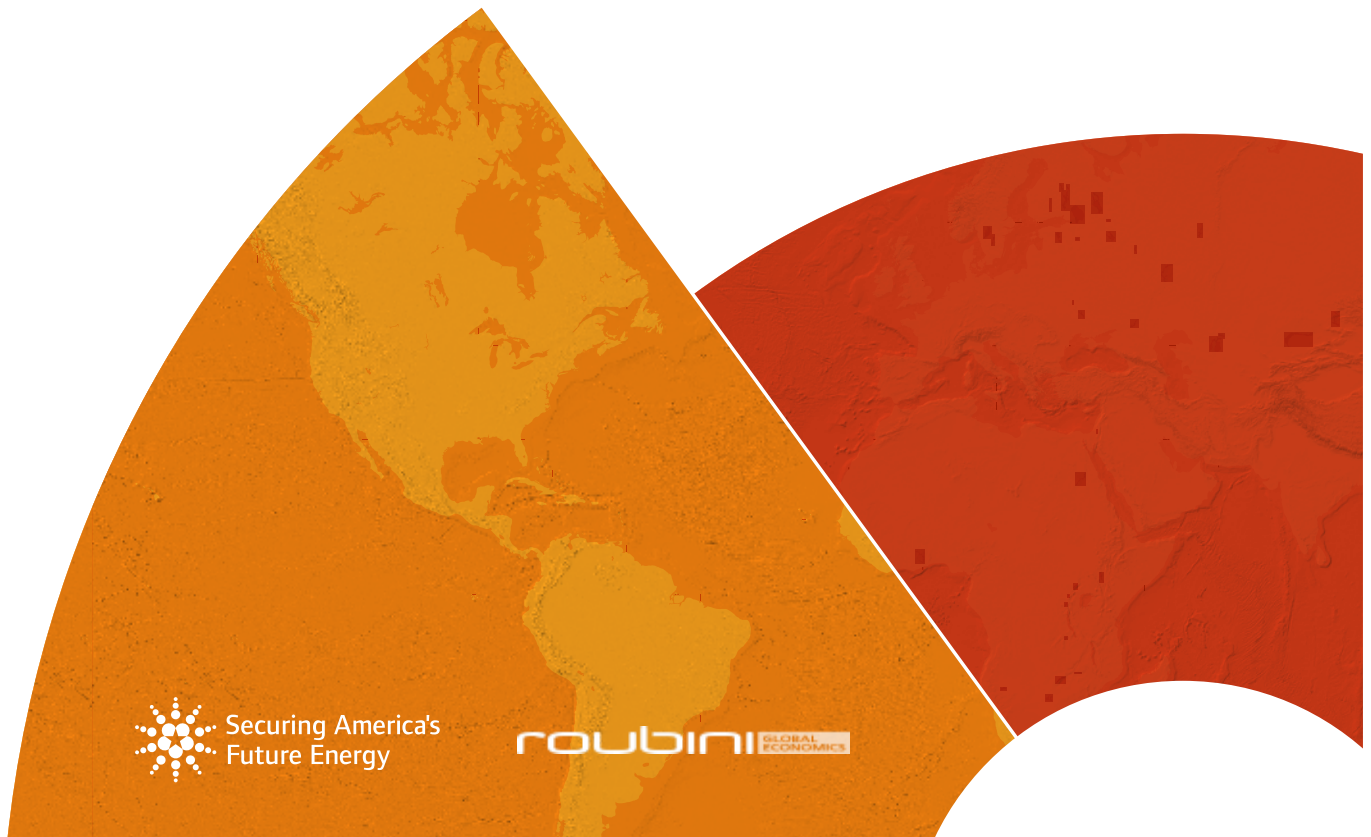


# Oil Security Index

## Quarterly Update



October 2015



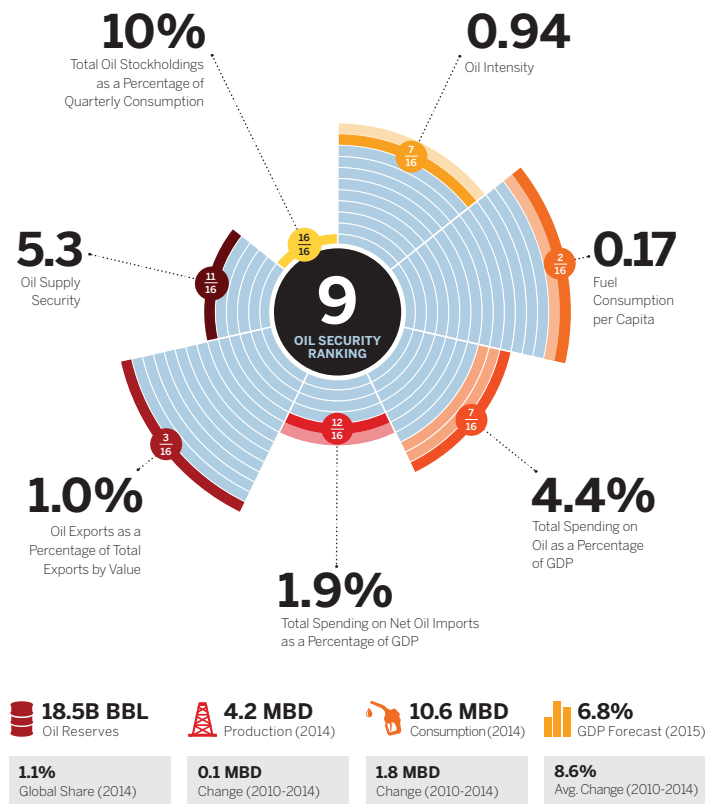
