Ukraine and Kazakhstan: What are the energy prospects after the Soviet past?

Description

More than thirty years on, how can we assess the impact of the end of communism on the energy policies of the former federated republics of the Soviet Union? Through a comparative study of two states with similar situations but very different opportunities and challenges, Ukraine and Kazakhstan, we uncover several common ecological, economic, and security issues that have shaped their energy policies.

The proclamations of sovereignty by Ukraine and Kazakhstan in 1990 marked a significant shift in the energy landscape of the then-Soviet space. Each federated republic, in theory, became the manager of its resources. However, the legacy of the Soviet era continued to shape their energy policies. President Nazarbayev's "Kazakhstan 2050" speech in 2012 was a testament to this. Yet, in 2014, the landscape dramatically shifted for Ukraine after the Dignity Revolution and the Russian invasion of part of its territory, altering its energy dependency prospects. This raises the question of the extent to which the Soviet legacy has influenced the development of their energy policies and what the current issues are.

A legacy of disasters

The policies pursued in the USSR had disastrous consequences for the environment. The Chornobyl(1) exclusion zone in the Ukraine was a prime victim, as were various areas of Central Asia – and Kazakhstan in particular – where open dumping of nuclear waste in pastoral regions, the Aral Sea disaster and atomic testing at the Semipalatinsk polygon were all combined. Kazakhstan and Ukraine, in response to these environmental challenges, have developed a unique ecological awareness in civil society and among the authorities. For example, section 7 of the 1990 Declaration of Sovereignty of the Soviet Ukraine is devoted to environmental security. Similarly, clause 3 of article 6, supplemented by article 31 of the Constitution of Kazakhstan, states that natural resources are the property of the State, which must *"protect an environment conducive to human life and health."*

However, there are perceptible differences in the relationship with nuclear power. In Soviet Ukraine, there was a sharp drop in nuclear production following the Chornobyl accident in 1986. However, this disaster was the main reason for the military denuclearisation of the country because of its impact on attitudes (mentioned in Article 5, section 9 of the Declaration of Sovereignty). Independent Ukraine used its military denuclearisation to strengthen its civil nuclear sector, receiving substantial negotiated aid and proceeding with the conversion of certain atomic warheads and the recycling of dual-use goods. The assistance is used to retrain employees in the military nuclear sector, process non-

recyclable atomic components, and import hydrocarbons. In Kazakhstan, anti-nuclear and environmental awareness has also been solid since perestroika. The Nevada-Semipalatinsk(2) anti-nuclear movement, to name but the best-known, shaped Kazakhstan's stance on renouncing both civil and military nuclear power. The dismantling of Kazakhstan's military atomic arsenal and nuclear test facilities was completed in July 2000 at the emblematic Semipalatinsk polygon.

Tense energy situations

Civil nuclear power, which appeared to be the solution for Ukraine when it left the USSR despite the trauma of Chornobyl, is absent from Kazakhstan's energy program. While this can partly be explained by the Soviet legacy in Ukraine (five power stations in operation when the Soviet Union ended, compared with just one in Kazakhstan), it should also be noted that the recycling of dual-use goods, which Kazakhstan also undertakes, is carried out under very different conditions: the country does not use this fuel but sells it on. The only nuclear reactor inherited from the Soviet period ceased operating in 1999 (it had been in operation since 1973). Although the country is rich in uranium, it still has no power plant to exploit it or even any enrichment capacity. In 2015, the Minister of Energy suspended preparations for constructing a power plant, citing the country's energy surplus.

Today, the construction of a power plant is envisaged, and the International Atomic Energy Agency (IAEA) has accepted the establishment of a reserve of low-enriched uranium(3) on Kazakhstan's territory. Orano made the first fuel delivery for this depot in 2019, and agreements (the content of which is not yet public) were signed with Assystem of France in December 2022.

Ukraine's energy situation was disrupted mainly from 2014 onwards by the annexation of Crimea and Russia's invasion of the Donbas. These events have had an impact on Kyiv's energy policy choices. In 2020, nuclear power accounted for around 50% of the country's energy production(4), and the share of hydrocarbons and coal remained very high, although declining. Access to raw materials is essential, as we saw during the Donbas strikes 1996, which led to the shutdown of thermal power stations due to a lack of coal. We also saw this during the economic crisis of 1998, with the rise in hydrocarbon prices, and then during the wave of privatizations in the 2000s, which primarily benefited Russia, which then had *"its hands on 50% of the oil market and all the gas pipelines crossing Ukrainian territory"*(5). The war provoked by Russia has shattered any prospect of energy cooperation between Ukraine and Russia, and the gas transit agreements that still link them will come to an end in 2025. Kazakhstan is well endowed with raw energy materials, and a significant proportion are exported. Until 2013, the country's energy intensity was twice the world average and four times that of OECD countries. Nearly 50% of its energy mix was coal-fired, with renewable energies accounting for a further 15%, thanks to extensive use of hydroelectricity.

Which transitions?

In 2013, Kazakhstan was still concentrating its infrastructural efforts on coal production. It was not planning to reduce carbon emissions before 2030, which was both a sign that it was lagging in the environmental energy transition and a sign that it was out of step with the place of ecology in the Kazakh mentality. The lack of reliable data and transparency in energy policy for a long time reflected the authorities' lack of interest in an effective and concerted energy transition(6), as demonstrated by the continuing priority given to coal.

