UNCONVENTIONAL UPSIDE
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## KEY TAKEAWAYS

- Indonesia has ASEAN’s largest shale potential.
- Indonesia desperately needs new production or see oil & gas deficit increase 500% by 2025.
- Shale offers disproportionate value generation to early movers.
- Challenges remain, but can be aided by appropriate regulation and fiscal regime to stimulate activity.

## RECENT REPORTS BY RISCO ENERGY
Indonesian shale potential

Unconventional upside

Indonesia’s nascent shale potential is a stand out within ASEAN, ranking 9th and 17th globally for shale oil & gas in place respectively on EIA/MEMR data. Indonesia’s hydrocarbon demand is skyrocketing while conventional production is stagnating, with a particular need to import crude. The result is a US$1bn/month oil & gas deficit that is set to balloon to US$6bn/month in the absence of new incremental domestic production to replace imports. Shale is a solution that also satisfies the government’s aim of energy security and independence. While Indonesian shale remains fledgling, it offers disproportionate value generation opportunities for early movers. Challenges exist, but Indonesia is highly fiscally motivated to stimulate activity.

A stand out for shale potential in ASEAN

Indonesia’s nascent shale potential is a stand out within ASEAN, ranking 9th and 17th globally for shale oil & gas in place respectively on EIA/MEMR data. Within Indonesia, shale potential has a clear weighting to Sumatra, which represents 41% of the 574tcf shale gas and 88% of shale oil in place.

Expanding oil & gas deficit fuels a need for incremental production

Indonesia’s oil & gas trade deficit currently exceeds US$1bn/month in net imports and is growing. The drivers are stagnating oil & gas production in the face of skyrocketing domestic demand. Assuming imports continue to fill the ever-widening supply/demand gap, we forecast Indonesia’s oil & gas trade deficit will balloon to US$6bn/month by 2025. Furthermore, we see upside risk to this figure given what we believe are understated assumptions in Indonesia’s National Energy Policy (NEP) for oil & gas demand. Increasing import reliance runs directly counter to NEP’s clear objective of energy independence and security, which is logically better satisfied by maximizing the full potential of conventional and unconventional hydrocarbons domestically – of which shale has still to be tapped.

Early days offer the thick edge of value creation - but also challenges

Shale in the USA and Australia, as well as CBM in Indonesia, demonstrate the early movers’ opportunity to capture 20% of the full-cycle value by investing <5% of the full-cycle capex. However, challenges remain: Indonesia’s investment climate for conventional oil & gas is broadly un compelling both regionally and globally. Some of these issues can cross over into unconventional, particularly ones of above ground operating and regulatory environment. Others are potentially amplified in an unconventional setting. Much of this can be addressed via clear, supportive and enabling regulation. Additionally, fiscal terms are critical in competing for the internationally mobile skills and capital that shale intensively utilises. Ultimately, Indonesia is highly fiscally motivated to stimulate shale activity.

Seven major Indonesian shale basins

Source: Risco Energy.
A stand out for shale potential in ASEAN

Indonesia’s traditional dominance in ASEAN’s conventional upstream oil & gas is mirrored in its potential nascent shale oil & gas significance. Indonesian geological agency Badan Geologi KESDM (BGK) and the Indonesian Ministry of Energy & Mineral Resources (MEMR) assess the country’s shale gas resources potential at 574tcf gas in place (GIP), with the EIA estimating 234Bnbbls shale oil in place (OIP). The nearest ASEAN comparable for shale is Thailand with a mere 22tcf GIP and zero OIP according to the EIA.

In a global context of shale potential, these figures rank Indonesia 17th for gas and 9th for oil shale in place when set against the EIA/ARI World Shale Gas and Shale Oil Resource Assessment 2013 country data rankings.

Within Indonesia, shale potential has a clear weighting to Sumatra, which represents 41% of the 574tcf shale GIP and 88% of shale OIP. There is a disconnect between MEMR and EIA’s quantitative assessments of shale gas potential in Indonesia at 574tcf and 302tcf GIP respectively. A key reason for this we believe is the EIA’s exclusion of North Sumatra, which they have ascribed to not having sufficient data. Additionally, neither Java nor Sulawesi are included.

Ironically, Sumatra contains world class, prolific conventional basins and Indonesia’s first successful oil drilling in 1885 was located at Telaga Said in the north. To date, Sumatran basins have yielded 27Bnboe in discovered recoverable conventional reserves, representing some 38% of Indonesia’s 72Bnboe of total discovered recoverable reserves according to IHS. Sumatran shales’ positive organic properties are encouraging the move to fracture stimulate these source rocks and, while rock properties have yet to be fully addressed, initial assessments suggest parallels with successful shale plays in the US.

Sumatra’s long history with oil & gas exploration & production also makes it relatively better placed versus the national average in areas such as pipeline infrastructure, land access and an ability to leverage unconventional from conventional activities. The USA, and more recently Australia, currently have commercial shale production and this historical evolution of unconventional oil & gas helps define nine key success factors (KSF’s) that offer a base of comparison for Indonesia. Indonesia has a number of these KSF’s, while others are yet to develop.
Indonesia has several key success factors needed for shale

Indonesia’s oil & gas deficit is >US$1bn/month

Deficit will continue increasing without new, incremental domestic production

Expanding oil & gas deficit fuels a need for incremental production

Indonesia’s oil & gas trade deficit currently exceeds US$1bn/month in net imports. The drivers for this oil and gas value deficit are stagnating oil & gas production in the face of skyrocketing domestic demand. The further layer of fuel subsidies (albeit having seen incremental reduction) provide additional demand stimulus and direct cost to the government.

