



**DEPARTMENT OF PETROLEUM & ENERGY  
GOVERNMENT OF PAPUA NEW GUINEA**

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## ***THE PNG GAS PROJECT***

***Cambodian Khmer Base Case Study  
5<sup>th</sup> Workshop – Sihanouk Ville  
29 August – 2 September 2005***



### ***PNG Petroleum Industry***

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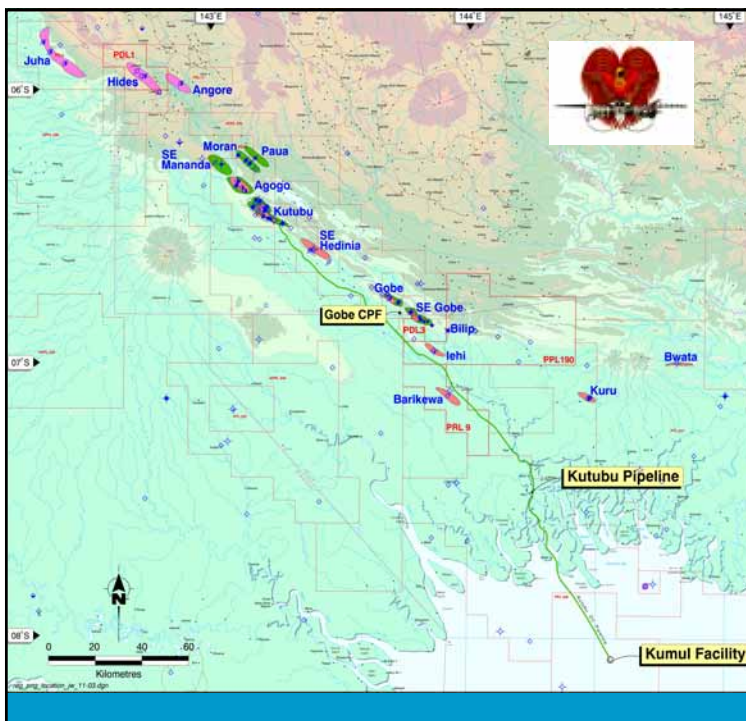
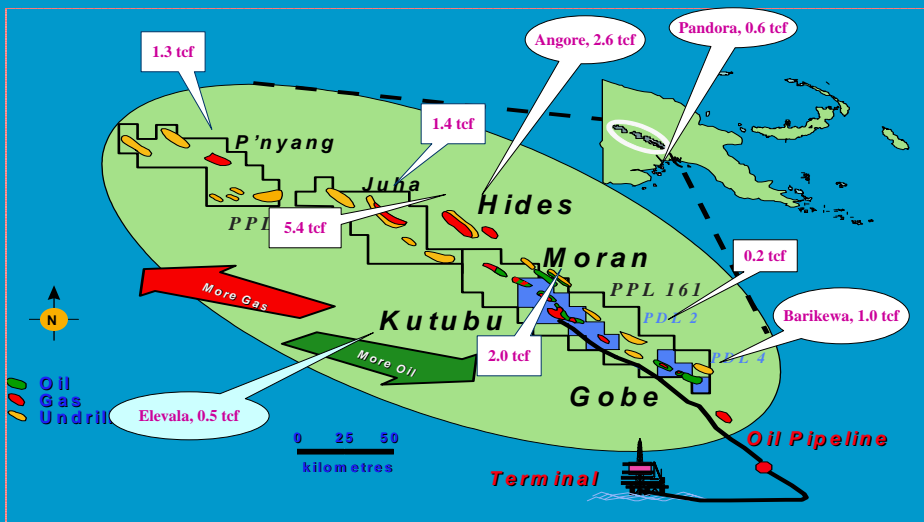
- ***Oil production is declining despite new oil fields coming on-stream recently - Moran and South East Mananda***
- ***There are many marginal oil and gas fields but are currently uneconomic to develop. They require a catalyst to develop them.***
- ***PNG has at least 7 times more gas than oil.***
  - 15 TCF (2P) gas reserves - 40 TCF (3P) gas reserves
- ***The big challenge is to find commercial markets for our gas. PNG Gas Project will act as the catalyst to develop the gas sector as well as sustain the petroleum industry in the country.***



