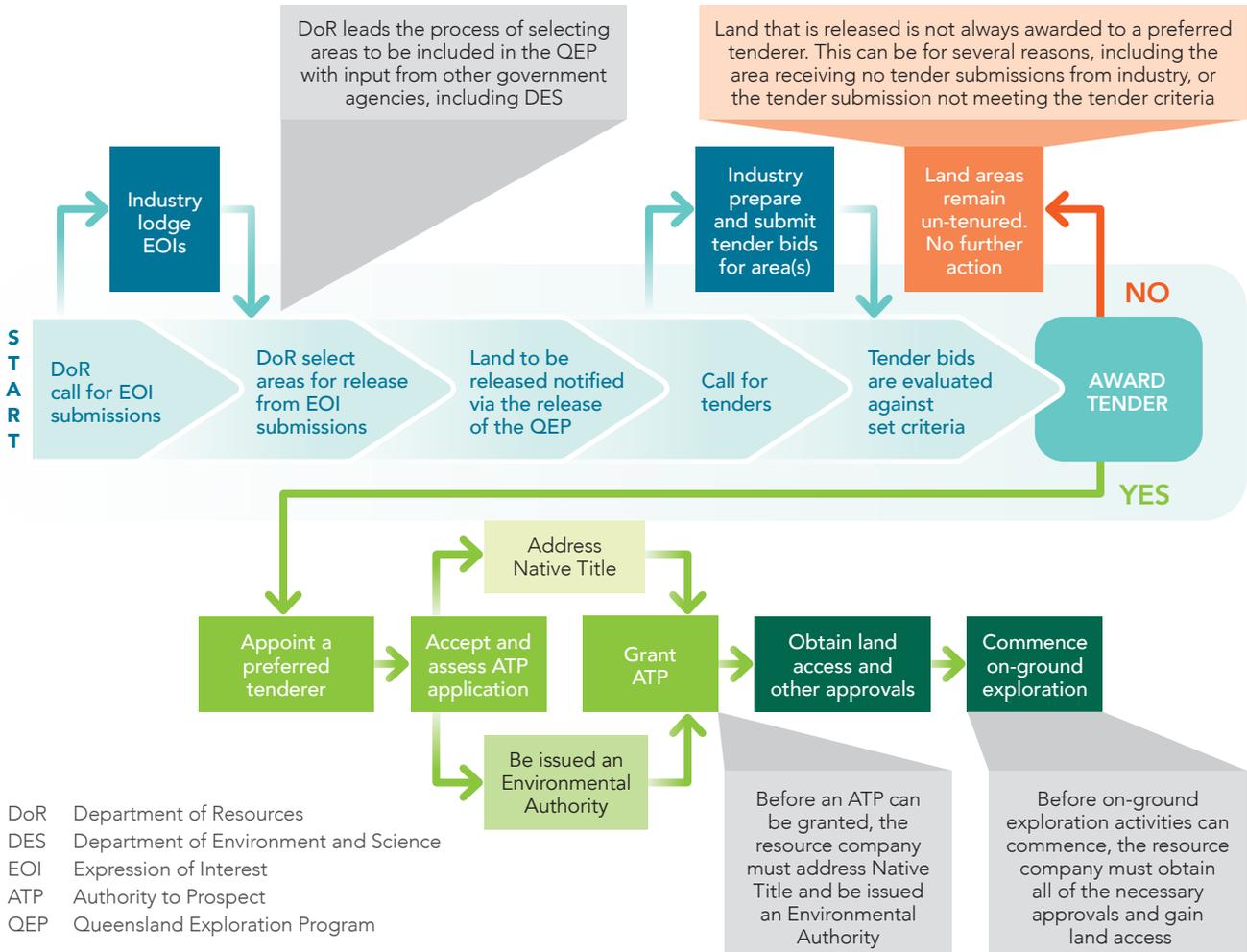
The emerging areas are considered to be:

- Galilee Basin
- Expansion of the Denison Trough (near Rolleston)
- Southern end of the Northern Bowen Basin (between Blackwater and Banana)
- Tight gas reserves in the Taroom Trough (between Moonie and Roma).

During the land release process, the Department of Resources engages with directly affected landholders and notifies them of the land release, when the tender process opens and closes, and whether the area was awarded or not.

