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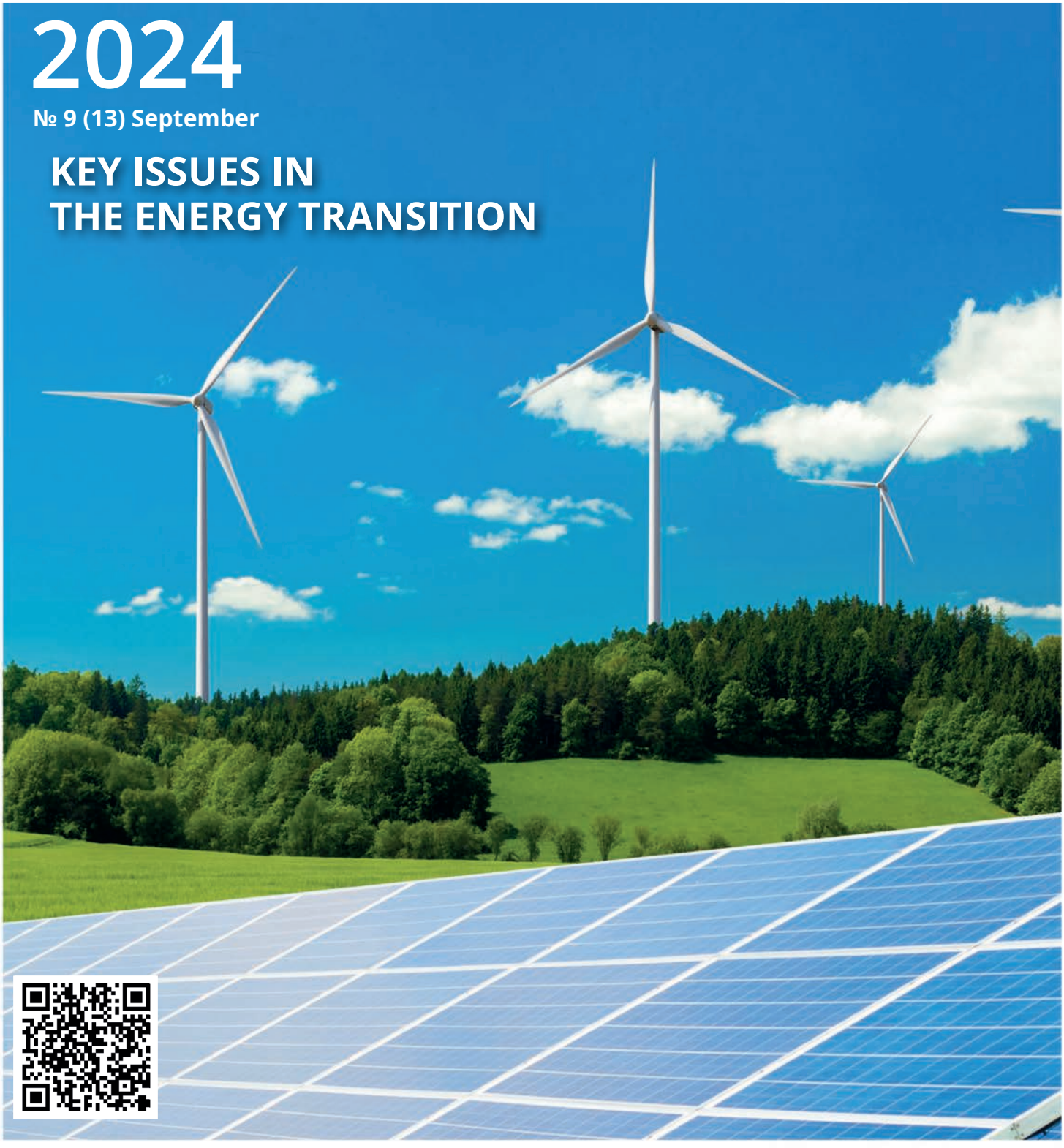


QAZAQ GREEN
RES ASSOCIATION
UNITED PLATFORM
for Kazakhstan and international players
in the field of renewable energy sourses
AIM – SECTOR CONSOLIDATION
to bring together actors in the
field of renewable energy sourses
in order to create favorable
conditions for development of the
sector
MISSION:
formation of a holistic position
of association memebers to
obtain attractive conditions for
investing in the projects of
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MINISTRY OF ECOLOGY AND NATURAL RESOURCES OF THE REPUBLIC OF KAZAKHSTAN
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QazaqGreen

THE WELCOME SPEECH OF NURLAN KAPENOV THE CHAIRMAN OF THE BOARD OF DIRECTORS QAZAQ GREEN RENEWABLE ENERGY ASSOCIATION

DEAR READERS! DEAR FRIENDS!

As the classic wrote: "Summer has passed as if it never happened ..." At the same time, with the arrival of autumn, the RES sector faces important tasks and challenges.

Thus, initiatives of the Ministry of Energy of the Republic of Kazakhstan aimed at stimulating the development of energy storage systems have appeared in the regulatory field. In August, the Ministry once again published draft amendments to the Rules of Technical Operation of Stations and Networks, as well as Electric Grid Rules. They presuppose the adoption of the concept of "electric energy storage system", the obligations of renewable energy generating plants to use such systems, the mandatory presence of information on the volume of annual available capacity and capacity of electric energy storage systems, the annual availability coefficient and technical characteristics of energy storage systems in the content of the developed Scheme for issuing power to a power plant (CBM).

Qazaq Green, expressing the opinion of the entire renewable energy business community, sent its opinion on this issue to the Ministry of Energy of the Republic of Kazakhstan.

Firstly, we believe that this will cause an additional burden on investors, due to the fact that RES facilities will be required to perform an unusual function for them to participate in balancing in the National Grid of the Republic of Kazakhstan.

Secondly, at the moment there are no legally fixed mechanisms for the return of investments for the implementation of projects with energy storage systems.

Thirdly, international experience shows that the use of ESS at renewable energy facilities is inefficient, costly, and difficult, from the point of view of operational management of the complex due to the degradation of the system. For example, at a USAID seminar on: "Best practices in integrating BESS technologies into energy systems and the energy market", which took place in April 2024 with the participation of KEGOC JSC, international experts stressed that despite the common misconception that the ESS can "smooth out" the production of a renewable energy facility, in practice this is impossible, given the absence of a generation value with a time advance of 1 minute or less. In addition, the presence of other consumers in grids and substations negates any possibility of additional benefits for the entire system, preventing from benefiting from regulatory opportunities. In this regard, international practice shows the effectiveness of ESS with connection to substations, where it is possible to provide a greater number of applications and the necessary savings. Thus, for example, according to information from Photomate, conditions have been created in Sweden under which investors invest in the implementation of energy storage systems connected to substations of a system operator and provide an appropriate regulatory service in the system.

Fourth, a fair question arises: "If renewable energy facilities have been financially responsible for imbalances in the balancing electricity market since July 1, 2023, why should renewable energy facilities invest heavily in ESS, which will eventually be managed by the system operator?" According to market participants, it is possible to use ESS for the stations' own needs to align the schedule of generation of RES station and in order to reduce the financial burden for imbalances in the balancing market. But in this case, the decision on the use of ESS is made by RES station itself.

If the ESS is connected to the ALFC and is fully subordinated to the management of the system operator, as indicated in paragraph 957-14 of the Rules of Technical Operation of Power Plants and Networks

of draft LSI, according to which the operating mode of electric energy storage systems is determined by the system operator, then investors should clearly understand the mechanism for the return of such investments in the ESS, regulatory and legal regulation system balancing services from ESS to the system operator, as well as pricing for such a service. Unfortunately, it should be noted that there is no such understanding within the framework of the draft LSI under consideration. In our opinion, such a case should not be a mandatory burden for renewable energy stations, but an opportunity to develop a new segment of system services through the introduction of ESS with clear and understandable rules of the game.

The issue of the use of energy storage systems in the National Grid of the Republic of Kazakhstan and their mandatory installation at renewable energy facilities has been discussed for more than 2 years. It is clear that the country's energy system is experiencing great difficulties due to the shortage of maneuverable generation, and the introduction of such systems seems to the system operator to be the most optimal solution that can be implemented in a short time (taking into account the limited water resources and problems of gas supplies to the domestic market). However, it should be noted that there are no competencies in energy storage systems in the country. This is evidenced not only by the terminological and methodological shortcomings in the draft LSI presented by the Ministry of Energy of the Republic of Kazakhstan, but also by the fact that at the moment no pilot project has been implemented that would allow the system operator to integrate energy storage systems with the ALFC and accumulate any empirical experience in the "manual" control mode for further development of technical requirements for such systems for their operation.

In this regard, Qazaq Green considers it extremely important to develop an analytical document that would incorporate the best foreign experience in the use of energy storage systems and which could be used in the "user's guide" mode, on the one hand, to form some kind of preliminary vision of the regulatory regulation of this issue, and on the other - to develop own competencies in the industry.

In the future, we consider it important to implement a pilot project on energy storage systems at the site of one of the renewable energy stations, which would answer the existential question: "After all, are energy storage systems based on a renewable energy station needed for their own needs and alignment of the daily generation schedule of this station or for participation in primary regulation in the energy system of Kazakhstan?"

It seems that the economic costs and technical results of such a pilot project will put the things right and give answers to all the questions that follow.

Let me take this opportunity to invite all interested parties to discuss this issue on the Qazaq Green site. I wish you all the best and accumulate energy for the upcoming autumn-winter period.

Nurlan Kapenov
Chairman of the Board of Directors
QAZAQ GREEN RES Association

THE PRESIDENT OF KAZAKHSTAN SIGNED A LAW ON SUPPORT FOR THE USE OF RES

The Head of State has signed the Law of the Republic of Kazakhstan on Amendments and Additions to Certain Legislative Acts of the Republic of Kazakhstan Regarding Support for the Use of Renewable Energy Sources and the Power Sector.

The law is designed to advance the mechanisms for supporting and developing the energy industry.

In particular, for the development of small-scale renewable energy, the concept of 'small-scale renewable energy facility' has been established, referring to technical devices with a capacity of up to 200 kilowatts that produce electrical and/or thermal energy using renewable energy sources (RES).

The owners of small-scale renewable energy facilities will continue to be able to use the generated electricity and/or heat for their own needs and sell any surplus electricity to the energy provider, as they do now.

The surplus electricity will be purchased by the energy provider at a marginal price (without differentiation by consumer groups) as determined by the Committee for Regulation of Natural Monopolies under the Ministry of National Economy.

In order to guarantee the purchase of electricity produced by small-scale renewable energy facilities and to eliminate access barriers to the power grids, electricity suppliers are mandated to enter into purchase agreements, and transmission organizations are required to provide unhindered access to their networks.

To increase the share of the country's hydroenergy potential, small hydroelectric power plants (Small hydro) with a total capacity of up to 10 megawatts, commissioned before July 1, 2023, are allowed to sell the electricity they generate directly to the energy providers, bypassing a single purchaser.

The electricity generated by the small hydro will be prioritized for purchase by energy supply organizations at a marginal tariff set by the Ministry of Energy. The tariff will be reviewed and renewed as per the established regulations (every 7 years).

The law modifies the conditions for investment agreements related to the modernization, reconstruction, and/or expansion of generating installations with the use of gas as an alternative type of fuel.

Credit financing for the construction, reconstruction, and modernization of electrical networks of regional grid companies under municipal ownership will be implemented using budgetary resources.

The credit financing regulations will be established by the Ministry of Energy with the agreement of the Ministry of Finance.

Source: akorda.kz

UNDP PRESENTED THE RESULTS OF A PROJECT TO REDUCE THE RISKS OF INVESTMENTS IN THE GREEN ENERGY SECTOR IN KAZAKHSTAN

The United Nations Development Programme (UNDP) in Kazakhstan has presented the results of the project to reduce the risks of investing in renewable energy technologies. At the final event of the project, which was implemented by UNDP in partnership with the Ministry of Energy of the Republic of Kazakhstan and with financial support from the Global Environment Facility (GEF), experts discussed the future prospects for the renewable energy sector. They also made recommendations for the further implementation of financial and non-financial support mechanisms and identified new strategies to be applied in the future.

As part of Kazakhstan's Strategy to achieve carbon neutrality, which prioritizes the gradual transition of Kazakhstan's electricity sector to alternative and renewable energy sources by 2060, the introduction of renewable energy technologies is essential for both large-scale plants and small and medium-sized enterprises. There are currently 148 large-scale renewable energy plants in Kazakhstan with a total capacity of 2,900 megawatts. The share of renewable energy in total electricity generation has reached 6.5 percent.

UNDP with the support of the GEF applied De-risking Renewable Energy Investment (DREI) methodology to test and implement new support instruments. The aim of this methodology is to target interventions and create a "risk-return" profile that encourages private investment to provide reliable, environmentally friendly, and affordable energy solutions in the country. The methodology incorporates a range of publicly available techniques, financial instruments, modelling, and key information sources. During the implementation of the project, it was adopted specifically for Kazakhstan.

"Decarbonizing the economy is our primary responsibility and reflects our commitment to future generations. Phasing out fossil fuels and transitioning to renewable energy sources are no longer just ambitious goals, but commitments that countries around the world have made. The approach proposed by UNDP helps governments to effectively promote and increase private investment in renewable energy through improved legislation. By supporting "green" initiatives, we are confidently moving towards a low-carbon future for people and planet," emphasized Katarzyna Wawiernia, UNDP Resident Representative in Kazakhstan.

One of the most important achievements of cooperation with the Ministry of Energy of the Republic of Kazakhstan was the amendments and additions to the Law "On Supporting the Use of Renewable Energy Sources". In particular, the term "small-scale renewable energy facility" was introduced, the maximum capacity for such installations was increased to 200 kilowatts and individuals who are net consumers were exempted from the obligation to register as legal entities. In addition, the obligation for electricity transmission companies to ensure free access and connection of grid consumers to the electricity grid has been introduced. According to experts, these changes will help to promote the growth of private investment in the renewable energy sector.

"The Ministry is actively working to increase the share of renewable energy sources in the country's energy balance. This will not only reduce greenhouse gas emissions, but also strengthen energy security. Once the Action Plan for the Development of the Electricity Industry is successfully implemented, the structure of installed capacity by fuel

type by 2035 will be as follows: renewables – 24,4 percent; hydropower – 10,8 percent; gas – 25,8 percent; coal – 34,3 percent," said Sungat Yessimkhanov, Vice Minister of Energy of the Republic of Kazakhstan.

In addition, as part of the joint project with the Ministry of Energy, financial instruments were developed and implemented to increase the accessibility of "green" financing. For example, an innovative mechanism — auctions with ready documentation or site-specific RE auction — was introduced in Kazakhstan in 2019. The success of this type of auction led to an influx of foreign direct investment and the application of this mechanism to other types of auctions. In 2020, Kazakhstan issued its first green bonds with the support of the Astana International Financial Centre. UNDP partner, the "Damu" Entrepreneurship Development Fund JSC, raised funds to finance renewable energy projects through second-tier banks by issuing and placing green bonds. These funds were then used to finance small and medium-sized enterprises implementing renewable energy projects.

It is important to highlight that the financial instruments developed under the joint UNDP-GEF projects have significantly improved access to “green” financing for more than 60 projects of small and medium-sized enterprises with a total investment of 3,9 billion tenge dedicated to the implementation of green technologies. These projects have been successfully implemented in the regions of Aktobe, Almaty, East Kazakhstan, Karaganda, Mangystau, North Kazakhstan and Turkistan, as well as in the cities of Almaty and Shymkent. The most frequently used technologies include solar power plants and biomass boilers for heating.

United Nations Development Programme (UNDP) is the leading United Nations organization fighting to end the injustice of poverty, inequality, and climate change. Working with our broad network of experts and partners in 170 countries, we help nations to build integrated, lasting solutions for people and planet.

Learn more about the project at undp.org.

JINKOSOLAR ANNOUNCES GLOBAL PARTNERSHIP WITH MANCHETSER CITY

JinkoSolar, the global leading PV and ESS supplier, todayannounced a new global partnership with Manchester City. The new partnership will allow JinkoSolar to accelerate its market presence to a global audience and to support the Club's effort to become one of the largest producers of renewable energy in world football.

JinkoSolar is a globally renowned and highly innovative solar technology company. Embracing the mission of "changing the energy portfolio and taking responsibility for enabling a sustainable future", JinkoSolar has maintained its position as the global leader in module shipments for five years.

As of the first quarter of 2024, Jinko Solar has delivered a total of more than 230 GW of module shipments globally, with 1 out of every 8 solar panels installed on earth coming from JinkoSolar.

Through the partnership, JinkoSolar will connect and engage with Man City fans globally to jointly promote the use of solar energy through their innovative and award-winning solar products and further educate fans on how they can play a part towards a sustainable future.

Jinko will also support the club's plans to make its training facility, City Football Academy, one of the largest producers of renewable energy in world football. Announced earlier this year, the project forms a key part of Manchester City's goal of becoming carbon net zero by 2030.

For more information, please visit www.mancity.com

As leaders in renewable energy and sports, this partnership will set a powerful example of the transition to sustainable energy solutions and as the JinkoSolar brand continues to grow globally, will further accelerate its market presence to both businesses and consumers around the world.

Kaitlyn Beale, Vice-President of Global Partnerships Sales at City Football Group, said: “We are delighted to announce this new global partnership with JinkoSolar. Manchester City and JinkoSolar are two leading organisations that put an emphasis on innovation in our respective fields. Both organisations are committed to creating a lasting change and empowering better lives, and we look forward to JinkoSolar joining our journey as we aim to create a more sustainable future.”

Gener Miao, Chief Marketing Officer at JinkoSolar, said: “We are excited to announce a landmark partnership between JinkoSolar and Manchester City Football Club, uniting two champions in their respective fields. This "champion to champion" collaboration celebrates excellence in sports and renewable energy, paving the way for a brighter, more sustainable future.

“Together with Manchester City, we are dedicated to advancing sustainability and showcasing how renewable energy can lead to a healthier planet. We eagerly anticipate the positive impact we will create on this exciting journey.”

