Welcome and introductions

Arrow Energy & Arrow Bowen Pipeline (ABP)

Arrow Bowen Pipeline (ABP) Construction

Arrow Bowen Pipeline (ABP) Environmental Impact Statement (EIS)

Questions
ARROW BOWEN PIPELINE
TODAY’S OBJECTIVES

- To explain the pipeline construction and rehabilitation process.
- To summarise the Environmental Impact Assessment process.
- To highlight key elements of the Environmental Impact Statement (EIS).
- To gather feedback and obtain input from community.
ARROW ENERGY & ARROW BOWEN PIPELINE (ABP)
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 PROJECTS

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

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

Power stations
• Braemar 2

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The Arrow Bowen Pipeline (ABP) is a 477km steel pipeline that will deliver coal seam gas (CSG) from the Bowen Basin to the proposed Arrow LNG Plant on Curtis Island.

- Consists of a mainline and three laterals
- Buried 1-2 m below ground level
- Above ground structures include main line valves and scraper stations
- ABP passes through:
  - Four local government areas (Whitsunday, Isaac, Rockhampton, Gladstone)
  - Two State Development Areas (Stanwell-Gladstone Infrastructure Corridor and Gladstone)
  - 232 landholdings
ARROW BOWEN PIPELINE
PROPOSED ROUTE

MAP 1: OVERVIEW MAP

LEGEND
- Local Government Area (LGA)
- Highway/Region Road
- Rail
- Watercourse
- ASP Route (RevC)
- Marine/Landroute
- Option

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ARROW BOWEN PIPELINE
ROUTE SELECTION

Route selection process:

- Landholder and community consultation.
- Specialist Field Assessments (e.g., flora and fauna).
- Indigenous and non-indigenous Cultural Heritage Assessments.

Route selection criteria:

- Minimise community and environmental disruption.
- Design and construction in compliance with relevant standards.
- Safety considerations to the workforce, residents and the general public during construction.
ARROW BOWEN PIPELINE
RIGHT OF WAY (ROW)
ARROW BOWEN PIPELINE
CONSTRUCTION ACTIVITIES

- Construction period is ~15 months (generally dry season)
- Pipe laying plus or minus 2km per day
- General construction activities include:
  - Surveying and pegging
  - Clearing and grading
  - Welding and stringing
  - Trenching and padding
  - Hydrostatic testing
The method used to cross a watercourse is dependent on the sensitivity of the area (ie ecology, water flow etc):

- Open trench
- Open trench with flow diversion
- Horizontal Directional Drill (HDD)
ARROW BOWEN PIPELINE
ROAD AND RAIL CROSSINGS

- Minor roads and tracks will be crossed using open cut methods.
- Sealed roads and railways will be undertaken using thrust boring or micro-tunnelling techniques.
  - Railways will be crossed at right angles.
  - Traffic and safety management procedures will be implemented.
  - Construction will be timed to minimise disruption to users.
Removal of foreign material eg waste.
Trenches and voids backfilled and compacted.
Topsoil reinstated.
Surface drainage lines re-established.
Minor surface roughness retained.
Watercourse banks reinstated and stabilised.
Pipeline construction area re-profiled to original contours.
Erosion and sediment control measures implemented.
Highlight key findings of the Environmental Impact Assessment.

Identify the existing environment of the project area.

Assess potential environmental, social and economic impacts of the project on the existing environment.

