COMMERCIALISING GAS RESOURCES IN PNG – WHERE TO NOW?

15TH PNG MINING & PETROLEUM INVESTMENT CONFERENCE
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THIS PRESENTATION ALSO CONTAINS FORWARD-LOOKING STATEMENTS WHICH ARE SUBJECT TO PARTICULAR RISKS ASSOCIATED WITH THE OIL AND GAS INDUSTRY. OIL SEARCH LIMITED BELIEVES THERE ARE REASONABLE GROUNDS FOR THE EXPECTATIONS ON WHICH THE STATEMENTS ARE BASED. HOWEVER ACTUAL OUTCOMES COULD DIFFER MATERIALY DUE TO A RANGE OF FACTORS INCLUDING OIL AND GAS PRICES, DEMAND FOR OIL, CURRENCY FLUCTUATIONS, DRILLING RESULTS, FIELD PERFORMANCE, THE TIMING OF WELL WORK-OVERS AND FIELD DEVELOPMENT, RESERVES DEPLETION, PROGRESS ON GAS COMMERCIALISATION AND FISCAL AND OTHER GOVERNMENT ISSUES AND APPROVALS.
SUMMARY

❖ PNG has established an excellent reputation for financing, delivery and operation of a world class LNG Project – PNG LNG

❖ The Country has the opportunity to more than double LNG production over the next 5 years by developing Papua LNG and expansion of PNG LNG – development characterised by cooperation and efficient use of capital to deliver highly competitive outcomes

❖ Growing demand for LNG provides a conducive environment for new developments, especially for delivery into Asia

❖ Significant competition from other project developments exist, making meeting project delivery timelines absolutely essential

❖ Markets may be taken – costs will escalate if we obfuscate
SUMMARY

- Substantial discovered gas remains to be commercialised in PNG and significant volumes remain to be found:
  - What are the commercialisation pathways?
  - Where and when do we need gas to deliver optimal value to all stakeholders?

- Successful future developments must provide a value balance between investors, the State and Communities’ growing social challenges

- New partnerships between Developers, Government and Communities are necessary to address these challenges
COMPETITIVE ADVANTAGES OF LNG FROM PNG

❖ Conventional LNG project, tried and tested, highly reliable technology, with very high uptime

❖ Globally competitive production costs:
  – Cooperative brownfield expansion with shared common facilities downstream, economies of scale from sequential construction of LNG trains

❖ High heating value gas:
  – Suitable for Asian reticulation networks
  – Global average heating value in decline as newer leaner projects come online

❖ Geographic proximity to key Asian LNG markets:
  – 50% round trip shipping days to North Asia vs US Gulf Coast LNG

❖ Good source of diversification for LNG buyers

❖ Top tier operators, ExxonMobil and Total, augmented by local in-country experience
POTENTIAL GLOBAL LNG SUPPLY SHORTFALL COMMENCING IN EARLY 2020’S

LNG LIQUEFACTION CAPACITY BY FID YEAR

- Significant fall in new LNG capacity sanctioned:
  - Only 8.8 MTPA sanctioned since 2016
- To meet supply-demand gap in 2025, ~40 MTPA of additional supply required (9 x 4.5 MTPA LNG trains):
  - New projects would need to take FID by ~2020
- By 2030, a further 135 MTPA of new supply required (30 x 4.5 MTPA LNG trains)
- Proposed new LNG capacity development in PNG in strong position to capture markets

Source: IHS Markit Aug 2018
Industry forecasters expect that by 2030, 150 MTPA of new LNG supply will be required to meet growing LNG demand. Projects must approve FIDs in the next two years to meet the market for the 2023-24 timeframe as the supply gap widens.

There are 300+ MTPA of credible supply projects competing to attract buyers and financing.

Project participants are in a race against time to lock in all the necessary agreements to advance in the queue.

PNG JVs also have competing projects trying to reach FID, i.e. Exxon Mobil Operator of 15.2 MTPA Rovuma LNG in Mozambique and 10 MTPA Golden Pass LNG in the US. Total in the 20 MTPA Artic-2 LNG project in Russia.
OIL SEARCH GAS STRATEGY
THERE ARE COMPELLING REASONS FOR CONTINUED INVESTMENT IN PNG GAS EXPLORATION

1. Investment footprint in PNG
   - Post Papua LNG & PNG LNG expansion, OSH will have US$8Bn+ invested in LNG infrastructure in PNG
   - >9 tcf of discoveries required by 2050, 3 tcf by 2025 to extend production lift

2. PNG remains a prospective basin for exploration
   - Estimated 30 tcf of Yet-to-Find gas in Western Foldbelt and Papuan Basin
   - Other Supermajor PNG operators continuing to invest in gas exploration activities

3. Competitive Returns and Capability Growth
   - Proposed exploration prospects offer a commercial return on investment
   - Drilling and seismic acquisition experience is necessary to maintain to cost competitiveness.

BUT........

4. Security, JV alignment and operating stability risks must be considered
OIL SEARCH GAS STRATEGY
OSH HAS A STRONG INFRASTRUCTURE FOOTPRINT IN PNG REQUIRING FUTURE INVESTMENT

- Post PNG LNG expansion and Papua LNG development, US$8 bn invested by Oil Search in LNG infrastructure in PNG

- Possible to extend production PNG LNG and Papua LNG developing what we have and by finding more reserves

- Additional 9 tcf required to extend PNG LNG and Papua LNG plateau to 2050, 3 tcf required by 2025
OIL SEARCH GAS STRATEGY
PNG IS A PROSPECTIVE AREA FOR EXPLORATION, EXTERNAL PARTIES AGREE

• 2015 ‘Yet-To-Find’ study concluded that 30tcf still remains to be found in the Western / Eastern / Deepwater areas in PNG
• >100tcf of gross mean unrisked gas in the current OSL exploration portfolio
• >15tcf of gross risked EMV positive leads and prospects