ABOUT MANCHESTER CITY FOOTBALL CLUB:

Manchester City FC was initially founded in 1880 as St Mark’s West Gorton and officially became Manchester City FC in 1894. Situated on the wider Etihad Campus, the Club’s footprint includes the 53,500 capacity Etihad Stadium, the 7,000 capacity Joie Stadium and City Football Academy, a state-of-the-art performance, training and youth development facility home to the Club’s men’s, women’s and academy teams.

Ranked as the Most Valuable Football Club Brand in the world by Brand Finance, Manchester City FC is currently developing a best-in-class fan experience and year-round entertainment and leisure destination at the Etihad Campus. The Club is committed to operating in a sustainable and socially responsible manner and ensures that equality, diversity and inclusion is embedded into its decision-making processes, culture and practices.

Solar JinKO

ABOUT JINKO SOLAR

Jinko Solar Co., Ltd. (referred to as "JinkoSolar," stock code: 688223) is a globally renowned and highly innovative solar technology company. Embracing the mission of "changing the energy portfolio and taking responsibility for enabling a sustainable future."

JinkoSolar's products serve over 190 countries and regions worldwide, catering to more than 3,000 customers. As of the first quarter of 2024, JinkoSolar has maintained its position as the global leader in module shipments for five years, with a cumulative total of more than 230 GW of module shipments. The company is an industry opinion leader in various international frameworks, including B20, and joined the RE100 green initiative in 2019.

Jinko Solar was listed on the STAR Board of the Shanghai Stock Exchange in 2022, and JinkoSolar Holding Co., Ltd., its indirect controlling shareholder, was listed on the New York Stock Exchange in 2010.

For more information, please visit https://www.jinkosolar.com/en

The results of the auction for the selection of renewable energy projects in the 1st half of 2024

Date of the auction	Company name	Type of RES	Auction price tg/ kWh (without VAT)	Installed capacity, MW
June 10, 2024	VES Tolkyn LLP	HPS	10	0.5
	"Zharyk Energo" National Energy Company" LLP	HPS	28	8.6
	FaB Stroy LLP	HPS	35.47	1.3
	VES Tolkyn LLP	HPS	35.48	3
	Aksugidro LLP	HPS	35.49	4.9
	ZhabykGidroResursy LLP	HPS	36.5	3
June 11, 2024	Cascade of Karatal HPP LLP	HPS	10	9.9
	Verkhne-Talaptinskaya HPP LLP	HPS	11	4
	Altyn-Hydro LLP	HPS	33.9	2
	Verkhne-Talaptinskaya HPP LLP	HPS	36	4.8
June 12, 2024	Verkhne-Talaptinskaya HPP LLP	HPS	8	4
	Cascade of Karatal HPP LLP	HPS	30	9.9
June 13, 2024	Ekovind LLP	RES	6.9	100
June 14, 2024	Ekovind LLP	RES	9.01	200
June 17, 2024	Shual LLP	RES	9	10.001
	Neptune Wind LLP	RES	10.37	89.999

Source: Kazakhstan Electric Energy and Capacity Market Operator JSC

INFORMATION ON THE PRODUCTION OF ELECTRIC ENERGY BY RES FACILITIES FOR THE 1ST HALF OF 2024

Installed capacity including: **2,903.7 MW**

WIND POWER PLANTS	1,409.55 MW
SMALL HPP	269.785 MW
SOLAR POWER PLANTS	269.785 MW
BIOELECTRIC POWER PLANTS	1,77 MW

Power generation including: **3896 million kWh**

WIND POWER PLANTS	2325 million kWh
SMALL HPPS	595.36 million kWh
SOLAR POWER PLANTS	974.9 million kWh
BIOELECTRIC POWER PLANTS	0.43 million kWh

The share of electric power generated by the RES in the total volume of electric energy production **6.47%**

The increase in electric power generation by renewable energy facilities for the 1st half of 2024 compared to the 1st half of 2023 is **16%**

BALANCING MARKET AND RENEWABLE ENERGY: A KEY STEP TOWARDS ENERGY INDEPENDENCE

In the era of active transition to renewable energy sources (RES), Kazakhstan is taking important steps to create a sustainable and independent energy system. One of the key elements of this process is the introduction of a balancing electricity market, which plays an important role in stabilizing the energy system and supporting the integration of renewable energy sources.

NEW MARKET MODEL

The transition to a new target model of the electricity market, based on the mechanism of a single buyer and a balancing market in real time represents a significant improvement for the energy industry in Kazakhstan. KOREM JSC, as the Settlement Center of the balancing market, carefully analyzes the results of the implementation of this model, which show significant progress in resolving imbalances and stimulating market participants..

Daribayev Aidos Nagimadinovich Chairman of the Management Board of KOREM JSC

RES AND THE BALANCING MARKET

Integrating renewable energy sources such as solar and wind power stations into the energy system requires special attention to managing imbalances. Renewable energy sources are characterized by variable generation, which complicates forecasting and load balancing. The balancing market helps to solve these problems by providing:

1. Imbalance management: Physical and financial imbalance management allows efficient integration of renewable energy sources, minimizing risks to the energy system.

2. Stimulating participants: Market participants receive incentives for accurate forecasting and compliance with the daily schedule, which is important for integrating renewable energy sources with their variable generation.

3. Stability of the power system: Precise balancing of electricity production and consumption prevents emergencies and ensures stable operation of the power system.

4. Transparency and equal conditions: The new pricing mechanism and strict controls ensure market transparency and equal conditions for all participants, which contributes to effective competition and sustainable development of the industry.

PROBLEMS AND SOLUTIONS

As part of the analysis of the balancing electricity market, some aspects related to price signals that affect the efficiency of the market have been identified.

The analysis results showed that at certain hours in the electricity purchase market, prices turned out to be lower than those of a Single Buyer. The discrepancy between price signals and real supply and demand led to a forced volume of electricity purchases from the Russian Federation, which subsequently contributed to shortages during peak hours. As a result, there was an increase in prices for electric energy in the wholesale market.

In conditions of instability and uncertainty, when price signals do not reflect the true costs and needs of the market, the price structure is distorted, which makes supply and demand management less effective.

In response to the identified problems, it became obvious that changes are needed in the current concept of the rules of functioning of the balancing market.

The main areas of reform include the following aspects:

1. Improving supply and demand forecasting: It is important to implement more accurate forecasting models that take into account seasonal fluctuations as well as factors affecting demand changes during peak hours.

2. Revision of the Rules of Price Formation: the approach to pricing has been revised to ensure a more accurate reflection of real market conditions. This should eliminate the imbalance between market prices and prices of a Single Buyer, thereby improving the predictability and stability of prices.

3. Optimization of the Daily Schedule: as part of the reform, the approach to the formation of the daily schedule was changed by introducing fines of up to 30% for deviation of actual generation or consumption from the planned schedule by more than 20%. This encourages participants to accurately predict and follow schedules.

4. Increased Transparency and Accessibility of Information: transparency of operations in the balancing market will be enhanced, which will allow participants to plan their actions more effectively and adapt to changes in the market situation.

Example No. 1, increase of hour

SC of BEM BUYS (-) negative imbalance					
Name	volume kWh	deviation %	tariff	price KZT/ kWh	amount tenge
RF	400 000			40	16 000 000
CA	-	0		0	-
Subjects	820 000				6 285 000
HPP-1	400 000	10	7,32	7,32	2 928 000
HPP-2	400 000	25	11.22	7,84	3 136 000
Consumer No.1	10 000	15	13	13	130 000
Consumer No.2	10 000	30	13	9,1	91 000

HPP-1 with a cap rate of 7.32 tenge/kWh deviated from the plan by 10%, which is within acceptable limits, subsequently (-) imbalance was sold at a cap rate of 7.32 tenge/kWh

HPP-2 with cap rate of 11,2 tenge/ kWh deviated from the plan by 25%, created (-) imbalance. In the case when the deviation from the plan is more than 20%, a penalty of 30% is applied to the cap rate and the price is calculated as follows - 11.2-3.36=7.84 tenge kWh

Consumer No. 1, who carries out the purchase and sale of electric energy at the forecast price of E3 in the amount of 13 tenge/kWh, deviated from the plan by 15%, which is within acceptable limits, subsequently (-) imbalance was sold at the forecast price of E3 =13 tenge/ kWh

Consumer No. 2, who carries out the purchase and sale of electric energy at the projected price E3 in the amount of 13 tenge/ kWh, deviated from the plan by 30%, creating (-) imbalance. If the deviation from the plan is more than 20%, then a penalty of -30% is applied to the forecast price E3, then the price is calculated accordingly 13-3.9=9.1 tenge/kWh

SC of BEM SELLS (+) imbalance				
Name	volume kWh	deviation %	tariff	amount tenge
RF	-			0
CA	-			0
Subjects	1 020 000			28 690 800
Sevkazenergo	100 000	14,5	21,84	2 184 000
Etalon Power	300 000	33,25	43,22	12 966 000
Consumer No.3	620 000	13	21,84	13 540 800

For violators of this hour, the estimated price for the imbalance on the BEM was 21.84 tenge/kWh

Sevkazenergo JSC, with cap rate of 14.5 tenge/kWh, has created (+) imbalance If the estimated price for the (+) imbalance is 30% or more higher than the cap rate of the station, then the price of the (+) imbalance remains calculated = 21.84 tenge/kWh

Etalon Power LLP, with cap rate of 33.25 tenge/kWh, created a (+) imbalance. If the estimated price for the (+) imbalance is not more than the cap rate of the station by 30% or more, then the price of the (+) imbalance will be calculated according to the cap rate of the station with a penalty of +30% and is calculated as follows +33.25 +9.97= 43.22 tenge/kWh

Consumer No. 3, who carries out the purchase and sale of electric energy at the projected price E3 in the amount of 13 tenge/kWh, has create (+) imbalance. In cases where the estimated price for (+) imbalance is 30% or more higher than the forecast price E3, then the price of (+) imbalance remains at an estimated 21.84 tenge/kWh.

Example No.2, decrease of hour

SC of BEM BUYS (+) positive imbalance					
Name	volume kWh	deviation %	tariff	price KZT/ kWh	amount tenge
RF	0			0	0
CA	200 000	0		16	3 200 000
Subjects	320 000				12 537 300
Consumer No.1	400 000	10	13	13	5 200 000
Consumer No.2	400 000	25	13	16,9	6 760 000
Etalon Power	10 000	25	33,25	43,23	432 300
Sevkazenergo	10 000	10	14,5	14,5	145 000

Consumer No. 1, who carries out the purchase-sale of electric energy at the projected price E3 in the amount of 13 tenge/ kWh deviated from the plan by 10%, which is within acceptable limits, subsequently (+) the imbalance was bought at the projected price E3 - 13 tenge/ kWh.

Consumer No. 2 who carries out the purchase and sale of electric energy at the projected price E3 in the amount of 13 tenge/kWh deviated from the plan by 25%, created (+) imbalance. In the case when the deviation from the plan is more than 20%, then a penalty is applied to the forecast price E3 in the amount of + 30%, then the price is calculated as follows - 13+3.9=16.9 tenge/kWh.

Etalon Power with cap rate of 33.25 tenge/kWh deviated from the plan by 25%, created (+) imbalance. In the case when the deviation from the plan is more than 20%, a penalty in the amount of + 30% is applied to the cap rate and the price is calculated as follows - 33.25+ 10.98=43.23 tenge/kWh

Sevkaznergo JSC with cap rate of 14.5 tenge/kWh deviated from the plan by 10%, which is within acceptable limits, subsequently (+) imbalance was purchased at cap rate of 14.5 tenge/kWh.

SC of BEM SELLS (-) negative imbalance				
Name	volume kWh	deviation %	tariff	amount tenge
RF	-			0
CA	-			0
Subjects	1 020 000			8 506 000
HPP No.1	100 000	7,32	5,12	512 000
HPP No.2	300 000	11,2	7,34	2 352 000
Consumer No.3	620 000	13	9,1	5 642 000

For violators of this hour, the estimated price for the imbalance on BEM was 9.1 tenge/kWh

HPP-1 with cap rate of 7.32 tenge/kWh has created (-) imbalance If the estimated price for (-) imbalance is not less than the cap rate of the station by 30% or more, then the price of (-) imbalance will be calculated according to the cap rate of the station with a penalty of -30% and calculated as follows, 7.32- 2.2 = 5.12 tenge kWh

HPP-2 with cap rate of 11.2 tenge/kWh created (-) imbalance. If the estimated price for (-) imbalance is not less than the cap rate of the station by 30% or more, then the price of (-) imbalance will be calculated according to the cap rate of the station with a penalty of -30% and is calculated as follows 11.2- 3.36=7.84 tenge/kWh

Consumer No. 3, who carries out the purchase and sale of electric energy at the forecast price E3 in the amount of 13 tenge/kWh, has created (-) imbalance. In cases where the estimated price for (-) imbalance is less than the forecast price E3 by 30% or more, then the price of (-) imbalance remains at the estimated 9.1 tenge/kWh

Thus, the analysis of the balancing electricity market in Kazakhstan appeared as a challenge requiring prompt and balanced decisions. Changing the rules of its operation will be an important step towards a more efficient and stable electricity market. Optimization of tariff policy and improvement of forecasting – all this can significantly affect price stabilization and efficient allocation of resources in the energy market. The measures taken should contribute not only to reducing prices, but also to creating a favorable environment for market participants, which ultimately will create a more predictable and stable environment for all participants.

RES AUCTION SCHEDULE IN 2024

The Ministry of Energy of the Republic of Kazakhstan invites all stakeholders to participate in auctions for selection of projects for construction of renewable generation facilities in 2024.

In accordance with the Order of the Minister of Energy of the Republic of Kazakhstan dated March 7, 2024 No. 105 "On approval of the auction schedule for 2024", the following schedule was approved:

№	Type of RES	Installed capacity, MW		UES zone	Information on reserved land plots for planned construction of renewable energy facilities	Information about the possibilities of connecting to points of electric networks of energy transmission organizations, indicating restrictions on power input and the number of new connections	Auction Date
		Small	Large				
1	HPP	20		All zones except for Tentek River			June 10, 2024
2	HPP	20		All zones except for Tentek River			June 11, 2024
3	HPP	10		All zones except for Tentek River			June 12, 2024
4	WPP		100	Northern zone	Region: Aktobe Area: Mugalzhar Settlement: Zhem Land area, ha: 250 Land category: 48.754823 58.108441 (the area around this land plot)	Energy transmission organization: KEGOC JSC Region: Aktobe Power line (name, coordinates): Ulke Substation (buses): 220 kV Restriction on power input: 100 MW Restrictions on number of new connections: 1	June 13, 2024
5	WPP		200	Northern zone	Region: Kostanay Area: Kostanay Settlement: Zhdanov r/d Land area, ha: 2237 Land category: 12-183-105-184	Energy transmission organization: KEGOC JSC Region: Kostanay Power line (name, coordinates): Kostanay 1150 Substation (buses): 220 kV Restriction on power input: 200 MW Restrictions on number of new connections: 1	June 14, 2024

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6	WPP	100	Northern zone	Region: Abay Area: Zhanasemey Settlement: Prirechniy r/d Land area, ha: 500 Land category: 50.098340 80.407734 Settlement: Semey, Semey – Ust-Kamenogorsk highway Land area, ha: 237 Land category: 50°20 21" 80° 19'12" 50°20 11" 80° 20'20" 50° 19 48" 80° 217" 50°19 17" 80° 20'29" 50°19 57" 80° 19' 13"	Energy transmission organization: KEGOC JSC Region: Abay Power line (name, coordinates): Semey Substation (buses): 220 kV Restriction on power input: 100 MW Restrictions on number of new connections: 2	June 17, 2024
7	SPP	100	Southern zone	Region: Almaty Area: Ili Settlement: Konayev c. Land area, ha: 200 Land category: 77.09274472660809 43.916188968964576 77.09274472660809 43.916188968964576 77.08255209214212 43.913164466252596 77.07338928343717 43.912422583620355 77.06657658993413 43.91413460650941 77.06092575113826 43.91780577842917 77.06311743160649 43.91942254396258 77.06670861887824 43.91921331795629 77.07198977663359 43.91793892548594 77.07756139806463 43.92604413141493 77.08115258533644 43.92491921816966 77.07888168750355 43.922732021102405 77.08004354220856 43.922161434729844 77.08310661370604 43.92398729185987 77.08799168462917 43.921134365467395 77.09080023456274 43.91807207224477	Energy transmission organization: Alatau Zharyk Companiyasy JSC Region: Almaty Power line (name, coordinates): Ili Substation (Bus): ПСА-143А Robot Restriction on power input: 100 MW Restrictions on number of new connections: 1	September 23, 2024

8	SPP	20	Southern zone	Region: Zhetysu Area: Panfilov Settlement: Zharkent c. Land area, ha: 150 Land category: 44.280.39N 80.04229 E 44.28018bI 80.06101E 44.27042bI 80.04310E 44.270.32N 80.05828E	Energy transmission organization: TATEK JSC Region: Zhetysu Power line (name, coordinates): 175 Substation (buses): 134,133 Restriction on power input: 20 MW Restrictions on number of new connections: 1	September 24, 2024
9	SPP	20	Southern zone	Region: Almaty Area: Zhambyl Settlement: Kazybek bek settlement Land area, ha: 40 Land category: 43037’36.88”C 76022’59.47”B 43038’19.55”C 76023,29.56”B 43038' 17.82”C 76024’ 15.80”B 43037’34.83”C 76024’20.36”B	Energy transmission organization: Alatau Zharyk Companiyasy JSC Region: Almaty Power line (name, coordinates): Substation (buses): ПС 115А Kazybek bek Restriction on power input: 20 MW Restrictions on number of new connections: 1	September 25, 2024
10	SPP	20	Southern zone	Region: Kyzylorda Area: Shiyeli Settlement: Yenbekshy r/d Land area, ha: 200 Land category: 66°52'43.416""B 44° 18' 15,817""C 66°52'42,073""B 44°18'53,079""C 66°54'28.747""B 44°18'54,662"MC 66°53'42,989""B 44°18’22,191""C 66°53'43,173""B 44° 18' 17,052""C	Energy transmission organization: KREK JSC Region: Kyzylorda Power line (name, coordinates): Substation (buses): 35 kV Restriction on power input: 20 MW Restrictions on number of new connections: 1	September 26, 2024

11	HPP		200	All zones except for Tentek River			November 11, 2024
12	HPP		100	All zones except for Tentek WPP			November 12, 2024
13	HPP	30		All zones except for Tentek WPP			November 13, 2024
14	HPP	20		All zones except for Tentek WPP			November 14, 2024
15	WPP		100	Northern zone	Region: Kostanay Area: Kostanay Settlement: Zhdanov r/d Land area, ha: 400 Land category: 12-183-105-036	Energy transmission organization: KEGOC JSC Region: Kostanay Power line (name, coordinates): Sokol Substation (buses): 220 kV Restriction on power input: 100 MW Restrictions on number of new connections: 1	November 15, 2024
16	WPP		100	Northern zone	Region: Kostanay Area: Kostanay Settlement: Zhdanov r/d Land area, ha: 341,2 Land category: 12-183-105-031	Energy transmission organization: KEGOC JSC Region: Kostanay Power line (name, coordinates): Sokol Substation (buses): 220 kV Restriction on power input: 100 MW Restrictions on number of new connections: 1	November 18, 2024

17	WPP	100	Southern zone	Region: Turkestan Area: Sauran Settlement: Zhana Ikan r/d Land area, ha: 400 Land category: 43°18'54.1 "Ы 68°38'38.9"E 43C19'05.4"Ы 68°38'59.7"E 43C19'50.7"К1 68°39'41.0"E 43°20'15.8 "Ы 68°37'52.5"E 43°19'47.6"Н 68°37'31.9"E	Energy transmission organization: KEGOC JSC Region: Turkestan Power line (name, coordinates): Ortalyk Substation (buses): 220 kV Restriction on power input: 100 MW Restrictions on number of new connections: 1	November 19, 2024
18	BioPP	10	All zones			November 10, 2024

Source: Ministry of Energy of the Republic of Kazakhstan

The total auctioned installed capacity in 2024 - 1,270 MW, broken down by type of power plants:
- solar power plants (SPP) – 160 MW;
- wind power plants (WPP) – 700 MW;
- hydroelectric power plants (HPP) – 400 MW;
- biogas power plants (BioPP) – 10 MW.

