Two LNG Projects - Ichthys and Abadi

Ichthys LNG Project
Ichthys Project Location

Extent of Ichthys Field

Long side: approx. 40km
Short side: approx. 15km
Area: approx. 600km²
Brief Summary of Permit

- Permit Holders: INPEX Browse, Ltd. (76%)  
  TOTAL E&P Australia (24%)
- Retention Lease (WA-37R): 5 years from Sep. 21, 2009. Currently working towards obtaining Production License for WA-37R.
- Permit Area: 3,041km² (5,049km² at commencement in 1998)
- Minimum Work Obligations: (Already done)

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<tr>
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<td>1 Well/G&amp;G</td>
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G&G: Geological and Geophysical Studies

Exploration History

1998

Aug.: Obtained Exploration Permit for the WA-285-P (Share 100%).
Dec.: Acquired 2D seismic with line length approx. 4,700km.


1st Drilling Campaign of 3 wells (Dinichthys-1, Gorgonichthys-1, Titanichthys-1) encountered gas and condensate pools in each well.

May-Oct. 2001:

The structure was named ‘ICHTHYS GAS AND CONDENSATE FIELD’ after the 3D Seismic data acquisition / processing / interpretation.

Jun. 2003 - Feb. 2004:

2nd Drilling Campaign, 3 wells (Ichthys-1A, Ichthys Deep-1, Ichthys-2A/ST1) confirmed areal extension of the reservoir and its hydrocarbon pool.

Apr.2007 - Jun. 2008:

Drilled Dinichthys North-1, Ichthys West-1 and examined further areal extension of the Ichthys Gas and Condensate pool.

Note: Current reserve volume of Ichthys Field is estimated to be 12.8TCF Gas and 527 MM barrels of Condensate
Outline for Development Concept

- LNG Production: approx. 8.4 million ton per year
- Condensate Production: approx. 100,000 barrel per day (Peak Rate)
- LPG Production: approx. 1.6 million ton per year
- Subsea Production Wells: 30 wells at Brewster, 20 wells at Plover
- Reservoir Depth: approx. 3,900m - 4,600m
- Subsea Production Facilities: Flow Lines, Flexible Risers
- Offshore Production Facilities: CPF (Semi-submersible Type) + FPSO (Condensate Storage and shipping)
- Gas Export Pipeline: 42 inch
- Design Life: 40 years
- At Darwin Onshore Facilities: produce, storage, and ship LNG, LPG and Condensate
- Onshore Storage Tank capacity:
  - LNG Tank: 2 x 175,000m³ (approx. 160,000 ton)
  - C3 Tank: 1 x 90,000m³ (approx. 40,000 ton)
  - C4 Tank: 1 x 90,000m³ (approx. 50,000 ton)
  - Condensate Tank: 2 x 60,000m³ (approx. 760,000 barrel)

Overall Development Image

Condensate 85,000 BPD (Peak)

LNG 8.4 MMTPA
LNG 1.6 MMTPA
Condensate 15,000 BPD (Peak)

Gas Export Pipeline 42” x approx. 885km

Darwin Onshore Plant

Future Plover Subsea Wells

Brewster Subsea Wells

Flexible Risers
Offshore Facility Layout

Subsea Well and Infield Flowlines
Gas Export Pipeline

- **Specification**
  - Size and Thickness: 42”x33.5 mm
  - Length: approx. 885 km
  - Allowable Pressure: 200 Bara
  - Material: X65
  - Total Weight: approx. 800,000 ton
  - Water Depth at Route: approx. 250m - 0m
LNG Plant Site Location

- Decided Onshore LNG Plant Site at Darwin
  - Announcement was issued at Darwin date on 26th Sep. 2008
  - Messrs. Martin Ferguson, Australian Resources Minister and Paul Henderson Chief Minister NT attended
LNG Plant Layout

Module Offloading Facility
**GHG (Greenhouse Gas) Management (1)**

- **Situation in Australia**
  - Carbon Capture and Storage (CCS) Law (Offshore Petroleum Amendment (Greenhouse Gas Storage)) became effective in Nov. 2008
  - CCS acreages released in Mar. 2009
  - Carbon Pollution Reduction Scheme (CPRS: emissions trading scheme) bill passed the Australian House of Representatives on Jun. 4, 2009 and was sent to the Senate. The bill was rejected by Senate twice (Aug. 2009 and Dec. 2009)
  - On Apr. 27, 2010, Prime Minister of Australia Kevin Rudd announced the CPRS scheme would be deferred until 2013 at the earliest.