Outline suitable management strategies to reduce or avoid any potential adverse impacts identified.
# ARROW BOWEN PIPELINE
## PROJECT TIMELINE

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terms of Reference</td>
<td></td>
</tr>
<tr>
<td>Environmental Impact Statement (EIS)</td>
<td></td>
</tr>
<tr>
<td>Review of EIS</td>
<td></td>
</tr>
<tr>
<td>EPBC referral for Matters of National Environmental Significance</td>
<td></td>
</tr>
<tr>
<td>EIS Assessment Report</td>
<td>2014 / 2015</td>
</tr>
<tr>
<td>Application and grant of Environmental Authority (with public input)</td>
<td>April 2016</td>
</tr>
<tr>
<td>Contract award and front end engineering and design</td>
<td>End 2017</td>
</tr>
<tr>
<td>Commence pipeline construction</td>
<td></td>
</tr>
<tr>
<td>Commence pipeline commissioning</td>
<td>2017 / 2018</td>
</tr>
<tr>
<td>Commence pipeline operation</td>
<td></td>
</tr>
</tbody>
</table>

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Normal agricultural activities occur over buried pipelines (grazing, cropping).

No long term adverse impact on existing land uses.

Compensation to landowner for temporary disruption to agricultural production.
Construction workforce of 693 people

Operational workforce of 15 people

Temporary workers camps will be located away from houses and towns

Possible locations include Bajool, Foresthame, Hillcrest, Daunia and Red Hill

All weather access, vegetation, soils, watercourses and cultural heritage values will be considered during site selection

Sites will be restored and rehabilitated
## ARROW BOWEN PIPELINE
### CULTURAL HERITAGE

<table>
<thead>
<tr>
<th>ASSESSMENT</th>
<th>MANAGEMENT STRATEGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>A number of Indigenous heritage sites recorded within close proximity to project area including stone artefacts, scarred trees, axe-grinding grooves, quarries, wells, shell scatters, burials, rock art and stone arrangements.</td>
<td>Historical Heritage Management Plan implemented.</td>
</tr>
<tr>
<td>No non-Indigenous cultural heritage sites were found within the project area.</td>
<td>Direct engagement with key Indigenous stakeholders is ongoing.</td>
</tr>
<tr>
<td></td>
<td>Indigenous Land Use Agreements will be sought by Arrow Energy.</td>
</tr>
</tbody>
</table>
## ARROW BOWEN PIPELINE

### LAND

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>- Ground elevations generally decrease from the west to east.</td>
<td>- Modified landforms will be re-contoured to original condition.</td>
</tr>
<tr>
<td>- Pipeline route passes through a number of petroleum production and exploration tenements.</td>
<td>- Land disturbed during construction will be rehabilitated and returned to its original land use.</td>
</tr>
<tr>
<td>- Majority of land traversed by the pipeline route (96.2%) is included in the rural land use class.</td>
<td>- Appropriate erosion and sediment control measures will be put in place eg sediment fencing.</td>
</tr>
</tbody>
</table>
## ARROW BOWEN PIPELINE
### AIR QUALITY

<table>
<thead>
<tr>
<th>ASSESSMENT</th>
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</tr>
</thead>
<tbody>
<tr>
<td>The project will generate dust and exhaust fumes during construction and small quantities of gas during commissioning.</td>
<td>Watering for dust suppression.</td>
</tr>
<tr>
<td>Impacts of dust will be short term and generally localised.</td>
<td>Haul distances will be minimised.</td>
</tr>
<tr>
<td>Construction of the project = approximately 0.02% of QLD’s annual green house gas emissions.</td>
<td>Existing sealed roads will be used where possible.</td>
</tr>
<tr>
<td>Negligible impact during operation.</td>
<td>No burning policy.</td>
</tr>
<tr>
<td></td>
<td>Progressive rehabilitation as construction progresses.</td>
</tr>
</tbody>
</table>
## ARROW BOWEN PIPELINE