INTERVIEW

In discussions on combating climate change, methane often takes a backseat to the more well-known problem of carbon dioxide. Nevertheless, substantial cuts in methane emissions are crucial for curbing near-term global warming and enhancing air quality. By joining the Global Methane Pledge, Kazakhstan committed to reducing its methane emissions by 30 percent by 2030.

Hela Cheikhrouhou:

IFC OFFERS TECHNOLOGICAL SOLUTIONS TO REDUCE METHANE EMISSIONS IN KAZAKHSTAN

We interviewed Hela Cheikhrouhou, IFC Vice President for the Middle East, Central Asia, Türkiye, Afghanistan, and Pakistan, to explore why reducing methane emissions is so important—and how global development institutions can support Kazakhstan in adapting to climate change.

– Ms. Cheikhrouhou, let's outline firstly why reducing methane emissions is so important, especially given the predominance of CO2 emissions in climate change discussions?

–- I agree with President Kassym-Jomart Tokayev that reducing methane emissions is the fastest way to slow global warming. Methane is up to 80 times more powerful than carbon dioxide in heating the planet. Being colorless and odorless, methane is a fast and invisible threat. At the same time, efforts to reduce methane emissions remain underfunded, with less than 2 percent of global climate finance dedicated to tackling the issue.

Agriculture, energy, and waste are the sectors that create about 60 percent of the world's methane emissions. If countries find and implement the right technological solutions, reducing methane emissions in these sectors becomes a realistic scenario. I am glad that the IFC and Kazakhstan are already jointly discussing the implementation of such solutions in the energy sector.

– How does the problem of methane emissions directly affect the economic and environmental situation in Kazakhstan?

– According to the International Energy Agency, the second largest source of methane emissions from human activity is the energy sector - oil, gas, and coal.

In the case of Kazakhstan, a nation with a significant reliance on the oil and gas industry, this matter holds particular significance. The country currently ranks among the top 20 globally in terms of per capita greenhouse gas emissions, a level that exceeds what is expected for an economy of its scale. As Kazakhstan develops its export potential, it must also take into account the growing number of trade demands from countries such as the EU, which will soon demand to either show emissions reductions or pay extra for them.

By joining the Global Methane Pledge last December and becoming the first country in Central Asia to commit to achieving carbon neutrality by 2060, Kazakhstan is highlighting its dedication to the fight against climate change as well as its determination to tackle the methane issue. I sincerely want Kazakhstan to become a leader in the region to implement climate goals. Its example will help other countries adopt the best practices for preserving nature, and human health, and ensuring economic development in Central Asia.

– How achievable is the goal of reducing methane emissions by 30 percent by 2030 and what resources will be needed to achieve it?

–Achieving a 30 percent reduction in methane emissions across diverse sectors of the Kazakh economy by 2030 is ambitious but feasible. The International Energy Agency estimates it will require at least $1.4 billion in funding . This definitely requires support from international partners - both through investments and through cooperation with donors and financial institutions. IFC is also ready to provide its support. Based on our experience, we believe the public-private partnership (PPP) model will be one of the models we can cooperate with.

To achieve the goal, cooperation, and involvement of all stakeholders - government, companies, and civil society organizations - is also needed. The government will develop policies and incentives to reduce methane emissions, and businesses will implement concrete solutions. Achieving success requires a partnership, and IFC is ready to become one of those partners.

– How in your opinion can IFC assist Kazakhstan in addressing these challenges?

– IFC conducted a preliminary analysis of methane emissions from Kazakhstan's oil and gas sector, which considered specific facilities and their locations, and we see significant opportunities to reduce methane emissions in the sector. We have also offered technological solutions to the government, including a monitoring program to measure methane emissions in the sector. This will require some government funding and moderate private capital investment.

We stand ready to continue to engage with the government and the private sector to mobilize resources to cover these costs and leverage our experience and resources to promote sustainable economic growth.

– You mentioned a project to use surface geothermal energy for heating and cooling buildings in Bishkek. Tell us more about this technology.

–This is truly an interesting technology. While solutions to tackle the climate crisis are being developed around the world, from artificial intelligence to electric vehicles, sometimes a solution may be right at hand or—in this case—right under your feet.

Networked geothermal district heating, when implemented wisely and at scale, can provide stable heating in winter and cooling in summer for large urban areas, as well as clean energy all year-round, while creating new jobs and business opportunities.

Networked geothermal district heating, when implemented wisely and at scale, can provide stable heating in winter and cooling in summer for large urban areas, as well as clean energy all year-round, while creating new jobs and business opportunities.

By using geothermal heat pumps, which transfer heat from the surface layer of the earth through a coolant in underground loops in a closed system, we can significantly reduce carbon emissions and provide clean energy while preserving the environment. This technology has already proven itself all over the world.

So, we are optimistic about the potential of interconnected geothermal district heating solutions throughout Central Asia. In Kazakhstan, for example, this technology could replace a largely coal-fired public infrastructure system that currently requires a major overhaul. We see interest from the government of Kazakhstan in this and will be happy to provide our support.

Schoolchidren of Beskol school-college, North Kazakhstan region
Photo: UNDP Kazakhstan/Andrey Volovik

CIRCULAR ECONOMY IN ACTION: EXPERIENCE OF NORTH KAZAKHSTAN REGION

North Kazakhstan region shows successful examples of the implementation of circular economy principles through the utilization of wood and agricultural waste, also known as biomass. Local enterprises are actively using wood and agricultural wastes for heat supply, reducing the ecological footprint, and increasing economic efficiency, according to UNDP Kazakhstan.

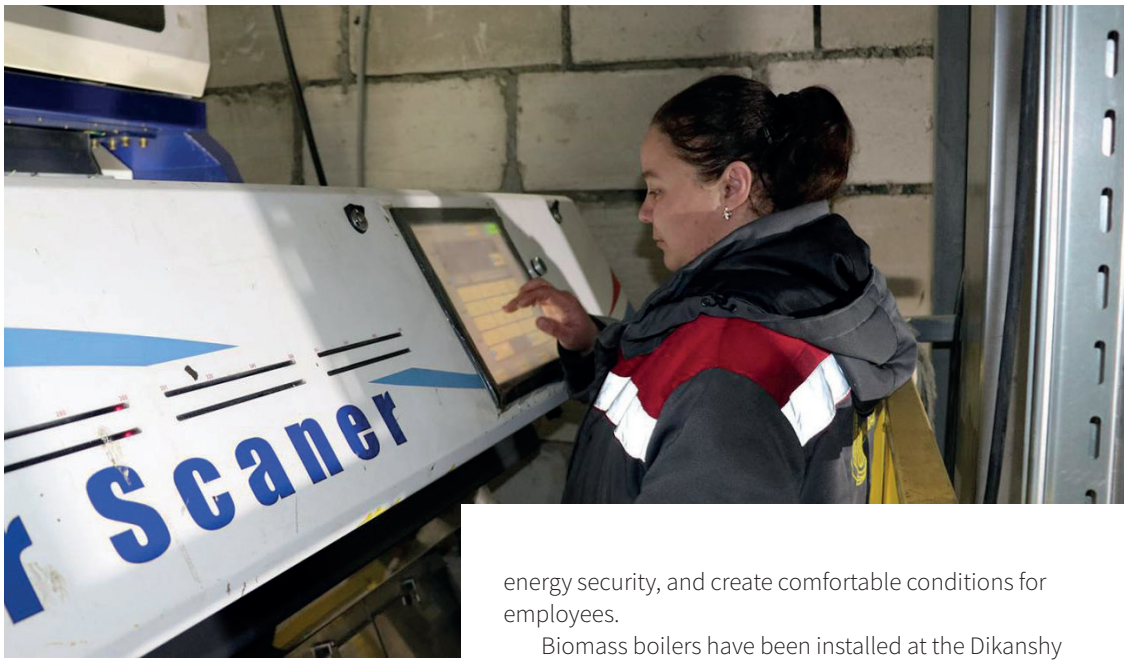
In the village of Beskol in the North Kazakhstan region, the installation of a modular biomass boiler house helped the school-college to solve the problem of low temperatures in the classrooms. Previously, the school-college was connected to a district heating system that did not provide the required amount of heat. Measures were taken to insulate the building, including replacing windows, insulating doors and openings, and repairing side entrances, but these did not completely solve the problem. The situation changed after the installation of the modular biomass boiler house, which, together with the measures taken, ensured a comfortable indoor temperature. Biomass heating proved to be twice as favourable as district heating.

At Agrofirma Mamlyutskaya LLP, North-Kazakhstan region, Azamat Kakimov, an employee
Photo: UNDP Kazakhstan/Madina Kakimzhanova

Annually, Kazakhstan consumes approximately 11 million tonnes of coal for municipal needs, which leads to emissions of heavy metals and greenhouse gases.

In the North Kazakhstan region, several enterprises are already processing sawdust and straw into fuel briquettes used for heating. This not only reduces costs but also helps to improve the environmental situation and increase the quality of life for local residents. Olga Dumanskaya, a resident of the village of Bulaevo, noted the positive effects of using biomass briquettes: "I have been heating with coal and wood all my life. It makes the air heavy, full of soot and ash; maybe that's why I often get sick. But now there will be no more ash and soot," says Olga.

UNDP research showed that the largest amount of agricultural waste is generated in the Akmola, Kostanay and North Kazakhstan regions. The total



At Dikanshy LLP, North-Kazakhstan region, Zhanna Solotko, an employee.
Photo: UNDP Kazakhstan/Madina Kakimzhanova

Annually, Kazakhstan consumes approximately 11 million tonnes of coal for municipal needs, which leads to emissions of heavy metals and greenhouse gases.

available amount of agricultural waste in these three regions of the country is 2,5 million tonnes of straw, which is equivalent to 2 million tonnes of coal. Instead of burning, dumping, or simply rotting in the field, wood and agricultural waste can be used to generate heat.

One such example is a company in the city of Mamlyutka that produces and processes grain. They used diesel fuel to dry grain and spent over 140 million tenge annually. In addition to grain, the company also grows flax. By recycling flax straw into bales and using them for heating, the company has significantly reduced its costs and improved the environmental situation. "Using flax straw bales for heating is very economical and beneficial for our company, as we grow the flax ourselves. Flax straw is not suitable as animal feed, so it is collected in the field, pressed into bales and taken to our production facility, where we use it as fuel for boilers," explains Askar Kakimov, an employee of Agrofirma Mamlyutskaya LLP.

For small and medium-sized enterprises, waste utilization and the use of biomass also offer economic and production-related advantages, as they reduce operating costs, improve energy security, and create comfortable conditions for employees.

Biomass boilers have been installed at the Dikanshy company in Petropavlovsk, which processes and exports organic agricultural products. The company also processes waste from a nearby plywood workshop into pellets. "Our company endeavours to use various innovative approaches at all stages of production. We used to be connected to the district heating system, but to reduce costs we switched to biomass boilers. We opted for fuel because we know that there is a lot of it left over in the nearby plywood workshop. It is also almost impossible to recycle. In our company, we have tried to make pellets from this dust, which we then used for the boilers. Now we are planning to purchase special equipment and set up pellet production, primarily for our own use," says Vyacheslav Sutulov, Head of Finance at Dikanshy LLP.

Examples of biomass utilization in the North Kazakhstan region show how circular economy approaches combined with green technologies support local production and promote a more rational use of resources, improving the quality of life of local communities.

CIRCULAR ECONOMY

Circular economy refers to models of production and consumption that minimize waste and reduce pollution, promote sustainable uses of natural resources, and help regenerate nature.

Circular economy approaches are all around us. They can be employed in a number of different sectors from textiles to buildings and construction, and at various stages of a product's lifecycle, including design, manufacturing, distribution, and disposal.

Besides helping tackle the problem of pollution, circular economy approaches can play a critical role in solving other complex challenges such as climate change and biodiversity loss. They can help countries accelerate their transition to mare resilient and lower-carbon economies while also creating new green jobs.

HOW SAFI UTEBAYEV UNIVERSITY PUTS CARBON NEUTRALITY PRINCIPLES INTO PRACTICE

In addition to major industrial enterprises, the country's leading universities are actively participating in the implementation of the strategy to reduce greenhouse gas emissions. Educational institutions conduct research on sustainable development and propose ideas for implementing the energy transition. In Kazakhstan, Atyrau University of Oil and Gas named after Safi Utebayev has been training specialists in the oil and gas sector for 65 years. The university, aware of its potential impact on the environment, is implementing several initiatives to reduce carbon dioxide emissions and train personnel responsible for achieving carbon neutrality in the future.

Gulzada Shakulikova
Doctor of Economics, Professor, Rector of AOGU n.a. S. Utebayev

Dana Kudassova
Candidate of Technical Sciences, MBA

Rinat Iskakov
Doctor of Chemical Sciences, Vice-Rector for Science and Innovation

In 2023, Utebayev University conducted an energy audit of its infrastructure to identify the main energy sources, disadvantages and advantages of its current energy supply system, and to assess the potential for a gradual transition to zero carbon emissions within the university campus.

As a result of the monitoring, two main sources of carbon dioxide emissions arising from the activities of the university campus were identified. This is the consumption of natural gas for heating and water heating and the use of fuels and lubricants for vehicles and generator sets.

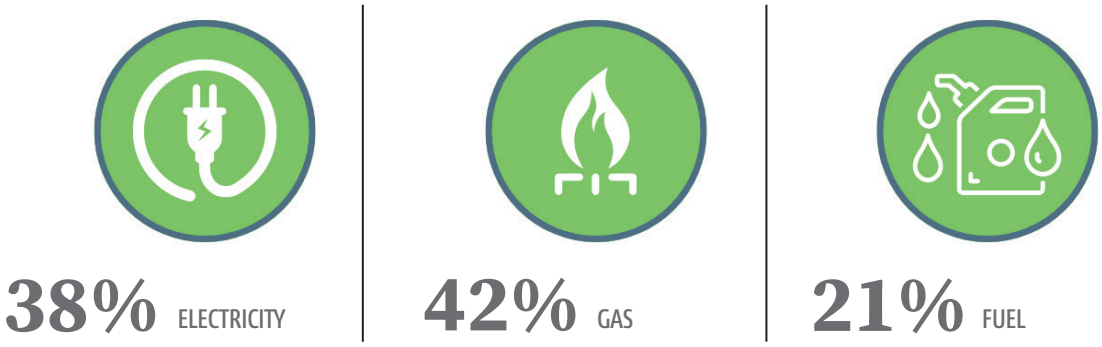
Table 1. Assessment of Hydrocarbon Consumption by the University Campus by the end of 2022

Months	2022	
	fuel V_{C8} (liter)	Natural gas V CH4 (m^3)
January	300,00	113 113,00
February	300,00	96 233,00
March	460,00	95 347,00
Q1	**1 060,00**	**304 693,00**
April	560,00	32 561,00
May	410,00	3 227,00
June	370,00	788,86
Q2	**1 340,00**	**36 576,86**
July	330,00	4 701,00
August	500,00	2 728,00
September	480,00	5 045,00
Q3	**1 310,00**	**12 474,00**
October	760,00	25 658,00
November	530,00	77 267,00
December	430,00	135 035,00
Q4	**1 720,00**	**237 960,00**
Total	**5 430,00**	**591 703,86**
Total in MJ	**2249,0**	**4 033,2**

Thus, the volume of hydrocarbon emissions in 2022 from direct combustion of fuel by diesel generators and vehicles amounted to 157 tons and 1603.7 tons for housing heating systems. On average, heating of one standard campus building accounts for 145.5 tons of hydrocarbon emissions.

When converting energy into calories, the distribution strongly depends on the time of year based on the type of energy. For example, in winter, the share of gas consumption increases significantly, and in summer, electricity and fuel (fuels and lubricants) are used significantly more.

