

ENERGY STORAGE SYSTEMS IN KAZAKHSTAN: TIME FOR REGULATORY CHANGES

Energy storage technologies emerged as a critical component in efficient, flexible, reliable use of energy worldwide. They help smoothing out supply of various forms of renewable energy

In terms of economic benefit, energy storage systems are cost-effective since they provide for lower operational costs in powering the grid and potentially reduce the amount customers pay for demand charges due to decrease in consumption by a customer in peak times.¹

Environmental impact of energy storage systems shall not be ignored, as several studies show its potential to support decarbonisation. For example, as part of the Green Deal, EU sets an ambitious goal of decarbonisation until 2030 and 2050 with the help of energy storage solutions.²

It is also crucial to highlight the importance of the role of energy storage as a new energy infrastructure that shall be integrated into renewable energy system and also integrate autonomous, distributed and centralized systems together with renewable energy sources.³

Kazakhstan is not an exception, due to the country's geography and climate, the most promising sources of renewable energy are solar and wind. According to estimates in the Concept for the Development of the Fuel and Energy Complex until 2030", the total potential of renewable energy sources for energy production is 1,885 billion kWh; the thermal potential is 4.3 GW (Government Decree of the Republic of Kazakhstan No. 724, 2014)⁴. However, with the current structure of generation mainly from the stations fired by coal and gas and the lack of balancing and reserve capacities, the intermittent nature of wind and solar plants puts even more pressure on the reliability and stability of the overall power system in Kazakhstan.

Currently, KEGOC, the system operator of unified power system of Kazakhstan, is contemplating the introduction of storage capacities, which will allow energy to be stored and used later.⁵

Ministry of Ecology of the Republic of Kazakhstan has recently presented a draft version of doctrine (strategy) on achieving carbon neutrality by 2060, which highlights the importance of energy storage systems in enabling renewable energy into conventional energy system for the purposes of decarbonization.⁶

¹ Paolo D'Aprile, John Newman, Dickon Pinner, The new economics of energy storage, Mckinsey, <https://www.mckinsey.com/business-functions/sustainability/our-insights/the-new-economics-of-energy-storage>

² Energy storage for a decarbonized Europe by 2050, <https://ease-storage.eu/publication/decarbonised-europe-2050/>

³ Napravleniya razvitiya elektroenergetiki Kazakhstana: Sistema nakopleniya elektricheskoi energii, <https://eenergy.media/2021/10/17/napravleniya-razvitiya-elektroenergetiki-kazahstana-sistema-nakopleniya-elektricheskoi-energii/>

⁴ Concept for the Development of the Fuel and Energy Complex until 2030, Resolution of the Government of the Republic of Kazakhstan dated June 28, 2014 No. 724

⁵ Alexey Bancikin, "KEGOC ishet nadezhnyi akkumulyator dlya VIE", <https://sknews.kz/news/view/kegoc-ischet-nadeghnyy-akkumulyator-dlya-vie>

⁶ Doctrine (strategy) on achieving carbon neutrality by 2060, <https://legalacts.egov.kz/npa/view?pageComment=2&id=1148821>

In this article, we focused on regulatory barriers that hinder the development of energy storage systems in Kazakhstan. The following review is based on the analysis of both Kazakhstan laws and international best practices in the field of energy storage systems.

Regulatory barriers and recommendations

Regulatory barriers are one of the main stumbling blocks on the way to effective implementation of energy storage system in Kazakhstan. Currently, there is no specific regulation or program to support energy storage system in Kazakhstan. In essence, there is virtually no regulation of ownership, construction and operation of energy storage systems in Kazakhstan. It is recommended to update the public policies and regulations to encourage the deployment of energy storage.

Regulatory barriers	Recommendations
<p>Out of date state programs</p> <ul style="list-style-type: none"> • several programs, roadmaps and other strategic program documents aimed at the development of the electric power industry and the industrial and innovative development of the country as a whole were adopted, but energy storage systems are mentioned only in passing (i.e. briefly): • <i>in the State program for the accelerated industrial and innovative development of the Republic of Kazakhstan for 2010-2014</i>, it is indicated that technologies for the production of new generation batteries, among others, were identified as critical technologies in the electric power industry.⁷ • <i>in the same program but for 2015-2019</i>”, the Centre for new energy and clean technologies (focus on energy storage systems and hybrid elements) was mentioned, and in the list of priority sectors of the manufacturing industry, the production of batteries and accumulators was indicated.⁸ • <i>according to the KEGOC Development Strategy for 2018-2028</i>, the introduction of energy storage systems, along with many others, is one of the key areas of technological development of KEGOC.⁹ 	<ul style="list-style-type: none"> • adopting new state programs, roadmaps and other strategic documents that take into consideration all actual peculiarities of energy storage systems.