### WATER

<table>
<thead>
<tr>
<th>ASSESSMENT</th>
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</tr>
</thead>
<tbody>
<tr>
<td>The pipeline route will cross a number of watercourses and traverse three river basins: Burdekin, Fitzroy and Calliope.</td>
<td>Disturbance to beds and banks will be minimised.</td>
</tr>
<tr>
<td>Most watercourses intermittent with little to no flow.</td>
<td>Construction of watercourse crossings will be scheduled during the dry season.</td>
</tr>
<tr>
<td>Potential for erosion in watercourse beds and banks.</td>
<td>Trenching of watercourses will be completed promptly.</td>
</tr>
<tr>
<td>Project requires potable and non-potable water resource.</td>
<td>HDD method will be used for sensitive watercourse crossings.</td>
</tr>
<tr>
<td>Project requires water for construction, hydrostatic testing and camps.</td>
<td>Water volumes required during construction will be sourced from existing allocations and will not impact existing users.</td>
</tr>
<tr>
<td></td>
<td>Primarily sourced from SunWater pipelines along the route.</td>
</tr>
<tr>
<td></td>
<td>Relevant approvals and extraction licences will be obtained.</td>
</tr>
</tbody>
</table>
**ASSESSMENT**

- During construction the main sources of noise will be heavy plant equipment, dozers, excavators, trenching machines.
- Some blasting maybe required in rocky areas.
- 119 residential dwellings within 1 km of the pipeline route (only 2 within 100m).

**MANAGEMENT STRATEGIES**

- Construction hours will generally be restricted to daytime period.
- Advance notice of noisy activities will be provided to nearby areas.
- Any blasting carried out will be in accordance with current standards.
<table>
<thead>
<tr>
<th>TERRESTRIAL FLORA &amp; FAUNA</th>
<th>AQUATIC FLORA AND FAUNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Non-remnant vegetation (73.8%), High value regrowth (4.78%) &amp; Remnant vegetation (21.3%).</td>
<td>▪ Majority of watercourses crossed by pipeline are ephemeral and contain limited habitat for aquatic species.</td>
</tr>
<tr>
<td>▪ Total disturbance by pipeline route is 371.2 ha of remnant vegetation.</td>
<td>▪ No protected fish species recorded during field surveys.</td>
</tr>
<tr>
<td>▪ Habitat found in the project area for some threatened species (eg Yellow Chat, Powerful Owl, Grey Snake, Ornamental Snake, Brigalow Scaly-foot, Yakka Skink, Common Death Adder, Little Pied Bat and Grey-headed Flying Fox).</td>
<td>▪ Platypus was not captured however were observed.</td>
</tr>
<tr>
<td>▪ Project may result in temporary disturbance to fauna movement corridors and dry season fauna refuges.</td>
<td>▪ Pipeline route traverses 350m of salt marsh and mangrove communities which contain marine plants and bare marine substrate.</td>
</tr>
<tr>
<td></td>
<td>▪ Maximum total disturbance of these communities from pipeline route is 1.05 hectares.</td>
</tr>
</tbody>
</table>
## MANAGEMENT STRATEGIES

- Pre-construction surveys will identify location of flora and fauna and minor realignments of the pipeline route to avoid or minimise clearing of significant flora and fauna.
- Investigation into use of HDD to avoid impacts on major marine and aquatic vegetation.
- All clearing boundaries will be clearly shown on project drawings and marked in the field.
- Qualified wildlife spotters will be on site during construction.
- Implementation of a Weed Management Plan.
- An offset plan will be prepared and implemented to rehabilitate vegetation similar to that of the impacted vegetation in a nearby location.
- Translocation will occur where possible.
- Relevant approvals and permits will be obtained.
### ARROW BOWEN PIPELINE
#### TRANSPORT

<table>
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<tbody>
<tr>
<td>Movement during construction will vary and will be generated from:</td>
<td>Construction traffic will be confined to the project area, right of way (ROW) and road network.</td>
</tr>
<tr>
<td>– Construction personnel</td>
<td>Traffic movements will be managed through an appropriate Traffic Management Plan.</td>
</tr>
<tr>
<td>– Minor construction materials and consumables</td>
<td>Unloading pipe at the ROW will be limited to daylight hours.</td>
</tr>
<tr>
<td>– Line pipe supply</td>
<td></td>
</tr>
<tr>
<td>– Plant / construction equipment</td>
<td></td>
</tr>
<tr>
<td>Haulage of materials and plant will be seven days per week.</td>
<td></td>
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</tbody>
</table>
## ARROW BOWEN PIPELINE WASTE