 **FOR MORE INFORMATION**
 Download the [Commission's Gas Guide 2.0](#) (see 'Chapter 3: Exploration Phase').

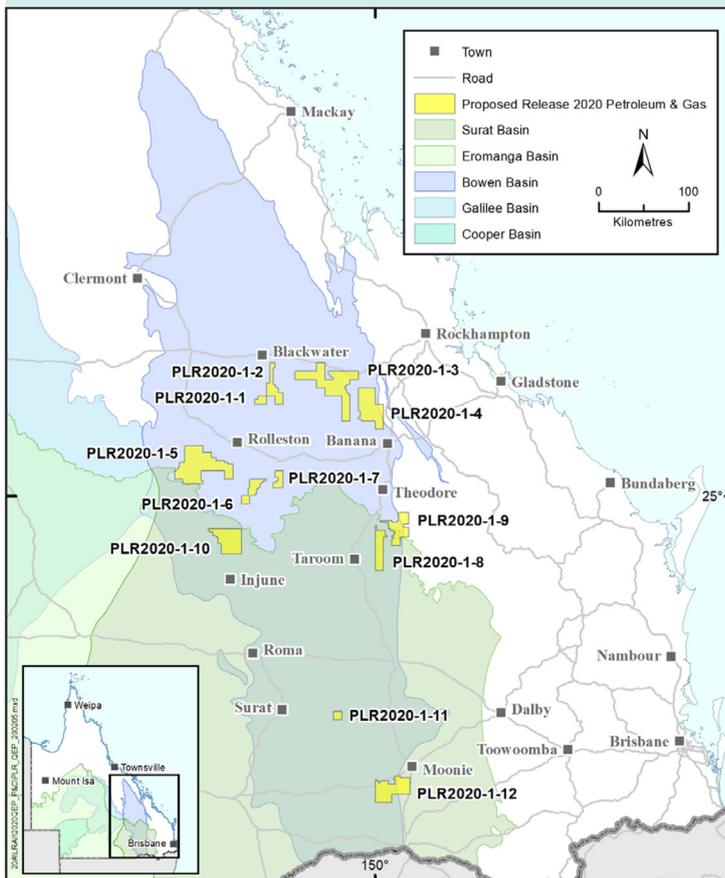
The Land Release Process



Since 2016, there have been 11 tender releases. Of the 7.01 million ha released, around 30% were awarded.

Table 4. Breakdown of tender releases by release period.
Source: Department of Resources.

Tender opened	Tenders offered	Tenders awarded	
	ha	ha	% Tenders offered that were awarded
Jun-20	145,900	11,400	8%
May-20	674,600	302,100	45%
Nov-19	3,317,700	223,500	7%
May-19	374,200	345,000	92%
Nov-18	663,600	279,300	42%
Nov-18	1,800	1,800	100%
Mar-18	1,743,100	750,200	43%
Sep-17	39,500	39,500	100%
Apr-17	8,600	8,600	100%
Feb-17	5,800	5,800	100%
Nov-16	36,500	36,500	100%
Total	7,011,300	2,003,700	29%



The 2020 Queensland Exploration Program (QEP) call for tenders for Authorities to Prospect (PLR2020-1) included 12 tender areas across the Bowen and Surat basins totalling 674,600 ha. Only six preferred tenderers have been announced.

Figure 19. Petroleum and gas exploration tender areas – PLR2020-1 tender release. Source: Department of Resources.

Table 5. Preferred tenderers under the Call for Tenders for Authorities to Prospect (PLR2020-1).

Source: Department of Resources.

Tender area	Location (approximate)	Successful tenderer
PLR2020-1-1*	52 km north-east of Rolleston	Comet Ridge Mahalo East Pty Ltd
PLR2020-1-2*	40 km south of Blackwater	Comet Ridge Mahalo Far East Pty Ltd
PLR2020-1-5	40 km south-west of Rolleston	State Gas Limited
PLR2020-1-9	44 km south-east of Theodore	Senex Queensland Exploration Pty Ltd
PLR2020-1-10	45 km north of Injune	Denison Gas (Queensland) Pty Ltd
PLR2020-1-13*	17 km south-west of Wandoan	Senex Assets Pty Ltd

* Area subject to an Australian market supply condition

Following the QEP 2020 releases, the government released five additional areas for competitive tender in June 2020, covering approximately 1,500 km², with two areas near Moonie, and three near to Injune in the Bowen and Surat basins. The tender process closed in September 2020.

