Callide Oxyfuel Project

Frequently Asked Questions

Q: Why are you doing this project?

A: We're testing Oxyfuel technology at Callide to demonstrate the feasibility and economics of retrofitting this clean coal technology onto an existing, operating power station, and to learn how it might be applied to new power stations.

Q: How is electricity generated using oxyfuel compared to a conventional coal-fired power station?

A: Oxyfuel combustion involves burning coal in a power station boiler in a mixture of pure oxygen and recirculated exhaust gases from the chimney. At a conventional coal-fired power station, coal is burnt in air in the boiler. This simple change allows us to produce a concentrated stream of CO_2 that can be captured and liquefied.

Q: There seems to be lots of clean coal technologies – how is oxyfuel different?

A: The main difference between oxyfuel and other clean coal technologies is how the carbon dioxide (CO_2) is captured at a power station. Oxyfuel combustion produces exhaust gases rich in CO_2. A portion of these gases are recycled through the boiler, and the remainder is purified and compressed to produce liquid CO_2, which can be stored deep underground in stable rock formations.

Q: Does the project need extra oxygen from the atmosphere to burn coal in oxyfuel conditions?

No. The Callide Oxyfuel Project will use the same amount of oxygen to burn coal under oxyfuel conditions as that used in air-firing (conventional) conditions.

Q: How much CO_2 emissions will it reduce?

A: Oxyfuel can reduce carbon emissions from an operating power station by up to 90%

Q: How much will the demonstration project cost?

A: $206 million

Q: Climate change is happening now, why test the technology for five years?

A: This project began with a pilot project scale at about one hundredth of the size of Callide A Power Station. The technology worked at pilot scale and has now been scaled up for application at Callide A. The five-year demonstration is needed to test the technology in 'live' power station conditions and assess its commercial applications to existing and new-build plant.

Q: What about renewable energies? Surely oxyfuel alone can't address climate change?

A: There is no single technology solution to the problem of producing low emission electricity. A mix of clean energy solutions are needed to enable the world to meet future energy demand while reduce greenhouse emissions. As coal-fired electricity accounts for a large amount of the world's power sources, minimising its emissions is essential to helping address climate change.

Q: Why use an old power station as the demonstration site – why not build a new one?

A: To decrease the lead time for industry to reduce emissions, a clean coal solution is needed for existing coal-fired power stations. Retrofitting Callide A with oxyfuel technology is a cost and time-effective way to test a clean coal technology. Oxyfuel technology also shows strong suitability for new build plant.

Q: Where will the project store CO_2 underground?

The Callide Oxyfuel Project team is assessing potential geosequestration sites to the west of Biloela in the Denison Trough. Studies have confirmed this area as ideal site to store CO2 as it has securely stored large volumes of gas for millions of years and has a very low level of seismic activity.

Q: How is the CO_2 transported from Callide A to the storage site?

A: The liquid CO_2 produced at Callide A will be transported approximately 300km by truck to the Denison Trough. The CO_2 is very stable and non toxic. For larger scale, commercial projects, the most efficient way to transport CO_2 is by pipeline to a geological storage site.

Q: What is carbon capture and storage and geosequestration?

Carbon capture and storage is neither a new concept nor a new technology. The process has been used by nature for millions of years to trap oil and gas underground. Storing liquid CO_2 underground from human activities is a process known as geosequestration. Suitable sites for geosequestration are sedimentary basins that have permeable rock to absorb CO_2, with a natural upper seal of non-permeable rock material. Depleted gas fields are an example of sites with high CO_2 storage potential, as they have characteristics that enabled natural gases to be stored there previously for millions of years.

Q: How deep is the CO_2 injected into the earth? How does it stay underground?

A: The liquid CO2 will be injected approximately one kilometre underground through rock strata into a seam of porous rock that acts like a giant sponge. The CO_2 will be trapped in this formation, with the cap rock above it providing a natural seal. Monitoring wells will be placed strategically around the site for continual measurements and verification.

Q: Will projects such as this one make electricity more expensive?

A: Low emission coal technologies are more expensive than conventional coal-fired electricity generation, but produce a fraction of the emissions. The Federal Government is working on a Carbon Pollution Reduction Scheme to limit Australia's carbon emissions and minimise the impact on business and households. This scheme will make technology such as oxyfuel more price competitive.

Energy conservation could also play a part in managing the future impact of electricity generation and balancing out increases in the price of electricity.

Q: Who is working on the project?

A: The joint venture comprises the Australian-based CS Energy, Xstrata Coal, the Australian Coal Association and Schlumberger, and the Japanese companies IHI, Mitsui and JPower. It

has additional funding through the Commonwealth Government's Low Emissions Technology Demonstration Fund, the Queensland Government and the Japanese Government.

Q: What happens when the demonstration project finishes?

A: If the demonstration is successful, CS Energy is examining applying the technology to its existing coal-fired power stations, and the joint venture will actively market oxyfuel to power stations in Australia and overseas.

Q: How is the Oxyfuel project different to the ZeroGen project?

A: Callide Oxyfuel and ZeroGen are two clean coal projects both underway in Central Queensland using very different combustion technologies. While both projects use carbon capture and storage, they differ in the process of capturing the carbon at the power station.

ZeroGen relies on building a new power station to gasify the coal, remove the carbon dioxide and then use the resulting hydrogen to power a gas turbine. Oxyfuel is simpler in that it recreates the same conditions that the coal-fired boiler was designed for, and captures the by-product. Both projects use the same storage techniques.

Q: When can oxyfuel technology be commercialised?

A: Following the completion of the oxyfuel demonstration project in 2015, it is predicted the technology could be applied at a commercial scale by 2020.