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Small amounts of domestic and general construction wastes will be generated from the project.</td>
<td>Reusable and recyclable wastes will be collected and stockpiled for recycling.</td>
</tr>
<tr>
<td>There will be little excess excavated spoil during construction of the pipeline.</td>
<td>All pipe delivery packaging will be removed from the ROW daily.</td>
</tr>
<tr>
<td>The total volume of water used to hydrostatically pressure test the pipeline will be 100 ML.</td>
<td>Wastes will be appropriately contained.</td>
</tr>
<tr>
<td></td>
<td>Waste oil and solvents will be collected by approved contractors.</td>
</tr>
</tbody>
</table>
### ASSESSMENT

- Demand on local hospital based services not anticipated.
- Project will support an estimated average of 2,952 full-time workers.
- Project will require local workers but majority of workers will be fly in, fly out (FIFO).
- The project is estimated to inject close to $891 million into the Australian economy.

### MANAGEMENT STRATEGIES

- A nurse and/or paramedic will be present at construction camps.
- Local health authorities will be advised of project timetable.
- Labour and materials will be locally sourced to enhance economic benefit.
- Workforce will be housed in temporary workers accommodation camps and will not provide opportunity for interaction with community.
- A Social Impact Management Plan (SIMP) and Stakeholder Consultation Plan (SCP) have been prepared to ensure ongoing consultation and management of impacts.
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<tbody>
<tr>
<td>Impacts on major crossings eg roads, railway, watercourses.</td>
<td>Preliminary hazard identification and risk assessment shows that residual risks are insignificant and minor.</td>
</tr>
<tr>
<td>Use, storage and transport of some hazardous materials eg oils and fuels.</td>
<td>No moderate, major or catastrophic residual risks have been identified.</td>
</tr>
<tr>
<td>Potential to initiate bushfire due to construction activities.</td>
<td>Hazards and risks are related to typical construction activities and risks during operation can be managed by a comprehensive operations and maintenance program.</td>
</tr>
<tr>
<td>Natural hazards eg floods, landslides, earthquakes.</td>
<td>An Emergency Response Plan will be prepared for all possible emergency situations.</td>
</tr>
<tr>
<td>Accidental release of gas/explosion.</td>
<td></td>
</tr>
<tr>
<td>Bushfire initiated by pipeline maintenance activities or by third party incident.</td>
<td></td>
</tr>
</tbody>
</table>
Referral being made to the Federal Department of Sustainability, Environment, Water, Population and Communities.

Matters of National Environmental Significance that may be impacted:
- Listed threatened species and ecological communities.
- Migratory species protected under international agreements.
ARROW BOWEN PIPELINE
SUMMARY

The EIS has demonstrated that potential environmental and socio-economic impacts associated with the ABP project will be mitigated through appropriate alignment and design and managed through the implementation of management plans.

- Health and safety of the community and workforce will be given the highest priority.
- Benefits to the community include income generation and local employment.
- Workforce will be housed in temporary self-contained camps.
Executive Summary is available here today and full EIS documents are on public display at a number of venues, including:

- Moranbah Library
- Emerald Library
- Dysart Library
- Nebo Library
- Middlemount Library
- Rockhampton Regional Council
- Gladstone Civic Centre
- Customer Service Centre, Proserpine
- Customer Service Centre, Bowen
- Customer Service Centre, Collinsville
- DEHP’s Customer Referral Centre, Brisbane

Submissions can be made in writing to DEHP (previously DERM) until 24 May 2012.

The Chief Executive:
Department of Environment and Heritage Protection
Attention: The EIS Coordinator (Arrow Bowen Pipeline project)
PO Box 15155, City East QLD 4002
Questions and Answers

Freecall: 1800 038 856

Email: info@arrowenergy.com.au