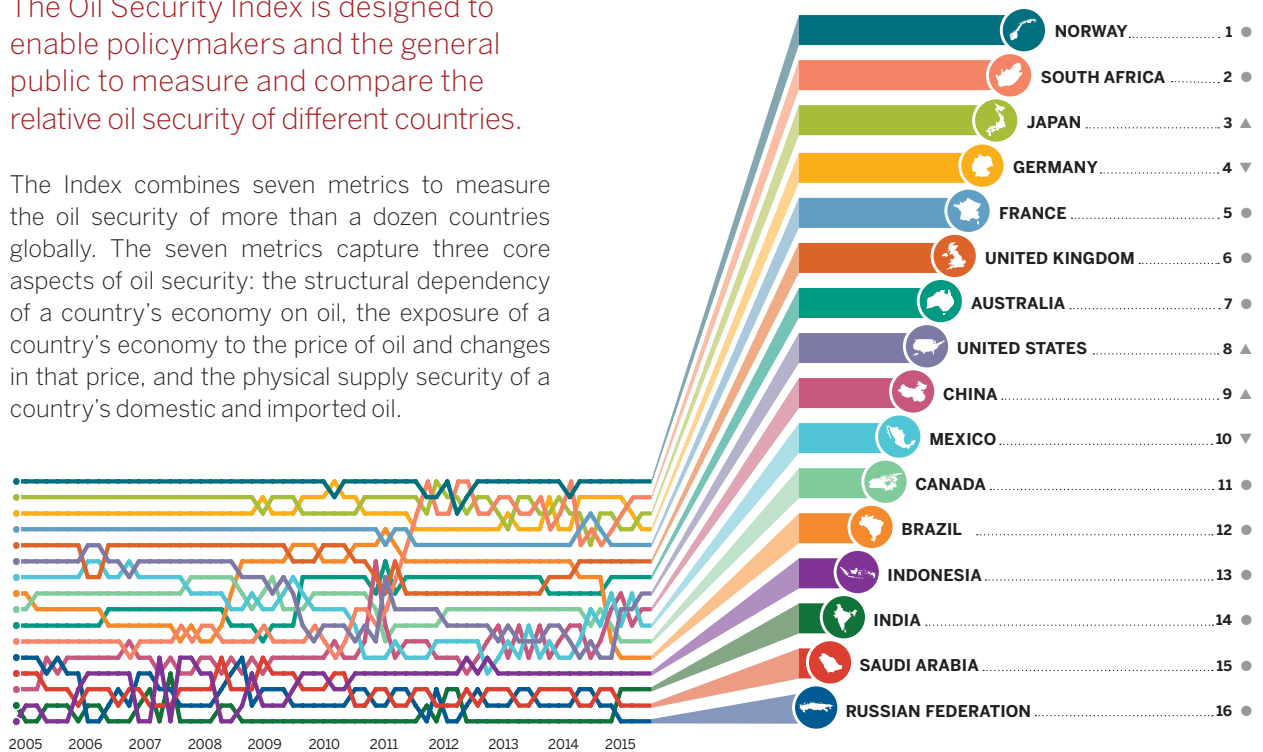
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# Oil Security Index Rankings