# Discoveries and Prospects



## Gas 7x > Oil



## Location

- Fold belt dominates reserves base
- Fold belt technical challenges are significant
- Remote from markets with infrastructure issues
- Existing oil infrastructure and operating framework





## Competing Gas Markets



- **Gas unlike crude oil can only be developed if there is a market.**
- **Domestic gas market not developed – only limited use of LPG**
- **LNG markets of Japan, Korea and China dominated by big players; Indonesia, Malaysia, Brunei, Australia.**
- **Export of gas by pipeline to Australia considered viable.**
- **Other Options – CNG, GTL, Methanol/DME**
- **Gas Project infrastructure to trigger increase in-country demand/use for gas.**



## Greenfield vs. Brownfield



### Gas project benefits from:

- Kutubu field development
- Oil export infrastructure
- Pipeline corridor/licence
- Operating cost precedent
- Existing logistics

### However:

- Project requires new processing plant, pipeline infrastructure and NGL storage and off take facilities
- Hides is a major new field development
- The gas project is not a true brownfield development
- Development of other fields after Hides/Kutubu will benefit from gas project infrastructure





## **PNG Gas Project Partners**



- **The current major sponsors of the PNG Gas Project are:**
  - ⇒ **ExxonMobil (Operator)**
  - ⇒ **Oil Search Ltd (PNG based and regionally recognised)**
- **Other influential regionally recognised companies include:**
  - ⇒ **Santos - Australian**
  - ⇒ **Japan PNG Petroleum Co Ltd - Japanese**
  - ⇒ **Australia Gas Light (AGL) - Australian**
- **Other, but smaller, companies that have interest in the project include landowner companies such as Petroleum Resources; Kutubu, Gobe and Hides**
- **Petronas & AGL will own & operate Australian section of pipeline**



## **Gas Contracts**



- **Upstream owners executed Gas Agreement with State in 2002**
- **Committed 5TCF for PNG Gas Project from existing fields**
- **Existing developing the existing oil producing fields and selling gas in Australia at rates up to 100 PJ/a (400 MMscfd).**
- **Project Partners negotiated and sign conditional gas sales agreements with customers**
- **Conditional gas sales agreements need to be firmed before project sanction in April/May 2006**
- **Made decision to go to FEED on reaching 150 PJ/day**
- **To date have secured volumes in excess 200+ PJ/day from customers under conditional sales agreements**
- **System system will be capable of being expanded to produce up to 250 PJ/a (600 MMscfd) of sales gas.**



## PNG Gas Project Overview



- Natural gas produced from all fields will be transported to new Gas Treatment plant at Kutubu for Sales Gas BTU control.

- LPG's will be stripped & recombined with Sales Gas stream with excess re-injected into Kutubu for storage & recycle.

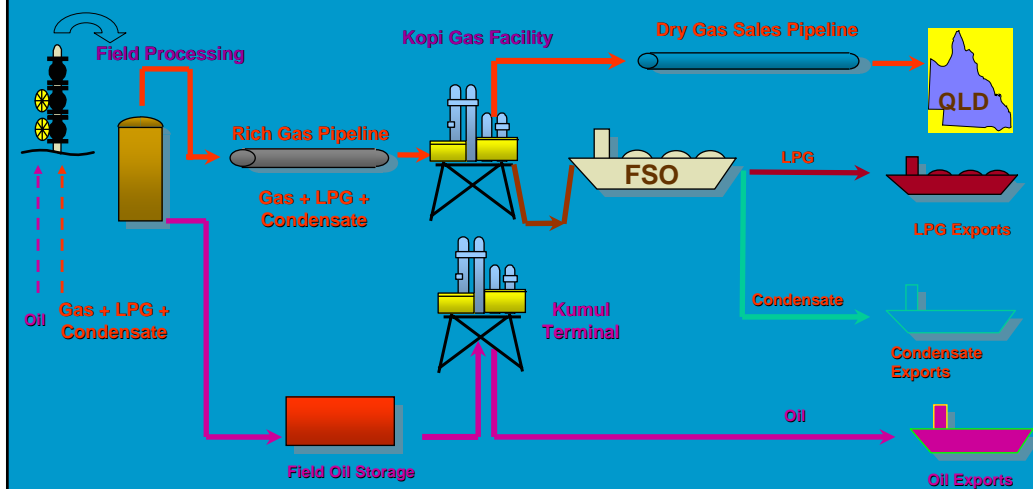
- Condensates will be blended with oil for sales export via existing Kumul Terminal

