



Government of **Western Australia**  
Department of **Mines and Petroleum**

# The Facts

about natural gas and  
fracture stimulation in  
Western Australia

# Foreword



The Department of Mines and Petroleum (DMP) is committed to building confidence with stakeholders through early community engagement and communication for the emerging shale and tight gas industry.

This brochure 'The Facts about natural gas and fracture stimulation in Western Australia' provides concise and factual information for stakeholders in an easy to read format.

DMP aims to build and foster positive relations by ensuring the community is kept informed of industry initiatives in Western Australia, and that their issues and concerns are noted, understood, and if appropriate acted on.

Differences between coal seam, tight and shale gas are significant, primarily related to well construction, water use and depth of well operations. Hydraulic fracture stimulation has been undertaken in Western Australia for more than 55 years, without incident.

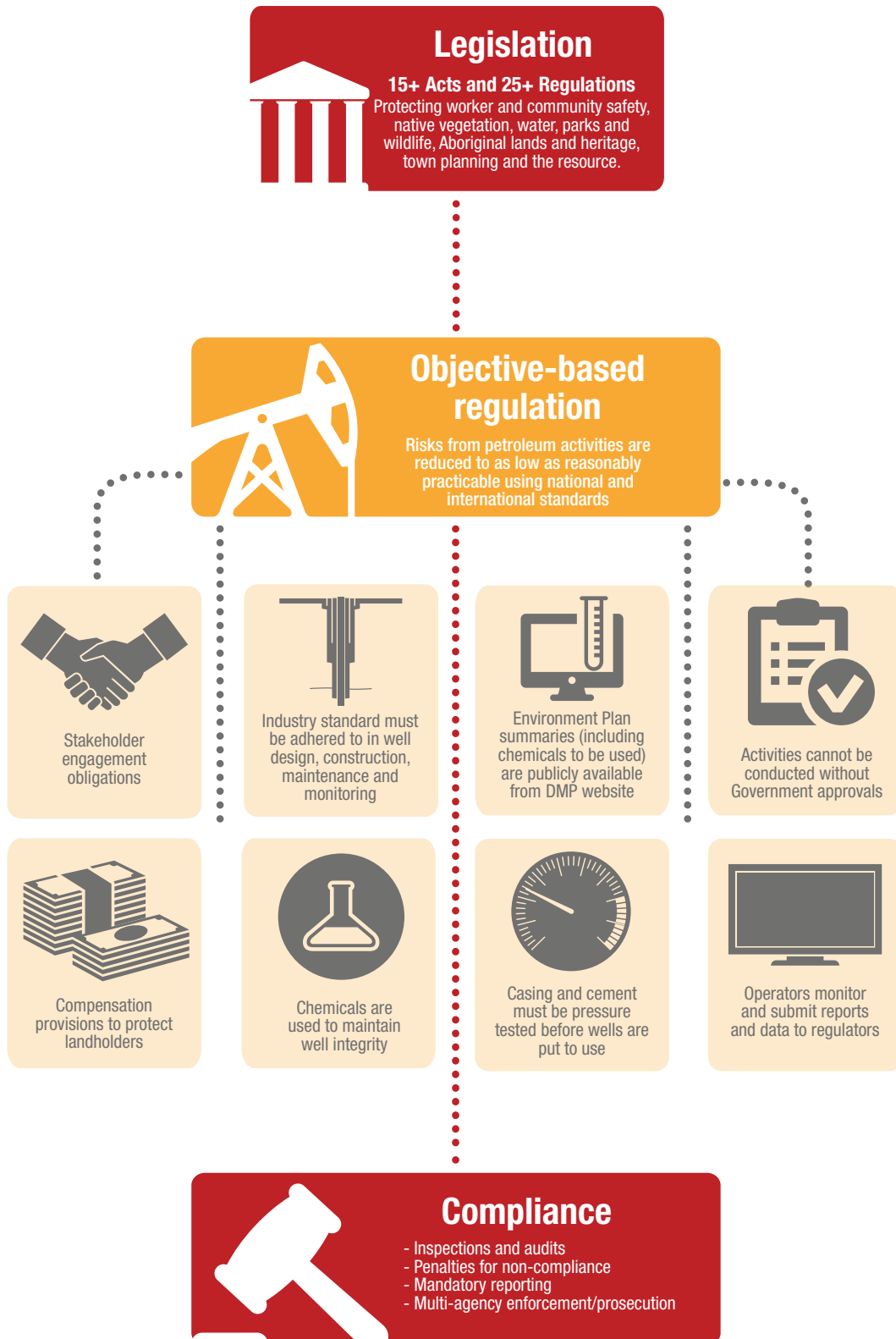
There is no evidence to date that fracture stimulation in Western Australia has led to any environmental harm, and DMP's robust multi-agency approach for the management of this emerging industry will ensure approvals and conditions are complied with into the future.