The five areas were previously released for tender under the 2018 QEP but were not awarded. The areas were re-released in response to industry feedback and as part of the Queensland Government's Unite and Recover for Queensland Jobs plan.

In February 2021, AusGasCo CSG Pty Ltd was appointed preferred tenderer for two blocks (tender area PLR-2020-2-1 and PLR2020-2-2), located to the south-east of Injune, totalling 114 km². Of the three remaining areas, two will not be awarded and one area is still under evaluation at time of writing.

There is currently no active QEP, however the Department of Resources is in the process of developing a new land release program which commenced with the EOI process closing in February 2021.

Table 6. Preferred tenderers under the Call for Tenders for Authorities to Prospect (PLR2020-2).

Source: Department of Resources.

Item	Tender area code	Size and location	Commodity	Tender outcome
1	PLR2020-2-1	77 km ² (25 sub-blocks) 17 km south-east of Injune	Coal seam gas	Awarded
2	PLR2020-2-2	37 km ² (12 sub-blocks) 29 km south-east of Injune	Conventional and/or unconventional gas	Awarded
3	PLR2020-2-3	154 km ² (50 sub-blocks) 32 km south-east of Injune	Coal seam gas	Not awarded
4	PLR2020-2-4	357 km ² (117 sub-blocks) 25 km south-west of Moonie	Conventional and unconventional oil and gas	Not awarded
5	PLR2020-2-5	834 km ² (275 sub-blocks) 50 km south-west of Moonie	Conventional and unconventional oil and gas	Under evaluation

Australian Market Supply Condition – Domestic Gas

Under the *Petroleum and Gas (Production and Safety) Act 2004*, the Australian Market Supply Condition is a condition imposed on certain petroleum and gas tenures in Queensland, that requires the holder of the tenure to supply any produced gas to the Australian market.

Not long after the LNG facilities on Curtis Island commenced full production, industrial consumers of gas in the east coast gas market raised concerns that they were unable to secure contracted gas at commercially viable terms and price. In response to these concerns, in February 2017, the Queensland Government released its first tender of petroleum land that had the Australian Market Supply Condition attached.

The release of the 58 km² area in the Surat Fairway was considered a 'pilot' to test the policy objectives. The preferred tenderer was awarded the area in September 2017 and gas has since been produced and is currently being supplied to manufacturing and industrial consumers for the production of everyday products such as house bricks, glass bottles and cardboard packaging.

Since this initial award, a further 9,147 km² of land has been awarded with the Australian Market Supply Condition attached – this equates to approximately 46% of all petroleum exploration land awarded since 2017.

In 2020, the Queensland Government conducted a Review of the Australian Market Supply Condition to test the conditions effectiveness and to determine if the policy objectives were being met. Overall, the review found that the Australian Market Supply Condition has not hindered investment in the gas industry while gas prices for the Australian market and LNG net back are similar, and it is generally accepted by the gas industry and industrial gas users.

The GasFields Commission Queensland is a vital reference source for landholders, regional communities and the onshore gas industry in Queensland.

By facilitating connections across the natural gas and agricultural sectors, business community and government, we aim to create an environment conducive to economic growth and innovation in rural and regional communities.

If you have any question or concerns related to this document, or gas developments occurring in your area please contact us via:

Phone 07 3067 9400

Web <https://www.gfcq.org.au/contact-us>

Email enquiries@gfcq.org.au



A photograph of an industrial facility, likely a gas processing plant, silhouetted against a bright orange and yellow sunset sky. The scene is captured from a low angle, with the sun positioned centrally in the upper half of the frame, creating a strong lens flare and illuminating the sky. The foreground is dark, and the overall mood is industrial and serene.

GLOSSARY

The gas industry and the mechanisms covering its operation in Queensland have spawned a range of terms and acronyms. This is a quick guide for the more commonly used terms and acronyms found throughout this document.

Access agreement – A negotiated agreement between a resource company and private landholder relating to the rights over designated ‘access land’ (see below).

Access land – This is land outside a declared resource authority area, over which it is reasonably necessary for a resource company to travel to access land subject to their resource authority.

ADR – Alternative Dispute Resolution refers to any means of settling disputes outside of the courtroom (resolving disputes without litigation) and typically includes early neutral evaluation, negotiation, conciliation, mediation, and arbitration.