The Oil Security Index is designed to enable policymakers and the general public to measure and compare the relative oil security of different countries.

The Index combines seven metrics to measure the oil security of more than a dozen countries globally. The seven metrics capture three core aspects of oil security: the structural dependency of a country's economy on oil, the exposure of a country's economy to the price of oil and changes in that price, and the physical supply security of a country's domestic and imported oil.



## Spotlight on China

China continues to be the leading contributor to global oil demand growth, but a summer of financial uncertainty has raised concerns.

China's troubling economic news, most visible in the form of a 43 percent decrease in the value of the Shanghai Composite Index between June and August<sup>1</sup>, has contributed to world producers' worries about stagnant demand. The IEA is confident that Chinese demand will continue to grow but projects deceleration, with annual demand growth of 4.1 percent and 3.0 percent in 2015 and 2016 respectively. China's own oil security will be aided by reported plans to increase the capacity of its strategic reserve from its current 200 million barrels to 351 million by the end of 2016 and 500 million by 2020.<sup>2</sup>

1 SAFE analysis based on data from: Bloomberg  
2 International Energy Agency, Oil Market Report, September 2015

## Q2 2015 Global Highlights

Changes in oil demand and supply in different countries around the world impact both those countries' oil security and the global oil market.



**A** Global demand, driven in part by continued low oil prices, rose by 1.8 mbd year-over-year (y-o-y) or 2.0 percent, its largest increase since Q3 2013. OECD demand increased by 0.5 mbd, a second-straight quarter of y-o-y growth after three consecutive quarters of decline. The driving force, however, was non-OECD Asia, which increased demand 1.0 mbd, or 4.4 percent, y-o-y.<sup>3</sup> China's demand increased 5.7 percent y-o-y, representing one-third of the total increase.

**B** Unplanned oil supply outages averaged 3.2 mbd in Q2, with 2.5 mbd of that in OPEC nations. Political conflict and sanctions were main drivers, with 1.2 mbd of outages in war-torn Libya and 0.6 mbd in Iran, which signed a landmark nuclear deal that will end sanctions, although the recovery of its production is not expected for several months. Outside OPEC, conflict continued to be a primary driver of outages, with Syria (0.3 mbd of outages) and Yemen (0.2 mbd) accounting for more than half of non-OPEC disruptions.<sup>4</sup>

**C** After years of consistent y-o-y growth, Brazil saw its oil demand decrease marginally y-o-y by 0.3 percent.<sup>5</sup> With macroeconomic growth stagnant and a projected economic contraction coming in

2016 according to the IMF, the decrease in Q2 may represent the end of a peak in Brazilian demand.<sup>6</sup>

**D** OPEC accounted for the majority of supply increases quarter-over-quarter (q-o-q), adding 1.0 mbd (and 1.4 mbd y-o-y). OPEC's share of global supply rose from 38.9 percent in Q1 to 39.5 percent. Growth was led by Saudi Arabia, adding 0.5 mbd q-o-q and 0.8 mbd (5.2 percent) y-o-y, and Iraq, adding 0.4 mbd q-o-q and 0.6 mbd (12.6 percent) y-o-y.<sup>7</sup>

**E** While the rest of non-OPEC supply decreased q-o-q by 0.1 mbd, United States production rose by 0.3 mbd q-o-q, and 1.3 mbd (10.9 percent) y-o-y. This is, however, the lowest y-o-y increase since Q4 2013,<sup>8</sup> and with initial August estimates showing production declining, lower oil prices have caused at least a temporary slowdown in U.S. oil production growth.