This brochure provides a 'snap shot' of the shale and tight gas industry and provides details where readers can obtain more comprehensive information regarding this emerging industry.

**Jeff Haworth**  
Executive Director  
Petroleum Division

# How we regulate

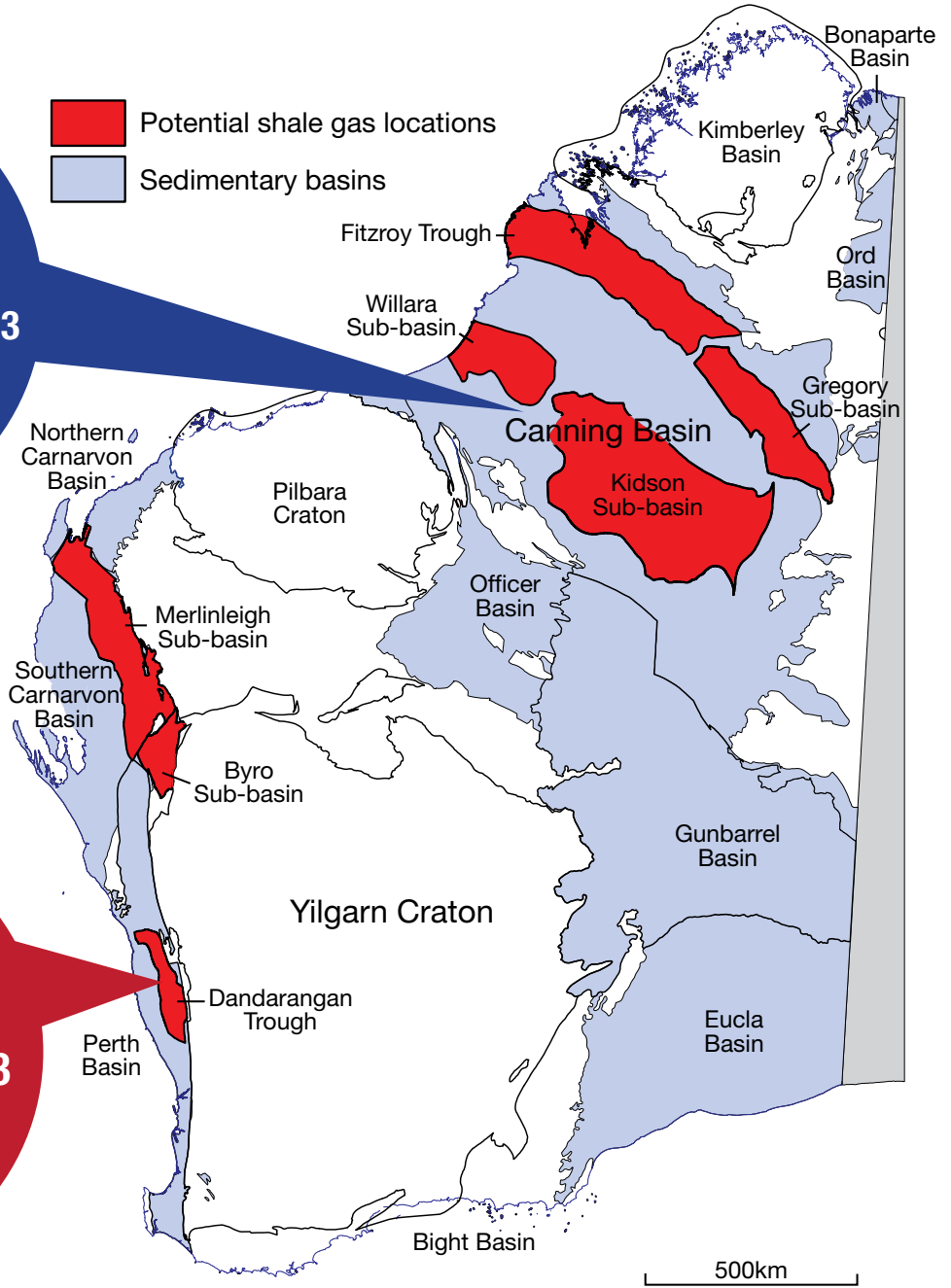
Under Western Australian petroleum law, petroleum activities must not unduly interfere with other land uses such as agriculture, tourism or the natural environment, including water sources.



