SHIFTING SANDS
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This presentation was originally made on 1 November 2013 at the Unconventional Gas (UGAS) conference in Singapore

KEY TAKEAWAYS

• Indonesia’s nascent shale potential is a stand out within ASEAN.

• Shale reservoirs are marginal plays characterized by low reserves/well and high production variability.

• Drilling & completion costs are greater than conventional reservoirs → commerciality risk.

• Key success factors are not just fiscal, supportive and enabling light handed regulation is essential.

• Indonesian entry costs will be high until the service sector responds to industry specific needs.

RECENT REPORTS BY RISCO ENERGY
Presentation Outline

Overview

Geotechnical aspects of shale oil and gas

Review of US shale oil & gas industry and derive key success factors

Review of Indonesian key success factors

Review US shale oil and gas economics

Review potential shale oil & gas economics in Indonesia

Recommend shale gas and oil regulatory regime
Risco’s involvement in Indonesian Unconventional Oil and Gas

Representative
Risco Energy Investments


Team of 12 professionals focused on upstream portfolio aggregation, asset optimization and funding.

Strong value creation track record in conventional and unconventional oil and gas in SE Asia.

Proposed Director
Lion Energy Limited

ASX listed Indonesian focused E&P company

Three assets:
- Seram production and development
- Aceh conventional exploration
- Sumatra unconventional Joint Studies through subsidiary KRX

45% owned and controlled by Risco Energy Investments (subject to shareholder approval)
Lion is being recapitalized, reskilled and repositioned

Russell Brimage
Chairman
Strengths:
Indonesian expertise, production, development
Interests:
2.5% Seram PSC
30% KRX Energy

Jack Toby
Company Secretary

Tom Soulsby
Proposed Director
Strengths:
Technical, commercial transactional, financial, Indonesian expertise
Interests:
35% Unconventional AMI
Funding:
A$7.5m

Kim Morrison
Proposed CEO
Strengths:
Exploration skills, SE Asian experience, track record
Interests:
35% South Block A PSC
35% Unconventional AMI

Roger Whyte
Proposed Advisor

Chris Newton
Proposed Director

Sammy Hamzah
Proposed Advisor
Strengths:
Relationships with regulators and industry participants, CBM background
Interests:
30% Unconventional AMI
Funding:
A$1.5m

Stuart Smith
Finance Consultant

All subject to 9 December 2013 shareholder approval
Overview

Indonesia faces a widening gap between domestic oil & gas supply & demand.

To ensure energy security, and address the trade account deficit, Indonesia needs to unlock the potential of its unconventional hydrocarbon resources.

This means delivering the right fiscal, regulatory and operating environment necessary to compete for the limited capital, technology and skills required.

Other countries have succeeded with unconventionals and their Key Success Factors (KSF) provide insights into what Indonesia needs to do to succeed.

- US with Shale oil and Shale Gas
- Australia with CSM

Geology, operating environment, regulatory and fiscal regimes make the challenges to succeed different for each country.

This presentation looks at what Indonesia needs to do to succeed?
The challenge and opportunity

Projected Indonesian Oil and Gas Supply and Demand Balance
Source: IPA & BCG analysis

Indonesian Oil and Gas Foreign Trade Balance
Statistics Indonesia
Key Messages

Shale reservoirs are marginal plays characterized by low reserves/well and high production variability.

Drilling & completion costs are greater than conventional reservoirs => commerciality risk.

In the US, only the oil plays are commercially viable at current oil and gas prices.

Shale plays are capital & technology intensive with commercial viability requiring a lean, mean, flexible & efficient factory driven drilling machine with an aligned, sometimes integrated and supportive service sector.

No clear boundary between appraisal and development with development flexibility and iteration essential for development optimization (Ring fencing inappropriate)
**Key Messages**

Shale plays have a larger surface footprint than conventional plays. Success in the US was driven by landowner alignment through mineral rights ownership.