**F** Saudi Arabia continued its trend of significant demand growth, notching an increase of 5.8 percent, or 0.2 mbd, y-o-y. Its oil consumption stood out vis-à-vis its neighbors, as the rest of the Middle East combined saw flat demand.<sup>9</sup>

3 SAFE analysis based on data from: International Energy Agency (IEA), Oil Market Report (OMR), September 2015

4 SAFE analysis based on data from: U.S. Energy Information Administration (EIA), Short Term Energy Outlook (STEO), April-July 2015

5 SAFE analysis based on data from: IEA, OMR, September 2015

6 IEA, OMR, September 2015, at 14

7 SAFE analysis based on data from: IEA, OMR, September 2015

8 Id.

9 Id.

# Indonesia: Rejoining OPEC but Facing Oil Security Obstacles

## BACKGROUND

At the June 2015 meeting of the Organization of the Petroleum Exporting Countries (OPEC), Indonesia surprised international observers by announcing its plans to rejoin OPEC, a move the organization is set to formally accept in December.<sup>10</sup> Indonesia joined OPEC in 1962, and remained a member until the start of 2009, when it withdrew from the organization after years of declining production and increased demand had turned the country into a net oil importer.<sup>11</sup> The energy minister at the time, Purnomo Yusgiantoro, naturally explained that while Indonesia wanted the price of oil to fall, the other OPEC members were committed to maintaining high oil prices.<sup>12</sup> Thus, returning to OPEC as a net importer appears counterintuitive but reflects Indonesia’s desire to have closer relationships with its suppliers. As current Energy Minister Sudirman Said notes, “we are one of the world’s biggest buyers of oil and gas, and demand is great. It’s important to be closely connected with the market, and OPEC members are among the bigger producing countries.”<sup>13</sup> Reining in costs despite growing demand is critical for Indonesia, which ranks 13th in the Oil Security Index due in large

part to its relatively oil-intensive economy and its high spending and dependency on oil imports. The move to rejoin OPEC comes against a backdrop of Indonesia facing the dual challenges of rejuvenating its oil industry while reining in consumption.

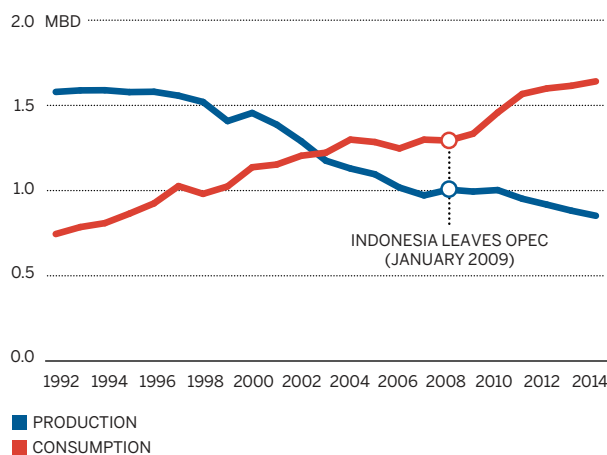
## FROM NET EXPORTER TO NET IMPORTER

Energy consumption in Indonesia has grown significantly over the past 20 years. In 1994, Indonesia consumed 0.8 mbd; by 2014 that number had more than doubled.<sup>14</sup> A number of factors have driven this steady demand including generous consumption subsidies, consistently high rates of economic growth, an expanding population and burgeoning middle class, and a sectoral transition away from agriculture. At the same time, Indonesia’s oil production and exports have dwindled. Indonesia’s oil production peaked in 1977 at 1.69 mbd, and remained roughly constant (between 1.3 and 1.6 mbd) until 1991, after which it began to steadily decline.<sup>15</sup> This decline was primarily a result of reduced exploration and investment, and field maturation, among other factors. In 2001, in an attempt to make the oil industry more competitive, the Indonesian government ended state oil company Pertamina’s monopoly over upstream and downstream

10 AP, “Indonesia to rejoin OPEC in move to secure oil supplies,” June 12, 2015; Wall Street Journal, “OPEC Accepts Indonesia’s Return to Oil Group,” September 8, 2015  
 11 Financial Times, “Indonesia pulls out of OPEC,” May 28, 2008  
 12 Id.  
 13 SAFE, The Fuse, “Indonesia, an Oil Importer, Announces Intention to Rejoin OPEC as Full Member,” June 4, 2015