• 2012 study by the US Geological Survey investigated Yet-to-Find volumes in the wider PNG area
• USGS estimates ~25tcf remaining to be discovered in the Foldbelts and Deepwater
• Estimates ~10Bnbbl of in-place oil yet to be found in PNG

Internal and external views agree that PNG is still a prospective area to explore for gas
OIL SEARCH GAS STRATEGY
EXPLORATION OFFERS COMPETITIVE RETURNS AND COULD UNDERPIN FUTURE EXPANSION

Future Growth Potential

- Identified prospects and leads are of potential size to enable further LNG expansion
- Future expansion projects likely offer competitive breakeven economics

Competitive Returns

- Over 20 commercial, drillable prospects in the OSH portfolio with >15tcf risked volume
- Forecasted finding costs are competitive with global benchmarks

PNG Operations Important

- Drilling and seismic capabilities are part of the OSH PNG competitive advantage

Exploration in PNG offers future production and capability growth potential for OSH
EXPANSION DRIVES NEW GROWTH PROGRAMMES

- PNG LNG currently comprises two trains producing at ~8.9 MTPA (3Q18)
- Papua LNG Project combined with expansion of PNG LNG underpinned by P’nyang field, will add ~8 MTPA of new capacity
- On combined plateau, PNG will be using ~1 tcf per year by mid-2020s
- Measured and targeted strategic investment in exploration over next five years to:
  - Expand through additional LNG capacity
  - Optimise sequence and fill high-value backfill opportunities

**Note:** Indicative only, not to scale
EXPANSION DRIVES NEW GROWTH PROGRAMMES

- Key strategic areas of OSH portfolio assessed
- Onshore Gulf (Eastern Foldbelt) identified as priority areas for LNG expansion – “chasing Antelopes”
- Foreland and Nearshore areas potential following successful appraisal (concept phase) – Kimu, Barikawa
- Western Foldbelt remains priority, to optimise development sequence and fill significant capacity in addition to growth - Muruk
- Offshore Gulf of Papua a potential ‘game-changer’ for standalone development
OSH has excellent spread of acreage

Recent seismic bolstering robust portfolio with 30 tcf yet to find

Measured exploration investment focus on expansion opportunities with strategic investment in high priority and gamechanger areas to firm up new potential
MURUK 2 APPRAISAL PROGRAMME

- Spudded on 10 November 2018
- OSH drilling well on behalf of ExxonMobil-operated PDL 9 joint venture
- ~11km step-out from Muruk 1 discovery well
- Base case: ~80 day well with expected total depth ~3,500m
- Objective is to narrow 1-3 tcf potential in Muruk discovery to support development
- Success case: Extended Well Test to prove up connected hydrocarbon volume
- Contingent success case: downdip sidetrack to evaluate extent of hydrocarbon column
- Additional 2D seismic planned for later in 2019 after drilling of Muruk 2 to further constrain Muruk and adjacent Karoma lead
KIMU 2 AND BARIKEWA 3 - SUCCESSFUL APPRAISALS

❖ Both wells encountered gas in line with pre-drill expectations but with better than expected reservoir quality
❖ Drill stem tests conducted on both wells to constrain fluid type and reservoir producibility
❖ Core and logs acquired and being evaluated
❖ Pre-drill objectives of constraining volume range and gas composition achieved
❖ Field volumetrics being refined and commercialisation options being progressed
❖ Barikewa immediately adjacent to PNG LNG Gas Export Pipeline
THE NEED FOR NEW PARTNERSHIPS - NEW WAYS OF WORKING

- PNG LNG has been an outstanding success in putting the country on the LNG market map and building international financing and investment sentiment.

- Lessons on project structure, benefits distribution, taxation balance and full stakeholder involvement have been learnt – reflected in recent MOU for Papua LNG.

- A dynamic environment remains:
  - PNG population growth – we add one Hela Province a year
  - Over 50% of population under 25 years
  - Life of 20 year LNG contract – population will close to double

- New ways of addressing these social challenges are needed.
THE NEED FOR NEW PARTNERSHIPS - NEW WAYS OF WORKING

❖ Government, Private Sector and other stakeholders must develop new partnerships to leverage respective skills and address social sensitivities.

❖ Focus on improving what we do:
  − Improve efficiency and transparency of benefits sharing
  − Partner with Governments on delivery of important infrastructure. To include facilitation of local participation in new industries such as power, refinery, downstream developments
  − Facilitate sustainable non-project related activities and skills training to specifically address the youth bulge
    o Agricultural programmes
    o Focus on craft training, carpentry, electrical and plumbing
    o Engage the whole population, Women and Men

❖ What worked in the past will not work in the future
CONCLUSIONS

❖ PNG has built a strong positive reputation for reliable LNG delivery to Asian markets, positively impacting investor and financing sentiments:
  − Provides a tremendous platform for further development

❖ World LNG supply competition is very strong requiring PNG to meet development timing objectives or miss out

❖ PNG has substantial discovered gas resources and material further exploration upside:
  − Further appraisal taking place in Western Foldbelt but focus moving to Eastern Foldbelt, onshore and offshore
  − Investment of over US$700m is required in appraisal and exploration over the next 5 – 7 years to underwrite expansion

❖ Need to commercialise ~9tcf to support production plateau to 2050, more to drive further expansion

❖ Timing of exploration driven by need to replenish high levels of production and development of other downstream industries

❖ Other industry development, power, petrochemicals etc are important, based on sensible commercial parameters:
  − Need to refocus efforts on addressing important social inclusion issues, with partnerships with Governments, development partners and communities, new programmes, new ways to engage communities to focus on young people
THANK YOU