- **INPEX Efforts**
  - Reduction of GHG emissions by optimizing the energy efficiency of Offshore / Onshore facilities. e.g. less flaring etc.
  - Study the measures to reduce or offset GHG emissions
    - Biosequestration, Geosequestration, Australian or international emissions permits.
  - As for Biosequestration, we are carrying out a reforestation assessment project (700ha, South West of WA).

**GHG (Greenhouse Gas) Management (2)**

- The graph below shows CO₂ emission in kg per 1MWh electric generation

![Graph showing CO₂ emission comparison](image)

- Total emission of CO₂ for Ichthys LNG project: 280MMt/40years, 7MMt/year

* Historical Aus LNG: NWS, Darwin LNG
Contribution to Local Community

Development Schedule

- Application of Environmental Approval
- Submission of additional information
- To obtain Environmental Approval
- Application of Production Licence
- To obtain Production Licence
- FID
- First LNG
- FEED
- Detailed Engineering
- EPC Decision
- Procurement
- Construction
- Onshore & Offshore Facilities
- LNG purchase commitment from buyers
- 2011
- 2016
**Exploration & Production Cost Trend (General)**

- Monitoring price trends of materials, equipment, machinery, labor wages and various services based on the analysis of various cost data.
- Calculating the budget for the projects reflecting each characteristic (statutory/environmental requirement etc.) based on the optimization of the plant specification in line with the progress of basic design (FEED) and the efficient tendering process through the contracting strategies for materials, equipment, machinery and services.
- Overall Exploration & Production (E&P) costs reached a peak in 2008 due to higher demand for commodities, labor, equipment, bulks, etc. reflecting worldwide economic growth.
- Then, costs for both Onshore and Offshore portions of the project declined by approx. 15% in 2009 in comparison with 2008 due to reduced E&P activities and materials demand reflecting the economic downturn caused by the global financial crisis.
- Towards the end of 2009, costs started to show an upward trend resulting from price increase of steel, caused by changes of pricing mechanisms implemented by resource majors for raw materials, such as iron ore and coking coal, and strong demand from China. Price increase is expected in 2010 for Onshore (approx. 10%) and Offshore (approx. 5%) compared with 2009.
Exploration & Production Cost Trend (Detail)

- **Facilities, Engineering and Labor Wages**
  - Oil & Gas Production Facilities: Dropped approx. 15% in 2009 compared with 2008. However, an increase is expected by approx. 11% in 2010.
  - Engineering Fee: Remained at the same level as 2008.
  - Labor Wages in Australia: Demand level stayed high under continuous upward trend due to labor shortage.

- **Steel Prices**
  - Hot Rolled Plates: Dropped approx. 45% in 2009 compared with 2008. However, an increase is expected by approx. 30% in 2010.
  - Line Pipes and OCTGs: Dropped approx. 30-35% in 2009 compared with 2008. An increase is expected by approx. 20% in 2010, but still below the 2008 level.

- **Nonferrous Metal Prices**
  - Nickel, Copper, Aluminum: Sharply dropped in 2009. However, recently showing an upward trend nearly coming back to the price range of 2008.

- **Rig Rates**
  - Rig rates for both Ichthys and Abadi spec. (water depth 1000-3000ft class): Showed an upward trend in 2009. The same level or higher is expected in 2010.

※All information above is as of April, 2010.

Exploration & Production Cost Trend (Index)

**Market Trend**

Data Source:
- ODS-Petrodata (Market Survey System)
- London Metal Exchange
- Australian Bureau of Statistics

*1: The data of Nickel, Copper and Aluminum are until March, 2010
*2: The data of Australian Labor is until 2009
LNG Market

- Market:
  - Asia, North America, Europe

- Buyers: In the Asian region, Electric/Power companies and City Gas companies in Japan, South Korea, China, Taiwan, Singapore, Thailand, Indonesia etc.

