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Invited review

Status and outlook of natural gas industry development in Indonesia

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ABSTRACT

Indonesia has been facing dramatic changes in natural gas industry development, which contributes to economic prosperity and reduces reliance on petroleum fuels. This paper reviews the current state of the natural gas industry in Indonesia, including reserves, supply and demand, infrastructure, pricing and regulation; discusses the outlook and path forward for the country's gas sector; and identifies the barriers to and regulatory remedies for further development. The government has struggled to balance domestic demand with exports with respect to the country's natural resource management and to respond to sensitive issues involving changes in oil and gas law that aim to prioritize gas for domestic usage. Meanwhile, the speed of gas infrastructure development has been slow and gas production is declining due to aging gas fields without significant new gas production. The projection results show that the domestic gas demand will increase significantly, with gas demand in 2025 being approximately double to triple that in 2013. To fulfill that demand, Indonesia needs to attract substantive investment for future gas infrastructure and upstream gas exploration and exploitation of new gas fields. Systematic support and clear policy guidelines, legal clarity and certainty, good bureaucratic performance, and effective domestic gas pricing mechanisms are necessary to assure the successful expansion of gas utilization in the country, achieve a cleaner energy mix portfolio and assist in moving away from oil subsidies.

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1. Introduction

Indonesia's oil and gas industry has a long history of over 100 years, and the sector is characterized by a relatively well-understood regulatory framework. In many areas, including the production sharing contract (PSC) model and the commercialization of LNG, Indonesia has been an international pioneer. Indonesia's oil and gas industry continues to be a vital sector; not only does it contribute to national revenues, including 12% of the state budget in 2014, but it also boosts national economic growth (PwC, 2014).

As a traditional LNG exporting country, Indonesia's natural gas industry has been experiencing dramatic changes. Indonesia has been one of the world's largest LNG exporters for three decades, currently ranking 4th (BP, 2014), but the rise in gas consumption in the country follows rapid economic growth. The country must allocate a larger gas production to supply domestic gas usage. In the next few years, Indonesia is predicted to turn from a net gas exporter to a net gas importer country to meet its fast-growing domestic demand (PGN, 2014a; MEMR, 2015). However, domestic gas utilization is still struggling because the main gas supply is far away from the central consumer location, and due to the sparse gas infrastructure and geographic archipelago of the country, which means the gas market is fragmented.

Indonesia's natural gas industry structure is characterized by an oligopoly in which there is competition in the upstream gas producer, but the midstream and downstream sides are still dominated by two national gas companies (Perusahaan Gas Negara (PGN) and Pertamina Gas (Pertagas)), while the government has adopted open access and unbundled the transmission and distribution of gas (PGN, 2014a). In the last few years, the domestic gas market has experienced dynamic development characterized by a significant increase in the share of the domestic supply allocation of total production and a drop in the percentage of LNG exports due to limited gas production and the opening of three regasification terminals.

In response to the rapid growth of Indonesia's economy, the government plans to increase domestic natural gas usage as stated in the 2014 Energy Law, with the target of a 22% share of natural gas in the national energy mix in 2025; this share is equivalent to 8300 MMSCFD or an additional gas supply of 3000 MMSCFD above the current domestic supply (MEMR, 2015). The government will face challenges reaching this target, especially the difficulties of balancing domestic gas demand with exports and limited gas infrastructure (OIES, 2014a,b) and ongoing changes to oil and gas law (IPA, 2014). Despite those challenges, and after reform energy subsidies announced in early 2015 which include the removal of subsidies on gasoline and the introduction of a fixed subsidy for diesel (IISD, 2015), the government has opportunities to divert the savings from subsidy expenditures for gas infrastructure spending; in combination with low oil prices, the government also gains momentum to increase domestic natural gas usage while cutting the country's reliance on oil in supporting national sustainable energy policy (OIES, 2014a,b).

This paper intends to review the current status of natural gas industry development in Indonesia, including reserves, supply and demand, infrastructure, pricing, governmental regulation and barriers to development, and to discuss an outlook and path forward for the country's gas sector to bring gas to unmet demand centers and to support a portfolio with a cleaner energy mix.

2. Current state of the natural gas industry in Indonesia

Natural gas has been found in Indonesia since the 18th century; however, the commercialization of natural gas began in the 1970s. When oil prices soar, countries worldwide look for alternative energy and Indonesia is one of the largest natural gas producers. The gas pipeline dates from the Dutch colonial era in 1859, with firm I.J. Eindhoven & Co. Gravenhage later taken over by the Dutch government and given the name Nederlandsch Indische Gas Maatschappij (NV. NIGM). After independence, the government nationalized the company into a state gas company (PGN) and the state electricity company (PLN) in 1965. Additionally, at the time of independence, the gas was produced by Stanvac Indonesia in Southern Sumatra (which then changed its name to Pertamina). This field has non-associated gas reserves which were discovered in 1958; three years later, gas production was used for the first fertilizer industry in Palembang, South Sumatra. This is an important moment in the development of the Indonesian natural gas business. The natural gas utilization in Indonesia subsequently experienced a rapid increase, as 1974 was marked by the construction of gas piping systems from Limau field to Prabumulih and from Prabumulih to Palembang. In the same year, Pertamina supplied the gas from the Java Sea offshore gas fields and Cirebon to the industrial area in West Java. Furthermore, PGN distributed natural gas in Jakarta City in 1978 and in Bogor City in 1981 and then expanded to other cities. PGN then operated the Grissik-Batam-Singapore gas transmission pipeline in 2003 and the transmission pipeline from South Sumatra to West Java in 2007 (MEMR, 2015).

LNG is one of the important businesses for Indonesia, as the largest contributor to state revenue, and Indonesia is also the world's largest LNG exporter. The Indonesian LNG business started with the discovery of gas reserves in Badak field in East Kalimantan by Huffco Inc. in the early 1970s, and Arun field in Aceh by Mobil Oil in 1971, which then pursued LNG plant construction in both regions. In 1977 a first LNG shipment was sent to Japan from Badak LNG plant, followed by the first shipment from Arun LNG plant in 1977. LNG Tangguh Plant in Papua sent the first shipment to Fujian, China, in 2009. Those three LNG plants used an integrated PSC scheme. The new LNG plant, Donggi-Senoro, began operating in 2015 using the downstream or non-integrated scheme. To counter the domestic gas supply shortage and limited pipeline infrastructure, the first LNG Terminal located in the Java Sea began operation in 2012 (MEMR, 2015). A brief history of Indonesian natural gas industry development is shown in Fig. 1.

2.1. Gas reserves

Indonesia possesses the fourteenth largest proven gas reserves in the world and the third largest in Asia–Pacific, or an estimated 1.6% of the worldwide proven gas reserves (BP, 2014). In 2013, based on data from the Special Task Force for Upstream Oil and Gas Business Activities (Migas, 2013), Indonesia held proven reserves of 99.77 TCF and potential reserves of 50.21 TCF. Fig. 2 shows