

# SECURING AUSTRALIA'S FUTURE ENERGY SUPPLY

## THE IMPORTANCE OF COAL SEAM GAS

Coal Seam Gas (CSG) is a type of natural gas found around coal deposits. Like coal, CSG is formed by the fossilisation of plant matter under pressure over millions of years.

CSG is trapped by the water that naturally occurs in coal seams and surrounding ground pressure. By drilling a well to release the water pressure, CSG can be extracted for processing into natural gas products for powering cookers, heaters and for generating electricity.

### IS CSG NEW?

The potential of coal seam gas as an energy source has been recognised since coal mining started in Australia in the 1900s. Today, we have the technology and know-how to extract it safely for use. CSG has been extracted safely in Queensland for around 20 years.

What is relatively new is the discovery of huge CSG resources in Queensland's Bowen and Surat Basins and in the Sydney, Gunnedah, Clarence-Moreton and Gloucester Basins in New South Wales. Exploration plans for the Galilee, Arckaringa, Perth and Perdinka Basins so far indicates there will be more CSG found in these coal deposits as well.

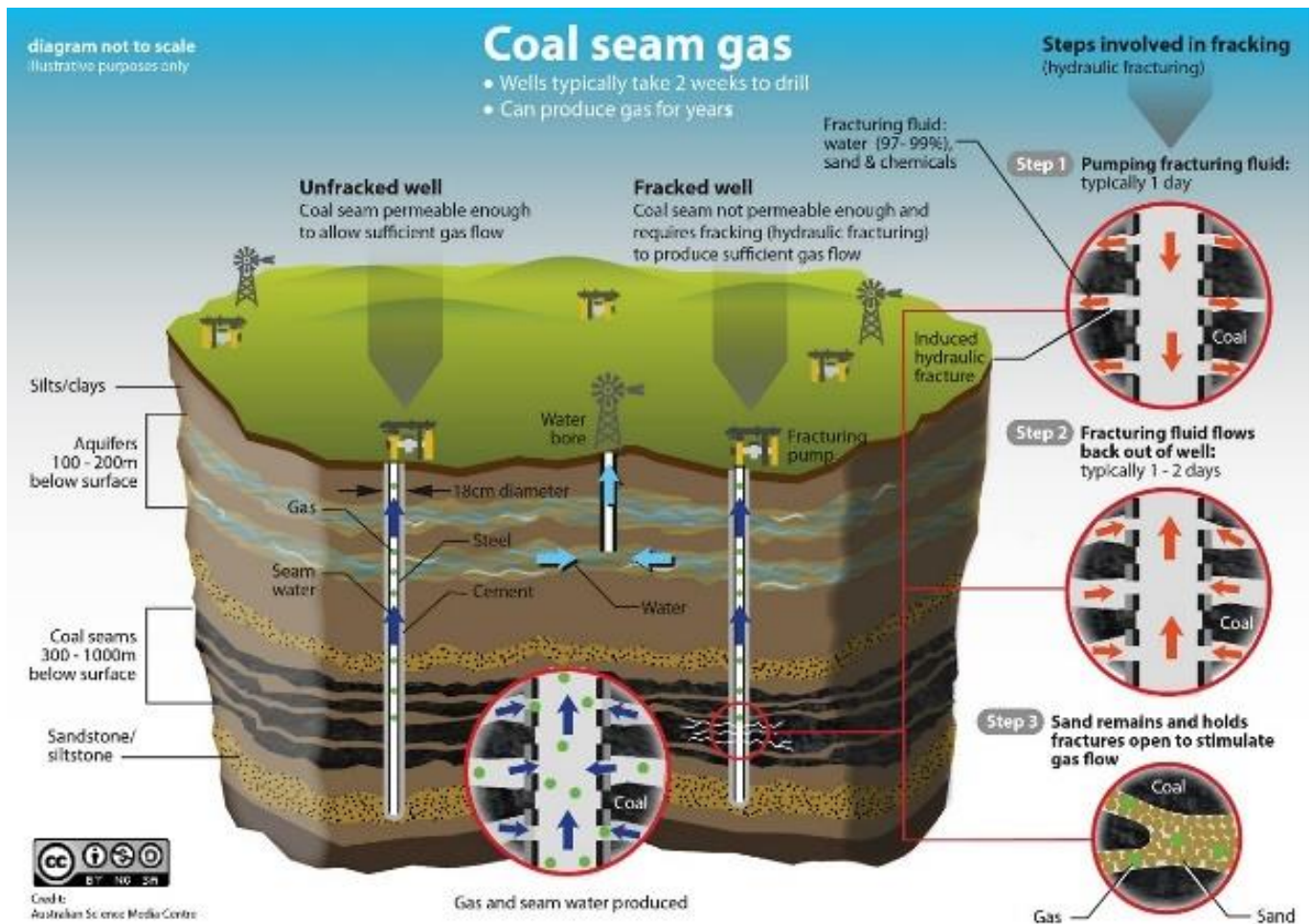
## HOW DO WE GET CSG OUT OF THE GROUND?