Alluvial aquifer – An aquifer that is not completely confined by an aquitard and usually located adjacent to a river. Alluvial aquifers are generally composed of silt, clay, sand, gravel, or similar unconsolidated material deposited by running water. An example is the Condamine Alluvium.

Aquifer – An underground geological layer with high permeability which means it can store and allow water movement.

Associated water – Sometimes referred to as ‘CSG produced water’. Groundwater that is produced because of gas production. This water can be treated and used beneficially for a range of purposes.

ATP – Authority to prospect also commonly known as an exploration permit or tenure. To explore for petroleum, oil, coal seam gas and natural gas in Queensland, you must hold a current authority to prospect.

Australian Energy Market Operator (AEMO) – A not-for-profit organisation, registered as a public company limited by guarantee; whose operating costs are recovered through fees paid by market participants. Their role is to manage the electricity and gas systems and markets across Australia, helping to ensure Australians have access to affordable, secure, and reliable energy.

Australian Competition and Consumer Commission (ACCC) – An independent Commonwealth statutory authority whose role is to enforce the *Competition and Consumer Act 2010* and a range of additional legislation, promoting competition, fair trading and regulating national infrastructure for the benefit of all Australians.

Coal seam gas (CSG) – Natural gas contained in coal seams.

Conduct and Compensation Agreement (CCA) – A legal agreement between a landholder and a resource company relating to proposed activities or conduct and, where there is impact on the landholder, compensation arrangements for those activities.

Construction phase – Can include the building and/or upgrading of vehicle access tracks, well pad development, drilling, well completion and the installation of above ground infrastructure and pipelines. As a general rule, it can take 5–7 months from the start of a well pad to operational handover.

Conventional gas – also see *natural gas*. Conventional gas reservoirs largely consist of porous sandstone formations capped by impermeable rock, with the gas stored at high pressure.

CSIRO – The Commonwealth Scientific and Industrial Research Organisation is Australia’s national science research agency.

DAF – The Department of Agriculture and Fisheries works to achieve a productive and profitable agriculture, fisheries, and forestry sector in Queensland by promoting sustainability and innovation.

Deferral agreement – A legal agreement in which a landholder and resource company agrees to defer the negotiation of Conduct and Compensation Agreement until a later date and after the resource company has accessed the land to undertake advanced activities.



GLOSSARY

DES – The Department of Environment and Science are responsible for protecting and managing parks, forests, and the Great Barrier Reef. They lead the development of science strategy for government whilst fostering a community of the arts and facilitating the growth of the arts and cultural sector in Queensland. They are also responsible for administering Chapter 3 of the *Water Act 2000*.

DoR – The Department of Resources are responsible for regulating the exploration and mining of mineral and land resources in Queensland.

EA – In Queensland, you need to apply for an Environmental Authority to undertake an environmentally relevant activity (ERA).

Fracking or fraccing – See *Hydraulic Fracturing*.

GFCQ/The Commission – Established as an independent statutory body in 2013, the GasFields Commission Queensland's purpose is to manage and improve the sustainable coexistence of landholders, regional communities, and the onshore gas industry in Queensland.

GISERA – CSIRO's Gas Industry Social & Environmental Research Alliance is a collaboration between CSIRO, Commonwealth and State Governments and industry established to undertake publicly reported independent research.

GWh – A gigawatt hour is a unit of energy representing one billion (1,000,000,000) watt hours and is equivalent to one million kilowatt hours.

Hydraulic Fracturing (Fraccing) – A safe and established method used by the petroleum and gas industry since the late 1940s to increase the rate and total amount of petroleum and gas extracted from reservoirs. Water, sand (99%) and household chemicals (1%) are pressure pumped into steel-encased wells to stimulate the opening of cracks in gas-bearing formations.

Hydrocarbons – Are organic compounds comprising hydrogen and carbon. Hydrocarbons are the principal constituents of oil and gas.

IAA – An immediately affected area (a subset of an LAA) is predicted to exceed the bore trigger thresholds within the next three years.

Infilling – The addition of wells in a field that decreases average well spacing. This practice both accelerates expected recovery and increases estimated ultimate recovery in heterogeneous reservoirs by improving the continuity between injectors and producers. As well spacing is decreased, the shifting well patterns alter the formation-fluid flow paths and increase sweep to areas where greater hydrocarbon saturations exist.