The structure of energy consumption by the Campus in winter, 2022



The structure of energy consumption by the Campus in summer, 2022

INSTRUMENTS FOR STEP-BY-STEP ENERGY CONVERSION

In order to implement the Roadmap for the energy transformation of the university campus and the transition to carbon-neutral technologies, a concept for the phased conversion of buildings to alternative energy sources, in conjunction with energy-saving measures, was approved.

In particular, based on the specific needs of the university, the following energy-saving measures were taken:

– Motion sensor lamps have been installed in rooms without natural lighting;

– In rooms with moderate natural light, a combined solution has been used: torch lamps and lamps with light sensors, depending on the room;

– In rooms with full natural light, lamps with light sensors have been installed.

According to preliminary calculations, savings can reach 123,500 kWh of electricity. If we take into account current electricity consumption, which is up to 737,300 kilowatt-hours, the savings would amount to 16.8 percent. At the current electricity price, this will comprise 5,684,500 tenge per year.

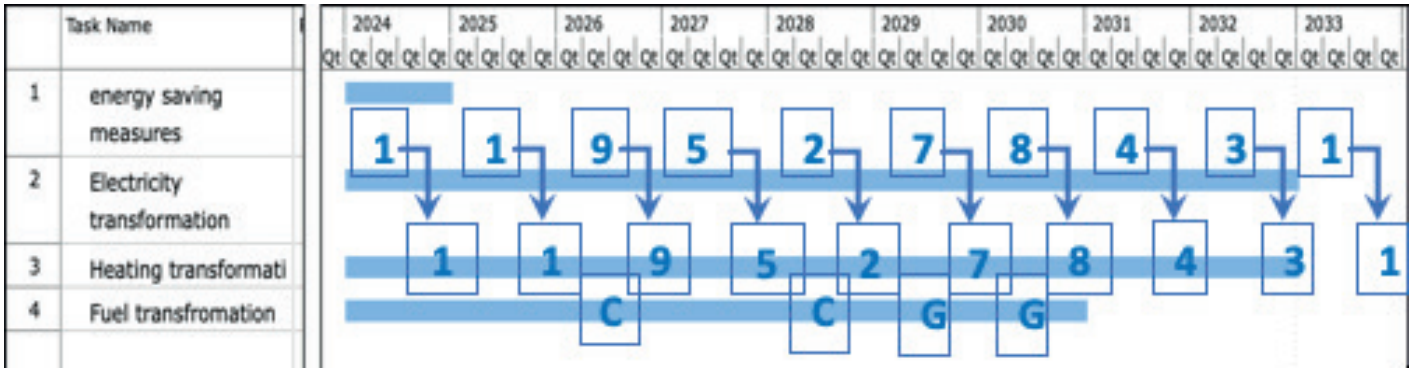
Together with voltage stabilization by reducing reactive current, the total annual energy savings will amount to 123,500 x 1,125 = 139,000 kWh, or 6,391,000 tenge.

Table 2 shows the time schedule of the energy transformation project until 2033, which will allow the university to achieve its goal of reducing energy consumption and harmful emissions, as well as outlines the main stages and their anticipated outcomes.

During the first year, the main efforts will be focused on the implementation of energy saving instruments throughout the campus infrastructure. At the same time, from the beginning of the project until its completion, the building will undergo a consistent renovation with the transfer of heating systems from natural gas to alternative energy sources.

In 2026, 2028, 2029 and 2030, respectively, both car engines (C1 and C2) and diesel generators (G1 and G2) will be replaced with hybrid/electric cars and renewable energy sources.

Table 2. Time Schedule for the Energy Transformation in the Campus



The feasibility study of the project indicates that, although there is a requirement for substantial initial investments in the energy transition, savings from utilizing own generated energy sources will commence after five years of transformation. Therefore, the cash flow curve for spending funds on the implementation of the Roadmap presented in Fig. 2 reflects the cumulative values of saving costs for external energy by increasing the base of own energy generation sources.

"Figure 2: Cumulative Cash Curve for Implementing the Roadmap to Transform the University Campus to Carbon Neutrality by 2033"

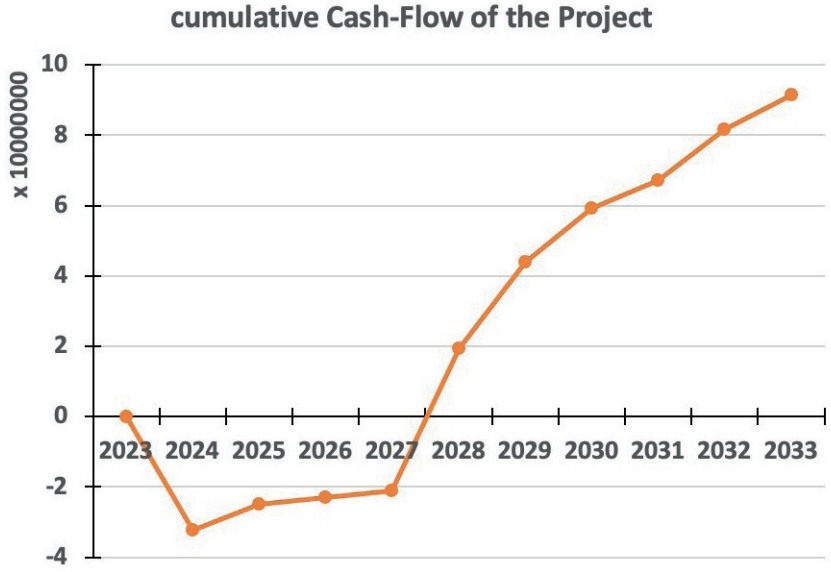


Table 3 demonstrates the main indicators classified into four different types of clusters, such as Energy and Carbon, Water Resources Management, Land Use and Material Use for each year of the Roadmap.

Cluster	Indicators	2024	2025	2026	2027	2028	2029	2030	2031	2032
Energy, carbon and climate change	Electricity saving	15%	10%	5%						
	Electricity consumption	1/11	1/11	1/11	2/11	1/11	1/11	1/11	1/11	1/11
	Natural gas consumption		1/11	1/11	1/11	2/11	1/11	1/11	1/11	1//
	Fuel consumption	1/5		1/5		1/5		1/5		1/5
Water resources management	Water conservation	10%	5%	5%						
	Water consumption	5%	5%	5%	5%	5%	5%	5%	5%	
	Water reuse		20%		20%		20%		20%	
Land use	Greenspace expansion	15%	5%	5%	5%	5%	5%	5%	5%	
	Biomass regeneration	25%	25%	25%	25%					
	Vegetation	15%	10%	5%	5%	5%	5%	5%	5%	5%
Using consumables	Use of paper	25%	25%	25%		25%				
	Waste sorting	1/4	1/4	2/4						
	Waste generation	5%	5%	5%	5%	5%	5%	5%	5%	

A detailed description of all figures and indicators is provided below:

1. Energy, Carbon Emissions and Climate Change

A. Electricity saving is presented as a decrease in the percentage of total consumption compared to the previous year.

B. Electricity consumption is shown as the amount of the entire infrastructure converted to alternative energy production.

C. Natural gas consumption is reflected as the amount of the entire infrastructure converted to alternative energy sources.

D. Fuel consumption is shown as the number of vehicles that have been converted to hybrid or electric models, or the number of diesel engines that have been switched to renewable energy sources.

Water Resources Management

A. Water conservation is indicated as a decrease in the percentage of total use compared to the previous year.

B. Water consumption is shown as a decrease in the percentage of total consumption compared to the previous year.

C. Water reuse is shown as an increase in the percentage of rainwater used for plant irrigation compared to the previous year.

3. Land Use

A. Green surfaces are shown as an increase in the percentage of land used for lawns and vegetation.

B. Biomass regeneration is shown as an increase in the percentage of biomass used either for plant purposes or for the production of green gas.

C. Vegetation is shown as an increase in the percentage of plants and trees compared to the previous year.

4. Utilization of Materials

A. The use of paper is shown as a decrease in the percentage of paper use compared to the previous year.

B. Waste sorting is shown as an increase in the number of sorted types of waste.

C. Waste generation is shown as a decrease in the percentage of solid waste compared to the previous year.

GREEN TRANSFORMATION

Therefore, the university has not only committed to adopting ESG standards but is also taking steps to transform its campus towards achieving zero hydrocarbon emissions in the future. In confirmation of the efforts undertaken, it is worth noting that in the 2023-2024 academic year, 29 graduation projects of students were devoted to the implementation of practical steps for the energy transformation of the university campus. This year, the university's first infrastructure renovation was conducted with consideration to transitioning towards energy conservation and the efficient utilization of alternative energy sources.

Despite its history in hydrocarbon development and specialist training for the industry, Atyrau University of Oil and Gas named after Safi Utebayev forms the competencies of sustainable development for a new generation of oil and gas industry professionals, encouraging them to take responsibility for the future green well-being of the country.

KAZAKHSTAN'S ENERGY TRANSITION PATHS THROUGH THE PRISM OF THE SDG 7 ROADMAP

Yernar Bilyalov,
UNECE National Consultant for Kazakhstan

Anis Zaman,
Economic Affairs Officer, Energy Division, UNESCA

Oleg Dzioubinski,
Regional Adviser, Sustainable Energy Division, UNECE

The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the United Nations Economic Commission for Europe (UNECE) are jointly implementing the UNDA project "Strengthening energy policies of Countries with Special Needs to build back better from COVID-19" (January 2022-June 2025) for eight beneficiary countries, including the Republic of Kazakhstan.

The project is aimed at supporting national Kazakhstan obligations in the framework of the SDGs implementation. The main goal of the project is to develop a Roadmap for Kazakhstan to achieve Sustainable Development Goal 7 (SDG7) "Ensuring access to affordable, reliable, sustainable and modern energy sources for all."

The project uses the National Expert SDG Tool for Energy Planning (NEXSTEP), which is an integrated and innovative approach to policy decision-making that involves an intensive data collection process, multi-stakeholder consultations, in-depth energy and emissions modelling, economic analysis, and policy analysis.. The tool will support the development of the SDG 7 Roadmap for Kazakhstan, which will assess the readiness of Kazakhstan in achieving SDG 7 and NDC targets, identify gaps and recommend areas that will require further efforts to ensure achievement of these targets.

Timeline of the project

February 2023
First National Stakeholder Workshop in Astana

March – October 2023
Data collection in Kazakhstan

November 2023
The second National Stakeholder Workshop in Astana

May– April 2024
Additional collection of data, comments from the stakeholders

June 2024
Presentation on the SDG 7 report on Kazakhstan in Astana to stakeholders

July–November 2024
Preparation of the SDG 7 Roadmap

December 2024
Presentation on the SDG 7 Roadmap for Kazakhstan in Bangok,Thailand

Q1 2025
Launch of the SDG 7 Roadmap in Kazakhstan

Q2 2025
Analytical study for Kazakhstan to identify nationaly relevant mechanisms to attract investments based on SDG 7 Roadmap

Introduction to Energy Modeling and Scenarios

The base year for modeling analysis is 2021, utilizing the most recent comprehensive data. Scenarios are modeled for the period 2022-2030, with one prospective scenario extending to 2050. Five scenarios were developed for Kazakhstan using a bottom-up approach:

1. Business-as-Usual (BAU): Projects energy demand and emissions trajectory based on historical improvements.

2. Current Policy (CP) Scenario: Considers existing policies and plans implemented or scheduled for implementation during the analysis period, and are aligned with SDG 7 and national NDC goals.

3. SDG Scenario: Aims to achieve SDG 7 targets and unconditional NDC targets by 2030, including universal access to electricity and clean cooking technologies, increased renewable energy share, and improved energy efficiency.

4. Sustainable Heating Scenario: Examines measures to reduce heating demand and increase the share of renewables in heat production.

5. Pathway to Neutrality by 2050: Investigates technological interventions, timelines, and legislative frameworks required for Kazakhstan to achieve net-zero emissions by 2050.

Key Assumptions, Demand Analysis and Growth Projections

The growth in energy demand is estimated using the activity level and energy intensity in the LEAP (Low Emissions Analysis Platform) tool. The demand outlook throughout the NEXSTEP analysis period (2021-2030) is influenced by factors such as annual population growth, annual GDP growth and per capita GDP.

ENERGY DEMAND AND EMISSION PROJECTION

1. Current Policy (CP) scenario

The total final energy consumption (TFEC) is expected to increase from 43.3 Mtoe in 2021 to 55.6 Mtoe in 2030, an average annual growth rate of 2.8 per cent. In 2030, the industrial sector consumption will be the largest at 31 per cent, followed by the residential sector 29.6 per cent, the transport sector 20.2 per cent, and the service sector 14.3 per cent. The agriculture sector will account for 2.5 per cent, while the remaining will go to non-specific energy use and non-energy use. Figure 1 shows the forecast of TFEC by sector under the CP scenario.

GHG emissions from the energy sector are estimated to increase to 219.6 $MtCO_2$-e in 2030. Power and heat generation emissions will be the largest at 103.4 $MtCO_2$-e. It is followed by the residential sector at 37.4 $MtCO_2$-e coming from solid fuel combustions for cooking and space heating. The emissions attributable to the industrial sector are estimated at 35.1 $MtCO_2$-e. The transport sector emissions will be 32.3 $MtCO_2$-e

arising from direct fuel combustions in internal combustion engines. The service and agriculture sector emissions together will be around 11.4 $MtCO_2$-e.

2. Sustainable Development Goal (SDG) scenario

Access to affordable, reliable, sustainable, and modern energy is essential to achieving the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change. Kazakhstan has achieved a 100 per cent electricity access rate in the current policy scenario. Nonetheless, a concerted effort is needed in other areas to allow the achievement of all SDG 7 targets, specifically the clean cooking target and the energy efficiency target, with measures recommended in the SDG scenario.

In this scenario, the total final energy consumption is expected to increase from 43.3 Mtoe in 2021 to 51.7 Mtoe in 2030, a reduction of 3.9 Mtoe compared to the CP scenario (figure 2). This reduction is due to the adoption of higher energy efficiency measures. In 2030, the industrial sector consumption will be the largest at 32.3 per cent, followed by the residential sector 27.3 per cent, the transport sector 20 per cent, and the service sector 15.1 per cent. The remining goes to agriculture and non-specific energy use.

GHG emissions from the energy sector is estimated to increase to 187.8 $MtCO_2$-e in 2030 in the SDG scenario. Emissions from the power and heat generation sector will be the largest at 86.1 $MtCO_2$-e. It is followed by the industrial sector at 35.1 $MtCO_2$-e and the transport sector at 28.7 $MtCO_2$-e. The residential sector will account for 26.4 $MtCO_2$-e while service and agriculture sectors' combined emission will be around 11.4 $MtCO_2$-e.

3. Sustainable Heating by 2030 scenario

Due to its climatic condition, a significant amount of heat is consumed in Kazakhstan. Most of the demand, however, is supplied from unclean heating technology. Building on the SDG scenario, the sustainable heating scenario further explores how the country can transition its heating demand and supply towards cleaner technologies.

Under the SDG scenario, it is expected that at least 14.4 percent of the rural population will still use coal boiler technology by 2030. In this sustainable heating scenario, NEXSTEP suggests phasing out of the remaining inefficient heating technology in the residential sector by promoting electrical heaters and natural gas boilers. In both urban and rural areas, the average natural gas boiler efficiency can also be improved from 75 per cent to 84 per cent (IEA, 2020). Additionally, actual thermal savings may be maximized, up to an estimated 15 per cent, by further insulation measures in roof spaces, basements and windows through deep retrofitting. This will result in 2.2 Mtoe energy saving in the residential sector. Figure 3 shows energy saving potential by fuel and technology.