Key success factors are not just fiscal, operators will need flexibility, speed and efficiency => supportive and enabling light handed regulation. Not command and control with a conventional oil and gas paradigm.

Shale project time horizons extend beyond 30 years so investors will need contractual arrangements that offer the clarity, consistency and certainty to deployed capital and take high risks over long time horizons.

Indonesian entry costs will be high until the service sector responds to industry specific needs. This needs fiscal and regulatory facilitation.

Capturing synergies with conventional E&P while accessing unconventional skills will be important initially.
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Unconventional’s include shales, CBM and tight rocks

- Low recovery factors relative to conventional resources
- Advanced technology is necessary for economic development;
- Low permeability (<1 md);
- Low recovery factors relative to conventional resources
- Lower exploration risk offset by higher commercialisation risk

Source: IEA
A geological continuum between conventional and unconventional but significant differences in obtaining commercial production.

Conventional Reservoirs – relatively small volumes that are easy to develop

Unconventional Reservoirs – large volumes that are difficult to develop

Increasing costs and more improved technology required for commercial production

- Good Quality Reservoir
- Low Perm Oil
- Tight Gas Sands
- Coalbed Methane
- Heavy Oil
- Shale Gas
- Oil Shale
- Gas Hydrates
- Shale Gas
- Heavy Oil
- Oil Shale
The geological differences have significant implications

- Exploration Risk Profile
- Reserves Uncertainty and Bookings
- Production profile
- Water production and needs
- Capex and Opex Profile
- Technology needs
- Service Sector Role
- Foot print and community relations

This dictates a different State approach to the:

- Fiscal Regime
- Regulatory Regime
- Operating Environment
Shale gas well productivity is log normally distributed with the majority of well rates sub economic.

Gas flow from Shale has log normal distribution as dependant on three main independent variables:

- Matrix permeability
- Brittleness
- Natural Fractures Present

In Conventional Sandstone play the main variable impacting flow is Permeability - therefore, well flow rates tend to have normal distribution.
Shale reservoirs exhibit far greater production variability

<table>
<thead>
<tr>
<th>Wells within a single field, completed using identical drilling and fracture stimulation programs frequently show a 2-5x variation in productivity and recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>These production ‘sweet spots' are very real and can change across the field</td>
</tr>
<tr>
<td>This large productivity variation has a significant impact on E&amp;D programs.</td>
</tr>
<tr>
<td>Multiple test wells needed before a commerciality decision can be made.</td>
</tr>
<tr>
<td>A significant portion of the development wells will be uneconomic or only marginally economic.</td>
</tr>
<tr>
<td>Huge economic driver to define the “sweet spots” early.</td>
</tr>
<tr>
<td>Key success factors from the US</td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>Overview</td>
</tr>
<tr>
<td>Geotechnical aspects of shale oil and gas</td>
</tr>
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</tr>
<tr>
<td>Recommend shale gas and oil regulatory regime</td>
</tr>
</tbody>
</table>
US unconventional production is reshaping global energy markets

**Key 2013 Metrics:**

- US shale gas production now > 35% of total gas production and >40% of gas reserves
- US shale gas and tight gas production >60% total gas production
- US moving from an LNG importer to exporter
- US Shale oil production now >15% of total oil production and exceeding 2.0 million barrels / day
- Material turnaround in gas reserves & recently oil reserves

Source: IEA
Market based pricing drove investment and innovation

US Gas Pricing and Supply History

1960 – 1974
Field and regional price controls cap prices below value and drive up demand

1974 – 1978
National price ceilings drive down demand and market over supplied

1978 – 1985
Increased ceiling prices drive down demand and market over supplied

1985 – 1993
Transition to full price deregulation

1993 – 2008
Market forces drive price and volume
CCGT technology impact

2008 - 2012
Recession and over supply

Production and Withdrawals (TCF)

Source: EIA & http://www.naturalgas.org/regulation/history.asp
Technology has delivered higher average production and reserves / well which drives investment economics

Key technology drivers:

- Horizontal drilling length
- Fracking technology advances, especially fluids and multi staging