- Spec Sales gas - exported via proposed 28-inch pipeline to Australia



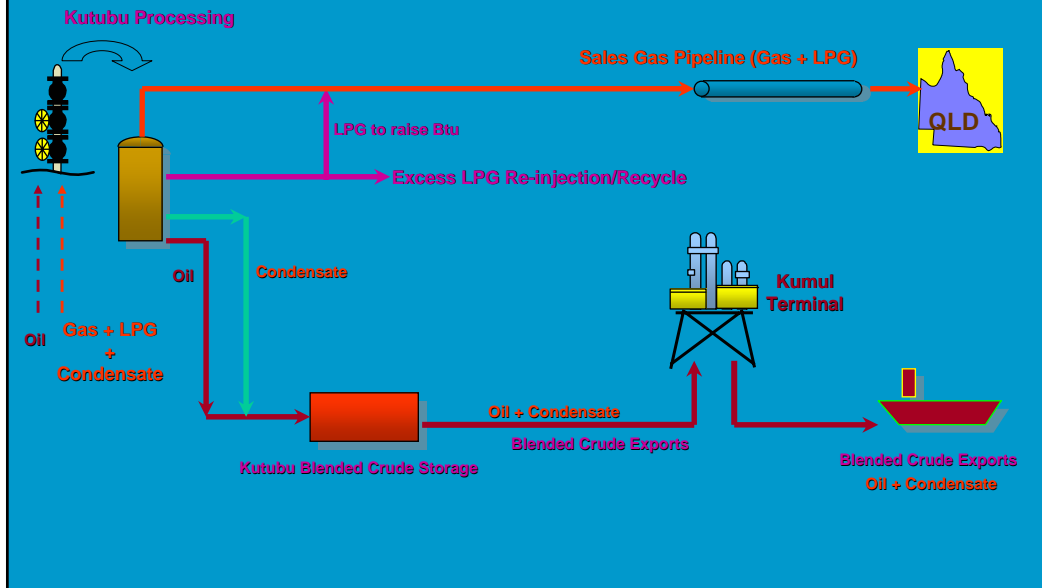
## Gas Agreement Concept

(212 PJ/A)





## PNG Gas Project - FEED Concept (150 PJ/A)



## Project Status



Project is well advanced

- FEED engineering is almost complete
- Alternative development scenarios identified
- Fiscal stability agreement in place
- Gas agreement signed
- Gas marketing is underway with several conditional term sheets/gas sales agreements in place

Competition in Australian market remains major hurdle

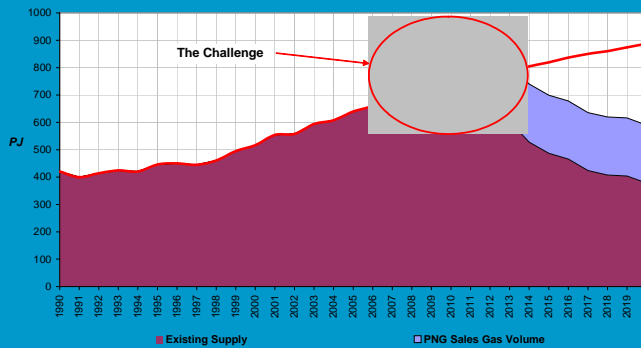


## East Australian Market



- The history of PNG gas project marketing has shown how difficult it is to contract up to 200PJ/a into an established market
- Small competing new supply will continue to capture incremental demand – resulting in supply/demand gap being pushed out
- Customers want certainty and are not prepared to gamble on an uncertain project
- History shows that major increments to demand do not occur very easily
- Large new gas fired electricity generation competes with low cost coal fired capacity

