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INDONESIA'S \$120 BILLION OIL AND GAS OPPORTUNITY

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IT'S A PRIZE WITHIN reach: between \$90 billion and \$120 billion of additional GDP over the next decade, an amount that would add 1% to 1.4% to Indonesia's annual GDP growth rate at a time when faster growth is in short supply. Moreover, Indonesia has the opportunity to increase local oil and gas production, create jobs along the supply chain, reduce dependence on imported crude, and improve its national and financial security.

Indonesia's oil and gas sector has long been a major pillar of the country's economy. Before the fall in oil prices in 2013, the sector generated \$28 billion a year in foreign income, provided 20% of the government's revenues, and supported 280,000 jobs. But the combination of strong growth in the national economy (projected at 5.2% per year through 2025) and declining oil and gas production from maturing fields is causing Indonesia to consume more energy than it produces. Domestic production covered less than half of consumption in 2015. The gap between demand and supply is expected to increase following the trend from

2010 through 2015, when oil and gas production declined by about 3.5% a year while domestic demand rose by 1.1%.

Indonesia can significantly slow, and even potentially reverse, this trend—while boosting its GDP substantially in the process. Doing so will take concerted action in six areas.

Indonesia's Energy Sector Today

Indonesia is rich in resources, with proven and potential conventional energy reserves of more than 7 billion barrels of oil and about 150 trillion cubic feet of gas. The country also has unconventional reserves of 450 trillion cubic feet of coal bed methane and 575 trillion cubic feet of shale gas. (Indonesia's potential petroleum resources total 150 billion barrels of oil and 490 trillion cubic feet of gas.) Yet in 2015, Indonesia required imports to cover more than 50% of domestic consumption.

There are several reasons for the shortfall. The most significant is that existing oil and

gas fields are maturing. Indonesia needs to take a combination of actions in response, including developing more from proven reserves, exploring for and developing new reserves, and using advanced recovery technologies, such as enhanced oil recovery (EOR), on mature fields to slow or reverse production declines.

All of these steps require capital, technology, and talent. But too many barriers and disincentives now stand in the way of the companies that possess those assets. Permit processes for new development are lengthy, and national and local reviews are complex. Current policies do not support collaboration between the local industry and more advanced companies. As a result, international companies are deterred from investing in Indonesia's energy industry, which means that production continues to decline and the transfer of knowledge and technology that could accelerate the build-up of skills and talent in the Indonesian industry has slowed.

Meanwhile, Indonesia's downstream infrastructure needs investment, reinforcement, and expansion before it can cope with stronger upstream supply and local demand.

In the global oil and gas sector, especially given current oil and natural gas prices, Indonesia is too often seen as noncompetitive. This problem will exacerbate the gap between supply and demand as the population and economy grow. We estimate that if current trends persist, by 2026 the gap will reach 2.3 million barrels of oil equivalent per day, and Indonesia will need to import 2.5 times its production, which will put significant pressure on the country's currency and energy security.

Six Steps to a More Productive Tomorrow

Indonesia has a choice. It doesn't have to pay such a heavy price, and it can generate substantial revenues for itself. The barriers to investment in and expansion of Indonesia's oil and gas sector can be overcome, and the solutions are within the government's, and the local industry's, control.