Indonesia became a net oil importer in volume terms in 2004 and this position has continued to grow as oil production has maintained a steady downward trajectory. Historic increases in gas production have partially, but not completely and consistently, stemmed oil’s decline in overall oil & gas volume terms. However, with nearly 50% of gas production exported, Indonesia has to date remained a net hydrocarbon exporter on a boe basis. As demand rises, oil production falls and gas production plateaus, the move to net importer is rapidly looming. While Indonesia remains (just) a net hydrocarbon exporter in volume terms, expensive imported petroleum products outweigh crude and gas/LNG exports making it a net importer in value terms.

Indonesia faces becoming an increasingly significant net hydrocarbon importer in both volume and value terms unless new, incremental domestic production is substituted for imports in filling the expanding supply/demand gap. Indonesia’s 2014 National Energy Policy (NEP) focuses on energy requirements in 2025 and 2050 with an overarching objective of energy independence and security. In forecasting the domestic supply/demand balance, we have used NEP policy targets for demand and based supply on the latest, production, development planning reserves, and resource data.
By 2025: we forecast the deficit will jump to US$6bn/month...

...and we see upside risk to this forecast

Continued reliance on imports to satisfy rising demand is counter to National Energy Policy

Shale offers disproportionate value generation to early movers

Indonesian shale potential

Assuming the 2025 supply/demand gap is filled by imports, the oil & gas trade deficit would balloon from US$1bn/month to US$6bn/month. This figure has upside risk if one factors our view that NEP oil & gas demand appears understated given these targets’ reliance on rising efficiency and a massive renewables contribution (mainly geothermal and hydro). This is supported by Wood Mackenzie’s forecast of 2025 liquids demand being 250kbpd higher than the NEP target.

Using imports to fill the gap is directly contradictory to NEP’s objective of energy independence and security, which is logically better satisfied by maximizing the full potential of conventional and unconventional hydrocarbons domestically – of which shale has still to be tapped.

Sumatra faces particularly tight supply/demand going forward with declining production from existing conventional oil and gas fields and material conventional reserves becoming increasingly difficult to find and expensive to develop. Furthermore, there is major projected shortfall in gas supply in the energy hungry Sumatra-Java corridor, with gas demand in Java forecast to triple by 2019 and North Sumatra demand to quadruple (Priambodo and Sadirsan, 2013).

**Early days offer the thick edge of value creation**

Shale in the USA and Australia, as well as CBM in Indonesia, demonstrate the opportunity for early movers to capture 20% of the full-cycle value by investing <5% of the full-cycle capex. The history of unconventional to date has illustrated the value creation potential of smaller players in the early cycle stages and larger players in the mid and later stages.
Indonesia offers a strong demand and market pricing backdrop, for shale gas in particular, and Sumatran geology implies as yet untapped prospectivity with market access via better infrastructure.

That said, challenges remain: Indonesia’s investment climate for conventional oil & gas is broadly un compelling on both a regional and global basis – as articulated in our “Bottom of the barrel” report & survey and demonstrated by the steady decline in pure exploration drilling. Some of these issues can cross over into unconventional – particularly ones of above ground operating and regulatory environment. Others are potentially amplified in an unconventional setting, such as land access (larger footprint) and services costs. Unconventional also has its own specific challenges such as high commercialization uncertainty and a need for operator flexibility & speed (requiring lighter handed regulation vs conventional). Much of this can be addressed via clear, supportive and enabling regulation.

While not a singular silver bullet, fiscal terms are a key variable, in addition to regulation & operating environment, in order to compete for internationally mobile skills and capital. Shale is capital and technology intensive, suggesting PSC awards should be prioritized to companies with those assets. It has higher costs, lead times and risk vs CBM, meaning incrementally more supportive fiscal terms than CBM are initially needed. Ideally a flexible PSC regime would drive the economic viability of marginal shale projects while capturing a fair revenue share for the state from attractive ones – e.g. R/C terms. To date, only Pertamina has signed a shale contract, that being in North Sumatra with undisclosed terms.

Indonesia has significant fiscal motivation for stimulating investment in incremental new domestic hydrocarbon production, of which shale is a key plank. The government has two key near-term levers available in the form of regulation and fiscal regime to achieve this, measurable in pure exploration drilling, and corresponding progress towards greater energy independence and security.
Risco Energy and shale in Indonesia

Risco is a 47% strategic shareholder in Lion Energy (LIO AU), which it recently restructured, recapitalized and reskilled with Tower Energy (14.36% shareholder in LIO). Lion Energy Ltd is an ASX listed oil & gas exploration & production company focused on Indonesia, where it has been operating for some fifteen years. It has two existing conventional Production Sharing Contracts (PSC’s) – Seram (East Indonesia) and South Block A (North Sumatra) - and an early mover position in the fledgling Indonesian unconventional industry via four Joint Study Applications (North and Central Sumatra).

Lion’s reskilled management and aligned strategic investors have the commercial, technical and relationship capabilities to secure first mover advantage in Indonesia’s emerging unconventional oil and gas plays. The company is well-funded and has access to the ASX, its strategic investors and capital markets to help fund incremental exploration. With a strong acreage footprint in Sumatra, it actively pursues Sumatran opportunities at the nexus of conventional and unconventional exploration. Lion seeks to secure high initial working interest positions and have operatorship in most of its blocks, featuring quality technical plays at the juncture of infrastructure and markets and ensuring its strategy is technically well resourced.
ABOUT RISCO ENERGY

Incorporated in Singapore, Risco Energy Investments Pte Ltd (“Risco”) is an energy investment company with preeminent 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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