In the supply side, it is also critical to increase the share of renewable energy in heating generation. In 2021, the heating demand was supplied mainly by fossil-fuelled Combined Heat and Power (CHP) and coal Heat

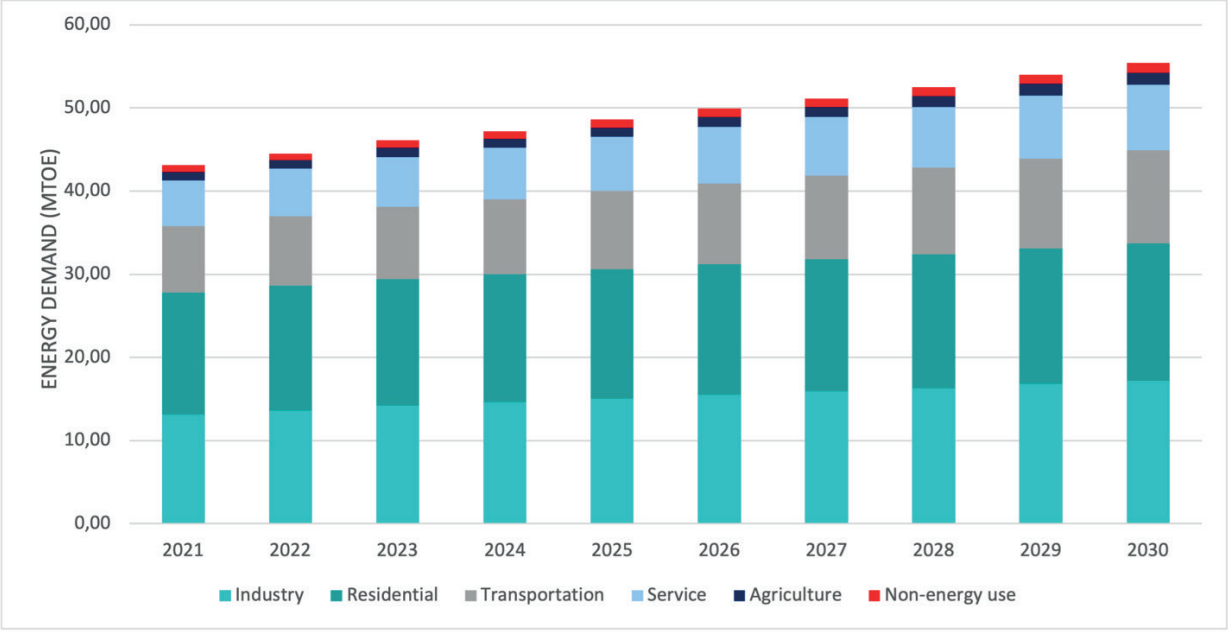


Figure 1: TFEC forecast by sector under the CP scenario

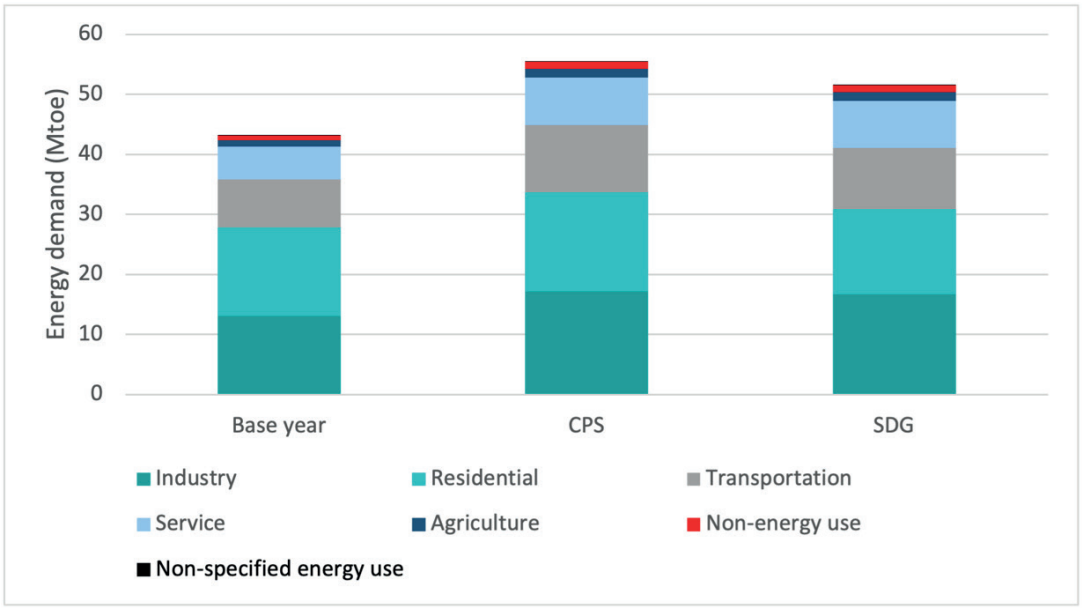


Figure 2: Comparison of 2030 energy demand of different scenarios

Only Boiler (HOB). NEXSTEP analysis suggests adding of 2.5 GW heat pump to reduce heat generation from fossil fuel. As a result, this scenario will improve the following indicators:

• increase the share of renewable energy in heat generation to 20 per cent by 2030, compared to none in the SDG scenario;

• increase the share of renewable energy in TFEC to 10.6 per cent by 2030, compared to 6.8 per cent in the SDG scenario;

• reduce the energy intensity to 3.9 MJ/US$2017 by 2030, compared to 4 MJ/US$2017 in the SDG scenario; and

• reduce GHG emissions to 180.3 $MtCO_2$-e or a reduction of 69.3 $MtCO_2$-e (27.8 per cent) compared to 1990 level which will exceed the conditional NDC target.

4. Towards Net Zero by 2050 scenario

This scenario explores challenges and opportunities for the Government of Kazakhstan to align its energy sector in line with the global ambition of achieving net zero emissions by 2050. Various stringent measures across different sectors will need to be implemented as we move beyond 2030. The first step would be to plan for full decarbonization of the power sector by 2050. In the demand side, the utilization of 100 per cent electric

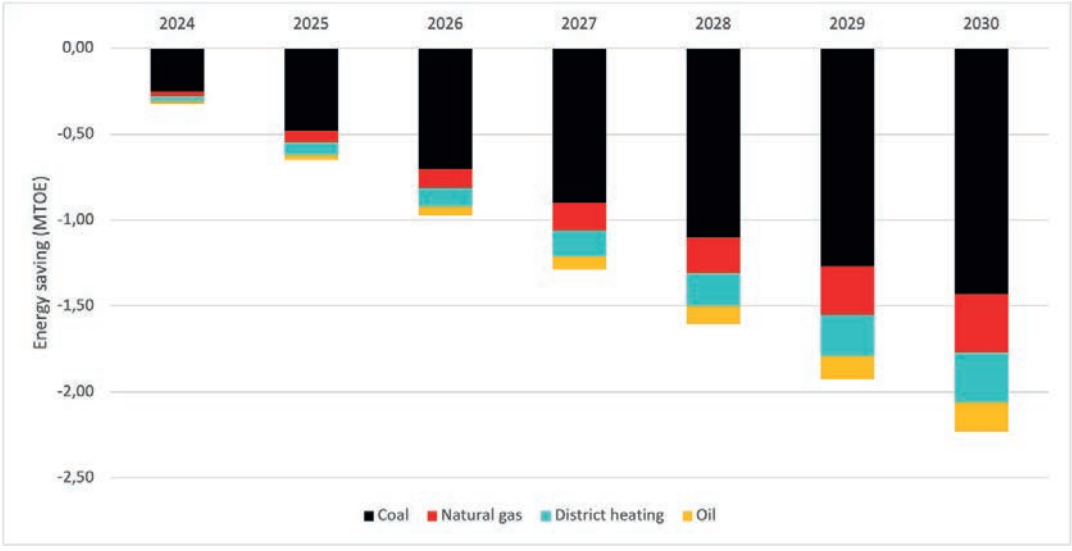


Figure 3: Energy saving potential by fuel and technology under the sustainable heating scenario

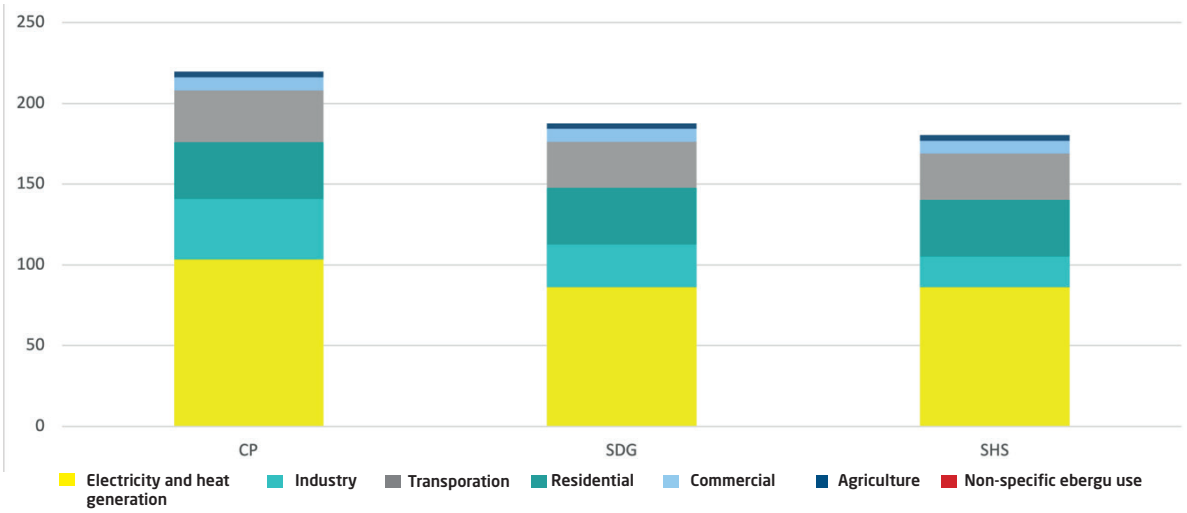


Figure 4 compares emissions under different scenarios.

cooking stove will be needed to achieve by 2050 to fully decarbonize the residential sector. Similarly, the transport sector will need the adoption of 100 per cent e-mobility. In the service and industrial sectors, fuel switching has a significant role, particularly the switching from fossil-fuel to electricity.

This scenario would save energy demand by around 25.6 Mtoe compared to the CP scenario. However, this scenario requires 713.9 TWh of electricity by 2050, an additional 454.4 TWh, compared to the CP scenario. Further implementation of energy efficiency would help reduce this electricity demand. In terms of supply, it is estimated that 276 GW of wind power capacity, 15 GW solar power capacity, 4 GW hydropower, and 2.2 GW mini hydro on top of 2.7 GW gas engine are required to fulfill the electricity demand by 2050. In addition to this, 18 GW heat pump will be required to fulfill the heat demand. Figure 5 presents comparison of energy demand under five scenarios.

Policy recommendations

• Targeted policy measures are required to address the gap in clean cooking by 2030. Achieving access to clean cooking technologies will not be a challenge for Kazakhstan since the gap is low at the moment. The adoption of electric cooking stoves to close the 2.2 per cent gap will significantly help improve clean cooking access. The cost of deployment of electric cooking stoves would be US$ 7.6 million by 2030.

• Increasing the efficiency of energy use in all economic sectors should be pursued. The presence of energy efficiency concept will help Kazakhstan reduce its energy intensity by 2029. Kazakhstan can further

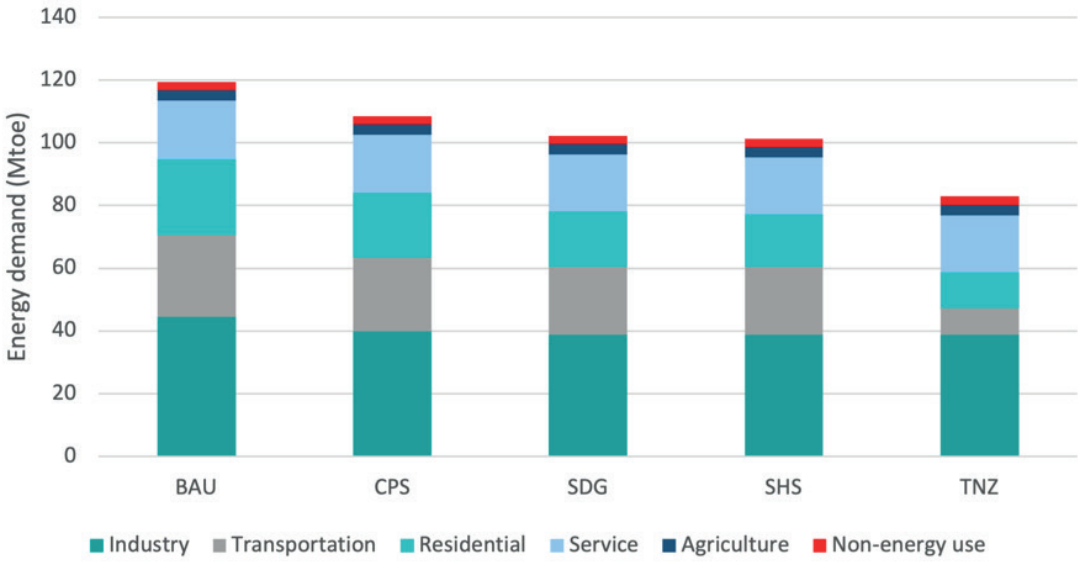
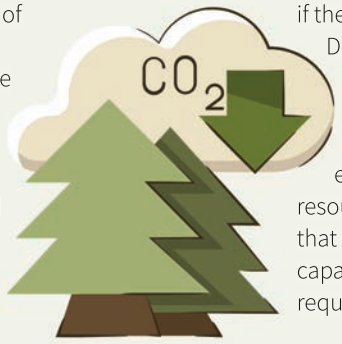


Figure 5: Comparison of energy demand for different scenarios.

increase its energy reduction by 2030 through additional measures under the SDG scenario. The residential sector is the highest energy consuming sector in Kazakhstan. Therefore, the utilization of improved heaters for space heating will significantly help improve energy efficiency and reduce emissions. The more aggressive MEPS adoption and thermal insulation improvement in the residential sector can be implemented to achieve a more sustainable heating system. In addition to the residential sector, industry and service sectors might have significant energy saving potential through deep retrofitting and motor replacement. Very high consumption of fossil fuel in the industry sector will pose a major challenge should the country wishes to pursue the net zero emissions pathway. In terms of decarbonization of the whole economy by 2050, the industrial sector might be a challenge for Kazakhstan since the consumption of fossil fuels is quite high. Therefore, fuel-switching options would need to be considered.

• **Transport electrification provide multi-fold benefits in the long-term.** Vigorous adoption of electric vehicles reduces the demand for oil products, hence reducing Kazakhstan's reliance on imported petroleum fuels. At the same time, it can contribute to climate mitigation and improve local air quality. Transport electrification would be critical to decarbonise the passenger transport sector by 2050. An adoption rate of 15 per cent of passenger cars, 5 per cent electric buses and 10 per cent of freight trucks by 2030 has the potential to save energy by 0.9 Mtoe and reduce emissions by 3.5 $MtCO_2$-e.



• **Decarbonisation of the heating system provides the highest potential in GHG emission reduction as well as improves energy security.** As can be noted in the sustainable heating scenario, a substantial GHG emission reduction is possible through the implementation of efficient and renewable energy-based heating system. Although the required additional capacities could be challenging technically and economically, they will help improve energy security through the utilization of indigenous resources. NEXSTEP analysis suggests 2.5 GW heat pumps be introduced by 2030, which should increase to 18 GW by 2050.

• **Decarbonisation of the power supply is the key to achieving net zero emissions by 2050.** Decarbonisation of the power sector is important to prevent shifting of emissions from one sector to the other when implementing policies, particularly on clean cooking and electric vehicles. This would be also needed if the country plans to move towards net zero by 2050. Decarbonisation attempt will require a substantial increase in renewable capacities, which could be challenging but it will offer multiple benefits, including reducing emissions and improving energy security through the utilization of indigenous resources. In terms of electricity supply, it is estimated that 276 GW of wind power capacity, 15 GW solar power capacity, 4 GW hydropower, and 2.2 GW mini hydro are required to fulfill the rising electricity demand.

FINANCING OF RENEWABLE ENERGY PROJECTS

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Renewable energy project financing is the process of attracting investment to finance the development of renewable energy projects (hereinafter - "RE"), namely the development, construction and operation of power plants producing solar, wind and hydroelectric power.

In Kazakhstan, the Government actively supports the development of renewable energy projects by introducing mechanisms for the procurement of electricity from renewable sources, offering tax and customs preferences and providing state support in the form of grants.

WHAT LEGISLATION GOVERNS THE FINANCING OF RENEWABLE ENERGY PROJECTS IN KAZAKHSTAN?

Financing of renewable energy projects in Kazakhstan is regulated by a number of legislative acts, including, but not limited to:

- Law of the Republic of Kazakhstan 'On Electric Power Industry' dated 9 July 2004;
- Law of the Republic of Kazakhstan 'On Support for the Use of Renewable Energy Sources' dated 4 July 2009;
- Order of the Minister of Energy of the Republic of Kazakhstan 'On Approval of the Rules for Centralised Purchase and Sale by a Single Purchaser of Electric energy of Electricity Produced by Renewable Energy Facilities, Energy Waste Management Facilities' dated 2 March 2015;
- Order of the Minister of Energy of the Republic of Kazakhstan 'On Approval of the Rules for Determination of Tariff for Support of Renewable Energy Sources'

dated 20 February 2015;

- Order of the Minister of Energy of the Republic of Kazakhstan 'On Approval of Standard Forms of Contracts of the Single Purchaser with Energy Producing Organisations Using Renewable Energy Sources, Energy Waste Management Facilities, Industrial Complexes, Direct Consumers, and Qualified Consumers' dated 28 December 2017; etc.

WHAT TYPES OF FINANCING ARE ACCESSIBLE FOR RENEWABLE ENERGY PROJECTS IN KAZAKHSTAN?

Potential investors for renewable energy projects in Kazakhstan include:

- Project sponsors
- Institutional investors
- Government
- International organisations and development banks
- General contractor, operator

Kazakhstan is actively developing international co-operation and attracting investments in the RE sector, especially in solar and wind energy projects, which contributes to the successful implementation of large-scale RE projects in various regions of the country. Currently, the main investors in RE projects in Kazakhstan are development banks and foreign investors. Kazakhstan's high natural potential creates favourable conditions for the development of this sector.

WHAT ARE THE SPECIFICS OF PROJECT FINANCING IN KAZAKHSTAN?

There are several unique and interesting features of RE project financing in Kazakhstan:

Government Support: Kazakhstan offers strong government support for renewable energy projects, including incentives such as auctions, tax benefits, customs preferences, and simplified licensing procedures. Depending on the type of investment, the Entrepreneurial Code[1] provides for, inter alia, the following investment preferences: 1) exemption from customs duties and value added tax on imports and 2) state in-kind grants.

According to the Concept of the investment policy[2] of the Republic of Kazakhstan until 2026 approved by the Government Decree of the Republic of Kazakhstan dated July 15, 2022 No. 482, despite the global crisis, Kazakhstan remains attractive for foreign direct investment and is the undisputed leader in the inflow of foreign investment in the Central Asian region. However, in order to maintain and strengthen this position in the current geo-economic and geopolitical

[1] *Article 283, paragraph 2, of the Entrepreneurial Code of the Republic of Kazakhstan dated 29 October 2015*
[2] *"On Approval of the Concept of Investment Policy of the Republic of Kazakhstan until 2026' Resolution of the Government of the Republic of Kazakhstan dated 15 July 202*

conditions, Kazakhstan needs to be actively proactive in the struggle for foreign investment and create the most optimal conditions for investors.
Foreign investors generally aim to stabilise the legislative framework and contractual terms. This stability allows them to accurately gauge their future obligations, liabilities, and risks.

However, if the potential developer enters into an investment agreement (as detailed in Section 1.5 below), only the terms within that specific agreement will be stabilised. It's crucial to understand that this stabilisation applies solely to the conditions of the investment agreement and not to other regulations affecting the potential developer's activities. Furthermore, this stability guarantee does not extend to amendments in laws related to national and environmental security, public health, or the regulation, production, and sale of excise-taxed goods.