# Where is the natural gas and oil onshore in WA?

Estimate  
**27,700 Gm<sup>3</sup>**  
 (1000 Tcf)  
**2000-4200 Gm<sup>3</sup>**  
 (73-147 Tcf)  
 could be  
 recoverable

Estimate  
**6300 Gm<sup>3</sup>**  
 (220 Tcf)  
**480-960 Gm<sup>3</sup>**  
 (17-34 Tcf)  
 could be  
 recoverable



Gm<sup>3</sup> = Giga or billion cubic metres.  
 Metric unit of measure for  
 volumes of natural gas.

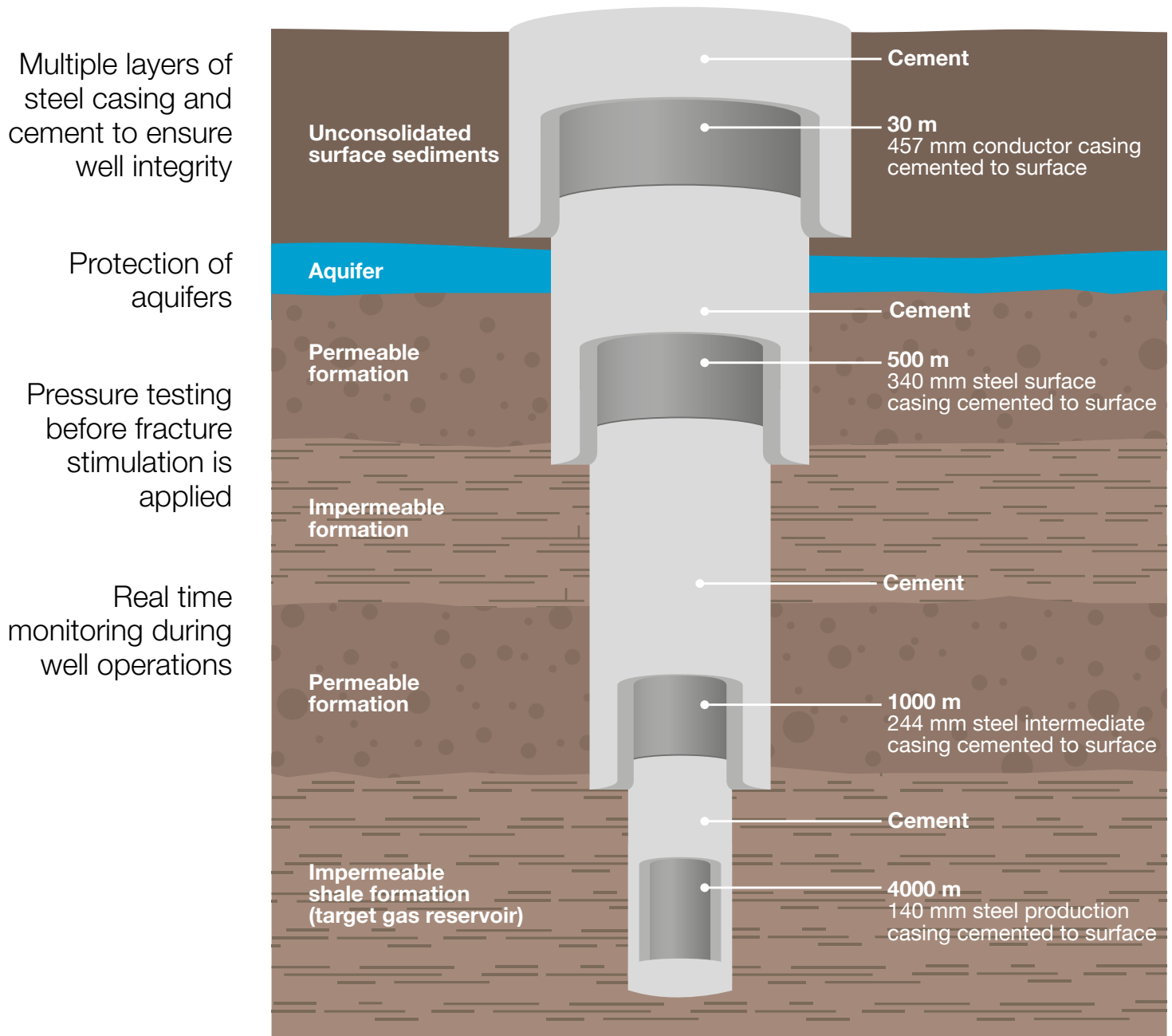
**28 Gm<sup>3</sup> (1 Tcf) is enough energy to supply a city of one million people with electricity for 20 years.**