- Price:
  - Asian LNG Prices are generally linked to JCC (Japan Crude Cocktail)
  - Indonesian LNG Prices are linked to ICP (Indonesian Crude Price)
  - There is a time lag between the movement of crude oil and LNG prices: LNG prices are normally linked to JCC a few months before the date of LNG sales.

- Contract Type (typical): Long-term (e.g. 20 years)

- Contract Terms (typical): LNG is marketed to buyers by the operator jointly with project partners, unlike equity lifting in oil sales.

Condensate Market

- Market:
  - Condensate production of 2.35 million barrels per day (2008) and condensate processing capacity of 1.89 million barrels per day in the entire Asian region (2009)
  - Condensate production of 0.71 million barrels per day (2008) and condensate processing capacity of 1.08 million barrels per day in Asia excluding the Middle East (2009)
  - 0.22 million barrels per day imported to Japan (2009)
  - Surplus condensate is mainly exported to U.S.A and Europe.

- Buyers: Refining companies and traders in Japan, South Korea, China, Taiwan, Singapore, Thailand, Indonesia etc.

- Use: Petrochemical feedstock, Refinery material

- Price: Linked to price of Dated Brent, Dubai, and similar crude oils produced in the nearby areas

- Contract Type: FOB or CFR

- Contract Term: Annual term and Spot
LPG Market

Market
- U.S. is the largest LPG consumer in the world, while in Asia-Pacific, China, India and Japan are the main consumers in the order of consumption.
- Japan is the world largest LPG importer importing about 12 million ton per year. It accounts for approximately 80% of total consumption in Japan. (2009)
- Main exporters are countries in the Middle East, while main importers are countries in the East Asia including Japan. About 27 million ton of LPG is supplied to East Asian countries, which corresponds to a half of world sea traded LPG volumes. (2009)

Buyers
- LPG wholesalers and some of Electric / Power companies and City Gas companies are directly importing LPG in Japan.

Price
- Saudi CP (Contract Price) is the extensively-used benchmark for world exported LPG Prices, made available in the beginning of each month by Saudi Aramco, national oil company of Saudi Arabia. Argus FEI (Far East Index, the averaged spot price in Far East) monthly announced by Argus is becoming another benchmark price for LPG in East-Asian market.

Taxation Scheme in Australia

The content may be changed

Sales
⇒ (Oil/Gas sales price) × (Sales volume) ............ ①

Cost of Goods Sold
⇒ OPEX incurred in relevant years ( Exploration cost ) + CAPEX depreciation ............ ②
- Depreciation ⇒ Diminishing balance Method (effective life: 15 years for Production facilities; 20 years for Pipelines)

Selling, General and Administrative Expenses
PRRT= (Upstream Revenue - Upstream Capex & Opex - Expl. Cost - Abandonment Cost - undeducted carried forward PRRT expenditure) × 40% ............ ③
- PRRT deductions are made in the following order: Upstream Capex, Opex, Expl. Cost, Abandonment Cost.

Note: Exploration cost is subject to mandatory transfer between Projects members of same group of entities.
- Upstream Revenue = Revenue from Oil and Gas sales or GTP × Sales volume
- GTP (Gas Transfer Price) = Average of “Cost Plus Price” and “Net Back Price”
- Cost Plus Price ⇒ identify value based on Upstream costs
- Net Back Price ⇒ identify value based on LNG FOB sales price less Downstream costs
- Undeducted PRRT Expenditure: non-utilised PRRT deductible expenditure can be carried forward to the following years, which is subject to augmentation at the rates set out below:

Development cost: LTBR+5%; Expl. Cost: LTBR+15%; Abandonment cost: LTBR

*GDP Factor applies to all expenditure incurred more than 5 years before the Production Licence application is made.

