

### Arrow Energy

#### **TSBE** webinar

Reviewing Energy Supply Chains -Opportunities and innovation for the future

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# About Arrow and Surat Gas Project

- Arrow is an integrated energy company owned 50/50 by Shell and PetroChina
  - 17,000km² of tenements over the Surat and Bowen Basins in Queensland
    ~1450 gas wells currently
  - ~6,500 petajoules of 2P gas reserves to date
  - supplies gas to Townsville, Moranbah and Braemar 2 power stations and to operators of Swanbank E, Daandine and Braemar 1 power stations
- Generation capacity = supply for ~800,000 Queensland homes
- The Surat Gas Project (SGP) is underpinned by the largest gas sales agreement on the east coast of Australia, with the Shell-QGC joint venture
- Last Friday, Shareholders made a Final Investment Decision (FID) for phase one of the 27 year project, and Arrow sanctioned construction to start in 2020
- Peak construction 2021-2025; first gas 2021
- Phase one development areas
  - expansion north and south from Arrow's current operational areas at Daandine and Tipton
- Later phases include the Wandoan and Cecil Plains areas.



## Contracting scope - pre FID phase one

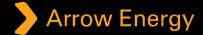


## Contracting scope - pre FID phase one

#### Top 10 SGP phase one activities:

- 1. Drilling
- 2. Well Services
- 3. Construction
- 4. Engineering
- 5. Environment & Water Management
- 6. Camps & Accommodation
- 7. Transport and Warehouse
- 8. Logistics
- 9. Rotating Equipment
- 10. Other Maintenance and support contracts





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- 5 large domestic operating fields
  - Tipton, Daandine, Kogan, Stratheden in Surat Basin
  - Moranbah Gas Project in Bowen Basin
- Arrow currently produces the equivalent of 40% of Qld's domestic gas demand
- \$850 million expansion of Arrow's
  Daandine and Tipton fields during 2016 2018 in the lead up to the Surat Gas
  Project



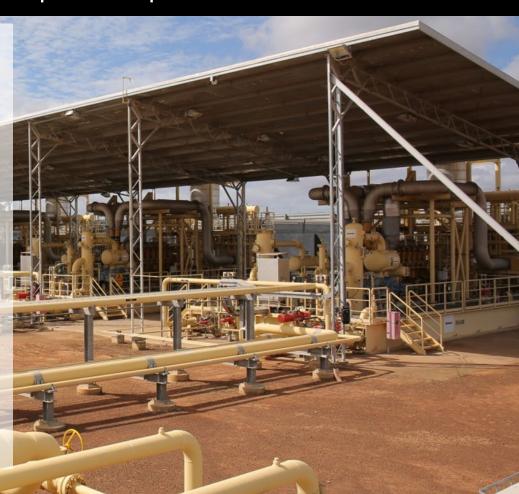
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Highlighted activities require ramp up

- 200+ construction jobs in phase one
  - Full SGP ~1000 jobs
  - (800 construction, 200 long term in operations)
- 600 new wells in phase one
  - ~300 TJ/d at peak production
  - Full SGP ~2,500 new wells;
    700 TJ/d at peak production
- Path to market for ~5 trillion cubic feet (TCF) of Arrow gas - full SGP
- By comparison, Queensland's projected 2020 domestic gas consumption is 126PJ – or about 0.12 TCF.



#### Innovation for the future - industry and up-skilling opportunities



#### 1. Automation and remote management

- Reduced human interaction with automated tools
- Monitoring control centres for production
- Remote working and reduced footprint
- Reduction in kilometres driven
- Unmanned Aerial Vehicle (UAVs)

#### 2. Data and logistics management

- Data information Arrow Energy Corporate Information Factory
  - stored centrally an used regularly for decision making
  - use of mobile data collection and storage
  - predictive maintenance
- Operational and maintenance equipment efficiency and utilisation
- Workforce management tracking and efficiency
- Well in a box logistics automation through standardised materials delivery

#### 3. Collaboration

- COVID19 risk and issue collaboration APPEA led
- Industry collaboration Safer Together requirements standardisation, training, HSE
- https://www.safertogether.com.au/resources/initiatives/covid-19





### Innovation - operating on black soil farmland



- 2/3 Arrow Surat tenure is over unique black soil farms
- The traditional 800m and 800m vertical grid field represented a high impact risk in these areas
- Arrow developed multi-well pads, grouping four to eight deviated wells from each pad, on the boundaries of properties, to minimise impact to 2% during construction, and less than 1% during operations
- Multi well pads (as seen here on Arrow's *Theten* farm) are located on the boundaries of these highly intensive properties. They reduce workover frequency and maximise gas efficiency
- These well pads now account for more than 60% of all wells in Arrow's field development plans



#### Protecting our mobile workforce in COVID-19



Government concern about risk of FIFO/DIDO staff and contractors into regional Queensland

- <u>Crisis Management Team</u> mobilised in March to implement controls for business continuity
- Immediate staff and contractors controls
  - FIFO / DIDO workers reduction by 20%
  - New Arrow charter flights with social distancing Bne to Mor
  - New Arrow charter buses with social distancing Bne to Dby; Mor to camps
  - Additional Arrow nurses
  - Daily temperature checks
  - Inter-state and intra-state exemption letters for essential contractors and individuals 30+
  - Health Declarations for all staff; full Arrow Health Plan submitted to QH regional centres
  - Separation of local and FIFO/DIDO workforces in local communities including work offices
  - New camps, and new health and hygiene controls
- Major stakeholder engagement program
  - Contractors
  - Contractor calls with 180+ contractor representatives weekly
  - Robust weekly assurance process in place
  - Customers, operating communities, government agencies





## Question time