Western Australia currently produces around 28 Gm<sup>3</sup> of gas per year, mostly from the offshore.

# What is the difference between coal seam, tight and shale gas?

Coal Seam Gas	Tight Gas	Shale Gas
Found in coal seams (adsorbed or absorbed). Coal seam gas is not found in WA	Found in sandstone or carbonate	Found in shale
Depths 300–1000 metres	Depths 2000–4000 metres	Depths 2000–4000 metres
Close proximity to groundwater	Separated from potable aquifers by hundreds to thousands of metres of impermeable rock	Separated from potable aquifers by hundreds to thousands of metres of impermeable rock
Dewatering of coal seam for gas flow / production	Hydraulic fracture stimulation may be required to test oil and gas production from tight reservoir	Hydraulic fracture stimulation required to test oil and gas production from shale
Associated with hundreds to thousands of wells for a field development	Modest surface footprint, targeting petroleum accumulations	Modest surface footprint, with multi well drilling from one pad

# How are wells constructed?



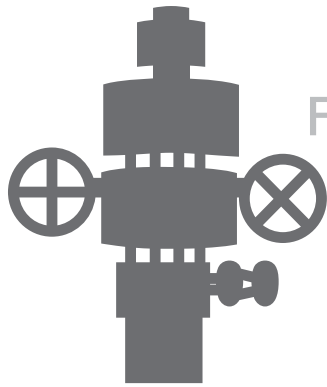
The hole drilled in the ground is equal to the width of approximately 20 centimetres



