Market and consumption of oil in China in the first half of 2020: preliminary review

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Abstract. China’s oil consumption in 2020 faced multifaceted impact of numerous factors, namely COVID-19 global spread, decrease of industrial production and hydrocarbon consumption, global consumption market shrinking etc. Power production is set as one of the sectors, most crucial for implementation two-stage plan for China's socialist modernization by 2050. This strategy’s major task is decreasing of coal overwhelming consumption in favor of hydrocarbons. Importing three-quarters of consumed oil, China forms leading trends in global oil transportation, par excellence, for its leading partners: Russia, Saudi Arabia, and Iran. 2020’ decrease in oil consumption has had negative impact not only on energy sector per se, but also simultaneously on the wide spectrum of industrial production on a par with transportation, for example, coastal port logistics. Nevertheless, both upstream and downstream oil sectors could rebound post-COVID fast recovery in coming months, which helps to avoid endangering China’s long-term plans of development.

1. Introduction
In the first part of 2020, global oil market had a double shock caused by the economic consequences of Coronavirus COVID-19 pandemic and price war between Russia and Saudi Arabia on the subject of review of volumes of production. In this context oil strategy of the largest importers of hydrocarbons raw materials becomes particularly important and first of all China oil imports whose economy recovers faster, than in other developed countries.

2. Impact of the oil market on the long-term development prospects of the energy sector
The XIX congress of the Communist Party of China held in October 2017 adopted a strategy of construction of a modernized socialist state. This strategy is to be implemented in two stages.

In the first phase (2020-2035) on the basis of building an average welfare society [1] it is planned mainly to implement socialist through significant growth of economic and technological strength. By 2035, China should become one of the world's leading innovative economies. At the same time, the environmental situation in the country should be radically improved, which will basically solve the task of creating "beautiful China" [2].

The second stage (2035-2050) yet to make transformation of China into a rich and powerful, democratic and civilized, harmonious and beautiful modernized socialist power. In addition, the level of material, political and spiritual culture as well as the degree of civilization of China's society and ecology must be significantly improved.

In terms of total national power [3] and international influence, China should be among the leading states and generally achieve overall prosperity [4].
As the energy industry is one of the most strategically important, planning for its development is carried out in full compliance with this strategy. Particularly, in the first stage, a clean, low-carbon and safe, highly efficient energy system must be broadly formed. At this stage, the level of electrification should be raised. It is assumed that coal and oil consumption will gradually reach peak values and non-fossil energy consumption will be developing steadily. Once the peak is reached, carbon dioxide emissions will begin to decline, there will be a fundamental shift in the protection of the environment, a sharp increase in the efficiency of the consumption of energy will take place while volumes of consumption will be put under strict control.

The second stage will see a comprehensive improvement in the quality of the new energy system, the development of electrification will reach the level of the world's leading countries, the energy structure will be deeply optimised, and non-fossil resources will provide up to half of China's energy consumption by 2045. Coal will only account for one third of the country's energy consumption, while oil and gas will account for other third and non-fossil sources of energy for the rest part. A sharp decline in carbon dioxide emissions will begin, energy efficiency will continue to rise, consumption of energy resources will peak by 2040, cost of energy will continue to decline, and clean energy sources will become widespread. This stage will see China's transition to the status of a "great energy power" [5].

However, the role of oil in China's energy scene will not change significantly, as major changes will affect the coal, gas and renewable energy industries. In 2017, for example, the share of oil in China's energy mix was 19%. In 2050, the share of oil in non-renewable energy consumption is projected to range from 14% (pessimistic scenario) to 16% (figure 1).

Figure 1. Pessimistic and optimistic forecasts of consumption of major energy resources in China.
3. The oil industry - the basis of PRC’s global economic strategy

In 2019, China was again ranked second in the world by oil consumption (US 920 million tonnes) and first in terms of imports (figure 2). Imports account for 72% of all oil consumed.

Although China was the sixth largest oil producer in the world in 2019, the country's low oil reserves are responsible for an increasing share of imports in consumption.

In 2019, China imported oil from 48 countries. In 2019, the undisputed leaders were Russia (first place in terms of import volume in 2016-2018) and Saudi Arabia. Riyadh has been particularly aggressive in recent years, seeking to expand its presence in the Chinese market. In particular, monthly exports to China have increased by 84.1% to 7.72 million tonnes since the sanctions were imposed on Iran in June 2020 (in May, 4.7 million tonnes) [6-8].

In 2019, the project to expand the export of American crude oil to China finally failed. For example, in October-November the volume of supplies from the USA fell from 908.4 to 257.2 thousand tonnes.

