

The background of the entire page is a photograph of two men in silhouette shaking hands on a grassy hill at sunset. The sky is filled with orange and yellow clouds, and the sun is low on the horizon. A large, faint white arrow graphic is visible in the upper right background. A yellow chevron graphic is positioned above the title box.

Surat Gas Project Overview

Arrow Energy overview

Arrow Energy is owned by a 50/50 joint venture partnership between Shell and PetroChina and is one of the largest integrated coal seam gas (CSG) companies in Australia.

Arrow has over a decade of CSG experience in Queensland and is now taking cleaner burning fuel to the world through a CSG to liquefied natural gas (LNG) project.

The Arrow LNG project comprises five sub-projects – the Arrow LNG Plant, the Surat Gas Project, the Bowen Gas Project, the Arrow Surat Pipeline and the Arrow Bowen Pipeline. It involves producing gas from the two basins and transporting it via two pipelines to an LNG plant on Curtis Island where it is liquefied for export.

Surat Gas Project update

Arrow has revised the Surat Gas Project (SGP) development plan since it was presented in the Supplementary Report to the Environmental Impact Statement (SREIS), submitted to the Queensland Government in June 2013.

The revised development plan involves the Surat Basin supplying gas to one LNG train, instead of contributing gas to fill 80 per cent of two trains as described in the SREIS.

An LNG train is a CSG liquefaction and purification facility within an LNG plant. A plant can include multiple LNG trains.

With only one LNG train being supplied by the Surat Basin, the pace of development and infrastructure requirements are reduced. This enables Arrow to phase development in the Surat Basin, starting in the northern and central regions and working south.



Surat Gas Project update

Previous case	Revised case
Surat Basin contributed CSG to fill up to 80 per cent of two LNG trains	Surat Basin supplies CSG to fill up to 100 per cent of one LNG train
Expected up to 7,500 CSG wells	Expecting up to 6,500 CSG wells
Development across most of the Surat Basin required from the outset of the project	Development staggered across the Surat Basin, starting in the northern and central regions and working south



Surat Gas Project overview

The proposed SGP will primarily provide CSG for LNG export.

Covering an area from Wandoan to Dalby, and south to Millmerran, the project is expected to include up to 6,500 CSG wells.

The wells will supply gas to one LNG train on Curtis Island, via the Arrow Surat Pipeline. Some of the gas may also go to existing domestic use such as the Daandine and Braemar 2 gas-fired power stations to generate electricity.

Project phasing

The project area has been divided into gas drainage areas, which will be developed in phases with work starting in the northern and central regions of the project area and moving south.

Drainage areas are logical groupings of wells and gathering lines that take into account the landscape and the natural flow of gas and water. Each drainage area will have its own centralised gas processing facility, to dry and compress the gas for transmission.

About 6,000km of gathering lines will be needed across the Surat Basin, to move both CSG and coal seam water from the wells to centralised gas processing and water treatment facilities.

Development schedule

The project's first phase of development will begin in Dalby (drainage area 7), Miles (area 2), Wandoan (area 1) and Chinchilla (area 5).

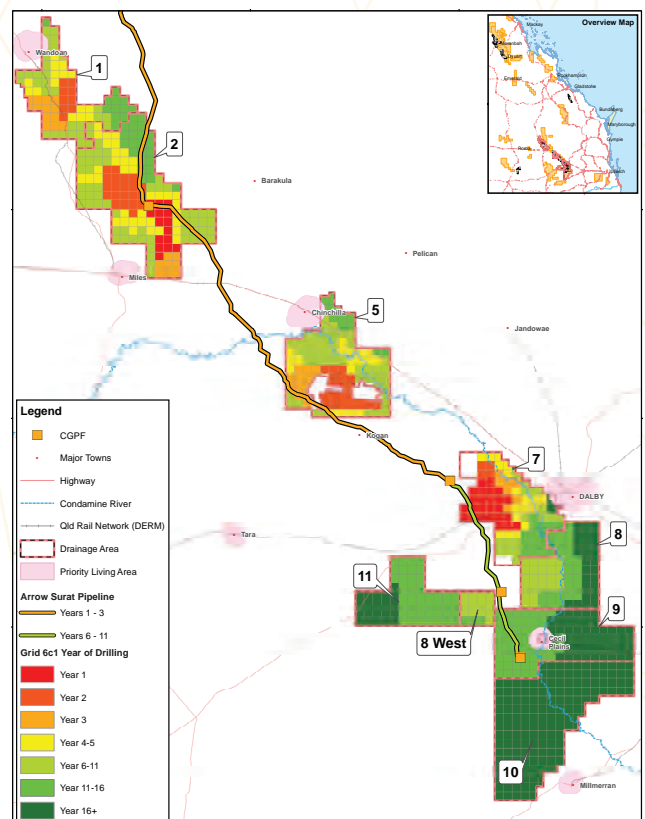
From beginning to end, phase one construction is expected to take around three and a half to four years. This includes constructing production facilities, pipelines and wells to start up the LNG train. Subsequent development of additional wells and gathering lines within phase one will continue over a number of years.