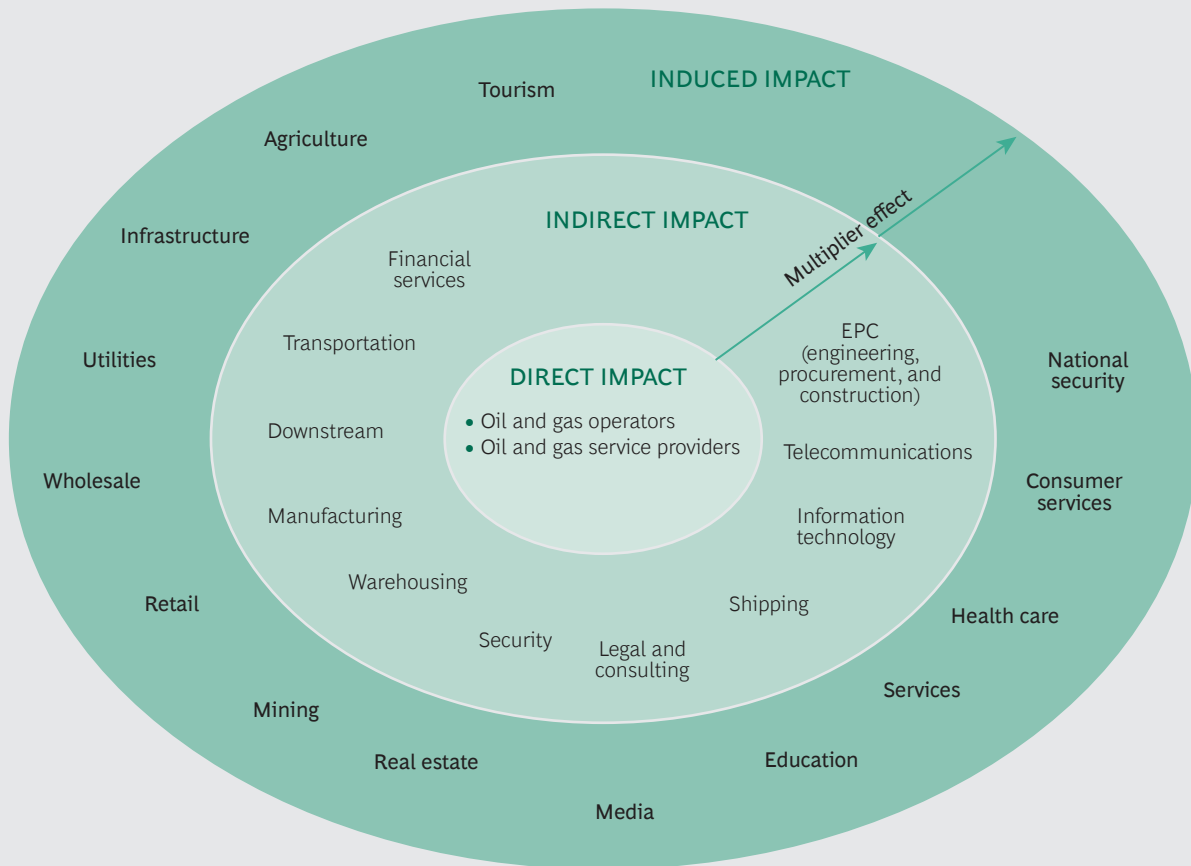
Not only will targeting increased production in the sector's best assets will have an immediate impact, but the follow-on benefits will flow through the entire economy. (See Exhibit 1.) Indonesia can boost local production and create jobs. Cutting dependence on imported crude will promote growth, maintain fiscal stability, and support national security. We estimate that simply maintaining 2016 production levels could unlock up to \$120 billion in added GDP over the next decade—equivalent to an additional 1.4% of GDP growth a year. (See Exhibit 2.)

The Indonesian government can take six actions to revive upstream exploration and production. (See Exhibit 3.)

Enhance production capabilities for existing fields. Indonesia's existing oil and gas fields are aging. More than 60% of oil production and more than 30% of gas production come from late-life-cycle resources. EOR techniques can significantly extend the life of older fields and boost the amount of oil and gas recovered. EOR has increased the recovery of original oil in place to 35% to 60% in older fields in other countries. But EOR requires major capital investment as well as advanced technologies and expertise that aren't available locally. In addition, current regulations in Indonesia don't encourage partnerships with international EOR service providers, which could facilitate the outside-in transfer of technology and knowledge.

Indonesia can start to revive domestic production by revising production contracts to incentivize EOR activities. This should involve extending the flexibility of fiscal terms to encourage EOR investments: the current standard of a fixed 30-year term (often combined with a 20-year extension option) often does not allow operators to plan EOR activities given that the payback period can be 20 to 30 years. Comprehensive screening of existing and idle fields is necessary to map the prospects for EOR activities and to identify fields with the highest potential yields. Indonesia should pursue comprehensive strategic partnerships with advanced EOR providers to gain ac-

EXHIBIT 1 | Upstream Oil and Gas Spending Has a Far-Reaching Multiplier Effect



Source: BCG analysis.

Note: Sectors are not exhaustive and are for illustration only. Induced effects are the results of increased spending by households and businesses that benefited from direct and indirect effects.

cess to the latest technology and to mitigate risks through cost-sharing arrangements with them.