Source: Macquarie (USA) Research
A supportive investment environment essential

2011 rank in group of 135

<table>
<thead>
<tr>
<th>State/Region</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mississippi</td>
<td>1</td>
</tr>
<tr>
<td>Ohio</td>
<td>2</td>
</tr>
<tr>
<td>Kansas</td>
<td>3</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>4</td>
</tr>
<tr>
<td>Texas</td>
<td>5</td>
</tr>
<tr>
<td>West Virginia</td>
<td>6</td>
</tr>
<tr>
<td>Netherlands - North Sea</td>
<td>7</td>
</tr>
<tr>
<td>Alabama</td>
<td>8</td>
</tr>
<tr>
<td>Hungary</td>
<td>9</td>
</tr>
<tr>
<td>North Dakota</td>
<td>10</td>
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<tr>
<td>Saskatchewan</td>
<td>11</td>
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<td>Manitoba</td>
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<td>Illinois</td>
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<td>Louisiana</td>
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</tr>
<tr>
<td>Arkansas</td>
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<tr>
<td>New Zealand</td>
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<td>Denmark</td>
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<td>Utah</td>
<td>18</td>
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<td>Victoria</td>
<td>19</td>
</tr>
<tr>
<td>Chile</td>
<td>20</td>
</tr>
<tr>
<td>South Australia</td>
<td>21</td>
</tr>
<tr>
<td>United Kingdom - North Sea</td>
<td>22</td>
</tr>
<tr>
<td>Austria</td>
<td>23</td>
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<tr>
<td>Netherlands</td>
<td>24</td>
</tr>
<tr>
<td>Ontario</td>
<td>25</td>
</tr>
<tr>
<td>Indonesia</td>
<td>114</td>
</tr>
</tbody>
</table>
A supportive investment environment essential
Shale plays recover lower volumes / well than conventional plays underpinning a lower margin business

Expected Ultimate Recoverable Reserves (EUR) / well Comparisons

While shale wells are drilled to similar depths, they cost more to drill, stimulate and complete
### Overview

| Geotechnical aspects of shale oil and gas |
| Review of US shale oil & gas industry and derive key success factors |

| Review of Indonesian key success factors |
| Review US shale oil and gas economics |
| Review potential shale oil & gas economics in Indonesia |
| Recommend shale gas and oil regulatory regime |
### Key Success Factors for Unconventional Oil and Gas

<table>
<thead>
<tr>
<th>Key Success Factors (KSFs)</th>
<th>United States</th>
<th>Australia</th>
<th>Indonesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>High potential resources</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
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<tr>
<td>Land access &amp; operability</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
</tr>
<tr>
<td>HR &amp; service sector capability</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
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<tr>
<td>Open &amp; extensive gas infrastructure</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
</tr>
<tr>
<td>Enabling fiscal &amp; regulatory regime</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
</tr>
<tr>
<td>Strong deregulated gas price</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
</tr>
<tr>
<td>Limited competition from conventional</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
</tr>
<tr>
<td>Growing gas demand</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
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<tr>
<td>Deep Capital Markets</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
<td>🟢🟢🟢🟢🟢</td>
</tr>
</tbody>
</table>
# US Shale Oil and Gas Economics

## Overview

## Geotechnical aspects of shale oil and gas

## Review of US shale oil & gas industry and derive key success factors

## Review of Indonesian key success factors

## Review US shale oil and gas economics

## Review potential shale oil & gas economics in Indonesia

## Recommend shale gas and oil regulatory regime
We have benchmarked four US shale plays:

- **Bakken**
  - Oil and Wet Gas
- **Barnett**
  - Lean Gas
- **Eagle Ford**
  - Oil and Wet Gas
- **Haynesville**
  - Dry Gas
Benchmarking methodology

**Analyze and Benchmark**

- Full cycle exploration, appraisal and development process, schedules and costs
- Access databases to benchmark reserves, production, cost and revenue performance of plays
- Uncertainty envelope in reserves and production / well from thousands of wells
- Revenues, pricing differentials & royalties

