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Fossil Fuels in Central Asia: Trends and Energy Transition Risks

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A B S T R A C T

This data article provides an overview of fossil fuel trends in Central Asia from 2010 to 2019. Data on the production, consumption, export and import of coal, natural gas and oil are summarised for Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. While promoting renewable energy, Central Asia continues to rely on and expand the use of coal, natural gas and oil with no major phase-out plans yet on the horizon.

*Keywords:* fossil fuels, Central Asia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

## 1. Background and data

The Central Asian states of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan are latecomers to the global energy transition (Vakulchuk and Overland, 2021; Mouraviev, 2021). Only since 2018 has renewable energy been one of the priorities of the region’s economic development.

Kazakhstan and Uzbekistan – two major economies in Central Asia – have been particularly active in launching renewable energy projects (Laldjebaev et al., 2021; Eshchanov et al., 2021; Shadrina, 2020). Kazakhstan announced a plan to achieve 50% renewables by 2050, and in December 2020, Kazakhstan’s President, Kasym-Jomart Tokayev, announced that the country would seek to achieve carbon neutrality by 2060. Yet, despite the positive pro-climate rhetoric and ambitious renewable energy targets, Central Asia is still a major exporter of hydrocarbons, which is a role that it has actively played since 1991.

There are two main dimensions of energy transition: the promotion of clean energy and the phasing-out of fossil fuels (Overland et al., 2019; Overland, 2019). This data article focuses on the status of fossil fuel phase-out in Central Asia, a topic on which only limited research has thus far been produced. It provides an overview of the trends in the use of fossil fuels in Central Asia from 2010 to 2019. Data on the production, consumption, export and import of coal, natural gas and oil were collected and summarised for Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. These data are also available in a unified dataset in Excel format from <http://osce-academy.net/en/research/cadgat/>

## 2. Data collection

The data in this article cover 2010–2019 and were gathered from August to December 2021 based on information obtained from national and international sources.

## 3. Findings

Tables 1-5 present detailed data on the production, domestic consumption, export and import of fossil fuels in each Central Asian country. The major trends during 2010–2019 were as follows: (1) the consumption of fossil fuels either remained largely unchanged or actually increased during the period; (2) while the countries officially recognised the need to decarbonise their energy sectors, this did not result in reduced consumption of coal, natural gas or oil; and (3) increasing electricity capacity sourced from renewable energy in Central Asia has not yet displaced electricity produced from fossil fuels.

Oil and gas production, consumption and exports have grown significantly in Kazakhstan and Turkmenistan, and much has been written about Central Asia’s dependence on oil and gas (Schaik et al., 2021; Ma et al., 2020; Vakulchuk, 2016). However, the coal industry, the largest emitter of greenhouse gases among other fossil fuels, has received limited attention from the scholarly community.

Coal remains the major source of electricity production in Central Asia. In Kazakhstan, coal’s share of power generation was 70% in 2020, while that of renewables was only 2.5% (IEA, 2021). The coal industry (mining, services and trade) remains an important source of employment, with several mono-industry towns built around coal mining sites. In 2018, more than 200,000 people (workers and their families) in Kazakhstan depended on income from the coal industry, which continues to be heavily subsidised by the government (companies are exempted from corporate income tax, land tax and property tax). Kazakhstan has the 8th largest coal reserves in the world (33.6 billion tonnes), is 10th among global producers and is also a major regional coal exporter (IEA, 2021). Coal exports also rose from 28 million tonnes in 2019 to 38 million metric tonnes in 2020, with Kyrgyzstan, Russia and Uzbekistan being the main importers.

Similarly, Kyrgyzstan generates more than 50% of its electricity from coal. By 2025, Kazakhstan and Kyrgyzstan plan to expand coal exports to many of their neighbours, including China. Uzbekistan also both produces coal and imports it from Kazakhstan and Kyrgyzstan, while Tajikistan produces coal and exports its surplus to both Pakistan and Uzbekistan.

**4. Policy recommendations**

While Central Asia is supportive of renewable energy, it continues to rely on coal, natural gas and oil with no major phase-out plans yet on the horizon. Based on the findings of this article, we propose the following policy recommendations:

*1) Adopt reduction targets for fossil fuels.* Unlike the targets adopted for increasing renewable energy, no targets were adopted to reduce the use of fossil fuels. The governments of Central Asian countries could put a greater effort into preparing strategies and policies for phasing out fossil fuels. A first step could be to adopt targets for the reduced extraction and use of coal, natural gas and oil.

