

Tight gas and coal seam gas: similarities and differences

Coal seam gas (CSG) has been produced commercially in Queensland for about two decades, with a large established industry in the Surat and Bowen basins.

Tight gas and tight oil development is at a much earlier stage in Queensland. There has not yet been any commercial production of tight gas or oil in the state.

The regulatory framework that applies to both is largely the same, but the two resources differ in geology, production method, water management and what they mean in practice for landholders.

What do they have in common?

Both tight gas and CSG are forms of natural gas (primarily methane). Tight gas can be also associated with tight oil. Both are found in onshore sedimentary basins. Companies need approvals under the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) to explore for and produce either resource.

Both are subject to the land access and compensation framework provided by the *Mineral and Energy Resources (Common Provisions) Act 2014* and the Land Access Code 2023.

A Conduct and Compensation Agreement (CCA) must be negotiated before a company can undertake advanced activities on private land for either resource type.

For both types of gas development:

- make good obligations may apply where companies operate on private land if a water bore is affected by nearby extraction activities
- an Environmental Authority sets conditions for managing environmental impacts
- surface infrastructure may include wells, access tracks, pipelines, and other infrastructure, such as compression facilities and ponds
- horizontal drilling may be used. This is where the wellbore is drilled vertically towards the target depth, then curved to run horizontally through the gas-bearing formation. This allows more of the target underground resource to be accessed from the surface location.

How are they different?

Depth and geology

CSG is found in coal seams, commonly between 200 and 800 metres below the surface, while tight gas and oil resources are generally much deeper – around 2000 metres or more below the surface.

In the Taroom Trough, a geological formation that forms part of Queensland's Bowen Basin, the target sandstone formations are below 2500 metres. This means tight gas and oil extraction activities generally occur much deeper than the Surat Basin groundwater systems, part of the Great Artesian Basin, commonly used by local landholders and communities. Between the shallower groundwater yielding aquifers and the target rock are thick layers of low-permeability rock.

Production method

CSG is produced by pumping water out of coal seams, which reduces pressure and allows the gas to flow into the well and up to the surface.

Tight gas and oil, however, almost always requires the use of hydraulic fracturing to create pathways for the gas and oil to flow through the low-permeability rocks to the well.

Water use and management

Production of CSG results in water from coals seams, known as produced water, coming to the surface. This produced water may be reused for an approved purpose.



Produced water can be reused for an approved purpose.

Because coal seams occur close to tapped aquifers, there have been concerns about impacts to groundwater levels in the Great Artesian Basin. These potential impacts are assessed and monitored under Queensland's groundwater management framework.

Tight gas projects may require significant volumes of water during drilling and hydraulic fracturing.

A key consideration is where this water will come from and how its use will be managed.

Some of the water used in hydraulic fracturing is recovered as flowback water. This water may contain fluids used during hydraulic fracturing and other dissolved materials from deep underground. The amount recovered can vary (usually between 10-50%) and strict requirements apply to how this water is stored, monitored, treated, reused, or disposed of.

For more information on water, see the accompanying fact sheet on *Managing potential environmental impacts*.

Size and scale

CSG projects involve many single wells across large areas, commonly at spacings of 700 to 800 metres. Tight gas and oil projects are likely to require less surface disturbance where multiple horizontal wells are able to be drilled from one pad accessing more reservoir rocks per well than vertical CSG wells. Multiple wells may be drilled from one pad, allowing a larger underground area to be reached from a single surface location. These well pads typically require a larger rig and are much larger in area than single CSG well pads (some CSG well pads also have multiple wells).

Hydraulic fracturing operations for tight gas are usually larger than those used for CSG, requiring more water and sand (known as proppant), larger equipment and storage areas, and more vehicles.

The larger scale of tight gas and oil operations reflects the greater depths, deeper wells and lower-permeability rock involved.

Stage of development

CSG is a mature commercial industry in Queensland. It has established supply chains, operating practices, and a significant history of agreements between companies and landholders.

Tight gas and oil are produced commercially in several locations overseas. In Queensland, however, tight gas and oil development remains at the exploration and appraisal stage. There has not yet been commercial production.

What this means for landholders

Legal rights and protections for landholders are the same for both resource types. A gas company must comply with the Land Access Code 2023 and the Mineral and Energy Resources Common Provisions Act. It needs to also negotiate a CCA with the landholder before advanced activities begin.

Compensation is assessed on impacts of the resource activities on the landholder's property and business.

Native Title rights and interests are addressed under relevant Queensland and Commonwealth laws. Companies may also enter into other voluntary agreements with Traditional Owners.

In practice, tight gas and oil activities will differ from CSG activities in a number of ways:

- individual well sites for tight oil and gas may be larger and more intensive, but further apart
- fewer well sites may be needed
- larger drilling rigs and horizontal drilling
- there may be more truck and vehicle movements during drilling and facility construction (and less during production)
- uses rather than produces volumes of water
- exploration and appraisal may continue for several years before a company decides to proceed with commercial development
- groundwater bore impacts may be less common due to depth and separation from shallower aquifers used by communities and agriculture.

Though it is early days, there is much to draw on in terms of experience from CSG in agreement making. However, landholders should always seek independent information and advice before entering into an agreement.

Where can I find out more?

Contact Coexistence Queensland on 1300 548 021 or visit www.cqld.org.au. The Office of the Coordinator-General is also developing a [Taroom Trough Development Plan](#).

Useful resources

- [Coexistence Queensland tight gas and oil factsheet series](#)
- [Understanding groundwater impact, Office of Groundwater Impact Assessment](#)
- [Queensland Government Taroom Trough Development Plan](#)
- [Environment and water, Queensland Government](#)
- [Native Title for mining and resources](#)