Long-Term Power Purchase Agreements (PPAs): Renewable energy projects in Kazakhstan often benefit from long-term PPAs with the government or utility companies, offering a stable revenue stream for project developers and making the projects more attractive to investors. A significant issue affecting the bankability of PPAs in Kazakhstan is that the tariff is fixed in Kazakh Tenge (the local currency) for the entire duration of the PPA. To address this, an indexation mechanism has been introduced to make these PPAs more attractive to investors.

It is worth mentioning that, the FSC concludes PPAs based on the results of the auctions held after January 1, 2021 with electricity producing organisations using RE and included by the authorised body in the list of electricity producing organisations using RE, and purchases electricity for twenty years from the date of commencement of comprehensive tests, during which the electricity is supplied to the unified power system of the Republic of Kazakhstan, or from the date of expiration of the deadline to submit the operational acceptance certificate of the RE facility as per the PPA, whichever comes first

International Cooperation: Kazakhstan has actively pursued international cooperation and investment in its renewable energy sector, resulting in the successful implementation of large-scale renewable energy projects of 1 GW in capacity, across various regions of the country.

Project Finance Structures: Renewable energy projects in Kazakhstan typically employ project finance structures that combine debt and equity financing. This approach allows investors to diversify their risk while also giving them a vested interest in the project's success.

Green Bonds: Kazakhstan has shown interest in issuing green bonds to finance renewable energy projects. Green bonds are a form of debt financing where the proceeds are used exclusively for environmentally friendly projects, such as renewable energy.

WHAT IS INVOLVED IN THE BASIC DOCUMENTATION FOR FINANCING RENEWABLE ENERGY PROJECTS?

1. Power Purchase Agreement (PPA): A long-term agreement between the project company and the FSC for the purchase of electricity. The FSC undertakes to purchase electric energy produced and supplied to Kazakhstan's unified power system by the RE facilities at auction prices based on the auction results, taking into account indexation. The PPA is crucial for securing revenue streams for the project.
2. Investments Agreements: A contract between the project company and the government that sets out the government's obligations to support the project, including providing necessary permits, approvals, and infrastructure support.
3. Finance Documents: These include the loan agreement, security documents (such as mortgages, pledges, and guarantees), and any ancillary agreements related to the financing of the project.
4. Engineering, Procurement, and Construction (EPC) Contract: A contract between the project company and the EPC contractor, which outlines the terms and conditions for the construction of the renewable energy project.
5. Operation and Maintenance (O&M) Agreement: An agreement between the project company and an O&M provider for the ongoing operation and maintenance of the renewable energy project.
6. Grid Connection Agreement: An agreement with the grid operator for the connection of the renewable energy project to the grid, including technical requirements and grid access.
7. Land Lease Agreement: A lease agreement for the use of the land where the renewable energy project will be located.
8. Insurance Policies: Various insurance policies, including construction insurance, operational insurance, and political risk insurance, to protect the project against unforeseen events.
9. Direct Agreement: This agreement is designed to protect the interests of the lender by ensuring that certain key project agreements, such as the power purchase agreement and construction contracts, remain in effect and are not terminated or modified without the lender's consent.
The Direct Agreement establishes a direct contractual relationship between the lender and these key parties, allowing the lender to step into the shoes of the project company in the event of a default, and to ensure that the project can continue operating and generating revenue to repay the loan.

WHAT RISKS ARE INVOLVED IN FINANCING RE PROJECTS?

Like any infrastructure projects, RE projects demand substantial initial investments. Typically, these projects are funded by loans from international organisations in foreign currency, which poses a currency risk and can substantially inflate the project's costs when converted into the national currency, tenge. To mitigate this risk, an indexation mechanism has been introduced to enhance the attractiveness of PPAs for investors. However, there remains a risk of delays in tariff indexation, potentially resulting in losses for investors, particularly if the costs of power generation increase while the tariff remains unchanged post-project launch.

Additionally, RE projects often entail long payback periods, amplifying risks for investors, particularly in unstable economic conditions. Political interference poses another risk in project finance, as changes in legislation can significantly impact a project's financial outlook. Therefore, it's crucial for investors to carefully evaluate political risks before committing to any projects.

These factors present significant challenges for investors, particularly during the planning and execution stages of RE projects.

At the same time, Kazakhstan's renewable energy sector offers a range of unique features and opportunities for investors, making it an attractive destination for renewable project financings.

Prospects for renewable energy curtailments in Kazakhstan: the role of power plants and networks

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THANKS TO THE POLICY OF SUPPORTING THE DEVELOPMENT OF RENEWABLE ENERGY SOURCES, INCENTIVES AND REDUCING THE COST OF TECHNOLOGIES, THE SHARE OF RENEWABLE ENERGY SOURCES IN KAZAKHSTAN HAS INCREASED SIGNIFICANTLY. THUS, ACCORDING TO THE MINISTRY OF ENERGY OF THE REPUBLIC OF KAZAKHSTAN, ACCORDING TO THE RESULTS OF THE FIRST HALF OF 2024, THE SHARE OF RENEWABLE ENERGY IN ELECTRICITY GENERATION REACHED 6.5% WITH AN INSTALLED CAPACITY OF 2.9 GW OF RENEWABLE ENERGY (WPP – 1.4 GW, SPP – 1.2 GW, SHPP – 0.27 GW)[1].

Thanks to the policy of supporting the development of renewable energy sources, incentives and reducing the cost of technologies, the share of renewable energy sources in Kazakhstan has increased significantly. Thus, according to the Ministry of Energy of the Republic of Kazakhstan, according to the results of the first half of 2024, the share of renewable energy in electricity generation reached 6.5% with an installed capacity of 2.9 GW of renewable energy (WPP – 1.4 GW, SPP – 1.2 GW, sHPP – 0.27 GW) .

According to the Energy Balance of the Republic of Kazakhstan, by 2035 (Order of the Ministry of Energy of the Republic of Kazakhstan No. 44 dated 30.01.2023), the total installed capacity of WPP and SPP is planned to increase to 7.5 GW, including

[1] *Settlement and Financial Center For Renewable Energy Support 24.07.2024 https://rfc.kz/ru/press-center/news/163797*

wind WPP up to 5.3 GW and SPP up to 2.2 GW. In addition, this balance does not take into account about 3.5 GW of WPP and 0.4 GW of SPP, planned for sale in accordance with the Auction Plan for 2024-2027 (Order of the Ministry of Energy No. 187 dated 23.05.2023), as well as such large projects as ACWA Power – 1 GW WPP, CPIH – 1 GW WPP, WPP Masdar – 1 GW, Shelek WPP – 1 GW.

It is well known that renewable energy is a variable source of generation that is not fully amenable to dispatching, with a characteristic forecasting error, therefore, the integration of a large volume of renewable energy into the power system can lead to certain restrictions associated with insufficient network capacity and maneuverability of traditional power plants. In this case, with excessive generation in the power system, the principle of maintaining its stable operation (balance of consumption and generation at each moment of time) forces the system operator to limit the generation of renewable energy sources and accept less wind or solar energy than the resource allows.

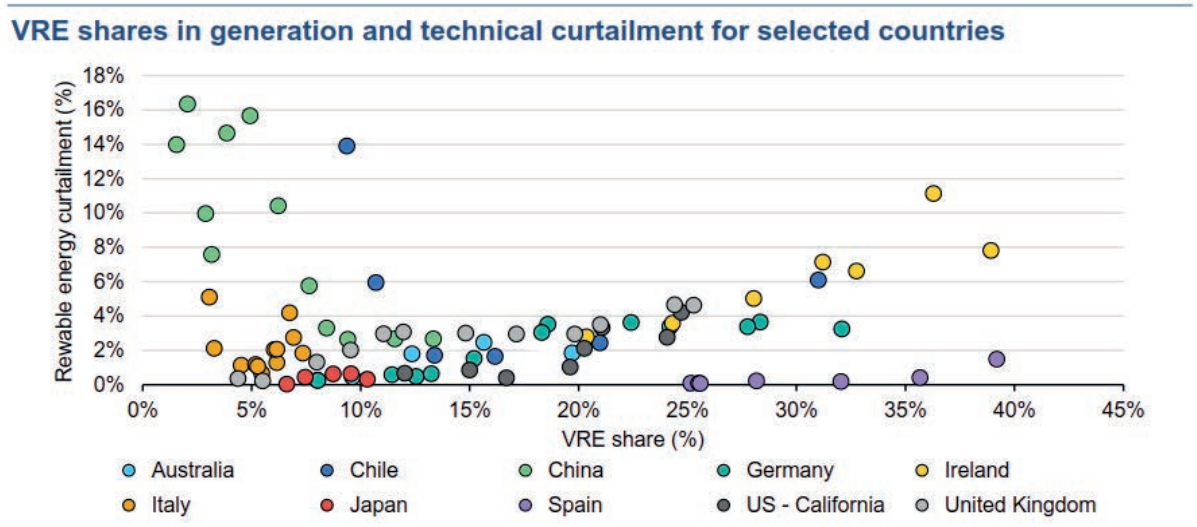
Curtailment means a forced reduction in the volume of wind or solar energy generation to a value lower than is potentially available at the moment.

Thus, the successful integration of a large volume of renewable energy into the energy system is associated with the need to introduce institutional changes, introduce market incentive mechanisms, transform the network topology, increase its capacity and flexibility, the structure of traditional generating capacities with an emphasis on the development of maneuverable sources, and improve operational activities. In case of delay in the implementation of these changes, renewable energy curtailments can reach significant volumes.

Renewable energy curtailment generation has a direct impact on the attractiveness of the project, and when concluding a take-or-pay contract, consumers will be forced to pay for ungenerated electricity.

International experience shows that in a number of countries with high rates of renewable energy development, with an increase in the share of electricity from renewable energy sources, the share of curtailments on their generation also increases (Figure 1.)

Figure 1. Dependence of the volume of renewable energy curtailments on the degree of their penetration



Source: Renewable Energy Market Update Outlook for 2023 and 2024. IEA

Thus, the share of curtailments on WPP/SPP generation in the future, with a degree of RES penetration of 30%, can reach 6-7%.

In this article, Energy System Research LLP has estimated the expected volume of renewable energy curtailments for 2030 – 2035, taking into account the indicators of the Energy Balance of the Republic of Kazakhstan until 2035, the main indicators of which are presented in the table below (Table 1).

Table 1. The main indicators of the Energy balance of the Republic of Kazakhstan until 2035, GW

Name	2030	2035
Load	**23.2**	**24.8**
Northern zone	**14.3**	**15.3**
Southern zone	5.8	6.3
Western zone	3.1	3.3
Installed capacity of power plants	**41.2**	**44.3**
Northern zone, including	24.1	24.5
WPP	2.7	3.0
GTPP	0.7	0.7
HPP	1.8	1.8
sHPP	0.1	0.1
CCGT	0.4	0.4
SPP	0.4	0.4
CHPcoal	12.1	12.1
TPP Gas	0.3	0.3
TPP coal	5.6	5.6
Southern zone, including	10.3	13.1
NPP	0.0	2.8
WPP	1.5	1.5
HPP	0.8	0.8
sHPP	2.1	2.1
CCGT	0.9	0.9
SPP	1.5	1.5
CHPcoal	0.02	0.02
TPP Gas	3.5	3.5
TPP coal	0.02	0.02
Western zone, including	6.7	6.7
WPP	0.8	0.8
GTPP	2.7	2.7
CCGT	1.0	1.0
SPP	0.3	0.3
TPP Gas	2.0	2.0

To determine the possible scope of WPP/SPP curtailments, a model was created that allows an analysis of hourly load coverage by power plants, taking into account:

- configurations of the load profile of each area,
- variable nature of renewable energy sources,
- regulating and ramping capabilities of existing and prospective traditional power plants for 2030-2035,
- throughput of weak sections,
- transfer capability of energy storage systems (ESS).

The simulation results were used in carrying out research on the operation of the power system, as well as in project approval by System operator the projects of Mirny WPP, Acwa Power WPP, Shelek WPP, etc.

The main assumptions made in the model are presented below.

Generation

Analysis of the maneuverability characteristics of existing power plants showed a wide range in the rate of power gain and discharge in %/min of installed capacity (Table 2). Significant variation in characteristics is due to equipment wear or involvement in the regulation of base power plants.

Table 2. The ramp up/ramp down rates of power in %/min of the installed capacity of existing power plants

Zone	Type	Power ramp up, %/min	Power ramp down, %/min
ICS North-South	HPP	0-8%	0-12%
	GTPP	3-9%	3-18%
	CPP	0-21%	0-18%
	HPP	3-50%	3-50%
West	GTPP	1-50%	1-50%
	CPP	0,5%	0,5%
	TPP	0-6%	0-2%

The values of the accepted maneuverable characteristics of promising power plants in % of Pinst and the power ramp up/ramp down rates %Pinst/min are shown in the table below by type (Table 3).

Table 3. Maneuverability indicators for promising power plants

Type	Max. winter load	Max. summer load	Min. winter load	Min. summer load	Power ramp up, % Pinst/min	Power ramp down, % Pinst/min
CCGT	90%	90%	40%	40%	5%	5%
GTPP	100%	100%	20%	20%	10%	10%
TPP	90%	60%	60%	30%	1%	1%
CPP	90%	90%	40%	40%	1%	1%
NPP	85%	85%	85%	85%	0%	0%
HPP (regulating)	100%	100%	0%	0%	10%	10%
HPP (counterregulator)	70%	40%	10%	10%	1%	1%

Load

Configuration of the prospective load profile was adopted on the basis of the 2021 reporting diagram. The results of the analysis of extremes and derivatives of hourly load data for 2021 are presented in the table below (Table 4).

Table 4. Indicators of hourly load data of power system of Kazakhstan for 2021

Name	Summer min	Spring min	Autumn max	Winter max	Power ramp up, MW/min	Power ramp down, MW/min
Western zone	1325	1287	1983	2079	6,9	6,2
Northern zone	6511	6747	9765	10047	8,9	11,4
Southern zone	2014	1935	3969	3957	18,5	16,3
ICS North-South	8683	8825	13646	13848	24,1	21,8

The graph of the total load of consumers of the North-South and Western zone ICS is characterized by a daytime and evening peak:

- daytime peak load (Astana time) - 10:00 – 13:00 for the North-South ICS, 11:00 - 15:00 for the Western zone
- evening peak load (Astana time) – 18:00 - 22:00 for the North-South ICS, 20:00 - 23:00 for the Western zone
- The number of hours of use of the maximum load T max is 7060 hours for the North-South ICS and 6970 hours for the Western zone.

RENEWABLE ENERGY GENERATION PROFILE

The hourly profile of renewable energy generation was calculated using specialized software PVSyst - for SPP, WindPRO - for WPP, according to historical data on the watercourse – for sHPP.

INTERSTATE FLOW RATES

Analysis of the work of the National Grid of Kazakhstan showed that the unbalances were in the range of ± 1000 MW and were covered by the exchange flows of power with the energy systems of neighboring states. However, taking into account contractual obligations on interstate flow rates in the amount of ± 150 MW from RF and ±50 MW from CA, the export/import range has been adopted in the amount of ± 150 MW for further extension.

THE TOPOLOGY OF THE ELECTRICAL NETWORK

At the 2030 stage, in order to unite the Western Zone with the North-South ICS of Kazakhstan, it is planned to construct an intersystem 500 kV overhead line Karabatan-Ulke, which will ensure the exchange flows of power between Western Zone and North-South ICS.

Taking into account the planned unification, modeling of the coverage of the prospective load for 2030 and 2035 was performed for National Grid of Kazakhstan including Northern, Southern and Western zones, taking into account the limited capacity in:

- North-South transit (L-5300, L-5320, L-5400).
- Beineu-MAEK area (L-2075, L-2085)
- Inder-Pravoberezhnaya area (L-2540).

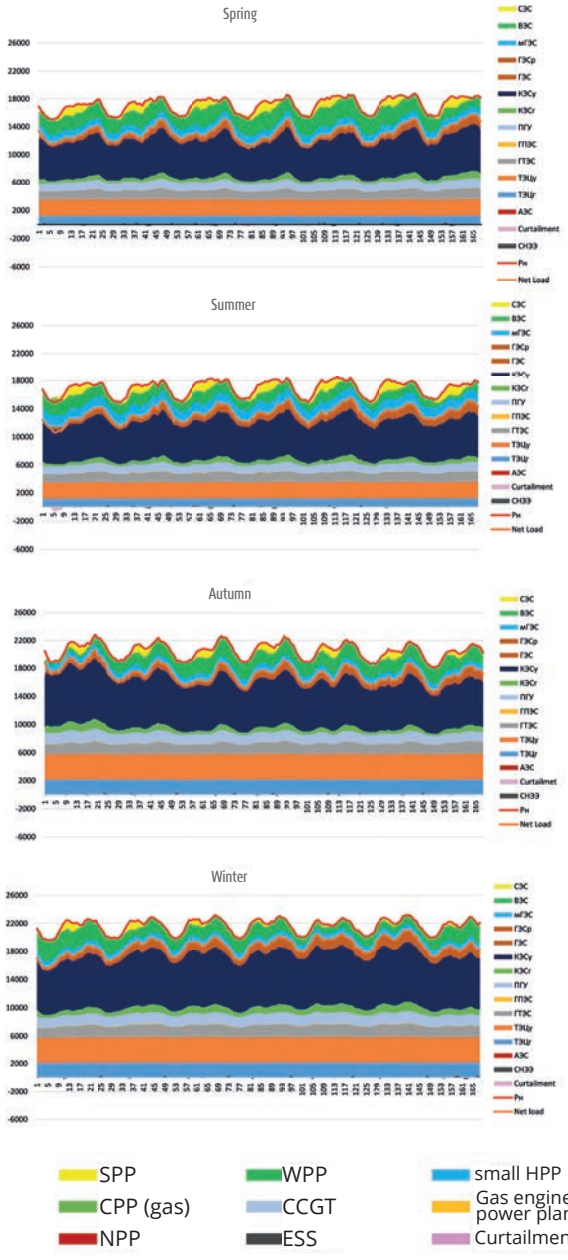
Hourly coverage schedules for 2030 and 2035 for 7 days of each season are shown in the figure below (Figure 2).

