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2022 World Energy Situation Indicated by Renamed Statistical Review of World Energy (1)

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On June 26, the Energy Institute, a London-based international association of energy industry stakeholders, published the “Energy Institute (EI) Statistical Review of World Energy 2023” as the successor to the annual BP Statistical Review of World Energy. As introduced 11 times in this report, the BP Statistical Review was one of the most representative annual statistics on international energy supply and demand and referred to by energy stakeholders around the world as covering comprehensive up-to-date data. The EI has taken over the statistical review, leaving it open to free access from all users. BP has committed to cooperate continuously in the compilation of the statistics. It is extremely gratifying that the statistics with a history of more than 70 years will be retained as EI Statistical Review.

In 2022, Russia's military invasion of Ukraine from February 24 shook the international energy situation. In order to interpret the global energy situation from various angles based on the EI statistics, I would like to review the international energy situation in 2022 in two parts. The first part written in this article focuses on global energy consumption trends in 2022.

First, global primary energy consumption in 2022 totaled 604.0 exajoules (quintillion joules; hereinafter referred to as EJ), up 1.1% or 6.6 EJ from the previous year. In 2021, global energy consumption scored a substantial increase of 5.5% or 30.9 EJ in a rebound from the COVID-19 disaster. In 2020, energy consumption contracted by 3.6% or 20.9 EJ from the previous year due to the serious impact of the COVID-19 disaster. After sharp changes in two years, global energy consumption posted a slight increase in 2022. The global energy consumption growth rate of 1.1% in 2022 was lower than the average of 1.4% for the past 10 years (2012-2022). Global economic growth in 2022 was 3.4% (according to the IMF World Economic Outlook released in April 2023), topping the global energy consumption growth. A factor behind the smaller global energy consumption growth might have been the impact of the Ukraine crisis as discussed below.

Second, a region-by-region breakdown of primary energy consumption in 2022 indicates that consumption grew by 3.1% in North America, by 4.1% in Latin America, and by 4.3% in the Middle East. In contrast, however, energy consumption plunged by 3.8% in Europe and by 5.8% in the former Soviet Union due to the Ukraine crisis. Consumption declined substantially in Europe, which was plagued with energy price spikes and supply insecurity, as well as in Russia, which saw an 8.2% drop in energy consumption due to regional destabilization and Western economic sanctions. Ukraine's energy consumption posted a dramatic decline of 30.7%.

Energy consumption in Asia Pacific in 2022 continued its upward trend with a slow increase of 2.1%. Energy consumption growth in China, the largest energy consumer, was limited to 0.9%, far slower than in earlier years. Furthermore, some Asia Pacific countries recorded substantial

energy consumption drops, including Pakistan with a 7.7% dive and Sri Lanka with a 10.8% plunge. In low-income Asian countries, soaring energy prices seem to have resulted in restraints on or falls in energy consumption through their adverse economic impacts. In 2022, energy consumption grew by 0.9% in developed countries belonging to the Organization for Economic Cooperation and Development and by 1.3% in developing and emerging countries outside the OECD, indicating that non-OECD countries continuously drove global energy consumption growth. OECD countries accounted for 38.8% of global energy consumption and non-OECD countries for 61.2% (including 46.0 percentage points for Asia Pacific), reflecting a continued trend in which the gravity center of global energy consumption was shifting to non-OECD countries including Asian ones.

Third, a breakdown of global energy consumption by energy source in 2022 showed that oil among fossil fuels scored a relatively robust increase of 3.2%, while natural gas posted a significant decline of 3.1%. Oil consumption growth centered on jet fuel and diesel oil, driven by growth in transportation demand. Natural gas consumption declined due to a significant surge in international gas and LNG market prices in almost all major countries and regions, excluding the United States, where natural gas consumption recorded a robust increase of 5.4%. In particular, natural gas consumption plunged by 12.9% in Europe (including Germany, the largest natural gas consumer, with a 15.8% decline) and by 14.0% in Russia. China's gas consumption fell by 1.2% for the first drop in 40 years since 1982. (Incidentally, China's oil consumption fell by 4.0% in 2022 for the first decline in 33 years since 1990).

Coal consumption increased only by 0.6% globally. Coal consumption rose by 1.0% in China, the largest coal consumer in the world, and by 4.1% in India, the second largest, while plunging by 6.6% in the United States, the third largest. Coal consumption trends thus differed by region. In the European Union, coal consumption grew by 2.0% (4.0% in Germany) as coal was used as a substitute for natural gas.

Among non-fossil energy sources, renewable energy posted a remarkable consumption increase of 13.0%. As the construction of solar photovoltaics and wind power generation facilities progressed to expand electricity supply capacity, institutional support such as preferential connections, renewable energy's advantage of low (or zero) variable costs in competitive electricity markets, and the enhancement of initiatives to strike a balance between decarbonization and the phaseout of dependence on Russia (mainly in Europe) contributed to the substantial increase in renewable energy consumption. Global nuclear energy consumption decreased by 4.7% or 1.2 EJ, of which France accounted for 65% or 0.78 EJ decline due to nuclear plant shutdowns caused by pipe corrosion, abnormal drought and other problems. Germany and Ukraine also saw sharp falls in nuclear energy consumption. The decrease in the three countries was almost equivalent to the global decline.

Fourth, it should be noted that the above-mentioned changes in energy supply and demand led to a sharp fluctuation in global energy-related CO_2 emissions in 2022. The year's global energy-related CO_2 emissions increased by 0.9% from the previous year to 34.37 billion tons. This increase was slightly lower than or close to the 1.1% increase in primary energy consumption. This may be attributable to changes in the global energy mix, including the significant increase in renewable energy consumption coupled with the decline in nuclear power consumption, as well as the decrease in gas consumption combined with the oil and coal consumption growth.

It should also be noted that the 0.9% increase in CO_2 emissions in 2022 was higher than the average increase of 0.6% over the past 10 years. In contrast, the 1.1% increase in primary energy

consumption in 2022 was lower than the average increase of 1.4% in the past 10 years. It was difficult for the world to promote CO_2 emission cuts in 2022. CO_2 emissions in the year increased by 0.9% in OECD countries and by 1.0% in non-OECD countries, showing no significant difference between developed and developing countries. In China, the largest CO_2 emitter in the world, emissions declined by 0.1%, accounting for 31% of the global emissions. The United States, the second largest emitter, increased emissions by 1.2%, capturing 14% of the global total. India expanded emissions by 5.3%, commanding 8% of the global total. EU emissions posted a 0.6% decline, smaller than the 3.5% fall in EU primary energy consumption, indicating the impact of changes in the EU energy mix.

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