Remaining drainage areas in the Surat Basin will be developed in phases two and three. Phase two will include Tipton (area 8) and Cecil Plains (area 9), and is expected to commence around ten years after phase one commences. Phase three will include Millmerran (area 10 and 11) and should commence around three years after phase two commences.

Reduced footprint

The new project development plan helps Arrow minimise its footprint and reduce its impacts to the land and communities. In fact, the revised development plan has significantly reduced impact in some areas because overall CSG production rates are planned to be lower.

Arrow's reduced footprint has been achieved through the use of new technologies such as pad drilling, pitless drilling and deviated drilling. It has also resulted from reduced infrastructure requirements, relinquishment of tenement areas not suitable for Arrow's revised development plan and local knowledge gained through talking with landholders and community members.



Accommodation villages

The workforce will be accommodated in up to six villages for the next 20+ years. The first four villages will be constructed during phase one development, once Arrow's shareholders make a final investment decision on the project. The remaining two villages will be constructed during later development phases.

Arrow intends to construct the villages close to its centralised gas processing facilities and away from nearby towns.

Each village will be self-contained with minimal impact to local infrastructure such as water and sewerage and roads. Policies on staff alcohol consumption, behaviour, safety and transportation will be enforced – all with a view to reducing impacts on neighbouring communities and maintaining the safety of the workforce.

Each village will accommodate 400 to 1,000 people, varying according to the project needs. There will be about 2,700 workers during peak construction, easing off to around 600 during operations.

The workforce will be transported by bus to further reduce vehicle movements and impacts on local roads and improve safety.

Water and salt management

Arrow is evaluating opportunities to further reduce its footprint by collaborating with other Surat Basin CSG companies for water treatment.

Whether or not Arrow proceeds with a collaboration option, it will continue to honour its Condamine Alluvium offset commitment and it is committed to maximising the beneficial use of its CSG water.

Additional Arrow water treatment infrastructure is dependent on the outcome of collaboration discussions and an assessment of Arrow's existing water treatment facilities.

Arrow is also participating in a joint industry initiative to investigate collaborative solutions for salt (brine) management. Salt is a by-product when CSG water is treated.

As Arrow continues to narrow the scope of its water management plan, it will:

- responsibly manage CSG water and salt
- offset its potential groundwater impact on the Condamine Alluvium as a result of CSG activities
- maximise beneficial use of its treated CSG water
- manage potentially affected springs
- establish 'make good' agreements with landholders whose existing water bores are impacted by its CSG activities.





Surat Gas Project approval status

The SGP draft Environmental Impact Statement was lodged in December 2011. It was approved by the Queensland Government for public release in March 2012. The submission period closed in June 2012.

Arrow lodged the SREIS in June 2013 and received Queensland Government approval in October 2013. The SREIS is now with the Federal Government for review and approval.

The SGP SREIS includes more than 450 commitments Arrow has presented for government consideration, which address all potential social, environmental and economic impacts.

The next steps for the project include obtaining secondary approvals such as Environmental Authorities and Conduct and Compensation Agreements.

Domestic gas

Arrow has been commercially supplying gas in Queensland since 2004 and now provides about 20 per cent of the state's supply. Most is used to generate electricity. Arrow has five gas-producing fields, owns one gas-fired power station and has interests in two others.

Braemar 2 Power Station- The 450MW Braemar 2 Power Station is 40km south-west of Dalby. Arrow took full ownership and operational control in July 2011, and Braemar 2 currently provides three to four per cent of Queensland's electricity.

It is fired by CSG from Arrow's Daandine and Tipton West gas fields in the Surat Basin and is the second largest gas-fired power station in Queensland.

Daandine Power Station- The 30MW Daandine Power Station is 40km west of Dalby. It was constructed near Arrow's Daandine CSG field which supplies it with gas. The power station generated its first electricity in December 2006 and sells to Essential Energy under a long-term power purchase agreement.





Arrow Surat Pipeline

The Arrow Surat Pipeline is a buried 32 inch diameter, high-pressure steel gas transmission pipeline to carry gas from the Surat Basin to a gas hub 22km west of Gladstone, where it will join the proposed Arrow Bowen Pipeline.

Its proposed route runs north from the Kogan area through the local government areas of Western Downs, Banana, North Burnett and Gladstone.

The route has been selected to minimise impacts on communities, environmentally sensitive areas like essential habitats, endangered and threatened ecosystems, and remnant (native) vegetation.

After construction, the pipeline easement will be fully rehabilitated to its preconstruction state.

Subsequent access and maintenance will be carried out in a way that minimises disturbance to the land and the landholder allowing normal activities (e.g. farming) to occur.



Contact details

Freecall: 1800 038 856

Email: info@arrowenergy.com.au

Mail: GPO Box 5262, Brisbane QLD 4001

Visit: www.arrowenergy.com.au

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