LAA – A UWIR identifies bores in a long-term affected area that are predicted at any time in the future to exceed the bore trigger threshold.

Landholder – Owner/occupier/lessee (e.g. rental tenant) of private land.

LNG – Liquefied natural gas. Natural gas that is cooled to -161 degrees Celsius to reduce its volume to 1/600th for the purpose of transport. To unload LNG from a vessel no processing is required as conversion back to gaseous form occurs as the temperature increases.

MGA – A Make Good Agreement is a legally binding agreement entered into by a resource tenure holder and a bore owner about a water bore. An MGA is required for all bores that have had a bore assessment undertaken (not just those with an impaired capacity).

Natural gas – Primarily methane extracted from gas-bearing underground reservoirs.

OGIA – The Office of Groundwater Impact Assessment is an independent entity established under the *Water Act 2000* responsible for assessing and managing the impacts of groundwater extraction from resource operations in CMAs (OGIA also provides advice on related matters outside CMAs).

Petajoule – One petajoule (PJ) is enough energy to power 42,000 average Australian households for one year.

Opt-out agreement – A legal agreement that enables a landholder to opt-out of negotiating a CCA, thereby allowing them flexibility to reach an agreement in a way that best suits them.

Petroleum – Liquid, gaseous and solid hydrocarbons including oil, gas, condensate, ethane, propane, butane, and pentane.



GLOSSARY

Petroleum well – For the purposes of this report, ‘petroleum wells’ refers to conventional, tight gas and shale wells.

PL – A petroleum lease gives its holder the right to explore, test for production and produce petroleum within the defined area of the lease.

PPL – To construct a petroleum pipeline outside the area of your petroleum lease, you need a petroleum pipeline licence.

Private land – Freehold land or an interest in land less than fee simple held from the State under another Act. However, land is not private land to the extent of an interest in a resource authority under a resource Act.

QEP – The Queensland Exploration Program provides a yearly schedule for exploration opportunities for petroleum and gas and coal. The program outlines the tender process and provides details on the location of each exploration tender area and the timing of each competitive tender process.

Reserve-Replacement Ratio – The reserve-replacement ratio measures the amount of proved reserves added to a resource company’s reserve base during the year, relative to the amount of gas that the company has produced. According to conventional market wisdom, when demand is stable, a resource company’s reserve-replacement ratio must be at least 100% for the company to sustain current production levels. Any figure greater than 100% likely indicates that the resource company has room for growth. Conversely, any number less than 100% telegraphs a cause for concern that the resource company may soon run out of gas.

Resource Act – The *Petroleum and Gas (Production and Safety) Act 2004*, *Petroleum Act 1923*, *Mineral and Energy Resources (Common Provisions) Act 2014*.

Resource authority – An authorisation (permit/licence) from the Queensland Government for a resource company to carry out specified activities over an area of land, including privately owned land.

Resource company – A resource authority holder or their agents or representatives.

Shale gas – Natural gas that is contained within shale formations under high pressure. Having extremely low porosity makes it difficult for gas to flow to wells. Hydraulic fracturing is commonly used in shale gas wells to increase the flow of gas from the reservoir.

Surat Cumulative Management Area (Surat CMA) – Under the *Water Act 2000*, a cumulative management area (CMA) can be declared if an area contains two or more resource tenures, including tenures on which coal seam gas (CSG) and mining activities operate, and where there may be cumulative impacts on groundwater resulting from water extraction by the tenure holders. The Surat CMA was declared in 2011 after consideration of the location of petroleum and gas operations, the geology of the area, the potential for interconnectivity between aquifers in the area and the cumulative impacts of water extraction by petroleum tenure holders.

Tight gas – A natural gas field that can be made economic with horizontal wells and/or fracture stimulation (see *hydraulic fracturing*).

Unconventional gas – Also see CSG, shale and tight gas. Unconventional gas is found in complex geological systems, with some trapped in reservoirs with poor permeability or porosity. The gas is often difficult to produce and techniques for production vary and may require innovative technological solutions for extraction.

UWIR – An underground water impact report for the Surat Cumulative Management Area assesses the groundwater impacts from resource operations in the Surat and southern Bowen basins. It also establishes strategies to manage the predicted impacts and responsibilities for implementing various aspects of the strategies.

Well Footprint – A standard single well site for conventional oil or gas will typically affect a surface area measuring 100 m x 100 m.

