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2018 Global Energy Situation Indicated by BP Statistics

Ken Koyama, PhD
Chief Economist, Managing Director
The Institute of Energy Economics, Japan

On July 25, international oil company BP PLC held a presentation meeting in Tokyo on the global energy situation in 2018, based on its "BP Statistical Review of World Energy 2019" released on June 11. BP conducts presentation meetings in various locations in the world following the release of the annual statistics. The Tokyo meeting was one of such meetings. As noted in seven past editions of this report, the BP statistics are one of the world's most representative annual energy supply and demand statistics. Energy stakeholders in the world refer to the BP statistics known for comprehensive coverage of the latest annual data. In the following, I would like to review the 2018 international energy situation based on the data.

First, global primary energy consumption in 2018 totaled 13.86 billion tons of oil equivalent (TOE), posting a very robust increase of 2.9% from the previous year. The growth rate was the highest since 2010, almost doubling the past 10-year average. Supporting the robust growth was a global economic expansion. According to the International Monetary Fund, the global economy logged a growth rate of 3.6% in 2018 following 3.8% in the previous year. Particularly, the vigorous U.S. economy accelerated its growth from 2.2% in 2017 to 2.9% in 2018. China and India maintained robust economic growth in 2018, growing by 6.4% and 7.9%, respectively. Amid such global economic expansion, energy consumption increased substantially. Of the global primary energy consumption growth at 390 million TOE, the Asia-Pacific region accounted for 238 million TOE or 61%, indicating that Asian demand growth drove global consumption growth. Of global primary energy consumption, developing countries outside the Organization for Economic Cooperation and Development accounted for 59%, with Asia capturing 43%. The gravity center of global energy consumption was shifting to non-OECD countries or to Asia. Thanks to the abovementioned high U.S. economic growth, U.S. primary energy consumption growth was as robust as 78 million TOE, or 3.5%. China, India and the United States commanded 70% of global primary energy consumption growth. While increasing its presence in oil and gas production growth, the United States attracted attention with its energy consumption growth in 2018.

Second, natural gas attracted attention with its high consumption growth among energy sources in 2018. Natural gas consumption growth came to 168 million TOE accounting for 43% of total global primary energy consumption expansion. The growth rate of natural gas consumption came to 5.3%, far faster than the overall primary energy consumption rise of 2.9%. Particularly, the United States and China scored remarkable growth in natural gas consumption, capturing 62% of global natural gas consumption growth. Posting the second fastest consumption growth was renewable energy. Backed by the rapid diffusion of wind and solar photovoltaics power generation, renewable energy consumption increased by 71 million TOE in 2018. Natural gas and renewable energy covered more than 60% of overall energy consumption growth. Renewable energy also posted the largest consumption growth rate among energy sources at 14.5%, indicating its rapid growth. Oil and coal consumption growth in volume followed natural gas and renewable energy growth, although oil and coal consumption growth rates were limited to less than 2%. Of global

energy consumption in 2018, oil won the largest share at 34% (slightly lower than in the previous year), followed by 27% for coal (slightly lower), 24% for natural gas (slightly higher), 7% for hydro (almost unchanged), 4% for nuclear (slightly higher) and 4% for renewable energy (slightly higher). Non-fossil energy sources expanded their share of total consumption moderately. However, fossil fuels accounted for the dominant share of 85%, with no major change seen in the basic energy mix. As fossil fuel consumption increased in line with overall primary energy consumption growth, global CO_2 emissions in 2018 increased by 2.0% to 33.9 billion tons in 2018. The growth rate was the highest in the past seven years.

Third, I would like to review energy trends by country or region. The United States drove global energy consumption growth in 2018. At the same time, the United States expanded oil and natural gas production amid progress in its shale revolution, solidifying its position as the world's largest oil and natural gas producer. U.S. oil production reached 15.31 million barrels per day (b/d) in 2018, posting a huge increase of 16.6% or 2.18 million b/d from the previous year, one of the fastest increases in U.S. oil production history since the second half of 19th century. U.S. natural gas production aggregated 831.8 billion cubic meters (BCM), scoring a very large increase of 11.5% or 85.5 BCM. Taking advantage of such production expansion, the United States made a step closer to oil self-sufficiency and increased net natural gas exports. Particularly, U.S. liquefied natural gas exports soared by 65.4% to 28.4 BCM. In 2018, the United States' growing importance in the international energy market was strongly recognized.

In contrast to the United States, the European Union reduced energy consumption by 0.2% to 1.69 billion TOE. While increasing steadily for hydro and renewable energy, consumption declined for every fossil fuel. Particularly, coal recorded the largest decline of 0.12 billion TOE. While fossil fuels retained the dominant share of energy consumption at 75% in 2018, switching to non-fossil energy sources made progress in the year.

In China, the largest energy consumer in the world, primary energy consumption in 2018 showed a brisk increase of 4.3%. All energy sources posted consumption growth in China. Particularly, remarkable consumption growth rates included 28.8% for renewable energy, 18.6% for nuclear and 17.7% for natural gas. Coal consumption expanded for the second straight year, though with the growth limited to 0.9%. In this way, China saw energy consumption's structural shift to non-fossil energy or cleaner fossil fuels. Natural gas consumption, though logging the third largest growth rate, scored the largest growth in volume at 0.37 billion TOE as switching from coal to natural gas was accelerated through the enhancement of air pollution countermeasures. Natural gas consumption expansion coincided with natural gas import growth. China boosted LNG imports by more than 40% in 2017, replacing South Korea as the world's second largest LNG importer. In 2018, its LNG imports expanded by as much as 39% to 73.5 BCM. In terms of total gas import (pipeline natural gas and LNG imports in combination), China is now the world's largest natural gas importer. Its natural gas import expansion attracted global attention in 2018.

In the Middle East that is the most important region for global oil and natural gas supply, oil production in 2018 increased by 0.8% to 31.76 million b/d. After falling in 2017 due to a coordinated production cut by the Organization of the Petroleum Exporting Countries and some of the non-OPEC oil-producing countries including Russia from the beginning of the year, the region's oil production rose in 2018 on a production cut modification (an effective production expansion). Saudi Arabia produced 12.29 million b/d of oil in 2018, remaining the world's second largest oil producer following the United States. The Middle East's oil exports in 2018 slightly increased from the previous year to 24.64 million b/d, accounting for 35% of global oil exports. The region's LNG

exports grew by 2.5% to 125.8 BCM, capturing 29% of global LNG exports.

In Russia, oil and natural gas production has been increasing even under Western economic sanctions. While attracting global attention with its participation in the OPEC-led oil production cut and enhanced cooperation with the oil cartel, Russia increased oil production by 1.6% in 2018 to 11.44 million b/d, remaining the world's third largest oil producer. Its natural gas production rose by 5.3% to 669.5 BCM, meaning that Russia was the world's second largest natural gas producer. In 2018, Russia expanded both oil and natural gas exports. Europe has been a dominant destination for Russia's oil and gas exports. Russia, which has exported natural gas primarily through pipelines, raised LNG exports by 61.5% from the previous year to 24.9 BCM in 2018.

Contact: report@tky.ieej.or.jp
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