**Derive**

- Finding and development costs.
- Unit finding, development and production costs
- EUR / well and P10, P50 and P90 production profiles
- Net unit revenues and margins
Example production and reserve benchmarking

Cost Benchmarks:
- Leasing, G&G, exploration, appraisal, development
- Completion, facilities, water disposal
- Fixed and variable Opex
- => Unit Capex and Opex by play
Oil & gas prices and energy price equivalence

Henry Hub vs WTI Price Path

Gas and oil price axis is scaled on an energy equivalent basis

Source: Bloomberg
Margin analysis by play

Gross Unit Margin

*Gross Unit Margin = Average Net Revenue – Capex & Opex

No surprise the oil plays are attracting all the activity and investment

BOE and MCFE converted on a price equivalent basis
US generic green field shale oil & gas model

Exploration, Appraisal and Development Program

Data purchase
Regional G&G Preliminary sweet spot identification for land leasing

Regional Geological Studies

First Mover Leasing secures circa 500,000 acres in play

Leasing

Drill 10 exploration wells to gather log and core data and confirm play concept

Exploration Drilling

Frac tests initially on vertical wells
5 horizontal wells with frac testing and pilot production
Confirm development concept and commerciality

Appraisal Drilling

Continue production testing
Plan staged development

Development Planning

Implement development plan
Ramp up production

Development and Production

Flexible Iteration & Optimization

Play Specific cost, price and tax /royalty benchmarks applied throughout
### Play specific assumptions

<table>
<thead>
<tr>
<th></th>
<th>BAKKEN</th>
<th>EAGLE FORD</th>
<th>BARNETT</th>
<th>HAYNESVILLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Oil</td>
<td>Oil Window</td>
<td>Gas-Condensate</td>
<td>Gas</td>
</tr>
<tr>
<td>EUR Variability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EUR/ well</td>
<td>530 MBO</td>
<td>457 MBO</td>
<td>2.7 BCF</td>
<td>7.5 BCF</td>
</tr>
<tr>
<td>EUR variability - P10/P90</td>
<td>12</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>%EUR produced in first 5 yrs</td>
<td>43%</td>
<td>43%</td>
<td>63%</td>
<td>55%</td>
</tr>
<tr>
<td>Finding and Development Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Cost/well(1)</td>
<td>$10.36MM</td>
<td>$3.96MM</td>
<td>$6.75MM</td>
<td>$10.25MM</td>
</tr>
<tr>
<td>Operating Cost/well(2)</td>
<td>$7.60MM</td>
<td>$5.65MM</td>
<td>$1.53MM</td>
<td>$2.98MM</td>
</tr>
<tr>
<td>Pricing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil price diff with WTI(3)</td>
<td>$(6.50)/bbl</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gas price diff with HH(4)</td>
<td>$(0.3)/MMBTU</td>
<td>$(0.2)/MMBTU</td>
<td>$(0.2)/MMBTU</td>
<td>$0.3/MMBTU</td>
</tr>
<tr>
<td>Fiscal Terms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Royalty</td>
<td>18%-22%</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>State Oil Severance</td>
<td>11.5%</td>
<td>4.6% &amp; $0.008/BBL</td>
<td>4.6% &amp; $0.008/BBL</td>
<td>25%</td>
</tr>
<tr>
<td>State Gas Severance</td>
<td>$0.11/MCF</td>
<td>7.5% &amp; $0.001/MCF</td>
<td>7.5% &amp; $0.001/MCF</td>
<td>25%</td>
</tr>
<tr>
<td>Ad Valorear Tax</td>
<td>0%</td>
<td>2.5%</td>
<td>2.5%</td>
<td>25%</td>
</tr>
<tr>
<td>US Federal Income Tax</td>
<td>35%</td>
<td>35%</td>
<td>35%</td>
<td>35%</td>
</tr>
</tbody>
</table>

