



## Fact sheet: Coal seam gas and water volumes

### Key points:

- Coal seam gas (CSG) is natural gas trapped in a coal seam by water pressure.
- Decreasing the pressure on the coals by pumping water frees the CSG for production.
- Water produced from CSG is a small percentage (0.03% or 3 parts in 10,000) of water held in the Great Artesian Basin.
- About 97% of the water produced is beneficially used: 59% by agriculture, 14% by industry and 24% by reinjection in aquifers.
- Regional aquifer depressurisation models predict impacts on aquifers. Continuous data capture and monitoring is used to validate and improve these predictions.

Natural gas is held on the surface of the coal by pressure from the water in the coal seams. Pumping water from the coals decreases the pressure and enables extraction of the gas.

A CSG well produces most of its water at the start of the pumping phase. As water production declines, gas production increases. The water pumping phase is unique to CSG. But the drilling techniques, surface equipment and gas compositions are similar to conventional gas operations.

### Water volumes

The Great Artesian Basin (GAB) holds 65 million gigalitres (GL) of water.<sup>1,2</sup> Over the proposed life of the current projects, Queensland's CSG industry will produce 1,700 GL of water from coal seams – less than 0.03% of the GAB's water. This is an average of 55GL/year. By comparison, in Queensland 452 GL/year is used for agriculture, industry, urban, stock and domestic purposes.<sup>3</sup>

### Water Use by Industry / User in Queensland Compared to CSG Volumes <sup>2</sup>

Purpose	Queensland (GL/year)
Stock and domestic (pastoral)	302
Stock and domestic wastage	54
<b>Total Stock &amp; Domestic</b>	<b>356</b>
Irrigation and intensive livestock industries	30
Town water use	32
Industrial, mining, commercial and other urban uses	24
<b>Total non-S&amp;D sum</b>	<b>96</b>
<b>Total Annual Water (Use)</b>	<b>452</b>
CSG Annual Total Production	55
CSG Annual Total Non-Productive Use (3% Brine)	1.6*
CSG Production against Queensland GAB Production	12%
Total Consumption of Produced Water by CSG (brine)	0.37%

\* Total Brine Production (0.5GL/year is deducted because of re-injection of brine into aquifers)

Water from coal seams is mildly salty. It comes from deeper geological layers, and is generally not usable for agricultural purposes without desalination treatment or blending with less saline water.

<sup>1</sup> Great Artesian Basin Coordinating Committee (2014) *Great Artesian Basin Strategic Management Plan - Progress & Achievements to 2008* - [http://www.gabcc.org.au/images/DL\\_684\\_.pdf](http://www.gabcc.org.au/images/DL_684_.pdf)

<sup>2</sup> CSIRO (2008) *Background report on the Great Artesian Basin: A report to the Australian Government from the CSIRO Murray-Darling Basin Sustainable Yields Project*. Contributing author Herczeg, A.L.  
[www.clw.csiro.au/publications/waterforahealthycountry/mdbsty/technical/S-GreatArtesianBasin.pdf](http://www.clw.csiro.au/publications/waterforahealthycountry/mdbsty/technical/S-GreatArtesianBasin.pdf)

<sup>3</sup> Great Artesian Basin Coordinating Committee (2010) *Great Artesian Basin Resource Study Update, 2010*



### Treatment and use of Queensland CSG water production:

- 97% is treated and desalinated
- 59% is made available for agricultural purposes
- 24% is reinjected into underground aquifers
- 14% is used for industrial purposes such as mining, roads and construction
- 3% remains as brine or salt.<sup>4</sup>

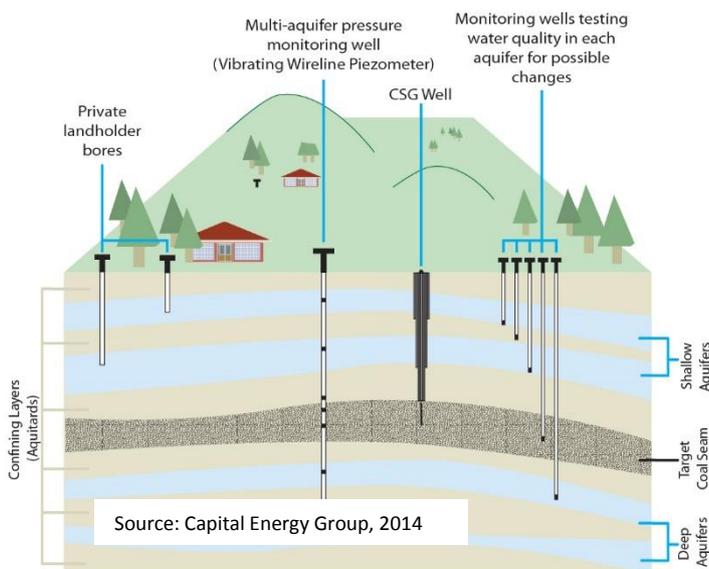
Treated CSG production water can be used as a substitute for water taken from the GAB's shallower, less saline aquifers. This in itself will help recharge these shallow aquifers over time.

### Domestic aquifers and CSG wells

Producing water from a CSG well reduces water pressure in nearby geological formations..

In 2012, the Queensland Government commissioned the *Surat Underground Water Impact Report*.<sup>5</sup> This forecasts the expected level of impacts across the "Surat Cumulative Management Area", which covers an area the size of Germany. The report collated information on regional aquifers, existing water bores and petroleum wells – as well as planned, but not yet drilled, wells – to identify "immediately affected areas" and "long-term affected areas".

### CSG wells, landholder and groundwater monitoring bores



An immediately affected area is where water level impacts will exceed a nominated threshold level within a three-year period.

Long-term affected areas are those that will be affected at any time in the future.

The threshold levels are a decline greater than 5 metres in sandstone aquifers and greater than 3 metres in sand aquifers.

Gas companies have installed monitoring wells to detect changes in pressure or chemistry in aquifers in their permit areas. Queensland's Office of Groundwater Impact Assessment (OGIA<sup>6</sup>) receives this data every six months.<sup>5</sup>

There are 21,000 private water bores in the Surat Cumulative Management Area. It was found that only 85 bores (0.4%) would be immediately affected, and another 528 (2.51%) would be affected in the long-term.<sup>4</sup> Most of the affected bores draw water from the same coals used for gas production.

Gas producers are required to "make-good" on any decline in bore level by providing alternative water supplies to landholders. This may include drilling deeper bores or supplying treated water.<sup>4</sup>

The Surat Underground Water Impact Report is required to be updated every three years. The next report – due in 2015 – will incorporate the next level of modelling, using new monitoring points and company data to enhance knowledge of possible impacts on groundwater users.

<sup>4</sup> Department of Trade and Investment Queensland, 2014. *Queensland Resources Under Construction: Queensland LNG*

<sup>5</sup> <https://www.dnrm.qld.gov.au/ogia/surat-underground-water-impact-report>

<sup>6</sup> <https://www.dnrm.qld.gov.au/ogia/role>