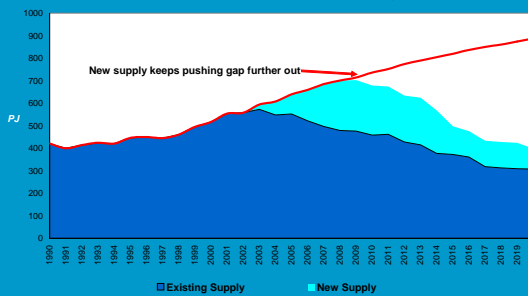
East Australian Demand VS Supply



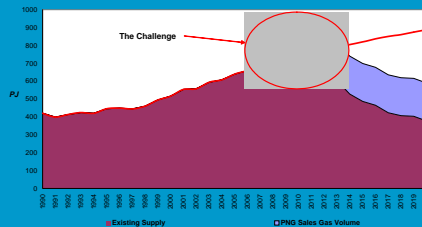
## Supply changing with smaller suppliers taking market share



East Australian Demand VS Supply



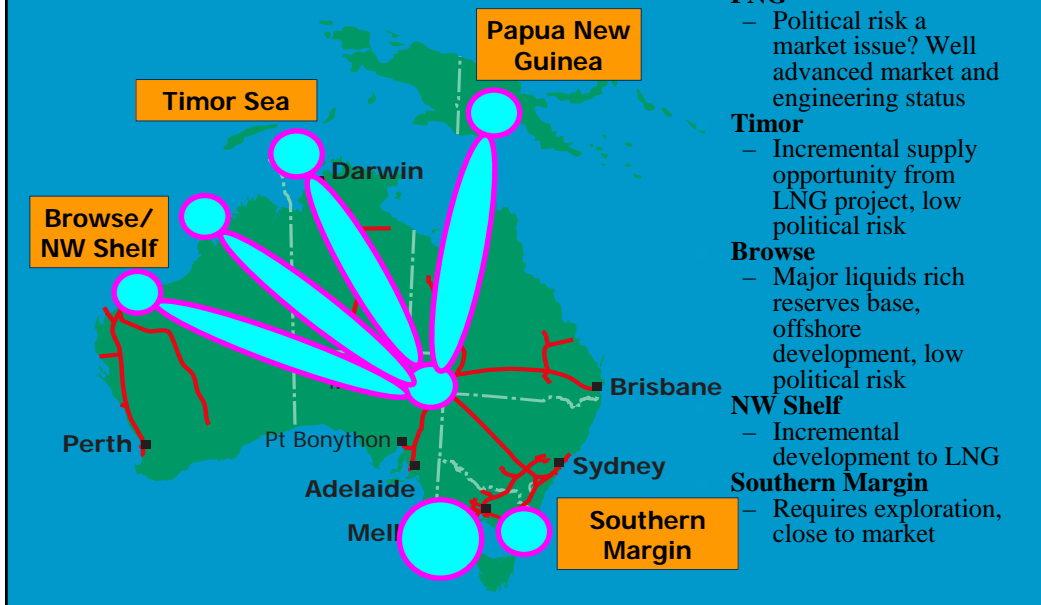
East Australian Demand VS Supply



- Existing domestic supply is sufficient to satisfy demand until 2010+
- Potential for new discoveries to add to domestic supply
- Need innovative solution to place large new volume in the market
- Small competing new supply continue to capture incremental demand – resulting in supply/demand gap being pushed out



## East Australian Market - Competing Supply Options

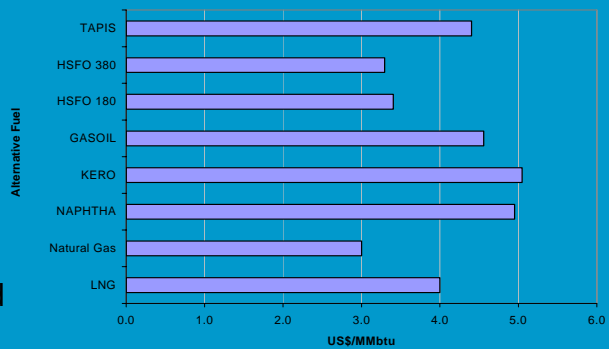


## Gas Pricing



- Price of alternative fuels
- Ability to fuel switch
- Competing gas supplies
  - Cost curve
- Oil price linked
- Commodity price linked
- Energy market structure – SA vs. Vic vs. Qld
- Impact of contract terms
  - Price structure
  - Price reviews

Alternative Fuel Prices



- Gas typically trades at a discount to alternative fuels
- Discount relates to greater flexibility of liquid fuels