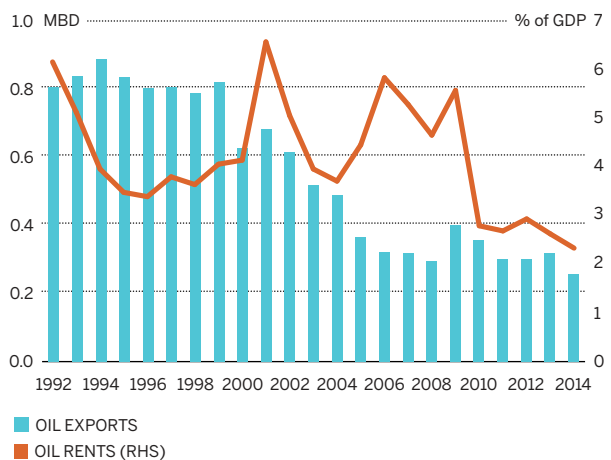
14 SAFE analysis based on data from: BP plc, Statistical Review of World Energy 2015  
 15 Id.

**FIGURE 1**  
 Indonesian Oil Production and Consumption



Source: BP Statistical Review of World Energy 2015

**FIGURE 2**  
 Indonesian Oil Rents and Exports



Sources: OPEC and World Bank

## Structural Dependency

*Definition: A country's structural dependence on oil due to capital stock and other economic factors. The structural dependency metrics typically change slowly over time, providing relatively consistent measures of vulnerability, regardless of prevailing price conditions.*

**Oil Intensity** captures the volume of oil consumed per unit of GDP (in this case, per \$1,000 of GDP). As such, oil intensity is a direct measure of the structural importance of oil in a country's economy and is perhaps the most meaningful measure of "oil dependence." Oil intensity changes little over short time periods and is almost entirely determined by oil-use efficiency levels, fuel diversity, and economic growth.

**Fuel Consumption per Capita** uses the size of a country's population, as opposed to the size of its economy, to contextualize oil consumption. This measure can be useful in comparing the different levels of oil consumption in countries with vastly different population sizes or GDPs. Fuel consumption per capita can give insight into a country's level of oil efficiency or its future demand growth potential.

## Economic Exposure

*Definition: A country's direct economic exposure to oil price volatility. Economic exposure is a function of structural dependency, but it is also more heavily driven by exogenous changes in global oil prices, and therefore variable over time. Economic exposure is measured by spending on oil across typical indicators like GDP and the current account.*

**Total Spending on Oil as a Percentage of GDP** is the most straightforward measurement of a country's economic exposure to oil. Changes in oil prices have direct effects on the ability of governments, businesses, and consumers to effectively plan, budget, and make expenditures. Transportation can be particularly sensitive to changes in oil prices, as oil is the predominant fuel in the sector and there are few substitutes (demand is therefore highly inelastic).

**Total Spending on Net Oil Imports as a Percentage of GDP** shows the extent to which countries rely on imported oil. This indicator provides a measurement of revenue either earned or spent through the oil trade and, therefore, oil's effect on a country's current account balance.

**Oil Exports as a Percentage of Total Exports by Value** highlights the degree to which the economies of oil-producing countries are dependent on oil revenues for economic growth. In other words, "oil dependence" should be evaluated not only in terms of an economy's consumption requirements, but also its production and export requirements. Just as oil price spikes are devastating for many consumers, oil price collapses are highly problematic for non-diversified producers.

## Supply Security

*Definition: A country's vulnerability to physical supply disruptions and its response capabilities. While supply disruptions are typically addressed by price changes, the adjustment period can be highly damaging for import-dependent countries, especially if adequate and appropriate emergency inventories are unavailable.*

**Oil Supply Security** is a proxy for the risk of disruption to a country's oil supply in both the short term (e.g. political instability and terrorism) and long term (e.g. tax and regulatory schemes). This metric accounts for the different levels of risk in the sources of supply that a country relies upon to meet its needs (in some instances, both domestic production and imports from a selection of other countries).