1. G&G, leasing, exploration, appraisal cost and development cost which includes well completion, facilities: processing, gathering, water disposal and midstream facilities.
2. Fixed and variable cost.
3. Benchmark Oil Price (WTI) is $90/bbl.
4. Benchmark Gas Price (HH) is $3.0/MMBTU.
Only upside outcomes show positive economics

This underscores our point:

“The majority of wells are uneconomic” and hence the importance of deploying technology for sweet spot identification
Revenue distribution waterfall by play (P50)

- **Bakken (Oil)**
  - Gross Revenue
  - E&A
  - Dev
  - Opex
  - Royalties
  - State Tax
  - Federal Income Tax
  - Net Cash Flow

- **Eagle Ford (Oil Window)**
  - Gross Revenue
  - E&A
  - Dev
  - Opex
  - Royalties
  - State Tax
  - Federal Income Tax
  - Net Cash Flow

- **Barnett (Gas/Condensate)**
  - Gross Revenue
  - E&A
  - Dev
  - Opex
  - Royalties
  - State Tax
  - Federal Income Tax
  - Net Cash Flow

- **Haynesville (Gas)**
  - Gross Revenue
  - E&A
  - Dev
  - Opex
  - Royalties
  - State Tax
  - Federal Income Tax
  - Net Cash Flow
Overview

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Recommend shale gas and oil regulatory regime
Indonesian specific considerations:

Take a dry gas play (Haynesville) and a liquids play (Bakken) as representative end members. Took at a hypothetical full field development under Indonesian conditions and fiscal terms.

**Development Concept:**
100 well development assuming 640 acres / well = 259km²  
⇒ appx. 25% development of a 1,000 km² block  
6 well exploration & appraisal period followed by development drilling @25 / wells / year

**Reserves & Production:**
P10 – P50 – P90 US benchmark data for each play  
Developed production profiles for liquids, gas and water

**Costs Adjusted for Indonesian Conditions:**
E&A drilling 1.5X current US costs reflecting equipment and service availability  
Development drilling 1.5 X current US costs  
Midstream and pipeline costs added to reflect lack of infrastructure  
Opex 1.2X US costs

**Product Prices:**
Base Oil Price = US$100 / bbl ICP  
Base Gas Price = US$8.0 MMbtu at customer gate escalated at 3%p.a.  
Associated gas <20 MMsfd consumed for own use purposes

**Fiscal Terms:**
Gas Base Case: Indonesian CBM PSC with 55:45 post tax split  
Oil Base Case: Indonesian CBM PSC with assumed 60:40 post tax split
The production sharing scheme option

1. FTP (First Tranche Petroleum)
   • 10% of Gross Revenue, non-shared and split with local government

2. Cost Recovery
   • Non Capital/Expense: recoverable in the same year
   • Capital: recoverable through depreciation: 25% - 5 years

3. Profit Oil/Gas
   • Pre-tax split
     - Oil: 66.67%/ 33.33% (Cont/ Govt)
     - Gas: 75.00%/ 25.00% (Cont/ Govt)
   • Post-tax split
     - Oil: 40%/ 60% (Cont/ Govt)
     - Gas: 45%/ 55%/ (Cont/ Govt)

4. DMO (Domestic Market Obligation)
   • Mainly for oil, max. 25% of cont. gross prodDMO price: 25% of market price

5. Effective Tax Rate 40%
   • 25% Corporate Tax Rate
   • 20% Branch Profit Tax Rate
Shale oil – Project Summary

Exploration and Appraisal

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature Bonus</td>
<td>US$ 2.0 MM</td>
</tr>
<tr>
<td>G&amp;G and G&amp;A</td>
<td>US$ 5.0 MM/ year</td>
</tr>
<tr>
<td>Exploration</td>
<td>3 wells</td>
</tr>
<tr>
<td></td>
<td>US$ 15 MM/ well</td>
</tr>
<tr>
<td>Appraisal</td>
<td>3 wells</td>
</tr>
<tr>
<td></td>
<td>US$ 22 MM/ well</td>
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</tbody>
</table>