The analysis of the results of the performed simulation of the dispatching of power plants at the level of 2030-2035 allows us to draw the following conclusions:

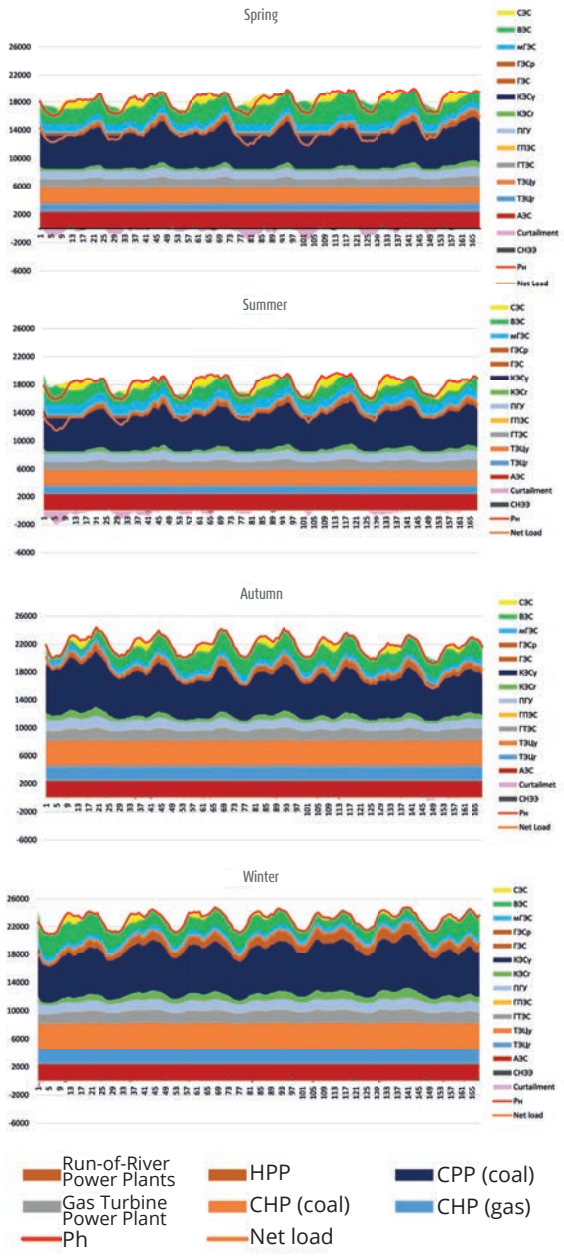
- The main factors influencing the volume of curtailments of the WPP/SPP are the regulating range of traditional power plants, as well as the presence and magnitude of the permitted range of imbalance between the power system of Kazakhstan and power systems of neighboring states;
- Taking into account the planned significant development of WPP/SPP in the Southern Zone in the summer and spring seasons for North-South transit by 2030-2035, flows of over 2 GW mainly from the Southern to the Northern zone are observed;
- Taking into account the planned unification of the Western Zone with the North-South ICS, exchange flows between the North-South ICS capacity and the Western Zone in the amount of ≈± 0.6 GW are observed at certain hours;
- The amount of curtailments of WPP/SPP due to insufficient regulating capacities in the Power system of Kazakhstan is increasing and, under accepted conditions, may reach up to 1% by 2030, up to 5% by 2035%;

Figure 2. Participation of power plants of the Republic of Kazakhstan on an hourly basis, taking into account the technological capabilities of power plants

2030



2035 (including NPP)



- The introduction of large renewable energy projects unaccounted for in the Energy Balance of the Republic of Kazakhstan until 2035, without the introduction of measures to reduce curtailments on renewable energy generation, may lead to an increase in curtailments of up to 30%.
- In world practice, the following is used to reduce the volume of renewable energy curtailments:
- Energy storage devices,
- Grid transfer capabilities,
- Demand response programs,
- Increasing the regulating range of the power plant by reducing the technical minimum load,
- Regional cooperation to ensure mutual regulation.

However, in order to determine the effectiveness of the above-mentioned means within the framework of the Energy System of Kazakhstan, detailed studies and a feasibility study are required.

Gulzhanat Gubasheva, EMBA

Assel Narymbetova, DBA

ESG STANDARDS AND THEIR IMPACT ON THE COMPANY'S KEY PERFORMANCE INDICATORS. **THE ENI CASE**

THE THEME OF SUSTAINABLE DEVELOPMENT IN THE MODERN WORLD REMAINS AN INTEGRAL PART OF THE CORPORATE RESPONSIBILITY OF COMPANIES FOCUSED ON CREATING A FINANCIALLY STABLE, ETHICALLY SUCCESSFUL AND SOCIALLY ORIENTED BUSINESS MODEL, WHICH IN THE LONG TERM LEADS TO A POSITIVE IMPACT ON SOCIETY AND THE ENVIRONMENT. THESE ASPECTS ARE CURRENTLY FLOWING INTO THE ESG STANDARDS.

Although there is no fixed definition of ESG standards, in general, the following characteristic can be given. Environmental standards - standards that determine the impact of a business on the environment through the consumption of natural resources necessary for the company's operating activities. Social standards relate to the impact of business on society. These are issues related to labor protection and human capital, human rights, equality, inclusivity and the development of society as a whole. Corporate governance standards relate to corporate practices and procedures that must ensure compliance with laws established by the State and stakeholders.

Since the moment of epidemiological diseases, various natural disasters, extreme heat, melting of large glaciers, various issues and disputes of a social and political nature, the issue of sustainable development is becoming more acute and the transition of companies to the "green" path of development is no longer a fashionable trend, but a new reality.

This is confirmed by the "Global Risks Report 2021", in which researchers at the World Economic Forum show that global environmental and social risks are beginning to dominate classical profitability risks (Figure 1), which encourages traditional businesses to adapt further.

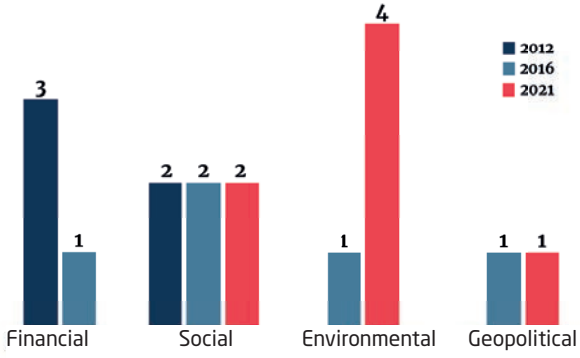


Figure 1 – Global risk trend

According to the methodology of the Global Reporting Initiative, the KPMG study "Big shifts, small steps" shows statistics confirming the growing popularity of ESG standards, in particular, the recognition by a significant number of G250 companies that climate change and social aspects are a risk to business (Figure 2).

Figure 2 – ESG standards trend

While a study conducted by PwC for January 2022 (Global Investor Survey, 2022), according to which 75% of respondents agree that "companies need to address ESG issues, even if it reduces profitability in the short term," another study "Seven Business Case Benefits of a Triple Bottom Line" (Willard 2022) shows that if an ordinary company used advanced approaches to sustainable development, it could increase its profits "by at least 51-81% over three to five years."

These data lead to the hypothesis that the successful application of ESG standards can have a positive impact on the company's key performance indicators. The object of the research paper is corporate practices related to the application of ESG standards in the activities of Eni. The subject of the study is the impact of the identified corporate practices on the key performance indicators of Eni. Key indicators in the context of research paper mean financial results, operational efficiency and strategic competitiveness or attractiveness to stakeholders. To confirm or refute the set goal, a combined research method was used, which included the collection, analysis and comparison of relevant information, correlation and content analysis.

Of course, ESG standards are implemented by all business sectors, but increased requirements and expectations are still imposed on companies in the extractive sector. In particular, oil and gas companies are under the close attention of investors, states, and environmental communities due to the negative consequences of their daily activities. After the signing of the Paris Agreement in 2015, oil and gas companies recognized their special role in combating environmental and social problems associated with their production. In addition, an example can be given in 2018 from the Scientific and Economic Journal "Problems of Economics and Management of the Oil and Gas Complex", when the Danish pension fund PKA excluded

a number of oil and gas companies from the investment portfolio of securities due to "inability to meet the goals of the Paris Climate Agreement". At that time, this fund left 12 companies out of 62 in its portfolio, left 15 companies for monitoring, and refused to invest 35 companies.

The choice of Eni S.p.A. among companies in the extractive sector is also due to the fact that, according to the analysis of the Energy analytics channel, Kazakhstan occupies a leading 21% in the Eni portfolio in terms of the share of oil reserves distribution.

Investigating the hypothesis of the relationship between the efficiency of companies (KPIs) and the implementation of ESG standards, the following data were obtained.

In general, two opposing theories can be traced: the theory of stakeholders (Freeman's theory) and the theory of compromise.

Research based on Freeman's theory argues that satisfying the ethical interests of all stakeholders creates long-term sustainability and attractiveness, leading to an increase in the company's financial performance. Various researchers identify a positive relationship between ESG standards and EVA, EBITDA, and market capitalization. Some consider the relationship between the financial performance of companies and their location in the ESG rating, coming to the conclusion that large corporations with high ratings achieve investor attractiveness and high financial performance. Other studies show that the implementation of ESG standards has a U-shaped relation with the company's profits.

New technologies and processes take time to evaluate, but with increasing visibility of the company, profits also increase. In general, the research data show that there is a positive correlation of more than 90% based on the analysis of more than 2,000 empirical papers.

The theory of compromise considers the implementation of ESG standards and the costs necessary for their implementation as unreasonable.

It is worth noting that there is a lack of literature on the impact of ESG on the company's production or operational performance, which creates a gap in understanding this aspect of the research issue. Empirical studies on the impact of ESG on reputation capital indicate a significant positive correlation between ESG ratings and a company's reputation, suggesting that higher ESG ratings usually correspond to a company's better reputation.

The research paper uses a combined methodological approach for three KPIs:

FINANCIAL EFFICIENCY

For the study, such indicators as revenue, EBITDA and dividend yield were selected, which determine the financial efficiency of the company. To identify the subsequent correlation of the second variable, Eni's ESG metric for direct greenhouse gas emissions was used. It is assumed that the implementation of ESG standards to reduce greenhouse gas emissions leads to additional financial costs to ensure production with new efficient technology and to introduce changes in production and operational processes. For the analysis, a Correlation model in Microsoft Excel was used using the "Data Analysis" function based on company data from recent years. Thus, correlation analysis will allow us to assess whether there is a statistically significant relationship between the specified variables.

OPERATIONAL EXCELLENCE

According to the 2022 report, Eni aims to strengthen its contribution to sustainable development through three levers of an integrated business model: Carbon Neutrality by 2050, Operational Excellence and Alliances for Development ("A Just Transition"). Eni states that the business is constantly focused on Operational Excellence, which is expressed in a constant commitment through the development of skills and the expansion of diversity to protect their health, and safety, as well as the integrity of assets. In addition, Eni strives to protect the environment by promoting the efficient use of natural resources and the protection of protected areas related to biodiversity, respect and promotion of human rights, with a focus on sustainability and improving the supply chain and customer portfolio, as well as transparency and combating corruption in all its forms.

In the context of Operational Excellence, scientific work conducts content analysis of the Open-es online platform based on the principle of fact-checking (Figure 3).

The platform is aimed at involving suppliers

Definition	Methodology
Analysis of the content of the Open-es platform for the promotion of ESG and transparency policy	Set parameters according to the principle of fact checking: • Relevance of the content in the context of ESG; • The possibility of self-assessment in the context of ESG; • Clarity and accessibility for suppliers; • Interactivity and collaboration
Analysis of the number of suppliers registered on the profile of Kazakhstan, taking into account what volume Kazakhstan accounts for in the Eni portfolio.	Collecting statistical data on the number of registered suppliers on the platform Identification of the share of Kazakhstani suppliers from the total number of suppliers

Figure 3 – Content analysis

in sustainable development and evaluating their ESG metrics with the possibility of further improvement through training and collaboration on the platform. The research paper suggests that the use of Open-es as a tool for customer orientation and transparency will contribute to achieving Operational excellence, which is an important indicator of the company's effectiveness.

INTERACTION WITH STAKEHOLDERS

As part of the "A Just Transition" program, Eni strives to create value for all stakeholders by monitoring their requests and involving local communities in the exchange of views. The study "ESG performance, investor attention, and company reputation" emphasizes that meeting the expectations of stakeholders improves the company's reputation and contributes to the accumulation of reputation capital, which is reflected in the ESG rating. The research paper aims to assess reputation capital through interaction with stakeholders and conducts a correlation analysis between the number of stakeholders and the volume of Eni investments in initiatives for local communities.

In addition to the above analyses, the research paper conducts a comparative analysis of Eni's mission and strategy with a similar company in the energy sector based on the parameters E, S and G (Figure 4).

Figure 4 – Comparative analysis

Parameters	Source	Method
Parameter E (Environmental)	Assessment of the current state of obligations according to 11 approved Climate Action 100+ indicators.	Climate Action 100+ is an investor initiative designed to ensure that the world's largest industrial companies take corporate action on greenhouse gas emissions in the fight against climate change. The implementation of these measures requires the implementation and application of ESG standards in corporate practice
Parameter S (Social)	Number (%) of women in the total workforce Number (%) of women in the management body (Executive and Management Committees)	Equileap –an independent, specialized data provider with a wide range of indicators of gender equality, diversity and inclusivity.
Parameter G (Corporate Governance)	Transparency and accountability (quantity and nature of information available)	Official websites of companies

The correlation analysis showed the following values (Table 1):

Table 1 – The value of financial performance analysis

Financial metrics	Correlation coefficient	Conclusions
Revenue	-0,02	There is a very weak negative relationship between greenhouse gas emissions and revenue, which suggests that changes in emissions have little effect on revenue. This may indicate the independence of these variables or the presence of other factors that have a more significant impact on both variables.
EBITDA	0,45	Moderate positive linear relationship suggests that an increase in one variable, such as greenhouse gas emissions, may be associated with an increase in another variable, such as EBITDA. This can happen if the increase in operating profitability is associated with an increase in production, which, in turn, leads to an increase in greenhouse gas emissions.
Dividend yield	-0,31	The presence of a negative but moderate relationship between the two variables means that an increase in greenhouse gas emissions is associated with a moderate decrease in dividend yields, and vice versa: companies with high emissions may have slightly lower dividend yields.

Analysis of the content of the Open-es platform allows us to conclude that the information provided corresponds to generally accepted standards of evaluation according to ESG criteria. The high-quality content available on the platform reflects important aspects of sustainable development and social responsibility, including ethical management, environmental protection, and social innovation through 4 models (Figure 5).

Figure 5 – Conclusions on content analysis

Model	Evaluation parameters	Цель оценки
Planet	Climate change, biodiversity, water use, energy efficiency, circular economy	To understand how companies ensure the protection and maintenance of the planet and its resources in carrying out their activities
People	Dignity and equality, human rights, health and well-being, future skills, employee well-being	Understand how companies ensure the protection of human rights and the development of human potential in the implementation of their activities
Management principles	Management objective, quality of the governing body, stakeholder participation, monitoring of risks and opportunities, ethical behavior	Understand how companies integrate ESG standards into their business models
Prosperity	Work, innovate better products and services, create wealth	To show the importance and relationship between commercial activities,
		investments and strategies of the company aimed at achieving the desired results for the company

Statistical data on the number of registered suppliers on the platform was also collected in the profile section of Kazakhstan. A statistical review showed that mainly medium-sized companies are registered on the platform. Many of them have high ratings for social and managerial factors, but environmental standards do not play a significant role in their sustainable development. High rates are observed in the oil and gas industry, professional services and the hotel business. The analysis demonstrates the active participation of various industries in self-assessment according to ESG standards, which indicates the broad impact of the platform on the business community

and its ability to involve companies in the formation of sustainable practices. However, there is a need to involve more local suppliers in registration and subsequent assessment and growth of ESG indicators.

Table 2 – The value of stakeholder analysis

The studied metric	Correlation coefficient	Conclusions
The relationship between the number of stakeholders in the SMS system and the volume of investments	-0,26	There is little feedback between the amount of investment in social initiatives for local communities and the number of stakeholders. Although it is assumed that an increase in investment can lead to an increase in stakeholders and an improvement in the company's reputation, the results show that the relationship between these two variables is not as straightforward as expected

According to the results of an additional comparative analysis (Eni and a company of similar sector) separately according to the E, S, G standards, it follows that both companies, being among the large international energy companies, demonstrate a fairly progressive, but equivalent level according to the specified parameters. However, their practice can help in tracking global trends or to conduct gap analyses to improve the current practices of local companies.

As part of detailed analysis of the applied methodologies and an assessment of their applicability in the context of this study, the scientific work provides comprehensive recommendations and highlights the existing limitations associated with the research results obtained. These restrictions are reduced to

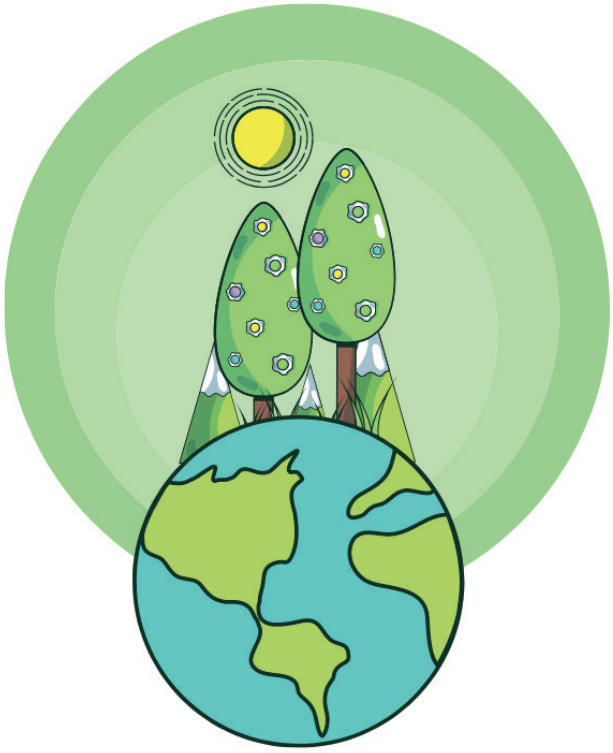
- the scale of the ESG topic and the limitations of the literature
- the tone of the investment climate dictated by the world's major investors
- methodological limitations (lack of uniform standards and metrics)

In light of these limitations, it is important to continue scientific research:

- aimed at developing common standards and methodologies for assessing the impact of ESG on the financial and operational performance of companies and other key performance indicators;
- including comprehensive data analysis and long-term monitoring of companies implementing ESG standards.