**Total Oil Stockholdings as a Percentage of Consumption** indicates how prepared a country is to meet its own short-term needs in the event of a physical disruption to oil supplies. Total stockholdings include commercial inventories (held by companies) and public reserves (held by governments).



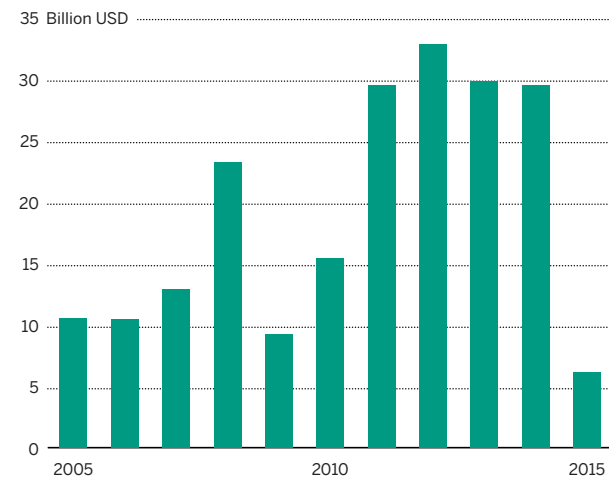
activities.<sup>16</sup> This had no substantive effect on production, however, and by 2003 Indonesia's daily oil production had fallen below its oil consumption, a gap that continues to gradually widen.

### WEANING CONSUMERS OFF SUBSIDIES

A major factor in Indonesia's rising energy consumption are the country's extensive energy subsidies. From the 1970s until 2005, the Indonesian government fixed the price of fuel, keeping it below \$0.20 per liter (\$0.53 per gallon).<sup>17</sup> Several administrations tried to increase the price of fuels in order to rein in rising subsidy costs, but such moves were often fleeting and left incomplete after sparking significant opposition and occasional violence. Under President Susilo Yudhoyono, Indonesia was eventually able to successfully initiate small subsidy cuts, increasing the price of gasoline, diesel and kerosene products in 2005, 2008, and 2013.<sup>18</sup> Nonetheless, it was unable to significantly reduce the overall cost of government fuel subsidies. As a result, between 2009 and 2013 the government spent over 714 trillion rupiah (nearly \$53 billion) on fuel subsidies, more than it spent on infrastructure and welfare programs combined.<sup>19</sup>

Recent actions taken by current president Joko Widodo, aided by the low oil price environment, are set to significantly reduce government expenditures on fuel subsidies. A major part of Widodo's campaign platform to improve the country's competitiveness was his plan to eliminate fuel subsidies, freeing up funds for other projects. Thus, on January 1, 2015, only two months after he was elected president, Indonesia eliminated government subsidies for gasoline.<sup>20</sup> While some subsidies will remain in place for diesel, Indonesia's finance minister Bambang Brodjonegoro expects the cut will save the government nearly \$16 billion annually.<sup>21</sup> In addition, the move should reduce to some extent the country's overconsumption of petroleum—although this is in part due to greater industrialization, Indonesia's fuel consumption per capita has increased 22 percent since 2000, and it ranks 12th among Index countries on net oil spending relative to GDP.<sup>22</sup>

**FIGURE 3**  
Value of Indonesian Energy Subsidies



Source: International Institute for Sustainable Development

### HALTING THE PRODUCTION DECLINE

In order to meet increasing demand, Widodo has attempted to reinvigorate the country's flailing oil sector. Upon taking office, Widodo quickly set about restructuring Pertamina, appointing a new head, Dwi Soetjipto, to help address corruption, and moving to replace its board.<sup>23</sup> In addition, the government has tried to encourage greater investment in the oil sector by reducing obstacles for foreign oil companies. This has included, for example, reducing the number of licenses required from the energy ministry to explore fields and begin production.<sup>24</sup> According to the Jakarta Post, foreign companies faced approximately "69 different types of permits needed in the upstream oil and gas sector involving 284 processes in 17 government agencies."<sup>25</sup>

