



## Conventional and unconventional gas

### Introduction

In NSW the gas industry is regulated by laws that control the exploration, assessment and production of the state's vast natural gas reserves.

Under the [NSW Gas Plan](#), the NSW Environment Protection Authority is the lead environmental regulator for all gas activities in NSW. All gas activities in NSW are required to hold an environment protection licence (EPL) issued by the EPA that sets out legally enforceable, site-specific conditions and controls. Licence holders must comply with these conditions and controls in order to prevent and minimise pollution and safeguard the environment.

The primary pieces of legislation governing gas activities in NSW are the [Petroleum \(Onshore\) Act 1991 \(PO Act\)](#) and the [Protection of the Environment Operations Act 1997 \(POEO Act\)](#). Under both of these pieces of legislation, all gas related activities are grouped together and defined as petroleum. The PO Act defines petroleum as any naturally occurring hydrocarbon or mixture of hydrocarbons, whether in a gaseous, liquid or solid state. It also includes naturally occurring hydrocarbons in a gaseous, liquid or solid state when mixed with one or more of the following: hydrogen sulphide, nitrogen, helium, carbon dioxide and water.

This fact sheet contains an introduction to the geological differences between gas (petroleum) sources found in NSW. These are commonly referred to as conventional and unconventional gas reserves.

### Conventional and unconventional gas

There are several types of geological formations that trap naturally occurring gas. They are categorised as either 'conventional' or 'unconventional' gas reserves.

#### Conventional

Conventional gas is trapped in naturally porous reservoir formations that are capped with impermeable rock strata. When intercepted by a well, gas is able to move to the surface without the need to pump.

#### Unconventional

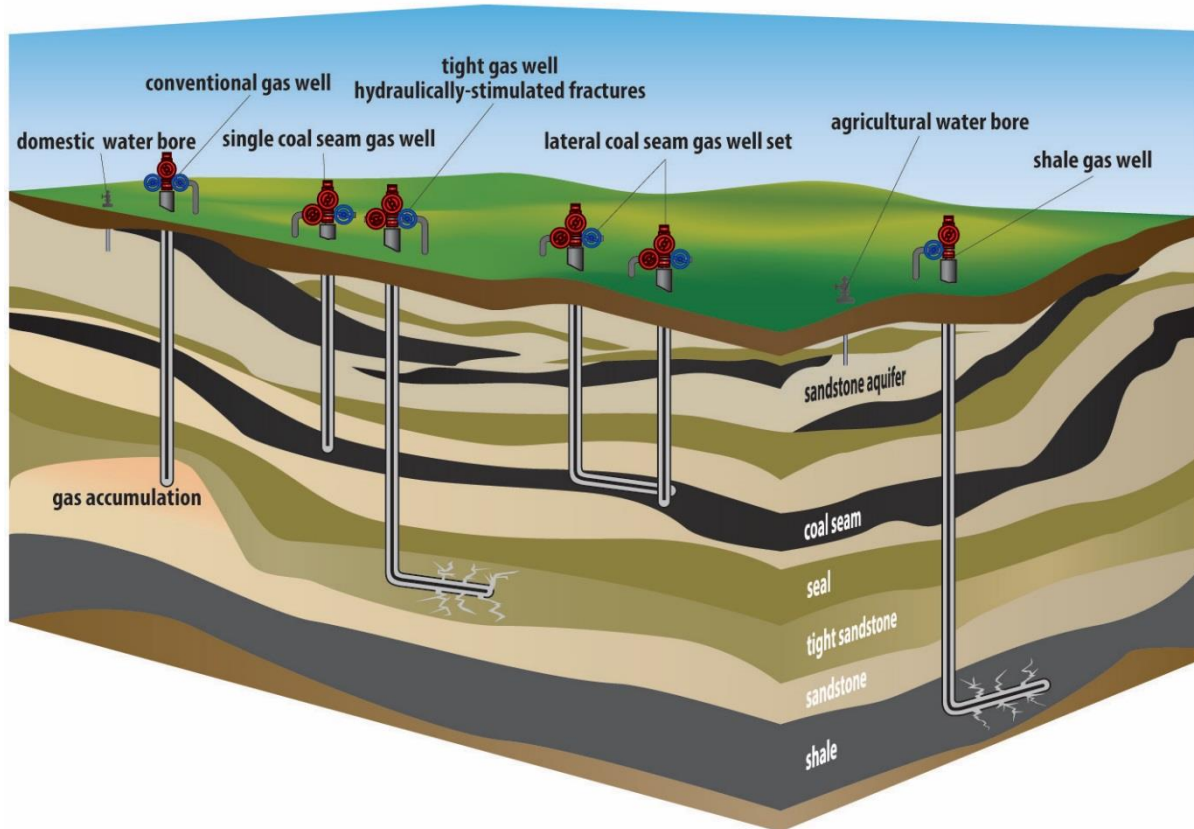
Unconventional gas is formed in more complex geological formations which limit the ability of gas to migrate and therefore different methods are required to extract the gas.

There are several types of unconventional gas, including shale gas and tight gas, which occur in reservoirs with very low permeability compared to conventional reservoirs. In these geological formations, horizontal drilling and hydraulic fracturing are often necessary for economic gas extraction.

The other form of unconventional gas is coal seam gas, where methane gas is trapped within the coal seam under pressure by overlying formations. To extract the gas, a steel-encased well is drilled vertically into the coal seam at which point the well may also be hydraulically fracture stimulated or drilled horizontally along the coal seam to increase access to the gas reserves.

## Sources of petroleum gas

When the coal seam is de-watered, the pressure is released, allowing the methane to escape the coal formation by flowing through the cleats and fractures in the coal seam back to the gas well.



**Illustration of typical geological conventional and unconventional gas formations in NSW**

In NSW, coal seams can generally be found at depths ranging between 300 and 1000 metres. Shale and tight gas are typically found at a depth greater than 1000 metres.

With advancements in technology, unconventional gas extraction has become a popular source of natural gas, and can now be captured and used as an energy source.

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