# The history of fracture stimulation in Western Australia

# 55+ Years

## Fracture Stimulation

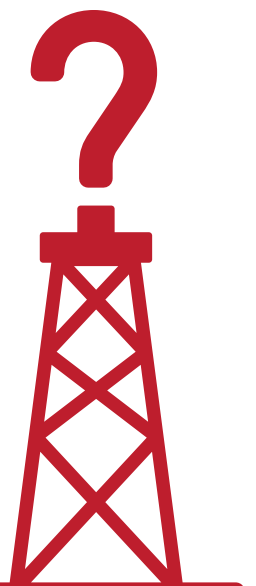


Fracture stimulation  
first occurred  
in WA in  
**1958**

Commercial success  
from exploration is

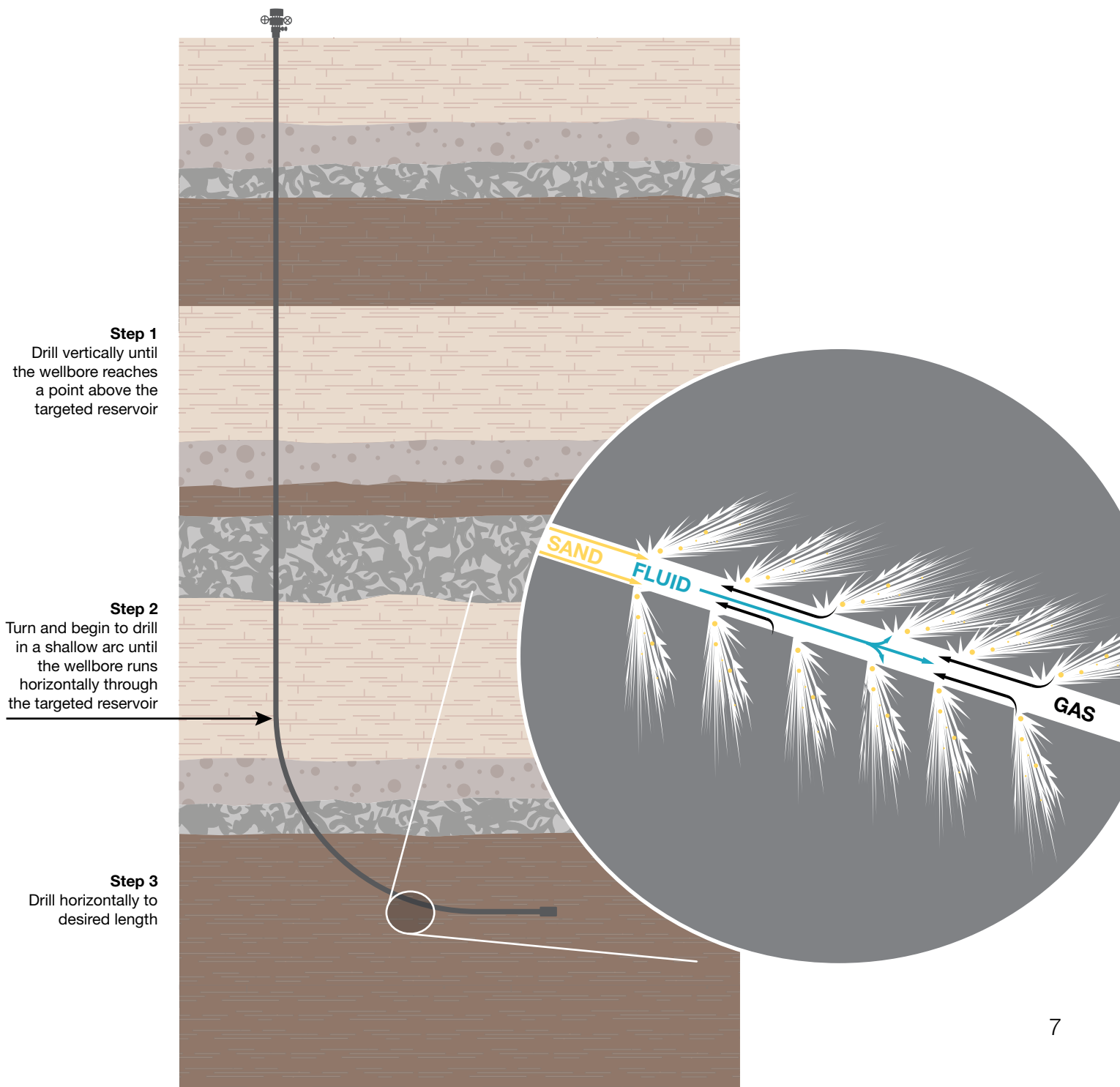
**not certain**

\$ \$ \$



# What is fracture stimulation?

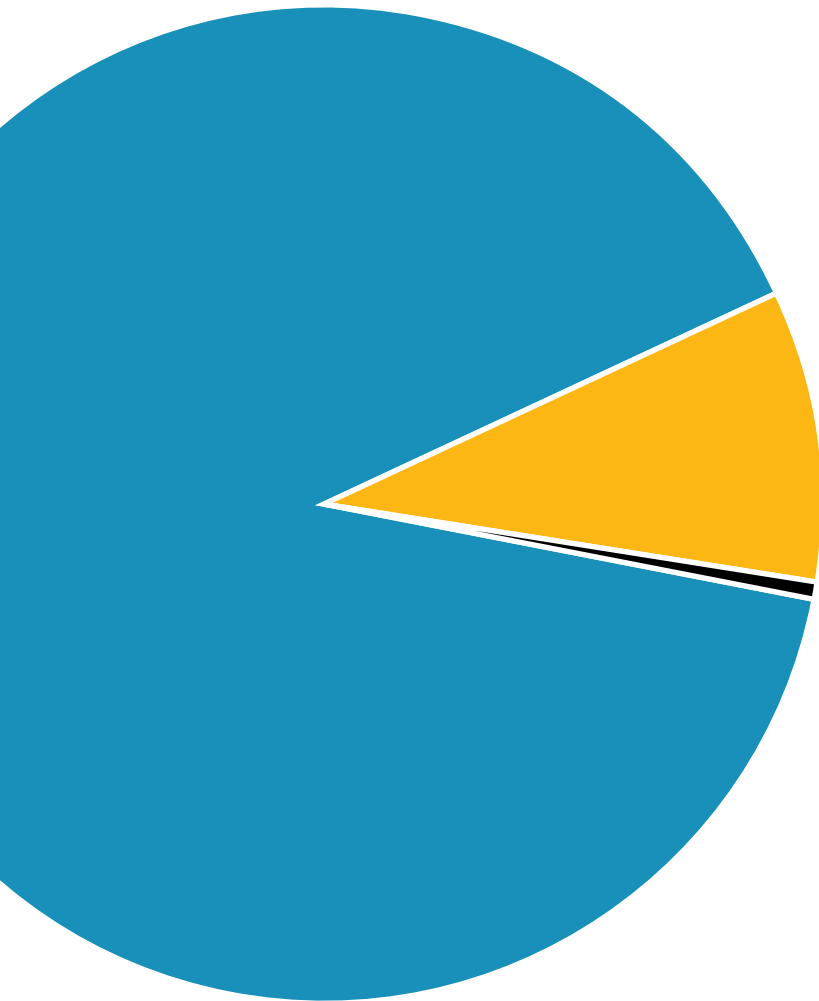
Hydraulic fracture stimulation involves pumping fluids and “proppants” (solid material such as sand or ceramic beads) into a low-permeability rock under high pressure to create fine fractures.





# What fluids are used during fracture stimulation?

Typically the fluid is about 90 per cent water with 9.5 per cent proppant (sand or ceramic beads), which is designed to keep the fractures open. The remaining 0.5 per cent is made up of chemical additives.



**90% water**

**9.5% proppant**

to hold the fractures in the rock formation open for gas to flow

**0.5% chemical additives**

to improve transportation of proppant and prevent bacteria and corrosion

Ratio of water volumes required for drilling and fracture stimulation represented as Olympic-sized swimming pools.



vertical drilling and fracture stimulation  
**3x**  
olympic size swimming pools

horizontal drilling and fracture stimulation  
**8.5x**  
olympic size swimming pools

compared to irrigating a 10 hectare crop for one year

**60x**  
olympic size swimming pools

# Managing the risks from fracture stimulation

DMP applies an objective based regulatory regime to minimise risk and impacts to 'as low as reasonably practicable'.

**There is no evidence to date that fracture stimulation in Western Australia has led to significant environmental harm**



A Parliamentary Inquiry in Western Australia has found that the risks from hydraulic fracture stimulation **can be safely managed**