There have been some promising signs that production is moving in the right direction as a result of these reforms. In December 2014, Pertamina signed a memorandum of agreement worth \$25 million with three global oil refiners (Saudi Aramco, Sinopec, and JX Nippon Oil & Energy) to upgrade Pertamina's oil refineries. Furthermore, during the first half of 2015, Pertamina recorded an 8.0 percent increase in crude oil production.<sup>26</sup> Foreign companies are participating in promising new projects, such as Petronas's Bukit Tua oil field, projected to produce 20,000 bd, and ExxonMobil's

16 Oentoeng Suria & Partners, "An introduction to Indonesia's oil and gas laws," August 2011, at 3

17 World Bank, "Why is Reducing Energy Subsidies a Prudent, Fair, and Transformative Policy for Indonesia?" Economic Premise 136, March 2014.

18 Magnus Jul Røsjø, "The Adverse Effects of Fossil-Fuel Subsidies in Indonesia," University of Oslo, May 2014

19 The Economist, "Fuel's errand," November 20, 2014

20 Wall Street Journal, "Indonesia Scraps Gasoline Subsidies," December 31, 2015

21 The Economist, "A good scrap," January 10, 2015

22 SAFE/RGE analysis

23 Reuters, "Indonesia overhauls oil giant Pertamina, moves to clean up sector," November 28, 2014

24 Rigzone, "Indonesia Seeks Regulatory Overhaul to Mitigate Energy Shortfall," June 22, 2015

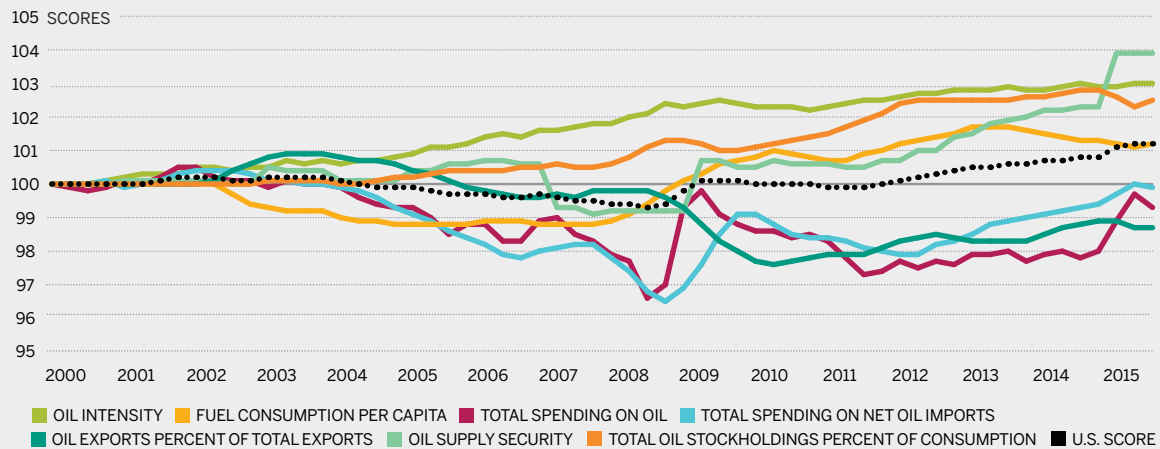
25 Jakarta Post, "Energy crisis: needs urgent action now," September 18, 2014

26 Reuters, "Indonesia's Pertamina crude oil output up 8% in 1H 2015," August 5, 2015

# Oil Security in the United States

The United States is improving its oil intensity, but risks losing progress on both decreasing consumption and increasing production.