2) *Assess the political, economic and social consequences of decarbonisation.* The decarbonisation of Central Asia poses significant risks to the region due to its dependence on fossil fuels as a source of public revenue, economic development, employment and political stability. The governments could assess these risks and develop systematic measures to address them.

3) *Establish a dialogue with importers.* The Central Asian fossil fuel exporters could establish a dialogue on decarbonisation with the European and Asian countries that import their fossil fuels.

4) *Scholars need to study the risks for Central Asia involved in not phasing out fossil fuels*. The scientific community that specialises in Central Asia’s energy could focus more on identifying the risks and challenges if Central Asia fails to decarbonise its energy sector.

**Table 1. Kazakhstan (*in million tonnes*)**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Product** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** |  |
| Coal production | 111 | 116 | 121 | 120 | 114 | 107 | 103 | 112 | 118 | 115 |  |
| Coal consumption | 335 | 363 | 378 | 375 | 370 | 34178 | 339 | 363 | 406 | 397 |  |
| Coal imports | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |  |
| Coal exports | 19 | 34 | 33 | 33 | 32 | 32 | 27 | 30 | 28 | 28 |  |
| Natural gas production | 9806 | 10356 | 10481 | 10993 | 11199 | 11263 | 11334 | 12169 | 12052 | 12022 |  |
| Natural gas consumption | 3372 | 3752 | 4030 | 4221 | 4740 | 4804 | 4998 | 5327 | 6135 | 6147 |  |
| Natural gas imports | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 5 | 15 | 5 |  |
| Natural gas exports | 13 | 11 | 12 | 20 | 19 | 19 | 22 | 15 | 17 | 19 |  |
| Oil production | 80 | 80 | 79 | 82 | 81 | 80 | 79 | 87 | 91 | 91 |  |
| Oil consumption | 10 | 13 | 14 | 14 | 14 | 17 | 16 | 18 | 19 | 18 |  |
| Oil imports | 6 | 8 | 8 | 10 | 3 | 2 | 3 | 3 | 2 | 1 |  |
| Oil exports | 67 | 68 | 67 | 69 | 65 | 61 | 57 | 68 | 68 | 73 |  |

Source: See Unified CADGAT Database in Vakulchuk and Overland (2022).

**Table 2. Kyrgyzstan (*in thousand tonnes*)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Product** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** |
| Coal production | 575 | 830.7 | 1163.9 | 1406.8 | 1812 | 1928.7 | 1851.3 | 1870.4 | 2395.2 | 2606 |
| Coal consumption | 1860.7 | 2016 | 2831.8 | 2228.9 | 2813.1 | n/a | 2447.1 | n/a | n/a | n/a |
| Coal imports | 1100 | 1500 | 1800 | 1200 | 1200 | 1500 | 883 | 1000 | 967 | 676 |
| Coal exports | 19.2 | 77.9 | 215 | 173 | 250 | 253 | 418 | 550 | 912 | 1200 |
| Natural gas production | 8051.7 | 9394 | 10065 | 11477 | 11477 | 11159 | 10206 | 9181.8 | 9640.9 | 8616.8 |
| Natural gas consumption\* | 0.4079 | 0.353 | 0.3761 | 0.3585 | 0.0379 | 0.1589 | 0.1658 | 0.1658 | n/a | n/a |
| Natural gas imports | 168 | 184 | 239 | 176 | 178 | 130 | 122 | 158 | 379 | 390 |
| Natural gas exports\* | 0.038 | 0.119 | 0.115 | 0.185 | 0.099 | 0.576 | 0.315 | 0.044 | 2.2 | 1.5 |
| Oil production | 82.8 | 89.9 | 78.9 | 83.5 | 82 | 107.1 | 145.3 | 173.2 | 200 | 233 |
| Oil consumption | 1123.4 | 1193 | 1528.4 | 1526.3 | 1354.3 | n/a | 1684.4 | n/a | n/a | n/a |
| Oil imports | 1300 | 1200 | 1400 | 1700 | 1500 | 1500 | 1300 | 1700 | 1600 | 1200 |
| Oil exports | 105 | 113 | 103 | 138 | 127 | 106 | 148 | 170 | 209 | 180 |

**\*** *Million tonnes*

Source: See Unified CADGAT Database in Vakulchuk and Overland (2022).