⁷ Decree of the President of the Republic of Kazakhstan dated March 19, 2010 No. 958 "On the State Program for Accelerated Industrial and Innovative Development of the Republic of Kazakhstan for 2010-2014 and invalidating some decrees of the President of the Republic of Kazakhstan"

⁸ Decree of the President of the Republic of Kazakhstan dated August 1, 2014 No. 874 "On approval of the State Program of Industrial and Innovative Development of the Republic of Kazakhstan for 2015-2019 and on making an amendment to the Decree of the President of the Republic of Kazakhstan dated March 19, 2010 No. 957 "On Approval of the List of State Programs"

⁹ KEGOC Development Strategy for 2018-2028

<ul style="list-style-type: none"> • doctrine (strategy) on achieving carbon neutrality by 2060 highlights the importance of energy storage systems in enabling renewable energy into conventional energy system.¹⁰ • current policies and regulations were created before new forms of energy storage were developed, and they do not recognize the flexibility of energy storage systems or allow them a level playing field. 	
<p>Lacking definition of energy storage.</p> <ul style="list-style-type: none"> • the Kazakhstan legislation lacks the proper and unified concept of "energy storage system", as well as the concept of "energy storage device", which prevents the regulation of the use of energy storage in the electricity markets. • according to the Law On Electric Power Industry, electric power industry¹¹ is the sphere of production, transmission, supply and consumption of electric and thermal energy. This definition does not mention the field of energy storage system, and thus does not include a model for the participation of energy storage system in the wholesale and capacity market. • the definitions of "system services" and "ancillary services" in the Law On Electric Power Industry¹², also do not specifically mention the field of energy storage. • battery electric storage systems can be used to provide system services, and may become participant in the ancillary services market 	<ul style="list-style-type: none"> • enable storage to be classified as generation, load or transmission and distribution infrastructure. • make the necessary adjustments that would impact energy storage such as access/connection/network tariffs and charging, market rules/ grid code/ network development plans etc. • properly define battery electric storage systems in the primary and secondary legislation of electricity sector in Kazakhstan.
<p>Lack of standardisation and technical requirements (including depending on the type of storage, etc.)</p> <ul style="list-style-type: none"> • this concerns safety and capacity requirements, testing processes. For example, in terms of safety standards, there are uncertainties whether and to what extent the safety regulation applicable to electrical systems of the same power and voltage class will apply to the energy storage systems. 	<ul style="list-style-type: none"> • introduction/adoption of standards needed for energy storage system's metrics (<i>such as efficiency, capacity, power ratings, system inefficiencies, etc.</i>) as well as testing methods, safety standards, etc.

¹⁰Doctrine (strategy) on achieving carbon neutrality by 2060, <https://legalacts.egov.kz/npa/view?pageComment=2&id=114882>
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¹¹ Law of the Republic of Kazakhstan On Electric Power Industry dated 9 June 2004 No. 588

¹² Law of the Republic of Kazakhstan On Electric Power Industry dated 9 June 2004 No. 588

<p>Absence of tax and other preferences, subsidies</p> <ul style="list-style-type: none"> considered by the developers <u>as another barrier</u> that may slow down the development of the energy storage systems projects. 	<ul style="list-style-type: none"> direct funding programs for research, development and pilot projects indirect incentives by hanging pricing rules for end consumers (<i>for example, the introduction of strongly hourly differentiated tariffs</i>) and the development of markets system services
<p>Double charging of network usage</p> <ul style="list-style-type: none"> imported and exported energy from the storage device may be viewed as another issue that may make the business case challenging. the issue of charging the network each time you move the energy back and forth is not regulated in Kazakhstan. As a result, the developer may have to pay double price. 	<ul style="list-style-type: none"> this issue shall be specifically regulated in the legislation of Kazakhstan.

Energy storage systems will play key role in enabling Kazakhstan to meet peak energy demands and facilitating clean energy revolution. However, as mentioned above there are various types of regulatory barriers to tackle such as out of date state policies, plans, roadmaps, legislation gaps, absence of economic incentives in the form of subsidies, funding and etc.

Therefore, developing energy storage systems is a complex issue that shall be addressed in a comprehensive and prompt manner by all stakeholders involved in order to reap the benefits of energy storage usage in Kazakhstan.

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