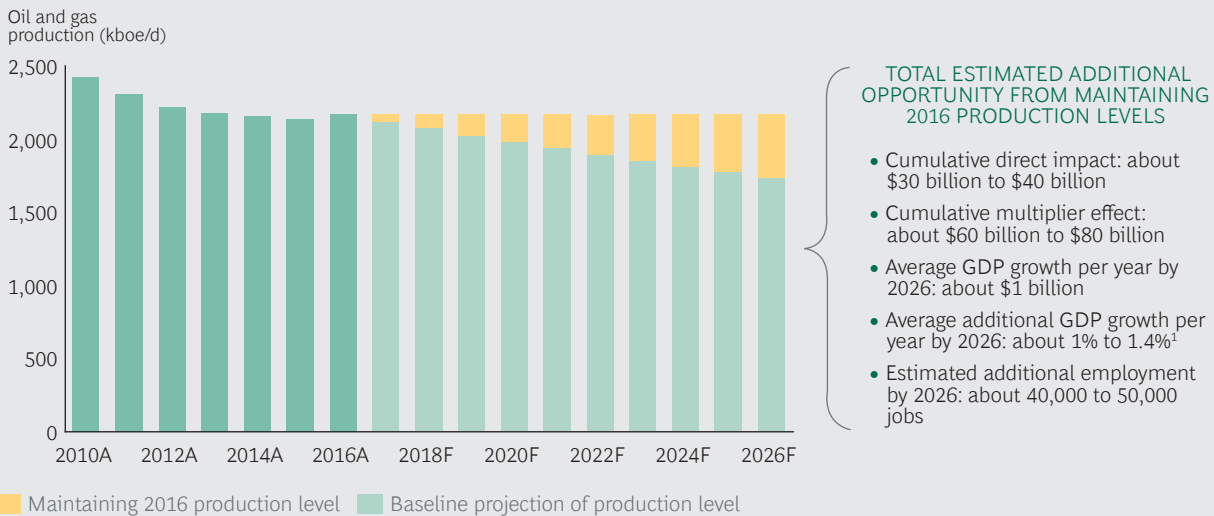
Revamp incentives for exploration. As the output from maturing fields declines, exploring undeveloped reserves becomes more important. Some reserves, such as those in deep water, are difficult to access. Investors need adequate incentives to commit to the costs and challenges of this type of exploration, which typically requires advanced technology and flexible financial frameworks.

There are several areas in which incentives can be tailored to make investment more attractive. One is more flexible production-sharing and tax schemes. Indonesia's production-sharing contracts (PSCs) mandate a rigid formula for revenue and cost sharing, regardless of the age or difficulty

of the field under development. This has resulted in declining operator margins—from 10% in 2011 to 5% in 2015—from levels already well below those adequate to encourage investment. As a result, investment in exploration fell from \$2.54 billion a year to \$1.34 billion a year over the same period.

More flexible approaches to the revenue split between contractor and government as well as to the share and price of the Domestic Market Obligation (a unique feature of Indonesia's oil and gas industry that companies don't have to deal with elsewhere) could lead to expanded margins for operators, more incentives for exploration and production, and more revenues for the government. Some of these measures have been undertaken recently under a newly established "gross split" production-sharing scheme. The impact has yet to be seen.

EXHIBIT 2 | Maintaining Production at 2016 Levels Will Boost GDP by Up to \$120 Billion



Sources: Ministry of Energy and Mineral Resources of the Republic of Indonesia; The Economist Intelligence Unit; BPS–Statistics Indonesia.

Note: The 2016 production increase resulted mainly from full-scale production of the Cepu Block. Kboe/d = thousand barrels of oil equivalent per day.

¹The estimate is based on GDP in 2015.

Similarly, we have found that in countries with high government revenue shares, difficult or low-profitability projects (such as mature fields, deepwater areas, or unconventional resources) run the risk of not being developed without some form of tax relief. Tax holidays, accelerated depreciation, and investment credits are examples that have been used in other countries, such as India, Mexico, and Russia.

Indonesia needs to increase the number of blocks offered for exploration. The number offered declined from 41 in 2006 to 6 in 2015. The number sold dropped from 27 to 8. The government can take several steps to increase the number of blocks offered, including conducting more intensive pre-exploration surveys to enhance the attractiveness of offered blocks and collaborating more on surveys with advanced exploration service companies.

Improving the criteria for contractor selection would also enhance exploration outcomes. A stronger focus on bidders' technical and financial capabilities would further overall investment and performance. There is plenty of room to speed tender timelines. The government can also investigate extending production periods or separating exploration and production time frames so

that contractors have adequate time to develop fields.

Improve the industry's cost competitiveness. At current oil and gas prices, Indonesia must improve its competitiveness relative to other large energy-producing countries. High exploration, development, and operation costs contribute to low returns for both contractors and the government. From 2010 through 2014, Indonesia ranked 16th of 17 leading countries in terms of percentage of contractor's share of exploration revenues; its 19% return was less than half of the leader's (Brazil) 45%. Containing costs will increase both contractors' and the government's revenues and encourage investment.