In Ukraine, the problem is different because of the obstacles Russia has posed to developing renewable energies. The regions occupied by Russia since the large-scale invasion in February 2022 have the most significant potential for renewable energy(7), particularly Crimea and the Donbas, which have a high potential for wind and solar power. The Russian aggressions of 2014 and 2022 hamper the implementation of sustainable energy policies (not to mention the Russian army's intensive targeting of energy structures since 2022). Apart from nuclear power, the most viable option with the most significant potential for Ukraine is bioenergy, which could cover the entire country even if it is underdeveloped at this stage. This process partly enables the soil in the Chornobyl exclusion zone to be decontaminated through an ecological process(8). The energy potential of minor watercourses is also significant in the west of the country, which has been less affected by the war, making it a viable and credible option that has been increasingly developed since 2020.

Despite different situations on the ground, common problems inherited from the Soviet period can be seen in both Kazakhstan and Ukraine: obsolete installations, abnormally high tariffs for renewable energies compared with nuclear or thermal production, energy losses during transport, and the transformation of electricity that are twice as high as the standard in developed countries, etc. In Kazakhstan, the authorities approach energy security through economic security: they need to ensure that they can pay for Russian electricity imports and continue to export raw materials since the primary source of stimulus for the Kazakh economy is the sale of energy fuels.

However, the outlook is not bright, with the depletion of reserves (in the medium term) and falling demand due to the energy transition (in the long term). The organization of the energy network also creates internal imbalances: some regions depend exclusively on imports from Russia, while others export their surplus production. The development of civil nuclear power in Kazakhstan appears to have come a long way from the country's ecological objectives and raises new issues. As the country has no nuclear fuel enrichment capacity at this stage, and Russia remains the region's leading supplier of enriched uranium, the country's energy sovereignty is far from assured. The choice of manufacturer for the country's future nuclear power plant is a crucial strategic issue: China is the world leader in this field and a plausible partner for Kazakhstan, but it is also suspected of being able to use system vulnerabilities(9). The risk of a cyber attack on the country's future power plant is not confined to China, as Russian hackers are particularly active and renowned.

Their repeated attacks on Ukraine's government and energy infrastructure, which have resulted in physical destruction, if not cyber destruction, illustrate these problems. The Kazakh government could also opt for Iran, which is playing a growing role in Central Asia's energy sector. At this stage, the most advanced solution for the construction and supply of the future Kazakh nuclear power station seems to favor the French partner(10). However, economic and logistical issues are emerging.

Notes:

(1) The transliteration used here is from Ukrainian rather than Russian: for example, Chornobyl (rather than Chornobyl) and Donbas (rather than Donbas).

(2) Movement chaired by the poet Oljas Souleimenov, campaigning to abolish nuclear testing.

(3) The IAEA's uranium banks are designed to secure fuel supply to member countries if it is no longer available on the commercial market due to exceptional circumstances.

(4) According to IEA World Energy Balances, « EU4Energy Data Explorer », *Electricity generation by source, Kazakhstan* et *Ukraine*.

(5) Gilles Lepesant, « L'Ukraine et ses défis européens », *in* G. Lepesant (dir), *L'Ukraine dans la nouvelle Europe*, Paris, CNRS Editions, Espace et milieux, 2004, p. 23.

(6) Makpal Assembayeva, Jonas Egerer, Roman Mendelevitch, Nurkhat Zhakiyev, "A spatial electricity market model for the power system: The Kazakhstan case study", *Energy*, vol. 149, 15 avril 2018, pp. 762-778.

(7) H. Khylap, T. Kurbatova, "State and economic prospects of developing the potential of non-renewable and renewable energy resources in Ukraine," *Renewable and Sustainable Energy Reviews*, Vol. 52, 2015, pp. 217-226.

(8) *Op. Cit.* Note 7, p. 223. The process involves growing rapeseed in the Chornobyl exclusion zone. The plant feeds on radioactivity and improves soil structure; its oil can be a biofuel.

(9) Thomas Gomart develops this example in the case of the deployment of 5G, but the same practices cannot be ruled out in the nuclear field. See the passages on digital and nuclear power in his book, *Guerres invisibles: nos prochains défis géopolitiques* (Paris, Tallandier, Collection Texto Essais, 2022, 352 p.).

(10) See, among others, David Dalton, "Kazakhstan: France Ready To Compete For New Build Project With EPR1200 Reactor Technology," *Nucnet*, 30 January 2023; and "Framatome signs agreement with Kazatomprom to extend nuclear fuel cooperation," Press Release, 3 November 2023.

Thumbnail: Enerhodar power stations, near Zaporijjia (Ukraine), 2009 (source: Wikimedia Commons).

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Link to the French version of the article

Translated from French by Assen SLIM (Blog)

To quote this article: Nathan HOURCADE (2024), "Ukraine and Kazakhstan: What are the energy prospects after the Soviet past?", *Regard sur l'Est*, 16th April.


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date créée
16/04/2024
Champs de Méta
Auteur-article : Nathan HOURCADE*