**WATER RESOURCES**



**SOIL**



**NATIVE FLORA & FAUNA**



**LANDSCAPE & HERITAGE**



**AIR QUALITY**



**PEOPLE'S HEALTH & WELLBEING**

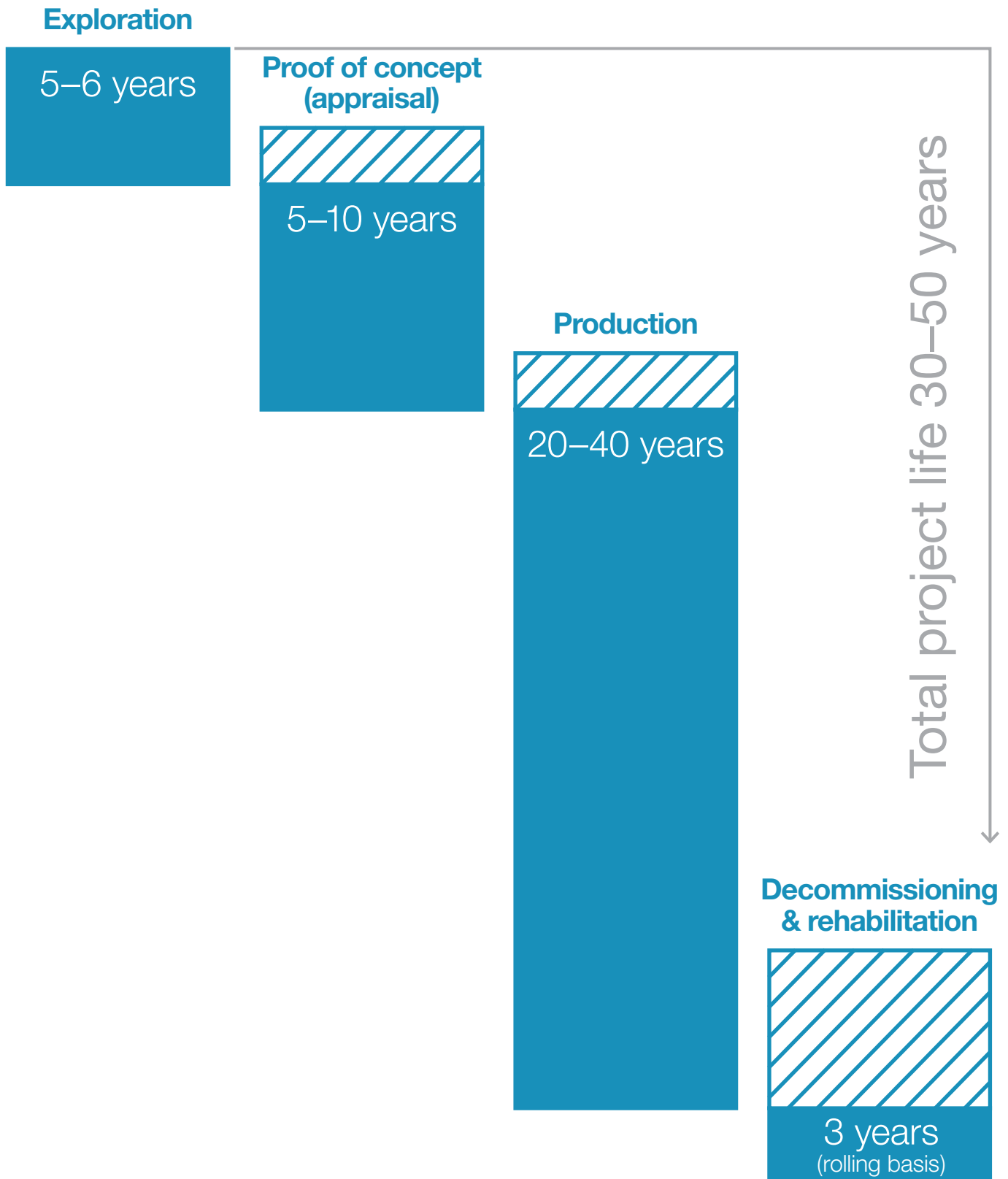


# Approvals process



# Project lifecycle

There are four broad and often overlapping stages in shale or tight gas developments:



# Where can I find more information?

Phone **+61 8 9222 3333**

or visit the Department of  
Mines and Petroleum's website

**[www.dmp.wa.gov.au](http://www.dmp.wa.gov.au)**



## **Petroleum Geothermal Register (PGR)**

Access to information relating to petroleum and geothermal titles.



## **Petroleum and Geothermal Information (WAPIMS)**

Petroleum exploration database containing non-confidential data on wells, geophysical survey titles and other related exploration and production data.



## **Environmental Assessment and Regulatory System (EARS)**

EARS Online and EARS 2 are online systems for submitting and tracking environmental applications, and compliance reporting.



## **Interactive geological map (GeoVIEW.WA)**

An interactive, GIS-based mapping system. Construct your own geological map and incorporate other mineral and petroleum exploration datasets including mines and mineral deposits, petroleum wells, active leases, and much more.



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