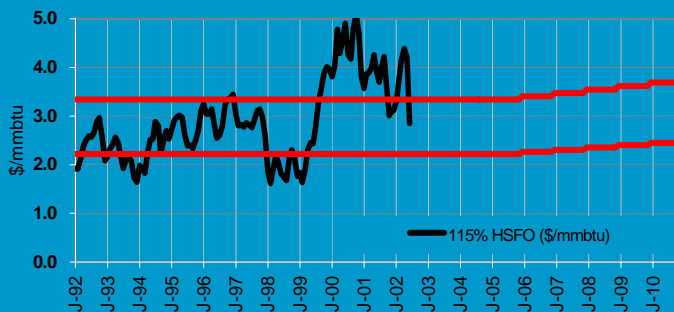




## Gas Pricing - Oil Linked with floor/ceiling



- Gas price based on energy equivalent – typically fuel oil or similar benchmark
- Floor/ceiling to limit price volatility
- Oil price is typically a moving average with a premium or discount
- Can include an indexed component



## Gas Pricing- Contract terms



### Base Price with indexation

Base price set by negotiation with reference to current market price

Indexation by reference to a percentage of CPI or other indexation factor

### Commodity Price

Commodity price \$/GJ with none or limited load factor

Additional load factor provide at fixed annual cost to reflect fixed cost associated with its provision

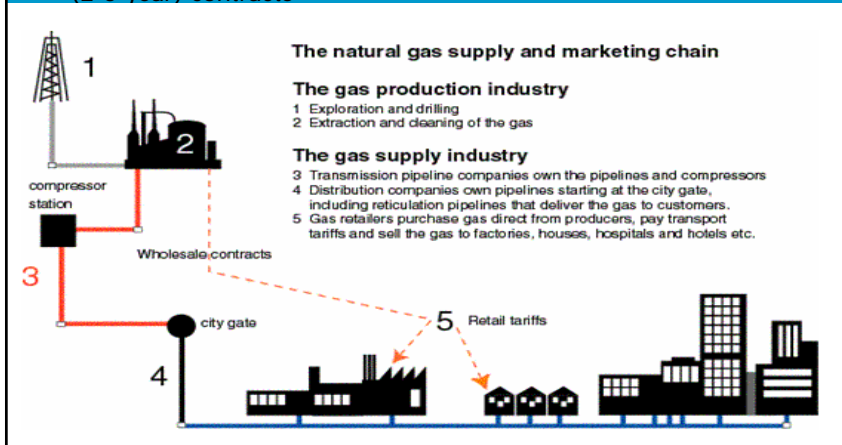
i.e. Buyers required large biannual swing to meet heating demand in winter. This is normally met by injecting gas into storage due low demand periods and withdrawing sales quality gas in winter. Charge represents fixed costs of developing and operating storage system



## Natural Gas – Pipeline Sales



- The key link in the pipeline sales of natural gas is the wholesale contract
- Historically contracts were long term (10-20 years) and required security of supply and a commitment to take the gas (or pay for it)
- Long term contracts still dominate but there is an increase in shorter term (2-5 year) contracts



### Issues

- Long term contracts
- Security of supply
- Large investment
- Take or pay and ship and pay obligations



## Sales Gas Contracts - Characteristics



### Typical contractual terms for long term Gas Sales Agreements:

- Term approximately 10-20 years
- Dedicated gas reserves
- Reserve risk dependent on the contract
- Gas prices not linked to oil prices – base price with indexation and price review clause
- Take or pay obligation of greater than 80%  
Swing of up to 20% above the DCQ
- Negotiation period can be in excess of 2 years

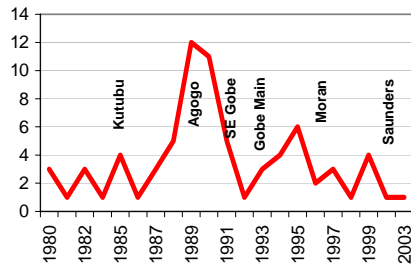


## Fiscal Regime Stability



- PNG fiscal regime has had a number of changes both positive and negative over the last few years
- Current regime is competitive
- The importance of fiscal regime stability to explorers/developers can not be understated
- An investment in exploration is a potential commitment to develop and produce for 10-20 years or more
- Stability of terms therefore has a major bearing on the commercial risk attached to a project

### PNG Exploration Wells



### PNG Foldbelt Oil Creaming Curve

