

The Callide Oxyfuel Project, recognised as one of the world's leading carbon capture demonstration projects, has successfully used oxyfuel combustion and carbon capture technology to generate low emission electricity from coal.

The Callide A Power Station in Central Queensland, Australia, is the first power station in the world to be retrofitted with oxyfuel carbon capture technology. The Callide Oxyfuel Project is one of only a handful of low emission coal projects in the world to move beyond concept to construction, and to go on to successfully complete a demonstration phase. This ground breaking project has contributed valuable results, data and knowledge for the next generation of low emission projects.



## Contributing to a low carbon future

The development of technologies that can be used to generate electricity from coal with reduced carbon dioxide emissions, is part of a global drive to create a cleaner energy future.

The Callide Oxyfuel Project has involved the retrofit of oxy-combustion technology to Callide A Power Station (Unit No. 4) and the installation of a downstream carbon dioxide capture plant. This unique and integrated facility operators within the electricity market under normal power station operating conditions.

## The oxyfuel combustion process

The Callide Oxyfuel Project has two parts: oxyfuel combustion and carbon dioxide capture; and the investigation of carbon dioxide storage.

Oxyfuel combustion involves burning coal in a mixture of oxygen and recirculated exhaust gases, instead of air, and results in a concentrated stream of carbon dioxide for improved capture and underground storage.

The oxyfuel combustion process was first conceived in Japan in 1974 and has been tested at a small scale in Japan, the USA, United Kingdom and Europe. The Callide Oxyfuel Project is the first completed project of its type in the world, and Callide's Unit 4 boiler is now the largest oxyfuel combustion boiler in the world.

## Contribution to carbon dioxide storage knowledge

As well as demonstrating carbon capture, the Callide Oxyfuel Project has been advancing industry knowledge and investigation into carbon dioxide storage.

Carbon dioxide captured during the Callide Oxyfuel Project has also been used in a test injection of carbon dioxide at CO2CRC's Otway Project site in South Western Victoria. These tests are being used to evaluate the geochemical and physical behaviour of carbon dioxide within the storage rock.

## International collaboration and partnerships

The Callide Oxyfuel Project is an international joint venture that received support from both the Australian and Japanese Governments, making the project an important step towards demonstrating practical and adaptable technology to help tackle climate change globally.

The international joint venture utilises the individual strengths of its partners to reach an innovative solution. The joint venture partners include: CS Energy; ACA Low Emissions Technologies (ACALET); Glencore; Schlumberger Carbon Services; and Japanese participants, J-Power, Mitsui & Co., Ltd, and IHI Corporation.

The \$245 million project was awarded \$63 million from the Australian Government under the Low Emissions Technology Demonstration Fund. The Callide Oxyfuel Project has also received financial support from the Japanese and Queensland governments and technical support from JCOAL.

## Next steps

The Callide Oxyfuel Project has reached its goal of operating in oxyfuel combustion mode for 10,000 hours, and has also achieved more than 5,500 hours of industrial operation of the carbon capture plant.

As the demonstration concludes, the project team will analyse all of the data obtained, consolidate its learnings and publish findings so that they can be applied to new carbon capture projects in the future.

The project continues to collaborate with research and development organisations and participants in other projects to optimise the technology and share knowledge. This will help progress the commercialisation and deployment of oxyfuel combustion technology around the world.



## More information

Find out more about the Callide Oxyfuel Project:

**Web** [www.callideoxyfuel.com](http://www.callideoxyfuel.com)

**Twitter** #callideoxyfuel

**YouTube** Callide Oxyfuel Project

## Project partners

Joint Venture Participants		
CS Energy		CS Energy is a Queensland Government owned energy provider and owner of the Callide A Power Station. CS Energy played a lead role in the Callide Oxyfuel Project since the beginning of the project, and provided the operation and maintenance services for the commissioning and demonstration phases.
ACA Low Emissions Technologies (ACALET)		ACA Low Emissions Technologies (ACALET) is an industry body whose member companies are the black coal producers in Australia. ACALET, through the COAL21 Fund was the Callide Oxyfuel Project's largest funder.
Glencore		Glencore is one of the world's largest global diversified natural resource companies. As funding partner in the Callide Oxyfuel Project, Glencore has been involved in the pre-feasibility stages of the project (through the former Xstrata Coal) and is now helping to project manage the delivery of the demonstration trial.
Schlumberger Carbon Services		Schlumberger Carbon Services provides technologies and services for the long term geological storage of carbon dioxide, and was involved in the site selection, risk assessments and monitoring and verification plans for the geological storage aspect of the project.
J-POWER		J-POWER (Electric Power Development Co., Ltd.) is the largest electricity utility in Japan. J-POWER was an integral part of the project management aspect of the Callide Oxyfuel Project, bringing more than 50 years of experience in electricity generation and knowledge of research and development activities for clean coal technologies from Japan.
Mitsui & Co., Ltd		As the major Japanese entity with the global interests in metal products and minerals, machinery and energy, Mitsui brought expertise in project management and coal-fired generation processes to the Callide Oxyfuel Project.
IHI Corporation		IHI, as one of Japan's leading heavy machinery manufacturers, was responsible for retrofitting the vintage Callide A Unit 4 boiler with oxyfuel technology, so that the boiler would be able to burn the pulverized coal using oxyfuel combustion.

Supporting Collaborators		
Australian Government		The project was awarded \$63 million from the Australian Government under the Low Emissions Technology Demonstration Fund.
JCoal		JCoal, The Japan Coal Energy Centre, has over 65 years history in clean coal development and utilization. JCoal has provided technical support to the Callide Oxyfuel Project.
Queensland Government		The Queensland Government provided financial support to the Callide Oxyfuel Project.
METI		The Japanese Government, through the Ministry of Economy, Trade and Industry (METI), provided financial support to the Callide Oxyfuel Project.

## Key Facts

Hours of oxyfiring operation	10,000 (in February 2015)
Hours of carbon dioxide capture	5,500 (in February 2015)
Carbon dioxide design capture rate	75 tonnes per day
Tonnes of coal burned	320,000 tonnes of coal
Coal supplied from	Anglo American's Callide Mine
Type of coal used	Black coal
Number of people employed during construction	150
Number of hours worked during construction	500,000
Number of people employed during demonstration	30
Callide A Power Station (Unit 4) commissioned	1969
Callide A Power Station (Unit 4) re-commissioned for the project	2008
Project cost	\$245 million