**Table 3. Tajikistan (*in thousand tonnes*)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Product** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** |
| Coal production | 220.5 | 260.1 | 454.2 | 568.8 | 967.8 | n/a | 1500.2 | n/a | n/a | n/a |
| Coal consumption | 228.2 | 252.4 | 478.4 | 579.8 | 980.0 | n/a | 1511.3 | n/a | n/a | n/a |
| Coal imports | 62.7 | 83.5 | 84.2 | 41.8 | 37.2 | 29.3 | 40.8 | 35.1 | 49.4 | 56.1 |
| Natural gas consumption | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | n/a | n/a |
| Natural gas imports | 34.1 | 93.7 | 263 | 252 | 235 | 309 | 327 | 350 | 422 | 487 |
| Oil production | 29.8 | 30.9 | 33.1 | 29.8 | 27.6 | 27.6 | 27.6 | 26.5 | 25.4 | n/a |
| Oil consumption | 466.1 | 490.8 | 663.0 | 772.8 | 952.4 | n/a | 884.3 | n/a | n/a | n/a |
| Oil imports | 576 | 335 | 432 | 398 | 541 | 571 | 654 | 689 | 489 | 635 |

Source: See Unified CADGAT Database in Vakulchuk and Overland (2022).

**Table 4. Turkmenistan (*in thousand tonnes*)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Product** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** |
| Natural gas production\* | 14161 | 19882 | 20836 | 20836 | 22425 | 23272 | 22319 | 20730 | 21719 | 22319 |
| Natural gas consumption\* | 6463 | 7310 | 8087 | 6816 | 7063 | 8970 | 8864 | 8758 | 10029 | 11124 |
| Natural gas imports | 0.02 | 0.011 | 0.001 | 0.002 | 0.001 | 0.003 | 0.001 | 0.024 | 0.015 | 0.012 |
| Natural gas exports | 2600 | 11900 | 16500 | 18700 | 19200 | 21200 | 22900 | 24900 | 25500 | 24100 |
| Oil production | 11100 | 11500 | 12000 | 12500 | 12900 | 13200 | 13200 | 13100 | 12600 | 12200 |
| Oil consumption | 5500 | 5800 | 6000 | 6200 | 6500 | 6500 | 6500 | 6500 | 6500 | 6700 |
| Oil imports | 15.5 | 23.7 | 30.2 | 33.9 | 29 | 23.5 | 132 | 24.9 | 27.5 | 35.5 |

\* *Million tonnes*

Source: See Unified CADGAT Database in Vakulchuk and Overland (2022).

**Table 5. Uzbekistan (*in thousand tonnes*)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Product** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** |
| Coal production | 3629 | 3845 | 3753 | 4090 | 4397 | 3488 | 3867 | 4039 | 4174 | 4048 |
| Coal consumption | 7170 | 9560 | 11950 | 16730 | 16730 | 11950 | 14340 | 14340 | 21511 | 19120 |
| Coal imports | 39 | 32 | 36 | 24 | 19 | 24 | 27 | 24 | 37 | 62 |
| Coal exports | 23 | 2 | 0.1 | n/a | n/a | n/a | 1.8 | 5.5 | 23 | 14 |
| Natural gas production\* | 20165 | 19988 | 19953 | 19741 | 19882 | 18929 | 18752 | 18858 | 20200 | 20235 |
| Natural gas consumption\* | 15538 | 16739 | 16315 | 16315 | 17128 | 16351 | 15291 | 15221 | 15680 | 15680 |
| Natural gas imports | 0.003 | 35 | 0.003 | n/a | n/a | 0.006 | n/a | 391 | 277 | 172 |
| Natural gas exports | 2100 | 2700 | 1700 | 3800 | 3400 | 3200 | 3600 | 5200 | 12200 | 7500 |
| Oil production | 3600 | 3600 | 3200 | 2900 | 2800 | 2700 | 2600 | 2800 | 2900 | 2800 |
| Oil consumption | 4293 | 3657 | 3537 | 3818 | 3433 | 3462 | 3590 | 3757 | 4151 | 4324 |
| Oil imports | 1100 | 693 | 736 | 809 | 630 | 812 | 1100 | 1300 | 1200 | 1200 |
| Oil exports | 1200 | 774 | 88 | 115 | 81 | 11 | 7 | 210 | 114 | 149 |

**\*** *Million tonnes*

Source: See Unified CADGAT Database in Vakulchuk and Overland (2022).

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