CSG is extracted by drilling a well into the coal seam to release the water pressure. This allows the gas to be collected in the well.

To maximise the gas that can be extracted from a coal seam, a technique called “hydraulic fracturing” is sometimes used. A solution of water, sand plus a small amount of additives is pumped at high pressure into the coal deposit. This creates cracks or fractures (hence “fracking”) which release the gas into wells for extraction. Not all coal seams require fracking to release their gas. Generally, it is only less permeable or deeper seams that require fracking.

Fracking fluid is 99 per cent water. The remainder is made up of common additives used in food production as well as in cosmetics and personal care products – substances including sodium carbonate (baking soda), acetic acid (vinegar), guar gum (in ice-cream) and surfactants (in soap and toothpaste). These additives have an anti-bacterial effect and turn the fracking fluid into a gel, which makes it easier to pump.

Fracking fluids are recycled for ongoing use or disposed of in accordance with strict environmental regulations.



Source: Australian Science Media Centre



Image: Coal seam gas well (CSIRO, credit: Neil Huth)

## Who owns the CSG?

All underground resources in Australia, including CSG, are owned by all people via the relevant state government, not the person who owns the land above. Landholders do have legal rights over access, negotiation and compensation from companies wanting to explore and extract CSG.

Companies must have the written permission of the landholder before they enter private property. Access agreements may also include provisions to minimise any loss or interference. Landholders must be compensated for any losses incurred or interference to their normal activities from CSG development activities.

[Click for more about landholder rights in Queensland](#)

[Click for more about landholder rights in New South Wales](#)

## IS FRACKING DANGEROUS?

No. Fracking has been used in the oil and gas industry since the 1940s. It has been used for CSG extraction in the United States since the 1970s and has been used in Australia since the 1990s. The CSIRO has declared the risk that our groundwater will be contaminated by fracking is minimal. All additives used in fracking are considered safe for the environment. CSG wells are fully lined with steel and cement to isolate groundwater from the drilling, fracking and gas extraction process. As the purpose of fracking is to liberate gas by removing water, companies undertake extensive geophysical surveying, modelling and imaging to avoid connecting seams and groundwater sources. Monitoring continues during and after fracking occurs to ensure fractures do not connect water sources with target coal seams. Finally, if a fracture does penetrate groundwater, water will flow down towards the coal seam rather than up into the aquifer. Coal seams are deeper than groundwater levels, therefore there is little risk of interconnection and contamination.



Fracking is a controlled and highly regulated process. Before fracking can start, CSG companies must submit a detailed “fracking plan” to the state’s CSG regulator for approval.



