# 1960’s: Introduction to Territory onshore natural gas

Onshore gas has played a major role in the Territory economy since the discovery of the inaugural fields in Central Australia in the 1960s.

The Territory’s abundant onshore gas resources remains one of our strongest competitive advantages and will play an essential role as a transition fuel in our journey to a net zero-emissions future.

There are various types of onshore gas in the NT, but they are extracted from two types of reservoirs: **conventional** and **unconventional**.

## Conventional gas extraction

Conventional gas largely consist of porous sandstone formations capped by impermeable rock, with the gas stored at high pressure. Conventional gas easily flows to the production well and the surface under natural high pressure. Sometimes fracture stimulation (hydraulic fracturing) is needed. This extraction typically involves vertical drilling.

## Unconventional gas extraction

Unconventional Shale gas occurs within rock formations under high pressure. These rock formations have extremely low porosity requiring hydraulic stimulation (hydraulic fracturing) to enable gas to flow from the reservoir to the wells. This extraction involves vertical AND horizontal drilling and the use of fracture fluids.

The Territory produces conventional gas from 3 fields in the Amadeus Basin in Central Australia (Mereenie, Palm Valley and Dingo) for local and interstate use.

Shale gas exploration is occurring in the resource rich Beetaloo Sub-basin in the Barkly Region for local and interstate use plus export.

# History: The Territory’s onshore natural gas history

* **1960:** Natural gas discovered – Palm Valley field.
* **1963:** Natural gas discovered – Mereenie field.
* **1973:** First conventional gas well fracture stimulation.
* **1980s:** Shale gas identified in Beetaloo Sub-basin.
* **1983:** Supply of natural gas to Ron Goodwin Power Station (Alice Springs).
* **1984:** Mereenie field commenced production.
* **1987:** Built: Amadeus gas pipeline.
* **2000:** Exploration begins in Beetaloo Sub-basin.
* **2011:** First unconventional gas well fracture stimulation.
* **2016:** Moratorium begins for onshore unconventional gas activity.
* **2018:** Moratorium lifted. 135 Pepper Inquiry recommendations accepted by NT Government.
* **2019:** Northern Gas Pipeline commissioned (Tennant Creek – Mt Isa) and Tanami gas pipeline commenced operation.
* **2019:** Santos first gas flow at Beetaloo Sub-basin. Exploration recommenced after completing 31 Pepper Inquiry recommendations.
* **2023:** Hydraulic Fracturing Final Implementation Report released meaning applications for production licences in Beetaloo Sub-basin can be made.

# Onshore natural gas fracture stimulation in the Territory

* **1973:** **Conventional** fracture stimulation used in the NT since 1973.
* **2011:** **Unconventional** fracture stimulation used in the NT since 2011.
* More than 50 wells have been fracture stimulated in the NT.
* 50 years of fracture stimulation in the NT.
* Most contemporary onshore gas extraction regulation in Australia:
	+ water
	+ soil
	+ flora and fauna
	+ air quality
	+ health
	+ culture and heritage.

# Onshore natural gas basins in the Territory

* **Current production:** Amadeus Basin in Central Australia (Mereenie, Palm Valley and Dingo) – local and interstate use.
* **Current exploration:** Beetaloo Sub-basin – for local and interstate use plus export.
* **Prospects:** McArthur Basin.
* **Mostly unexplored prospects:** Pedrika Basin and Georgina Basin.

The NT Government has a reserved block policy that safeguards towns, parks, reserves and areas of high ecological value from onshore gas activity.

* **Producing basins:** 482 Billion Cubic Feet (BCF). Amadeus Basin has produced almost 500 BCF over its life creating vital local jobs and significant economy activity for the NT.
* **Current exploration:** 500 Trillion Cubic Feet (TCF). Beetaloo Sub-Basin has enough estimated unconventional gas in a single layer to supply Australia’s energy and manufacturing demand for 1,000 years.

Beetaloo Sub-basin is expected to produce 13,000+ jobs and $17+ billion in economic activity in the NT over 25 years.

# Strict regulations for unconventional onshore gas extraction

The independent Scientific Inquiry into Hydraulic Fracturing in the NT provided its final report in March 2018. It found that environmental, social, cultural and economic risks could be sufficiently mitigated if **135 recommendations** (**that became 138**) were implemented.

In May 2023, the NT Government released the Final Implementation Report detailing actions undertaken to fulfil all recommendations and create a robust regulatory and monitoring framework that meets community expectations.

This implementation response has concluded and companies can now apply for production approvals.

