

Tight gas and oil: what is it and where is it found in Queensland?

Natural gas forms from the remains of ancient plants, algae, and marine organisms that have been buried by layers of rocks over millions of years. Increasing temperature and pressure gradually transform the organic matter into hydrocarbons, such as oil and natural gas.

Because it is buoyant, the gas will gradually move upward, limited only by how many pores or cracks are in the rock it passes through – a concept known as rock permeability. Gas movement slows when the rocks have fewer pores and becomes trapped if it encounters an impermeable rock layer, known as a seal.

Tight gas refers to natural gas that is held in low-permeability rock formations, typically more than 2000 metres below the surface. These formations can also contain oil and other hydrocarbons, called condensates, or wet gas.

What is tight gas and oil?

“Tight” is used to describe low-permeability rock formations (where the pore spaces are tiny and poorly connected) that restrict the ability of gas and liquids to move through the rock. The lower the permeability the more difficult it is for gas and liquids to flow from the rock formation into the wellbore to be produced. Extracting the gas and liquids therefore requires improving the permeability and/or accessing more of the formation from the wellbore. This is often achieved through a combination of horizontal drilling and hydraulic fracture stimulation.

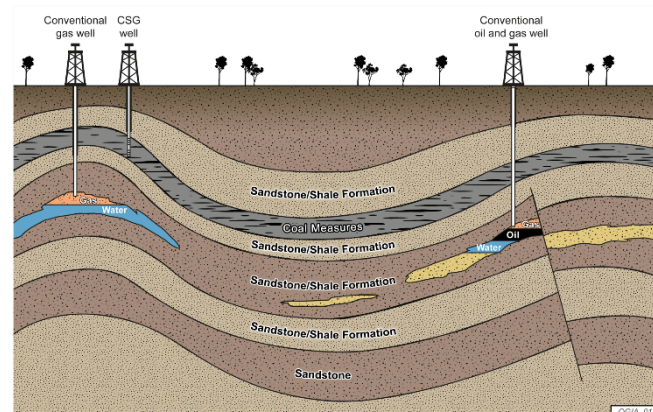
Tight gas is one of several types of unconventional resources. These require different methods of production to conventional resources. Tight gas properties can range from dry gas (predominantly methane) to wet gas which contains Liquid Petroleum Gas (LPGs) and gas condensates.

Other unconventional resources include shale gas and oil, coal seam gas (CSG), basin-centred gas or deep coals. Of note, many basin-centred gas resources are also tight gas resources. The key difference is that tight gas describes the rock, while basin-centred gas describes the type of gas accumulation.

Tight gas compared to conventional gas and CSG

Conventional gas has migrated upward from source rocks and collected in more permeable rock beneath a very low permeability rock layer which forms a seal to prevent it from flowing towards the surface. As the permeability of the formation is high, the gas flows to a drilled well without much assistance, which is why it has been produced economically for decades.

CSG is gas held in coal seams typically between 200 to 800 metres below the surface. The gas is not sitting in open pores like in a conventional gas reservoir but is attached to the vast internal surface area of the coal. The gas detaches when the pressure in the coal is reduced by pumping water from the seam. It then flows to the well. CSG production is a mature commercial industry in Queensland.



*Types of oil and gas accumulation and development
(source: OGIA)*

Queensland's tight gas and oil basins

Queensland has potential tight gas (and liquid) resources across several basins at different stages of exploration.

The Taroom Trough, in the deepest part of the southern Bowen Basin, contains formations at depths of 2000 to 5000 metres or more. The Queensland Government has publicly described the Taroom Trough as one of the most prospective onshore oil and gas exploration regions in Australia, with operator-reported results from drilling programs in 2024-26 indicating the presence of oil, condensates and gas.

The Cooper, Surat, Bowen and Eromanga Basins, spanning south-westerly across Queensland to the South Australia border, have a long history of conventional oil and gas production.

They also contain tight gas and oil and shale gas resources assessed under the Australian Government's Geological and Bioregional Assessment program.

The Adavale Basin in central-western Queensland has known petroleum potential and has featured in recent exploration tender releases. The north-west Queensland region has been identified as having potential shale and tight gas resources, though exploration there is at a very early stage.

Resources and the current state of play

Tight gas and oil resources in Queensland are not yet confirmed as commercially viable. They are generally classified as Contingent or Prospective resources. Prospective resources are estimates of quantities that are believed to exist, inferred from geological models and seismic data.

Contingent resources have been confirmed by drilling but whether they can be produced commercially depends on contingencies and therefore remains uncertain. Common contingencies include the need for additional appraisal drilling, uncertain economics, lack of infrastructure, regulatory approvals and technology or market limitations.

Whether tight gas and oil develops into a producing industry will depend on demonstrating commercially viable production rates from ongoing exploration and appraisal drilling, developing an effective production technology, regulatory approvals, environmental assessments and meeting market conditions.

Energy context

Queensland's gas supply comes primarily from CSG in the Surat and Bowen basins. Those fields were developed on the back of being able to supply export markets, with liquefaction plants built at Gladstone to ship gas overseas. The development of these CSG projects enabled domestic consumers to also be supplied together with ongoing conventional and unconventional gas production from other Queensland basins.

The Queensland Government has released new exploration acreage in potential tight gas and oil areas as part of its energy strategy to maintain and boost production, though commercial development remains some years away.

Regulation

Tight gas and oil is regulated under the same framework as other onshore petroleum activities. Key legislation includes the Petroleum and Gas (Production and Safety) Act 2004, Petroleum and Gas (Safety) Regulation 2018, and Petroleum and Gas (General Provisions) Regulation 2017, which together cover tenures and operations.

Well engineering is governed by the Code of Practice for the Construction and Abandonment of Petroleum Wells and Associated Bores in Queensland (RSHQ, 2019). The Environmental Protection Act 1994 (Qld) requires an Environment Authority before operations begin.

The Water Act 2000 (Qld) (Chapter 3), administered by DETSI, in relation to petroleum underground water obligations, governs groundwater protection supported by the independent assessment and management of cumulative groundwater impacts by the Office of Groundwater Impact Assessment (OGIA) in the Surat Cumulative Management Area (CMA). The Mineral and Energy Resources (Common Provisions) Act 2014 governs land access and compensation.

Where can I find out more?

Contact Coexistence Queensland on 1300 548 021 or visit www.cqld.org.au. Queensland.

Government's [GeoResGlobe tool](#) shows current petroleum tenures and well locations across the state.

Tools available on OGIA's website also show water bores and locations of petroleum and gas wells together with a groundwater monitoring network.

Useful resources

- [Coexistence Queensland tight gas and oil factsheet series](#)
- [Queensland Government Taroom Trough Development Plan](#)
- [The Office of Groundwater Impact Assessment](#)
- [Environment and water, Queensland Government](#)
- [Petroleum and gas: Queensland is a global powerhouse](#)
- [The Gas Guide, Coexistence Queensland](#)