*LTBR = Long Term Bond Rate

*GDP Factor = GDP Deflator of Australia

= (①-②-③-Interest paid) × 30%
Abadi Gas Field (1)

- Abadi Gas/Condensate Field
  - Water Depth: 400 - 800m
  - Reservoir Depth: 3,700 - 3,900m
  - Areal closure: more than 1,000km²
- Discovered gas and condensate in Abadi-1 exploration well in 2000
- Drilled 6 additional appraisal wells, and confirmed the extension of gas and condensate pools in the Abadi structure
- The gas reservoir pressures are plotted on the same line in the pressure v.s. depth plot which demonstrate the communication of the pressure between wells
- Gas reserves sufficient for 4.5MMTPA LNG production for more than 30 years
Abadi Gas Field (2)

Production Sharing Contract

- Contractor: INPEX Masela, Ltd. (90%)*
- Effective Date: Nov. 16, 1998
- Contract Period: 30 years
- Exploration Period: 10 years (proceed to Development and Production Period in case of commercial discovery)
- Contract Area: 3,221.3km² (already partially relinquished twice from the original 5,725km²)

* In November 2009, INPEX Masela, Ltd. signed an agreement with PT EMP Energi Indonesia to transfer a 10% participating interest. The transaction is subject to certain conditions precedent.
Plan of Development

- In Sep. 2008, INPEX submitted the Plan of Development (POD) of the Abadi gas field, and the Indonesian Government (BPMigas) approved the POD.

- Development Concept as approved in the POD**
  - Floating LNG
  - Initial development focusing on the North block
  - LNG production of 4.5MMt/a
  - Condensate production of 13,000 bbl/d
  - Production start-up: targeted 2016

** POD may be adjusted according to the progress of the third-party evaluation on the POD.

- Advantages of the FLNG development Option
  - Minimum environmental impact
  - Reduction in CAPEX, OPEX and abandonment work & cost
  - Possibility to reduce project lead time

- A third-party evaluation on the POD being conducted by the Indonesian Government

Floating LNG

Development Facilities
Development Scheme: Subsea Production System + Floating LNG
Development Well: 18 production wells (Directional Wells from 5 Drilling Centers)
Floating LNG: Loading LNG Plant, LNG Storage Tank, and Loading facility on conventional FPSO
**FLNG Layout**

- Living Quarter
- Utility Area
- Process Area
- Flare Stack
- Turret
- Stern
- Bow
- Condensate Offloading Hose Reel
- LNG Loading Arm

**Development Schedule**

- Public Announcement
- Local hearing
- Government Approval
- Environmental & Social Impact Assessment
- Environmental Permit
- Final Investment Decision (FID)
- FEED
- Detailed Engineering
- EPC Decision
- Procurement
- Construction
- First LNG
- LNG purchase commitment from buyers
- Gas Marketing

**Floating LNG Subsea Production System**
Organization of Project Implementation

Abadi Project History

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Current Status of FLNG undertaken by other Companies

- Shell: LNG-FPSO (3.5 MMTPA)
  - Signed a master agreement with Technip/Samsung consortium for the design, construction and installation of multiple floating liquefied natural gas (FLNG) facilities over a period of up to fifteen years in July 2009
  - Signed FEED contract with Technip/Samsung consortium for the Prelude FLNG project in March 2010
  - Announced on April 29, 2010 that Shell’s FLNG technology was selected as the Sunrise Joint Venture’s preferred option for developing the Greater Sunrise gas fields, and the Sunrise project would be the second deployment of Shell’s proprietary FLNG design following Shell’s Prelude FLNG development

- Petrobras: LNG-FPSO (2.5 – 3.0 MMTPA)
  - Started triple FEED for Floating LNG project for associated gas in the Brazilian pre-salt offshore Santos basin in Dec 2009 (FEED Contractor: Saipem, SBM/ Chiyoda, Technip/ JGC/ MODEC)

- FLEX LNG: LNG-FPSO (1.7 - 1.95 MMTPA)
  - Awarded Samsung a contract to build 4 Hulls in Sep 2008
  - Completed FEED of Generic Design LNGP (LNG Producer) in the 1Q of 2009
  - Reviewing applicable projects in Nigeria, PNG, Trinidad and Tobago, Brazil etc.

- SBM: LNG-FPSO (2.5 MMTPA)
  - Completed FEED of Generic LNG-FPSO in the 2H of 2008, reviewing applicable gas field

- Höegh LNG: LNG-FPSO (1.6 MMTPA)
  - Completed FEED (May, 2008 – March, 2009) of Generic LNG-FPSO, reviewing applicable gas field