ARROW ENERGY
TODAY’S AGENDA

Arrow Energy Overview

Arrow Energy Activities

Bowen Gas Project Environmental Impact Statement (EIS)

Community Engagement

Questions and Answers
ARROW ENERGY OVERVIEW
Arrow is a leading coal seam gas company with five domestic gas supply operations, interests in three gas-fired power stations and plans to deliver liquefied natural gas to the international market through a world class plant in Gladstone.

- Queensland based company which started in 2000.
- Shell (50%) and PetroChina (50%) are established owners committed to safety, environment and long term relationships with stakeholders.
- Currently have almost 500 producing coal seam gas (CSG) wells across Queensland.
- Provide approximately 20 per cent of Queensland’s gas needs which is primarily used for electricity.
ARROW ENERGY
OUR JOURNEY

Staff numbers

<table>
<thead>
<tr>
<th>Year</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>212</td>
</tr>
<tr>
<td>2008</td>
<td>235</td>
</tr>
<tr>
<td>2009</td>
<td>372</td>
</tr>
<tr>
<td>2010</td>
<td>432</td>
</tr>
<tr>
<td>2011</td>
<td>900</td>
</tr>
<tr>
<td>2012</td>
<td>978*</td>
</tr>
</tbody>
</table>

*year to date

Today’s value $5bn (indicative)

First gas sold

Shell / PetroChina Takeover

Listed at $20 m

$250m
Coal seam gas (CSG) is naturally occurring gas trapped in underground coal seams, most commonly methane.

- Trapped by water and ground pressure.
- Extracted by drilling into the coal seam and pumping water which lowers the pressure and releases the gas.
- Vast CSG resources across Australia’s coal basins.
- Commercially produced in Queensland for more than 15 years.
- Gas-fired power stations create less than half the greenhouse gas emissions of equivalent sized coal fired power stations.
Liquefied Natural Gas (LNG) is natural gas that has been cooled and converted to liquid for transport.

We are planning an LNG plant in Gladstone that will convert CSG to LNG in preparation for international shipping.

CSG from the Bowen and Surat Basins will be piped to the proposed Arrow LNG plant.

It will produce up to 16 million tonnes of LNG per annum (mtpa).
ARROW ENERGY
OUR PROJECTS

Domestic gas operations
- Tipton
- Daandine
- Kogan
- Stratheden
- Moranbah Gas Project

Arrow LNG (proposed)
- Surat Gas Project
- Bowen Gas Project
- Arrow Surat Pipeline
- Arrow Bowen Pipeline
- Arrow LNG Plant
- Power Development

Power stations
- Braemar 2
Moranbah Gas Project (MGP) produced its first gas in 2004

Supply gas to power homes, businesses and industry:
- Moranbah Power Station
- Yabulu Power Station in Townsville
- Dyno Nobel
- Two refineries in the Townsville area

Approximately 170 staff in Moranbah

Our business partners are AGL Energy and QGC

100% overlapping tenure with 30 major coal companies

18 co-development agreements with coal companies
Once a possible site for exploration or production is identified, the landholder is contacted by an Arrow Land Liaison Officer (LLO).

The LLO will discuss site access, schedule cultural heritage and environmental clearances, co-ordinate other activities on the property and ensure the rehabilitation of site.

Arrow has:

- a Standard Compensation agreement
- removed the privacy provisions (landholder can request inclusion)
Site preparation for drilling activity only (70m x 70m)

Hole diameter is about 120mm (5 inches)

Hole depth depends of geology
  - Generally less than 800m

Drilling and testing timeframe
  - Approximately one month

Qualified drilling personnel

Strong safety focus – lifesavings rules

Well is cemented and sites are rehabilitated after drilling

Exploration wells cannot be converted to production wells
Prove the production potential of the coal seam

Two to five pilot wells are used to confirm whether gas can be produced to surface in commercially viable quantities

Site preparation for appraisal activity (70m x 70m)

If successful the well is closed and production is stopped pending potential future use for gas production

If unsuccessful the well is shut in and rehabilitated in accordance with the law
Well specifications
- Horizontal in seam wells generally in Bowen Basin
- 70m x 70m for drilling a single well
- Rehabilitated to approx 10m x 10m
- Currently trialling fracking and other completion technologies
- Well spacing approx 1 well per square km

Gathering system - pipelines
- Buried to min 750mm in grazing land

Rehabilitation
- Any disturbed land will be rehabilitated as soon as practicable in accordance with Government standards
PROPOSED BOWEN GAS PROJECT
Project Area:

- Bow Energy acquisition – Norwich Park and Blackwater included
- Inclusion of ATP759 West
- Excludes Arrow’s MGP tenures
# PROPOSED BOWEN GAS PROJECT

## LOOK AHEAD

### Pre-Development

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>Concept select (complete Q3 2012)</td>
</tr>
<tr>
<td>2012</td>
<td>Preliminary design (complete Q3 2013)</td>
</tr>
<tr>
<td>2013</td>
<td>Ongoing exploration</td>
</tr>
</tbody>
</table>

### Approvals

- Bowen EIS (approved Q3 2013)

### Project Starts

- Approx 300 wells per year from 2017
- Expect 4 Bowen facilities to come online in 2017, 2 further in 2020 and so on
- Detailed Environmental Approvals sought

### Timeline

- **2011**: Concept select (complete Q3 2012)
- **2012**: Preliminary design (complete Q3 2013)
- **2013**: Ongoing exploration
- **2014**: Bowen EIS (approved Q3 2013)
- **2015**: Transmission pipeline construction commences
- **2016**: LNG Production from Bowen
- **2017**: LNG Production from Surat Basin
- **2018**:

*FID* = Final Investment Decision
Assess the impact of all possible options being considered.

