

# Fact Sheet



## Air Quality

- Natural gas is the cleanest of fossil fuels
- Emissions from the Queensland Curtis LNG Project will be low relative to Australian and international standards
- The plant will not produce any sulphur oxides, soot or benzene, which are harmful emissions
- When approved, the project will monitor emissions to ensure they do not exceed environmentally acceptable standards

We all need clean air.

The Queensland Curtis LNG Project, a BG Group business, is like any industrial process.

The project will involve air emissions as it liquefies natural gas at Curtis Island, Gladstone, for export to world markets.

This fact sheet explains why air quality is important, the nature of emissions expected from the plant and how the project intends to ensure it does not contribute to any degradation of air quality in Gladstone.

### **Air quality in Gladstone**

Gladstone has grown rapidly in the past few decades and air quality has emerged as an important community concern.

Originally the focus was on dust, particularly coal dust emissions from coal handling facilities at the Port of Gladstone.

As new industries emerged, the community has also become concerned about emissions from minerals processing and chemical manufacturing.

These emissions include sulphur dioxide, oxides of nitrogen and airborne particles known as particulate matter. Also of concern are polycyclic aromatic hydrocarbons such as benzene, toluene, ethylbenzene and xylene, which are collectively referred to as BTEX and in large doses are known to cause cancer.

### The “air shed”

To help manage emissions around industrial centres, authorities establish “air sheds”, or imaginary atmospheric envelopes over specific areas.

Mathematical models are used to predict cumulative concentrations of emissions, helping to set limits on the volume and type of emissions into the air shed.

Air monitoring stations around the air shed help verify the models and ensure that set standards or limits are not exceeded.

These limits are based on international, national and state standards. In Queensland, the Environmental Protection Agency sets guidelines or standards, issues licences, and monitors industrial emissions to protect people, animals and the environment.

The Queensland EPA is involved in a two-year project of detailed monitoring of the Gladstone air shed to incorporate a greater range of emissions. The information will help to manage air quality around Gladstone.

Queensland Curtis LNG is committed to a significant air shed study as part of its approval process under Queensland and Australian Government legislation.

When approved, the project will be licensed and will monitor emissions to ensure they do not exceed environmentally acceptable standards.

### Emissions from the liquefaction plant

Emissions from the proposed liquefaction plant at Curtis Island will be limited to only a few compounds and the amounts of these will be low relative to Australian and international emissions standards.

This is largely due to the nature of the gas being supplied to the plant, which contains only small amounts of unusable nitrogen and carbon dioxide.

Typically the feed gas will comprise 98% methane, 1% nitrogen and 1% carbon dioxide. The nitrogen and carbon dioxide will be removed and vented to the atmosphere.

The principal emissions from the proposed liquefaction plant will be carbon dioxide and oxides of nitrogen from the gas turbines which drive the refrigeration compressors within the plant and provide the electricity for the liquefaction process.

These “aero-derivative” turbines are very fuel efficient and are designed to produce low emissions from the combustion of gas. They are fuelled by a portion of the feed gas.

Gas turbine emissions include low levels of oxides of nitrogen, carbon monoxide and carbon dioxide. These are sometimes expressed by their chemical symbols  $\text{NO}_x$ , CO and  $\text{CO}_2$ .

These gases are encountered every day, most commonly as car exhaust fumes. When  $\text{NO}_x$  and organic compounds such as methane combine in the presence of sunlight, they can create visible smog.

Results from preliminary air quality investigations indicate that the current background levels of nitrogen dioxide in the North China Bay area of Curtis Island, in the vicinity of the proposed liquefaction plant, are 40 micrograms per cubic metre.

The total amount of nitrogen dioxide released from the liquefaction process will be fed into a detailed model to analyse the dispersion of the gas and its contribution to the Gladstone air shed.

Initial modeling suggests that the addition of nitrogen dioxide emissions from the liquefaction plant will have a negligible cumulative impact on existing levels of nitrogen dioxide, and air quality overall.

Emissions from the proposed liquefaction plant at Curtis Island will be low relative to Australian and international emissions standards.

For example, the maximum one-hour average concentration of nitrogen dioxide in the North China Bay area of Curtis Island, taking into account Queensland Curtis LNG’s plant plus existing and approved industries including other planned liquefaction facilities, is predicted to be 40 micrograms per cubic metre.

This is in line with current background levels and is well below the National Environment Protection Measure standard of 246 micrograms per cubic metre.

Importantly, because there is no sulphur or more complex hydrocarbons in the natural gas feeding into the plant, there will be no emissions of combustion-related products such as sulphur oxides ( $\text{SO}_x$ ) and particulate matter (soot).



The plant will also not produce polyaromatic hydrocarbons such as benzene, toluene, ethylbenzene or xylene (BTEX), which are of concern in air sheds as they are known carcinogens.

In addition, there will be no “fugitive” emissions from the cooling system: industrial gases used in the liquefaction cooling system are contained in a “closed-loop” process and are re-circulated, just as they are in a household refrigerator.

On occasions liquefaction plants may be seen to emit puffs of dark smoke. These can occur when plants are being commissioned or for short periods when other fuel sources such as diesel are used to power the turbines instead of gas.

### **Measuring emissions**

In Queensland, air emissions are measured by standalone stations containing around 90 instruments for electronically recording and storing information on the weather and air quality.

Authorities around the world set limits on safe exposure levels, usually based on World Health Organisation and other local and national criteria.

The Queensland environmental protection policy for air has a goal of 0.16 parts per million (ppm) of NO<sub>x</sub> for one hour of exposure to protect sensitive people such as children and asthmatics.

Because of the liquefaction plant’s low NO<sub>x</sub> emissions, it is predicted that it will have a negligible impact on air quality.

However, it is also important to assess the cumulative impact on the local air shed of all emissions in the area.

Results from a Queensland Curtis LNG study on air quality will be incorporated into planning to ensure Gladstone’s air quality remains well within acceptable health standards.

Operationally, Queensland Curtis LNG will ensure NO<sub>x</sub> emissions are kept to a minimum by using specially-designed low-NO<sub>x</sub> burners in the plant.

## Greenhouse gas emissions from the liquefaction plant

Carbon dioxide (CO<sub>2</sub>), a greenhouse gas, is produced in making liquefied natural gas.

Carbon dioxide emissions will come from two principal sources. The first is the carbon dioxide removed from the feed gas for the plant, which is vented to the atmosphere. As the feed gas is composed of about 1% carbon dioxide, a relatively small volume will be released.

More significant carbon dioxide emissions will come from the combustion of feed gas in the gas turbines.

These will be monitored and publicly reported under recent Australian energy and greenhouse gas reporting legislation. We estimate that annual carbon dioxide emissions will be about 1 million tonnes for each processing unit, or production "train".

Queensland Curtis LNG is investigating ways of offsetting carbon dioxide emissions from the project through programs such as carbon trading and forestation.

However, natural gas is the cleanest of all fossil fuels. It emits 22% less carbon dioxide than oil and 40% less than coal to produce the same amount of energy.

Exports of this cleaner low-carbon fuel, in the form of liquefied natural gas, to those countries where it is used as an alternative to coal or oil, means that considerably less greenhouse gases are generated in these countries than would otherwise be the case.

This helps to reduce global emissions and overall carbon dioxide levels.

For these reasons, many people view natural gas as the world's transition fuel as we move away from hydrocarbons to cleaner energy sources.



## Contact

If you would like more information about the Queensland Curtis LNG Project and air quality please contact us at:

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