In 2016, geologic oil reserves amounted to 125.7 billion tonnes and proven reserves to 30.1 billion tonnes, but technically recoverable oil reserves in 2018 amounted to only 3,573 million tonnes (1.5% of the world total). The 15 largest oil and gas fields account for more than 90% of oil reserves (table 1).

4. Discussion

At the beginning of 2020, the Coronavirus COVID-19 pandemic brought difficult times for the Chinese oil industry (figure 3). Production in January-April increased by 2% compared to the same period in 2019 (to 64.44 million tonnes) and imports by 1.7% (to 167.61 million tonnes), but processing volumes decreased by 3.4% (to 203.48 million tonnes).
Figure 3. Changes in crude oil production and refining performance in 2019-2020.

Table 1. Main oil fields in China [1-5].

| Oil Field                          | Geological oil reserves, mln tn | Proven reserves, mln tn |
|-----------------------------------|---------------------------------|-------------------------|
| Coastal Zone, Gulf of Bohai       | 24 287                          | 6558                    |
| Ordos                             | 15 838                          | 2672                    |
| Sungari-Liaohe Lowland            | 13 428                          | 3986                    |
| Tarim Basin                       | 12 065                          | 2794                    |
| Shelf of Bohai Gulf               | 11 029                          | 2537                    |
| Dzungaria                         | 10 673                          | 2202                    |
| Zhujiang River mouth              | 7432                            | 2963                    |
| Ciantan Highlands (Northern Tibet)| 5095                            | 1121                    |
| Tsaidam                           | 3819                            | 624                     |
| Gulf of Tonkin                    | 2118                            | 510                     |
| Erenhot (Inner Mongolia, Centre part) | 1784                     | 267                     |
| Sichuan                           | 1611                            | 129                     |
| Barkul Kazak Autonomous County (Eastern Xinjiang) | 1552                        | 155                     |
| Hainan Island Shelf Area          | 1489                            | 600                     |
| Coqên County (South Tibet)        | 1104                            | 164                     |
| Hailar                            | 1010                            | 201                     |

In April 2020, there was the most significant decline in oil imports from abroad (figure 4). In physical terms, it fell by 7.5%, and in value terms (mainly due to a decline in global oil prices) by 49.3% compared to the same period in 2019.

Despite the rapid development of pipe oil imports, primarily from Russia and Kazakhstan, a significant proportion of foreign raw materials continue to flow through the Chinese seaports. For example, in January 2020, 39.44 million of the 43 million tonnes of imported crude oil were transported by sea. The four largest oil-loading ports - Qingdao, Rizhao (Shandong Province), Ningbo
and Zhoushan (Zhejiang Province) - traditionally account for over half of oil imports. However, in February 2020, the situation changed due to the Coronavirus pandemic, of which Zhejiang Province became one of the epicentres (table 2).

![Figure 4. Monthly rates of change in oil imports in 2019-2020.](image)

**Table 2.** Main ports of oil shipment and delivery to China in February 2020 [1-5].

| Ports of shipment / transshipment | Dispatches of tankers | Total deadweight, thousand tonnes |
|-----------------------------------|-----------------------|----------------------------------|
| Singapore                         | 17                    | 312.24                           |
| Mina Al-Ahmadi (Kuwait)           | 9                     | 222.98                           |
| Ras Tanura (Saudi Arabia)         | 9                     | 217.94                           |
| Kozmino (Russia)                  | 14                    | 193.48                           |
| Das Island (UAE)                  | 5                     | 134.81                           |

| Ports of delivery | Entries by tankers | Total deadweight, thousand tonnes |
|-------------------|--------------------|----------------------------------|
| Rizhao            | 22                 | 642.66                           |
| Qingdao           | 21                 | 565.28                           |
| Dalian            | 12                 | 363.41                           |
| Dongjiakou (Shandong Province)    | 12                 | 332.12                           |
| Zhangjiang (Guangdong Province)   | 12                 | 299.18                           |

Due to the huge volume of oil imports, sea transportation is provided mainly by supertankers. VLCC vessels (over 330 m) and above account for 52% of maritime oil imports, Aframax (245 m) for 19% and Suez-Max (285 m) for 14%. Some ports are specialized in unloading certain types of tankers, for example, Qingdao and Rizhao - VLCC, and Dalian and Jinzhou (Liaoning Province) - Handymax and Panamax ships.

**5. Conclusion**

Despite the short-term negative impact of the Coronavirus pandemic in 2020, China's oil industry can already recover within the full production-consumer cycle: upstream-midstream-downstream in the short term. A minor disruption in the first months of the year will also have little impact on long-term...
industry plans up to 2050, where oil is expected to play the role of a stabilizer for inter-sectoral shifts in the energy sector.

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