*The NT Government also completed a world-class Strategic Regional Environmental and Baseline Assessment (SREBA) into Beetaloo Sub-basin to inform decision making and monitoring.*

## All 138 Inquiry recommendations implemented to mitigate risks from Hydraulic Fracturing in 10 focus areas

1. Strengthening of the regulatory environment
2. Addressing a lack of knowledge
3. Safeguarding water resources
4. Protecting landscapes
5. Preserving the natural environment
6. Improving the health of local communities
7. Mitigating the contribution to climate change
8. Embedding Aboriginal people and their culture in all considerations
9. Enhancing the wellbeing of local communities
10. Ensuring local communities receive economic benefits

## 4 Years

Extensive 4+ year implementation of Inquiry recommendations.

## Independent Officer

Dr. David Ritchie oversaw and reported on implementation of 138 recommendations.

# How is unconventional natural gas extracted?

[Description of graphic]

Water is pumped from a transported water source and mixed with sand and additives to make fracture fluid.

This fluid is then pumped down through the well, which have casing on its walls to prevent leaks into ground water or earth, and down into the shale rock at a depth of more than 1000m.

The fluid then travels along a horizontal well in the shale gas reservoir.

**Safeguarding geology:** Well walls are cased and cemented to prevent leaks.

**Safeguarding groundwater**: Well bores that pass through aquifers (water), must have multiple barriers to prevent leaks

A typical well is 20cm in width. This is the length of an average adult tooth brush.

# What is fracture fluid?

* 99.5% Water + Sand
* 0.5% Additives – commonly found in:
	+ Household cleaning products
	+ Hair products
	+ Food additives.

# Is onshore natural gas fracture stimulation safe?

There is no evidence that fracture stimulation in Australia has caused serious environmental harm.

In the NT, the independent Scientific Inquiry into Hydraulic Fracturing found that risks could be sufficiently mitigated if all 135 recommendations (that became 138) were implemented. All have been implemented to create a new regulatory environment.

The NT Government also completed a world-class Strategic Regional Environmental and Baseline Assessment (SREBA) into Beetaloo Sub-basin to inform decision making and monitoring.

* Wells that go through aquifers must have multiple layers of steel casing and cement to stop leaks.
* Operators monitor the containment of wells using high-tech equipment and have strict report rules.
* Casing and cement in drilling wells is pressure-tested for leaks before being used.
* Unconventional gas extraction is different to coal seam mining (which doesn’t occur in the NT).

# The benefits and economic potential.

* Local, National and International energy security for households and business:
	+ Guaranteed supply
	+ Lower costs
* Billions of dollars into NT and Australian economies
* One layer of Beetaloo Sub-basin alone could deliver $17+ billion economic activity to the NT over 25 years
* Thousands of local jobs + Indigenous community benefits
	+ Local jobs
	+ Business partnerships
* Regional development
	+ Better roads
	+ More services
	+ New supply chains
	+ More economic opportunities
* Reduced emissions (Gas as a transition fuel to renewable energy)
	+ Aligns with National and NT ‘net-zero by 2050’ target
	+ Supports growing international demand for cleaner, affordable transition fuel

# Onshore gas supports the Territory’s transition to net-zero emissions by 2050

Natural gas is a cleaner, reliable and stable source of energy as we transition to 100% renewables sources (ie. solar and wind).

* 30% less carbon emissions than oil
* 45% less carbon emissions than coal

**Fact:** While uptake is growing, renewable energy supplies cannot currently meet household demands for heating and electricity.

**Fact:** While uptake is growing, renewable energy supplies cannot currently meet business demands for power generation.

**Fact:** Natural gas is the cleaner, reliable and stable option to meet current energy demands. Importantly, it is also used to make other lower-emission fuels like Hydrogen.

**Fact:** Natural gas is also used in the manufacturing process of zero-emission renewable energy products like:

* Solar panels
* Wind turbines
* Magnets and batteries

# How are onshore gas activities approved?

## Environment Management Plan Approval Process

Before onshore unconventional natural gas extraction activities can occur in the NT, companies must submit an Environment Management Plan (EMP) that describes what they propose to do, where they propose to do it, what the potential impacts might be, and how these will be avoided or minimised.

The Minister for Environment considers all these things before making a decision to approve an EMP under the Petroleum (Environment) Regulations 2016. An EMP can only be approved if impacts are minimised to acceptable levels. This process was made more robust as part of the Independent Scientific Inquiry into Hydraulic Fracturing.

**Environment Management Plans must consider many impacts**

* Stakeholder Engagement
* Water Protection
* Environment impacts are minimised
* Cultural Heritage is protected
* Site rehabilitation
* Greenhouse gases reduced and offset

For more information visit: [hydraulicfracturing.nt.gov.au](https://hydraulicfracturing.nt.gov.au)