Development Cost Analysis

<table>
<thead>
<tr>
<th>Cost Component</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development</td>
<td>100 wells</td>
</tr>
<tr>
<td>Investment – per well</td>
<td>US$ 0.75 MM</td>
</tr>
<tr>
<td>Land acquisition</td>
<td>US$ 13.50 MM</td>
</tr>
<tr>
<td>Completed well cost</td>
<td>US$ 0.50 MM</td>
</tr>
<tr>
<td>Processing and gathering</td>
<td>US$ 0.30 MM</td>
</tr>
<tr>
<td>Water Disposal</td>
<td>US$ 15.05 MM</td>
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<tr>
<td>Operating Cost</td>
<td></td>
</tr>
<tr>
<td>Fixed Cost</td>
<td>US$ 18,000/well/month</td>
</tr>
<tr>
<td>Variable Cost</td>
<td>US$ 3.0/bbl</td>
</tr>
<tr>
<td>Water treatment</td>
<td>US$ 0.25/bbl</td>
</tr>
</tbody>
</table>

Oil price in economic evaluation: US$100/bbl Brent
Shale gas – Project Summary

Exploration and Appraisal

<table>
<thead>
<tr>
<th>Signature Bonus</th>
<th>US$ 2.0 MM</th>
</tr>
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<tbody>
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<td>Appraisal</td>
<td>3 wells US$ 22 MM/ well</td>
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</tbody>
</table>

Development Cost Analysis

<table>
<thead>
<tr>
<th>Development</th>
<th>100 wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment - per well</td>
<td></td>
</tr>
<tr>
<td>Land acquisition</td>
<td>US$ 0.75 MM</td>
</tr>
<tr>
<td>Completed well cost</td>
<td>US$ 13.50 MM</td>
</tr>
<tr>
<td>Processing and gathering</td>
<td>US$ 1.00 MM</td>
</tr>
<tr>
<td>Water disposal</td>
<td>US$ 0.30 MM</td>
</tr>
<tr>
<td>Main pipeline</td>
<td>US$ 0.90 MM</td>
</tr>
<tr>
<td>Development cost/well</td>
<td>US$ 16.45 MM</td>
</tr>
<tr>
<td>Operating Cost</td>
<td></td>
</tr>
<tr>
<td>Fixed Cost</td>
<td>US$ 11,000/well/month</td>
</tr>
<tr>
<td>Variable Cost</td>
<td>US$ 0.10/MCF</td>
</tr>
<tr>
<td>Water treatment</td>
<td>US$ 0.25/bbl</td>
</tr>
</tbody>
</table>

Gas price in economic evaluation: US$8/MMBTU, 3% esc/yr

Gas Production Forecast

Recoverable Resources*
- Low Case: 270 BCF
- Base Case: 600 BCF
- High Case: 1,226 BCF

*25-yr production

Gas Water Ratio: 100 bbl/scf

*gas is for own use
### Economic Results

<table>
<thead>
<tr>
<th></th>
<th>Shale Oil</th>
<th>Shale Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PSC</td>
<td>PSC</td>
</tr>
<tr>
<td><strong>Low Case</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Unit NPV</td>
<td>$(52)/boe</td>
<td>$(0.6)/MCF or $(0.1)/boe</td>
</tr>
<tr>
<td>• IRR</td>
<td>N/A</td>
<td>2%</td>
</tr>
<tr>
<td>• UTC</td>
<td>$264/bbl</td>
<td>$10.0/MCF</td>
</tr>
<tr>
<td><strong>Base Case</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Unit NPV</td>
<td>$(3)/boe</td>
<td>$0.3/MCF or $0.05/boe</td>
</tr>
<tr>
<td>• IRR</td>
<td>4%</td>
<td>18%</td>
</tr>
<tr>
<td>• UTC</td>
<td>$92/bbl</td>
<td>$5.3/MCF</td>
</tr>
<tr>
<td><strong>High Case</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Unit NPV</td>
<td>$4/boe</td>
<td>$0.6/MCF or $0.1/boe</td>
</tr>
<tr>
<td>• IRR</td>
<td>35%</td>
<td>43%</td>
</tr>
<tr>
<td>• UTC</td>
<td>$33/bbl</td>
<td>$2.7/MCF</td>
</tr>
</tbody>
</table>

CPI (Capital Productivity Index) is sum of NPV and discounted capex divided by discounted capex. CPI is a measure of efficiency of capital investment.