Early Reference Case developed as a scenario for the Environmental Impact Statement (EIS).

Social, economic and environmental impact assessment based on:
- Preliminary plan
- 17 fields gradually developed over 35 years
- Potential for footprint to be significantly reduced

Currently no fixed locations for any infrastructure

EIS is high level “in principle” approval with detailed environmental approvals to follow.
## BOWEN GAS PROJECT
### KEY DIFFERENCES BETWEEN THE SURAT AND BOWEN

<table>
<thead>
<tr>
<th>Bowen Gas Project</th>
<th>Surat Gas Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ 100% Overlapping Tenure</td>
<td>➢ Intensively Farmed Land</td>
</tr>
<tr>
<td>➢ Lower permeability coals</td>
<td>➢ High permeability coals</td>
</tr>
<tr>
<td>➢ Horizontal wells (where possible)</td>
<td>➢ Vertical wells</td>
</tr>
<tr>
<td>➢ Trialling hydraulic fracturing</td>
<td>➢ No hydraulic fracturing required</td>
</tr>
<tr>
<td>➢ Significantly lower volumes (&lt;20%) CSG water produced</td>
<td>➢ Higher volumes of CSG water produced</td>
</tr>
</tbody>
</table>
Permissible Project Activities Based on Level of Constraint:

<table>
<thead>
<tr>
<th>Level of Environmental Constraint</th>
<th>Environmental Management Control</th>
<th>Project Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Wells</td>
</tr>
<tr>
<td>No Go</td>
<td>Not applicable</td>
<td>No</td>
</tr>
<tr>
<td>High</td>
<td>Site-specific controls</td>
<td>Yes</td>
</tr>
<tr>
<td>Moderate</td>
<td>Specific controls</td>
<td>Yes</td>
</tr>
<tr>
<td>Low</td>
<td>Standard controls</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- Benefits of framework approach include:
  - Addresses uncertainty about location and timing of development
  - Identifies constraints having regard to sensitivity of environmental values
  - Document constraints through mapping buffers, thresholds or triggers
  - Environmental management controls address identified constraints
CONSTRAINTS ANALYSIS

- Constraint levels (no go, high, moderate, low) developed for
  - Terrestrial ecology
  - Aquatic ecology
  - Cultural heritage
  - Surface water hydrology
  - Land tenure
  - Land use
  - Landform and soils
  - Public safety

- Constraints transferred to GIS layers and overlain to develop cumulative constraints

- Constraints analysis used in site selection, project planning and environmental management controls
BOWEN GAS PROJECT
KEY ISSUES

➢ Some of the issues that will be address in ToRs include:

• Environmental:
  ➢ Ecology (threatened species)
  ➢ Groundwater
  ➢ Land use (overlapping tenure)
  ➢ Amenity (noise, air quality)

• Socio-economic
  ➢ Fly In Fly Out (FIFO)
  ➢ Roads and traffic

➢ Draft ToRs expected to be released for public review July 2012
## BOWEN GAS PROJECT
### ENVIRONMENTAL IMPACT STATEMENT (EIS) UPDATE

<table>
<thead>
<tr>
<th>EIS Process</th>
<th>Expected Timeframes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lodge Voluntary EIS Application</td>
<td>Completed</td>
</tr>
<tr>
<td>Lodge Initial Advice Statement</td>
<td>Completed</td>
</tr>
<tr>
<td>Decision on the “proposed action” under the EPBC Referral Act</td>
<td>Expected June 2012</td>
</tr>
<tr>
<td>Draft Terms of Reference available for public comment</td>
<td>Early July 2012</td>
</tr>
<tr>
<td>Arrow to provide response to ToR submissions to government</td>
<td>August 2012</td>
</tr>
<tr>
<td>Final Terms of Reference from DEHP</td>
<td>Quarter 3 2012</td>
</tr>
<tr>
<td>Undertake field surveys and technical studies</td>
<td>Commenced Quarter 4 2011</td>
</tr>
<tr>
<td>Deliver draft EIS</td>
<td>Expected final Quarter 4 2012</td>
</tr>
<tr>
<td>EIS available for public comment</td>
<td>Quarter 1 2013</td>
</tr>
<tr>
<td>Qld and Commonwealth Government project decision</td>
<td>Quarter 3 2013</td>
</tr>
</tbody>
</table>
Arrow Energy is committed to creating sustainable employment and economic development for local industry.

Arrow Energy will provide full, fair and reasonable opportunity for capable and competitive Local industry to participate in the procurement of goods, equipment and services.

Arrow has committed to:

- **Recruiting locally**, where skills and experience are available
- **Actively seeking local** and Australian industry participation
- Delivering **benefits** to the community
Speaking at local Primary and High schools

Identifying opportunities to support established training institutions, for example:

- Trade students manufacturing well guards and other equipment

School based traineeships:

- Year 11 students at Moranbah State High School
- Two administration traineeships
- Two engineering traineeships
- Certificate II level

University scholarships

Vacation employment

- 12 weeks paid employment
- 2nd year university students
Local employee committees assess applications for donations, sponsorships and partnerships on the following focus areas:

- Health and safety
- Education
- Environment

Successful applicants in the Bowen Basin to date include:

- Moranbah District & Support Services
- Moranbah State High School
- Moranbah Athletics club
- Moranbah East State School
- Moranbah MyTime Group
- Moranbah Arts Council
- QLD Arts Council