**FIGURE 4**  
U.S. Index Score and All Metric Scores Q1 2000 to Q2 2015



Source: SAFE/RGE analysis

U.S. oil intensity improved again in Q2 to 1.01 barrels per \$1,000 of GDP, continuing a long-term positive trend from 1.20 five years ago and 1.52 ten years ago.<sup>1</sup> U.S. oil security also continues to benefit from total oil imports that have fallen by more than 50 percent in less than a decade to 5.6 mbd in Q2,<sup>2</sup> resulting in a highly favorable trade balance. Domestic oil production increased nearly 130,000 barrels per day between Q1 and Q2 to 9.6 mbd, the highest level in decades.<sup>3</sup> Production has more than doubled from levels observed as recently as Q3 2008, displacing imports from countries like Angola and Nigeria which are at higher risk of supply disruption. This shift is helping promote a gradual—but substantial—improvement in the Oil Supply Security metric from 5.6 in 2008 to 6.9 in Q2 2015.<sup>4</sup>

However, there is reason to be cautious about U.S. oil supply at least in the near term, as Q2's increase over Q1 marked the lowest such rise in nine quarters.<sup>5</sup> While the shale oil boom has proven to be

positive for U.S. oil security by drastically decreasing the country's reliance on external sources of oil, the current low price environment appears to be taking a toll on U.S. shale producers. Lower oil prices, while beneficial for U.S. oil spending levels in the short term—4.5 percent of GDP in Q2 versus 7.4 percent one year prior<sup>6</sup>—may also be deterring progress on decreasing oil consumption through improved efficiency and use of alternative fuels. Fuel consumption per capita stayed constant at 1.7 gallons in Q2, reflective of a slight worsening since 2012-13.<sup>7</sup>

Taken together, the country is importing less oil, spending a lower percentage of GDP on oil, and using oil more efficiently in its economy. However, increased domestic demand and slowing production growth, both potentially attributable to current lower oil prices, warrant attention going forward if the country is to maintain its progress on the path to improved oil security.

1 SAFE/RGE analysis

2 Id.

3 Id.

4 Id.

5 Id.

6 Id.

7 Id.

Cepu block, a joint-venture with Pertamina that could see a 125,000 bd increase this year.<sup>27</sup>

## CHALLENGES AHEAD

Recent Indonesian administrations have also taken steps to reduce the country's reliance on oil by promoting alternative forms of energy. For instance, in June the Widodo government announced plans to quintuple Indonesia's renewable energy budget.<sup>28</sup> Government officials have also proposed creating a national electric car.<sup>29</sup> This is in addition to government efforts to promote biofuels production and geothermal energy in the country; in April the government introduced export levies on palm oil to subsidize biofuels research and development.<sup>30</sup> Together, these projects are in their infancy but could help improve Indonesia's oil security by reducing its reliance on oil imports.

Nevertheless, the country's history of protectionist oil policies continues to impact governmental policy and international involvement in the sector. International companies who wish to explore or develop potential oil fields in the country are still required to use costlier local

resources, discouraging investment, particularly during periods of lower oil prices. On top of these burdensome upstream requirements, the Widodo government recently proposed requiring contractors working in Indonesia's oil fields to sell their oil exclusively to the domestic Indonesian market.<sup>31</sup> Though intended to help address Indonesia's rising oil demand, this might also discourage investment, ultimately impairing Indonesia's ability to meet its energy needs. This is of particular concern as much of the country's remaining oil reserves require substantial technical expertise to exploit. A shift back toward greater protectionism remains a possibility, as Indonesia's parliament faces proposed legislation that would limit foreign involvement in the upstream sector to capital and technology investments; the exploration and development of both new and old oil fields would effectively be nationalized.<sup>32</sup>

Overall, Indonesia's moves to rejoin OPEC and reduce fuel subsidies show a proactive reassessment of policies that have seen the nation's oil security hurt by falling production and rising consumption. Nonetheless, efforts to mitigate the shift from net oil exporter to net oil importer by decreasing overconsumption, reinvigorating oil production, and investing in alternative fuel technology could be undermined by the persistence of resource nationalism.

27 Argus Media, "Bukit Tua offers marginal Indonesia output boost," May 25, 2015

28 PV Tech, "Indonesia set for five-fold increase renewable energy budget – reports," June 16, 2015

29 Environment News Service, "Indonesia's 'National Car' Will be an Electric Car," March 30, 2015

30 Bloomberg Business, "Indonesia to Impose Palm Export Levy to Fund Biofuel Subsidy," April 6, 2015

31 Jakarta Post, "Govt considers revising oil share contracts," July 30, 2015

32 IHS Maritime, "Oil and gas law may cut future investment," July 11, 2015



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