UTC (Unit Technical Cost) is the discounted capex and opex divided by discounted production. UTC is often used by decision makers as a first pass ranking of projects in a portfolio.
R/C approach may address uncertainties

With large project costs and revenues uncertainties, a flexible PSC regime is needed that drives the economic viability of marginal projects while capturing a fair share of revenue for the State from attractive projects driven by high IP and EUR/well.

- The R/C approach provides this.
- R/C approach is more progressive in that government take increases with profitability.
- R/C Index = \( \frac{\text{Revenues (R)}}{\text{Costs (C)}} \)

Revenues (R) are defined as contractor's cumulative share of cost oil/gas plus profit oil/gas less any supplementary payment. Costs (C) are defined as contractor's cumulative share of all recoverable crude oil/gas costs (exploration, appraisal, development and operating costs).

<table>
<thead>
<tr>
<th>Cont. R/C Index</th>
<th>Contractor Take Pre Tax</th>
<th>Contractor Take Post Tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 &lt; R/C &lt; 1.5</td>
<td>100%</td>
<td>60%</td>
</tr>
<tr>
<td>1.5 &lt; R/C &lt; 2.0</td>
<td>80%</td>
<td>48%</td>
</tr>
<tr>
<td>2.0 &lt; R/C &lt; 3.0</td>
<td>40%</td>
<td>24%</td>
</tr>
<tr>
<td>3.0 and above</td>
<td>10%</td>
<td>6%</td>
</tr>
</tbody>
</table>

R/C = 1 represents undiscounted pay out time. However, real pay-out-time (considering time value of money and tax payment) occurs when R/C is around 1.5.
Revenue/Cost: Contractor gets higher share of Profit Oil/Gas when Contractor's Profitability is low and gets lower share when the Profitability increases.
### Economic comparison with R/C application

|                  | Shale Oil |         | | Shale Gas |         |
|------------------|-----------|---------||-----------|---------|
|                  | PSC       | R/C     | | PSC       | R/C     |
| **Low Case**     |           |         | |           |         |
| • Unit NPV       | $(52)/boe | $(52)/boe | | $(0.6)/MCF | $(0.6)/MCF |
| • IRR            | N/A       | N/A     | | 2%        | 2%      |
| • UTC            | $264/bbl  | $264/bbl | | $10.0/MCF | $10.0/MCF |
| **Base Case**    |           |         | |           |         |
| • Unit NPV       | $(3)/boe  | $(2)/boe | | $0.3/MCF  | $0.3/MCF |
| • IRR            | 4%        | 6%      | | 18%       | 19%     |
| • UTC            | $92/bbl   | $92/bbl | | $5.3/MCF  | $5.3/MCF |
| **High Case**    |           |         | |           |         |
| • Unit NPV       | $4/boe    | $4/boe  | | $0.6/MCF  | $0.5/MCF |
| • IRR            | 35%       | 39%     | | 43%       | 45%     |
| • UTC            | $33/bbl   | $33/bbl | | $2.7/MCF  | $2.7/MCF |
| • State Share    | 50%       | 49%     | | 49%       | 49%     |

**CPI (Capital Productivity Index)** is sum of NPV and discounted capex divided by discounted capex. CPI is a measure of efficiency of capital investment.

