Arrow Energy

Arrow in the Surat

TSBE Enterprise Evening in Dalby

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11 October 2018

TSBE members at Arrow’s Braemar 2 Power Station (above) as part of a Surat Basin site tour on 11 October.
About Arrow

- An integrated coal seam gas company owned 50/50 by Shell and PetroChina
- Produces gas equivalent to 25% of Queensland’s annual demand
- Provides gas for industrial users and electricity generation
  - tenure over two major production basins - the Surat and Bowen basins
  - about 1,450 gas wells
  - some 17,000km² of Queensland production and exploration tenements

- Existing domestic gas operations:
  - five gas producing projects in the Surat and Bowen basins - Tipton, Daandine, Kogan, Stratheden (Surat Basin) and Moranbah Gas Project (50/50 AGL - Bowen Basin)
  - supply gas to power stations - Braemar 1, Braemar 2 (100% owned), Yabulu, Daandine, Moranbah, Swanbank
  - generation enough to power 800,000 average-sized Queensland homes.

- In 2017, Arrow announced a gas supply deal between Arrow and QCLNG to commercialise most of Arrow’s gas reserves in the Surat Basin through a phased development over 27 years.
- Arrow and QGC remain standalone companies.
Operational areas

1. Kogan North
2. Daandine
3. Braemar 2
4. Tipton
5. Plainview Pilot
Ivan Tan
Chief Operating Officer

Surat Gas Project

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Australia’s energy mix

Australia Energy Consumption, by fuel type

Natural Gas Flows, Australia, 2015-2016

Source: Department of the Environment and Energy (2017)
Just how much gas is 1 PJ?

19,000
The energy used by 19,000 homes in a year

868,000
The electricity used by 868,000 refrigerators in a year

2,354,000
The electricity used by 2,354,000 televisions in a year

436 million
The number of kilometres a car can drive on 29 million litres of petrol
Surat Gas Project: bringing more gas to market

- Commercialise ~ 5 trillion cubic feet
  - majority of Arrow’s Surat Basin gas reserves
  - ~ 5000 PJ
  - Queensland total gas supply: ~1,450PJ/yr

- Uses existing infrastructure
  - gas compression, processing, transmission
  - accelerated development
  - long-awaited infrastructure collaboration in the CSG industry to minimise impacts

- 27-year Gas Sales Agreement
  - one of the largest gas supply agreements in the history of Australia’s east coast

- ~ 1000 new jobs:
  - 800 during peak construction
  - 200 ongoing operational roles
Reduced well numbers:
- 2500 from 6500 previously; 60% reduction
- 30% of wells deviated on multi-well pads

Reduced supporting infrastructure
- no Arrow Surat Pipeline
- two new gas facilities, previously eight
- no new water treatment facilities

Phased development
- execution phased and managed
- begins with expansion of existing domestic gas assets, and then will move south to north
- some off-tenure pipelines to connect to existing infrastructure

Water
- pre-emptive mitigation of impacts to Condamine Alluvium
- treated water provided as substitution of existing allocations
- existing groundwater users only
Deviated wells

- Single well pad; up to eight wells at surface
  - vertical section to 50-120 m
  - slanted away from other wells
  - drilled to target seam ~ 600 m

- Reduced footprint (25-50% less)
  - up to 2.4km between pads
  - less gathering pipelines; less access
  - pads moved to boundaries to fit land use
  - only company using deviated wells

- Arrow has committed to using multi-well pads to reduce impacts on intensively farmed land, where geology allows
Corporate Safety and Process

Critical success factors

- Personal and process safety
- Execution is key; managing execution variability for each well
- Aligned and like-minded contractors – growing together
- Continuous improvement and cost-efficient operations
- Coexisting with the community
• Arrow has 12 coexistence commitments for Intensively Farmed Land, to ensure:
  • minimised impact
  • no permanent damage to productivity of the land or the Great Artesian Basin
  • landholders are fairly compensated for possible impacts from our activities.

• We will demonstrate coexistence, in collaboration with our landholders, through:
  • pre-development design work to minimise our footprint
  • best practice construction management to minimise our impact on landholder operations
  • best practice operational management to minimise our impact on farm productivity.
Coexistence on Intensively Farmed Land

Practically, Arrow’s coexistence means:

- Multi-well pads as standard on intensively farmed land, where coal depth allows, unless negotiated
- Gathering lines deep enough for future land use
- Power: reticulated underground to well sites or generated on-site, unless otherwise agreed
- Well site surface spacing will average not less than 800m on intensively farmed land
- Area wide planning to identify infrastructure locations
- Arrow’s compensation framework considers the value of prime farming land, including:
  - value of the land
  - level of disturbance
  - intensity of development.
Economic benefits through employment, contracting and procurement

Job opportunities:
- Arrow strongly supports local employment
- 800 jobs in construction - peak 2022
- 200 jobs in on-going operations
- vacancies will be advertised.

Local Content:
- Arrow and its contractors will provide full, fair and reasonable opportunities for capable and competitive local industry participation
- Arrow will publish a Supplier Information Guide on the Arrow Energy website and [www.arrow.icn.org.au](http://www.arrow.icn.org.au)
- Work with local supplier advocates, regional development bodies, chambers of commerce and local councils to promote supply opportunities
- Support local suppliers to develop their businesses in prequalifying or tendering with workshops in 2019.
Brief overview of some of the current upcoming opportunities:

- Bus / coach services
- On-plot construction of facilities
- Rural supplies
- High-density polyethylene pipe
- Broad range of IT and application services
- Specific engineering and consulting services
- Hire equipment
- Warehouse upgrade
- Cleaning services
- Specific subcontractor opportunities through existing Arrow Energy contracts

**Surat Gas Project** - A detailed Australian Industry Participation Plan (AIPP) is being developed
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