Several industrywide cost-saving steps would be relatively simple to implement. For example, joint sourcing programs could streamline procurement processes and take advantage of economies of scale. An industrywide asset-sharing system could lead to much more efficient use of equipment and spare parts and allow companies to implement cost containment strategies. The experience of other markets shows that sharing best practices leads to significant savings. For example, in Europe, one international oil company's integrated standardization

EXHIBIT 3 | Six Priorities to Revitalize Oil and Gas Production in Indonesia

ENHANCE PRODUCTION CAPABILITIES FOR EXISTING FIELDS	<ul style="list-style-type: none"> • Revise the fiscal terms of production-sharing agreements to incentivize enhanced oil recovery (EOR) activities in the main contractual period • Apply a nationwide screening process to existing and idle fields • Encourage strategic partnerships with advanced EOR service providers
REVAMP INCENTIVES FOR EXPLORATION	<ul style="list-style-type: none"> • Form a flexible fiscal structure to incentivize the exploration of difficult resources • Intensify seismic activity through preexploration data acquisition • Improve contractor selection and target operators that have the right technology
IMPROVE THE INDUSTRY'S COST COMPETITIVENESS	<ul style="list-style-type: none"> • Promote the sharing of best practices across the industry to provide a platform for cost reduction based on experience • Leverage economies of scale by developing joint sourcing programs • Establish an industrywide asset-sharing system to optimize the value of inventory
RATIONALIZE AND ACCELERATE THE PERMITTING PROCESS	<ul style="list-style-type: none"> • Streamline the permitting process to accelerate investment • Promote an open and digital system to increase the transparency of processes and regulations • Align policies and plans across relevant institutions
PROMOTE DOWNSTREAM DEVELOPMENT	<ul style="list-style-type: none"> • Accelerate the expansion of natural gas infrastructure to satisfy growing needs • Improve downstream oil capacities to catch up with increasing demand
STRENGTHEN LOCAL LEADERSHIP SKILLS	<ul style="list-style-type: none"> • Develop a strategy and a roadmap for producing local leaders • Enhance the quality of educational institutions and graduates • Improve R&D capabilities and activities

Source: BCG analysis.

and replication system led to 20% cost reductions and 10% to 15% time efficiency gains. In Malaysia, a platform to streamline the cost structure across the full value chain resulted in a 15% reduction in capital expenditures and a 25% cut in operating expenses, which together are projected to save \$1.8 billion annually starting in 2019.

Rationalize and accelerate the permitting process. The current permitting system is a barrier to investment. Indonesia's application process involves many more selection criteria than those of other countries do. (Indonesia evaluates 20 different criteria; other major producing nations, such as Brazil, Colombia, and India, rely on 2 or 3.) Moreover, little reliable data is available to prospective investors, making it difficult for them to analyze potential projects and returns. Agencies, government offices, and other related institutions have varying policies, procedures, and requirements; there is no overarching permitting process for contractors to follow.

Indonesia needs to streamline its process and bring the policies and procedures followed by various industry players (including central and regional governments) in

line with one another. It can follow the model of other countries (such as Brazil, India, Canada, and the US) that select contractors on the basis of a few fundamental criteria, such as technical capabilities and proposed work plan. Indonesia has already greatly streamlined the number of permits required, but it can simplify the process further by promoting a clear permitting timeline and putting a priority on high-impact, low-difficulty permits. It can also follow the lead of countries such as Norway and the UK, which are using advanced IT systems and digital technology to make vital data more readily accessible, simplify and automate applications and workflows, and provide support to the industry.

Promote downstream development. Indonesia's big energy users are transportation, industry, and power. Transportation accounts for more than 55% of oil demand, and the industrial and power sectors account for 80% of the demand for gas. All three sectors are growing.

To meet these expanding needs, the system requires a better supply infrastructure. New oil refineries, storage facilities, petrochemical plants, and pipelines will

strengthen the supply line and stimulate upstream development. Specifically, existing and planned gas infrastructure projects should be accelerated, including expanding pipeline capacity and access, improving liquefaction and regasification facilities to meet growing demand for LNG, and incentivizing investment in natural gas capacity development. Growing domestic demand, especially in the eastern part of Indonesia, requires more oil refinery, storage, and transportation and distribution capacity. Rapid action is needed in three areas: initiating more construction for oil storage capacity, expediting integrated refinery and petrochemical development, and encouraging greater collaboration between upstream and downstream players to accelerate capacity expansion.

Strengthen local leadership skills. To compete with other countries over the long term, Indonesia must make use of its talent by upgrading local leadership skills. The first step is to map the capabilities it will need over time, setting realistic national objectives by industry segment. This effort should include a plan to enhance the capabilities of supporting industries in order to promote synergies among economic sectors.

The results of this effort can then be used to set goals and policies for the educational system so that it focuses on producing industry leaders that can compete with international talent. Meeting future needs will almost certainly require improving the quality and geographic distribution of schools and teachers and a major commitment to advanced technologies. Expanding programs with international universities and industry players can help build an educational ecosystem that supports continuous learning and skill development, including the transfer of technology for the exploration and extraction of difficult resources and the transfer of knowledge necessary to conduct operations in other fields.

THE PIECES ARE all in place. Indonesia has the resources, both natural and human. The technologies and know-how exist. Capital is available, under the right circumstances. A \$120 billion prize is on the table and, along with it, a much more vibrant and productive energy sector. Indonesia can start now to ensure that its energy sector realizes its full potential.

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