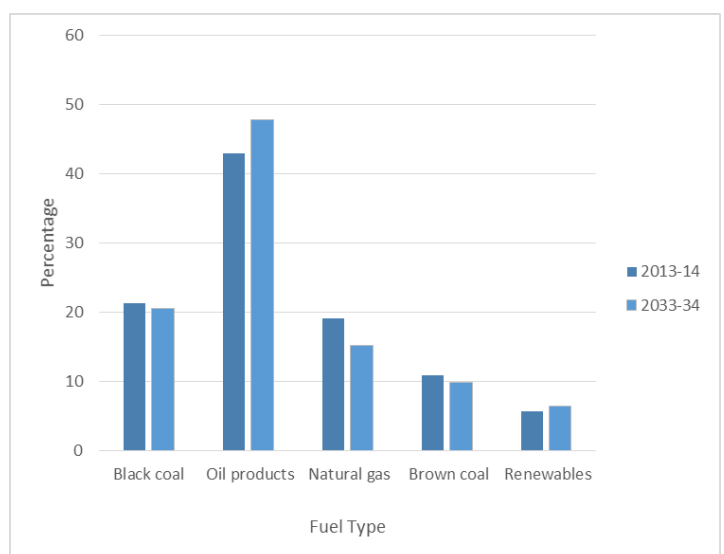
## WHY CSG IS IMPORTANT

Australian homes and businesses on the east coast are expected to use around 10,900 petajoules (PJ) of gas over the next 20 years. Based on current forecasts, our use of gas will fall to 15.2 per cent by 2033-34 (Figure 1). Despite the decline, the forecasts indicate that gas will continue to play an important role in our energy mix.

CSG is important to securing an energy supply for Australia that's reliable, affordable and much cleaner than other fossil fuels - it is cleaner than both coal and conventional natural gas. Gas has the advantage of being a reliable source for electricity generation, providing baseload capacity that can run twenty-four hours a day if required. Gas fired power stations are also more flexible than coal-fired power stations.

Gas fired power stations are able to fire up and power down quickly and efficiently, so we can switch them on at times of high demand and turn them off when we don't need them.

**Figure 1: Primary energy consumption 2013-14 and 2033-34**



Source: esaa, Electricity Gas Australia 2015

## BENEFITS OF CSG

CSG does not just secure our energy supply. It's a cleaner alternative to coal power generation with the potential to create jobs and support regional communities. It has already opened up an important new export market for the Australian economy.

As the world takes action to meet the challenge of climate change, gas will play an increasingly important role in energy generation globally. Gas-fired power stations emit up to 70 per cent less greenhouse gases than existing coal-burning plants.

The eastern Australian gas market has been undergoing a transformation as a result of the development of CSG resources and its greater linkage to export markets. The abundance of CSG reserves and the prospects of selling into the Asian market via LNG shipments has resulted in Queensland becoming the centre of an LNG from CSG export industry with three committed projects on Curtis Island near Gladstone. The projects are Asia Pacific LNG (APLNG), Queensland Curtis LNG and Gladstone LNG. They are the first LNG projects in the world to rely mainly on CSG. The first shipment of LNG departed Gladstone in January 2015. Much of the growth in production for LNG is expected to come from CSG in the Surat-Bowen basins in Queensland.

A moratorium on CSG in the Northern Territory was put in place in September 2016. A scientific inquiry, which delivered its final report in December 2017, considered the social, economic, cultural and environmental impacts of CSG. CSG will resume in the Northern Territory, subject to strict environmental considerations.

Development of CSG has led to some conflicts between existing landholders and local communities. Much of the debate and regulatory policy developments have focused on managing any potential environmental and health and safety effects of the exploration and production of CSG. Scientific evidence has shown that CSG risks can be managed and that extraction technologies are mature. Despite this, vocal opposition has led state governments like Victoria and New South Wales to heavily restrict or ban CSG development.

According to the Australian Petroleum Production and Exploration Association (APPEA) in 2015-16, Australia shipped 37 million tonnes of LNG cargoes, earning \$16.55 billion in export revenue. During this time, Australia's production was 48 per cent higher than its 2014-15 production. The country's LNG exports are expected to more than double over the next five years and by 2018, Australia is forecast to overtake Qatar as the world's leading producer of LNG. Every LNG ship leaving Gladstone is forecast by APPEA to generate more than \$3.8 million in Queensland royalties and federal petroleum resource rent tax, as well as \$4.9 million in company tax.

In Australia, we have enough CSG to meet domestic demand for gas and sell into international markets. We just need to get it out of the ground. Resource restrictions in states such as New South Wales and Victoria belie the importance of coal seam gas in ensuring the effective operation of the east coast gas market.