**UTC (Unit Technical Cost)** is the discounted capex and opex divided by discounted production. UTC is often used by decision makers as a first pass ranking of projects in a portfolio.
## Fiscal and Regulatory Recommendations

<table>
<thead>
<tr>
<th>Overview</th>
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<tr>
<td>Geotechnical aspects of shale oil and gas</td>
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<tr>
<td>Review of US shale oil &amp; gas industry and derive key success factors</td>
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<tr>
<td>Review of Indonesian key success factors</td>
</tr>
<tr>
<td>Review US shale oil and gas economics</td>
</tr>
<tr>
<td>Review potential shale oil &amp; gas economics in Indonesia</td>
</tr>
</tbody>
</table>

**Recommend shale gas and oil regulatory regime**
Conclusions and recommendations for regulators

Unconventional projects have high commercialization uncertainty driven by uncertainty in IP’s and related EUR/well and cost uncertainty for early movers in particular.

Unlike CBM, the E&A stage to prove commerciality is very capital and technology intensive, exacerbated by the lack of fit for purpose equipment and services in country.

Low case volume/well outcomes do not generate an economic surplus (even in the US).

Upside outcomes can be quite attractive if schedule & cost can be optimized but are by definition a low probability.

The need for and potential of shale oil & gas is clear, the challenge is to compete for internationally mobile skills & capital:
- Structure a fiscal regime that captures a fair share of the economic surplus across the wide range of potential outcomes while recognizing the average outcome is a marginal business.
- Structure a regulatory regime that facilitates and enables investment and provides the necessary operating flexibility for operators to iterate and optimize with technology and operations.
Conclusions and recommendations for regulators

With significant volume and cost uncertainty the R/C structure where R/C ratio drives profit oil and gas split has merit.

CBM type fiscal terms will deliver the state a greater share of the economic surplus than in the US.

With higher costs and great risks in the early stages in Indonesia, fiscal terms better than CBM are needed.

An attractive fiscal regime alone will not drive capital, skills and technology intensive investment if the operating environment does not provide the necessary flexibility and efficiency necessary to iterate, optimize and relentless drive down costs

- Elimination of PTK 007 compliance obligations in the exploration stage would be a good start
- No clear boundary between appraisal and development with development flexibility and iteration essential so ring fencing is inappropriate

With long life projects and long payout times, contractual, clarity, consistency and certainty is essential.
Strategy in action

Clear Vision and Mission

Leading Indonesian unconventional player

Target areas with:
- Infrastructure
- Markets
- Quality
Unconventional / conventional potential

Risco’s skill set spanning technical, commercial, transactional
Tower’s relationships and experience in unconventional via CBM
KRX technical skills
Lion existing Indonesian position, experience

that leverages Capabilities & Track record

Declining conventional oil/gas supply and rising demand
Rising domestic gas prices
Capital and skills gap for unconventional in Indonesia

and Exploits Discontinuities

Capture first mover value
Unconventional opportunities with overlapping conventional exploration
Aligned and supportive shareholders

to Capture High-graded Opportunities
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Economics and Planning team
- Lindawati Kusuma
- Leonardus Budhi
- Dessi Yuliana

Management and Technical Team
- Kim Morrison
- Roger Whyte

Management Team
- Sammy Hamzah
ABOUT RISCO ENERGY

Incorporated in Singapore, Risco Energy Investments Pte Ltd (“Risco”) is an energy investment company with pre-eminent sector expertise and capital to deploy focused on ASEAN upstream oil & gas.

Risco has a strong track record and balance sheet, having already delivered high annual returns on the creation and monetization of a multi-country oil & gas portfolio in less than two years. Its management team has a near 200 years of combined experience acquiring, running, operating, dealing, managing, funding and commercializing oil and gas assets.

Team achievements with Risco’s previous asset portfolio (2Q10 to 1Q13) include:

• Executed five investments across three geographies in less than two years.
• Grew production from zero to 7,500boepd and 2P reserves to 20.5mmboe in just two years.
• Grew Ebitda from zero in 2H10 to US$60m FY12A and an expected US$90m FY13F.
• Drove portfolio value to deliver high double digit percentage annual returns.

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