Returning to the hypothesis of the study that the successful application of ESG standards in the activities of companies at present can have a positive impact on their key performance indicators, supporting financial growth, operational efficiency and strategic competitiveness or attractiveness to stakeholders, it should be noted that the answer to this question has been carefully considered using the example of Eni.

Based on the results of the study, it can be concluded that a partial answer to the scientific question has been received.



However, the following aspects must be considered:

- A more detailed study is required to establish a causal relationship between ESG and financial results, taking into account long-standing data. At the same time, it should be borne in mind that the implementation of ESG standards does not always lead to immediate financial benefits, but it may have a long-term positive effect;
- Weak data interconnection is not necessarily an indicator of the inefficiency of ESG standards;
- The example of one company cannot fully reflect the situation in other companies and industries.

However, it is safe to say that the scientific work has laid an important foundation for understanding the impact of ESG standards and has highlighted the need for further research to obtain more accurate and well-founded results.

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Jane Joughin,
Corporate Consultant (Sustainability)

Dhiren Naidoo,
Principal Consultant (Decarbonisation)

srk consulting 50 YEARS

SRK Consulting is an international consultancy providing technical services to the mining industry with a consulting practice in Almaty, among 45 consulting practices worldwide. We are attuned to the progressive changes in Kazakhstani law that are advancing environmental management in the mining sector, as part of the country's broader sustainability agenda. In the light of these changes, we share some of our global insights on aspects of mine environmental management of high interest to investors and lenders – decarbonisation, water stewardship and mine closure.

Advances in Environmental Management in the Mining Sector

TRENDS IN THE DECARBONISATION OF THE MINING SECTOR

More than a third of companies in the global mining and metals sector have set ambitious decarbonisation targets and are publicly reporting on their progress in meeting these targets. Some Kazakhstani companies are among these industry leaders.

Climate disclosure standards and laws have evolved to address the interest of investors in climate risks, strategies and performance. Mandatory climate disclosure requirements are being introduced by many stock exchanges, using standards designed to reveal companies' decarbonisation ambitions.

There are many complementary international initiatives that push for a level of decarbonisation ambition aligned with Paris Agreement goals. Relevant to the mining sector, members of the International Council on Mining and Metals (ICMM) have collectively committed to a goal of net zero Scope 1 and 2 greenhouse gas (GHG) emissions by 2050 or sooner in line with the ambitions of the Paris Agreement. The Glasgow Finance Alliance for Net Zero (GFANZ) pushes for ambitious decarbonisation targets aligned with 1.5°C pathway in the Paris Agreement.

Courtesy: Boliden

The decarbonisation commitments of leading mining and metallurgical companies differ in detail but are commonly aligned with the less than 2°C pathway in the Paris Agreement. They involve targets to reduce their Scope 1 and 2 GHG emissions by at least 30% by 2030 when compared to their baselines (often their emissions dates between 2018 and 2021) and to achieve Net Zero by 2050.

Achieving these goals requires significant changes to the technologies being used. The trends in decarbonisation by mining and metallurgical companies can be described as broadly following these paths:

- **Switching to low-carbon electricity.** Underwriting the development of solar and wind farms by electricity generating companies through Power Purchase Agreements with the electricity generating companies allows the mining and metallurgical companies to reduce emissions while not fundamentally changing any aspect of their operation. This is often the easiest and quickest solution with companies such as BHP reducing their emissions by 24% since 2018 in this way.
- **Efficiency improvement initiatives.** Improving efficiency, often through investment in information systems to enable better decision-making, is another effective way to reduce emissions.
- **Using current technologies to reduce Scope 1 emissions.** There are a number of changes which can be implemented today to reduce emissions, such as switching from coal to natural gas for powering boilers and dryers, installing Trolley Assist systems or In-Pit Crushing and Conveying systems to reduce diesel consumed by haul-trucks, and using renewable diesel. These solutions are easier to introduce in new developments than retrospectively at existing mines.
- **Supporting the development of new technologies.** There has been significant investment in the development of new technologies such as battery-power, hydrogen fuel cells, switching to using natural gas or green hydrogen in smelting, or switching from pyrometallurgical to either hydrometallurgical or electric smelting technologies. Many underground mines are already purchasing battery-electric machines. Commercial production of battery electric haul-trucks is forecast to commence in 2027.

• **Methane capture / destruction.** Using methane to generate electricity is a way to reduce emissions as the methane is destroyed. The challenge is extracting methane from the coal seams through either pre-drainage boreholes or from mined out areas at a concentration high enough to be used. An alternative method of destroying methane is to install systems to destroy the methane contained in Ventilated Air Methane though this is currently difficult to do. As methane has not been a safety factor in open pit coal mines, there are currently no systems in place for capturing methane. These would require pre-drainage boreholes drilled in advance of mining – this approach is being explored in several countries.

• **Valuing carbon in decision-making.** As decisions made today often commit a company to a long-term outcome, many companies globally are therefore applying a "shadow carbon charge" of between USD 50 and USD 150/t. CO_2e to reflect potential future carbon tax values.

• **Identifying multiple projects.** Companies are comparing many alternatives to achieve carbon reduction targets and are ranking these by Net Present Value and by quantum of emissions saved using the Marginal Abatement Cost Curve (MACC) methodology.

Lenders are also playing a role in facilitating the transition with organisations such as the IFC and EBRD providing loans for solar and wind farms, and many commercial banks requiring companies to show how they plan to achieve reductions in their stated targets in emissions.

The Government of Kazakhstan is also exerting pressure on mining and metallurgical companies to introduce changes in order to meet the Government's target of a 15% reduction in emissions by 2030 and at least 15% of consumed electricity provided by renewable sources. Emissions quotas have been set to the top emitters and the number of free quotas are being reduced, requiring

companies to purchase emission credits on the open market. This is expected to increase the cost of carbon from less than USD 2/t.CO_2 today to USD 15-20/t.CO_2 by 2030. For those companies exporting materials which will ultimately be sold to the EU, the EU's Carbon Border Adjustment Mechanism (CBAM) will add a further cost which will cause high carbon intensity steel and copper, for example, to incur a discount to sales prices.

Whilst some of the points mentioned above all indicate increased costs, Kazakhstan is fortunately blessed with significant potential for low-costs solar and wind power. Consequently, the price for renewable electricity agreed at auction in 2023 was, at 10.4 KZT/kWh, cheaper than the cost of electricity generated by coal.

Further, Kazakhstan has large uranium resources. Small Modular Reactors (SMRs) are proven technologies with the potential for generating low-cost electricity. Canada, another major host of uranium, is seeking to position itself as the world's major supplier of both uranium and nuclear power by supporting the adoption of SMRs across Canada.

Therefore, SRK sees opportunities for Kazakhstani mining and metallurgical companies to reduce their costs through embracing the move towards reducing GHG emissions and for Kazakhstan to position itself as a low-cost energy hub.

CHANGING WATER MANAGEMENT IN THE MINING SECTOR IN KAZAKHSTAN

Kazakhstan will soon introduce a new Water Code that aims to transform water resource governance throughout the country. Considering this Code together with the new Environmental Code and the instruction for liquidation of mines (closure) made under the Subsoil and Subsoil Use Code, it is foreseeable that water management of mines in Kazakhstan will be much more strictly regulated.

Our due diligence work for investors and lenders provides us with site-level knowledge of water governance by mines across the globe. We see that water law, and its effective enforcement, has a formidable influence on water management by mines. This is particularly true where environmental and water permits are hard to gain and maintain, and where suspensions of operations for water impacts are not unheard of.

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Public access to information on water resources, as provided for in the draft Kazakhstan Water Code, adds to this influence as communities living downstream of mines are empowered to hold regulatory authorities to account for protecting water resources. The increased awareness of water quality issues and water scarcity are expected to facilitate this movement.

Mines in Kazakhstan are not widely viewed as contributors to stress on the country's water resources. Perhaps this is because many of the mines are in remote locations, far from human settlements, and in terrain where the drainage is not well defined.

Impact assessment and permitting documentation for Kazakhstani mines often gives the impression there are no affected water resources and water users. This is different from norms in other mining jurisdictions across the globe where most mines have a detailed understanding of their water context, even if they are in remote settings and arid climates. They acknowledge stresses in the occupied river basin and often have a good understanding of the downstream river system, downstream water users, and surrounding groundwater uses. The interrelationship between surface water and groundwater is usually well understood too.

Strong understanding of geochemistry is not so widespread, but many countries with well-developed mining industries are strict about understanding the geochemistry of rock exposed by mining (potentially causing acid mine drainage), particularly waste rock placed on surface, and tailings.

Water stewardship aligned with international standards requires the above information to ensure water management and monitoring is focussed on clearly defined impacts and risks, considering the life of assets and the needs of water users in the river basin. Several local mining firms are aspiring to implement water stewardship principles and have established progressive water policies matching those of international corporations and are transitioning to water management and monitoring that is more impact centric and proactive.

The recently approved Best Available Techniques (BAT) handbooks for mines identify many water management measures that must be implemented if mines wish to obtain complex environmental permits and be exempted from escalating pollution payments for emissions, water discharge and waste disposal. It will be interesting to see the rate of implementation of BAT on mines in Kazakhstan. Outside of the 50 major polluters that are now legally obliged to implement BAT, there is much deliberation how to go forward. For many mines, it will be a while before the pollution payments become financially material; escalations in these payments are only scheduled for the 2030s.

MINE CLOSURE MATURITY IN KAZAKHSTAN

Kazakhstan has advanced the regulation of mine closure. The new Subsoil and Subsoil Use Code (2017) requires integration of mine closure into mine planning and makes mining companies responsible for achieving an agreed post-closure land use. It also requires ongoing financial provision for mine closure. Supporting subsidiary law includes instructions for mine closure planning processes, cost estimation, and financial provisions for closure.

Currently, there is a gap between closure law and closure practice, which could be attributed to inexperience with the new concepts in law. Many mine closure plans in Kazakhstan, although formally approved, are conceptual, and the corresponding closure cost estimates and financial provisions are generally too low. This presents risks to investors, to the government and taxpayers, and to local communities if a miner fails to fulfil its closure duties.

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Refinements to the legal requirements for mine closure are ranked as a Priority #4 under the subject of Developing the Mineral Resources base of Kazakhstan in the National Development Plan 2029 (2024). The proposed refinements will cover closure cost estimation and criteria for reviewing the closure plans to avoid risks of insufficient funds for closure. Guidance based on international practices will support these refinements.

Closure planning and costing reliability is likely to increase steadily through the mandatory three-year update process. SRK considers that this should include improvements to

It also requires ongoing financial provision for mine closure. Supporting subsidiary law includes instructions for mine closure planning processes, cost estimation, and financial provisions for closure.

the knowledge base for closure and more detailed technical design coupled with the setting of realistic closure criteria for each closure domain. A risk-based approach to closure planning would enhance closure designs and strengthen the assumptions.

The geochemistry of mine waste and rock exposed by mining and associated potential water impacts are commonly not well understood. Globally, this is a widespread closure planning weakness. However, numerous governments have become strict about addressing this during permitting – particularly in countries where there is much experience of mining and an effective drive to improve the quality of water resources. Both mining law and new environmental law in Kazakhstan provide for the necessary geochemical studies, but more guidance is needed to support professionals to undertake these to inform mine design and closure planning that protects water resources.

Previously, mine closure focused largely on biophysical and health and safety issues only. Nowadays, the socio-economic transition is getting more attention. Mining is a major industry in Kazakhstan and many local economies are dependent on mining. Examples are Temirtau, Rudny, and Ridder. While the socio-economic transition is important, it is not addressed in law yet.

ELECTRIC VEHICLES IN KAZAKHSTAN:

WHAT IS ALREADY AVAILABLE AND WHAT IS STILL NEEDED

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Partner at Unicase Law Firm

Kamila Tabuldinova
Junior Lawyer

INCENTIVES AND SUBSIDIES FOR ELECTRIC VEHICLES

In 2024, electric vehicles will account for 16% of the total number of vehicles in the global car market[1]. This trend is also supported by the governments of various countries, which actively support the decarbonisation of transport systems in general and the introduction of electric vehicles in particular. According to statistics available at the end of 2022, the leading countries in terms of electric vehicle sales in the world are Western Europe and China, as can be seen in Figure 1 below:

[1] *"The world's best-selling electric cars January 2024", José Pontes, https://cleantechnica.com/2024/03/05/top-selling-electric-vehicles-in-the-world-january-2024/*

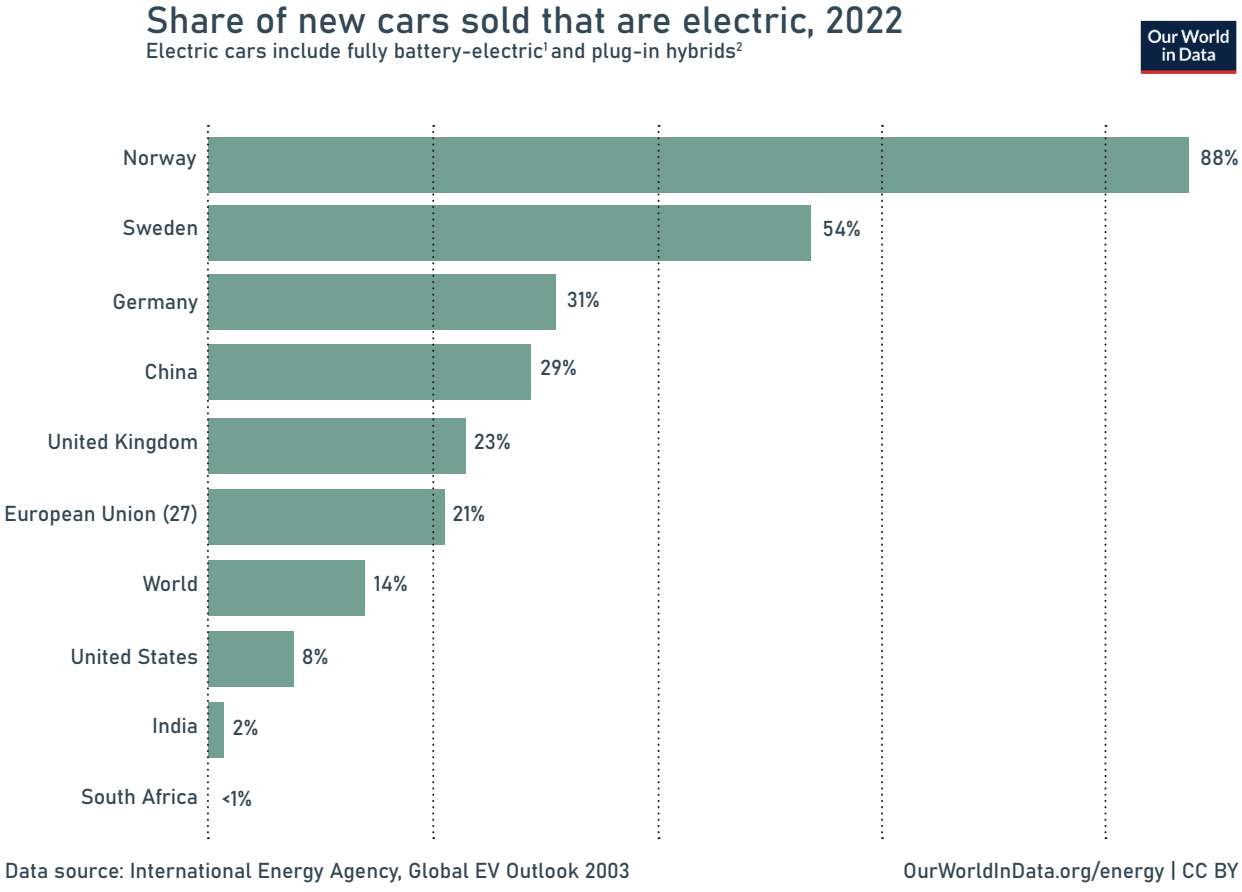


Figure 1: Share of electric vehicles in new car sales by country, in % for 2022.

The main measures to support this tendency are subsidies for the purchase of electric vehicles, tax incentives and customs duty exemptions. Thus, citizens permanently residing in Armenia, Belarus, Kazakhstan and the Kyrgyz Republic are granted customs duty exemption benefits. However, ownership, use and disposal of electric vehicles cannot be transferred to persons with citizenship and/or permanent residence in the Russian Federation[2] .

Norway is leading the worldwide sales of electric vehicles[3]. It is one of the first countries to adopt a number of legislative initiatives to incentivise the use of electric vehicles. Already in the 1990s, the Norwegian government took a number of measures to exempt electric vehicles from paying the purchase/import tax, annual road tax, charging for toll roads and several others[4], which made the use of electric vehicles more affordable for purchase and use. Moreover, according to the CNBC TV documentary "How Norway Built An EV Utopia While The U.S. Is Struggling To Go Electric"[5] dated 17 February 2024, electric vehicle owners enjoy free parking, passage along bus lanes, ferry crossings and toll roads, and are exempt from the 25% Value Added Tax (VAT). These initiatives are still in force today, which in turn has only increased the number of electric vehicles in Norway.

As regarding our neighbour countries, Uzbekistan has adopted the following regulatory acts: "On Measures of State Support for the Organisation of Electric Vehicle Production"[6] and "On Measures to Expand the Infrastructure for the Operation of Electric Vehicles", both dated 19 December 2022[7] . There are advantages for import of electric cars - neither customs duties nor excise taxes are to be paid for them. Also, in order to stimulate sales, the state partially reimburses interest rates on loans used to purchase electric vehicles manufactured in Uzbekistan and sold in the domestic market.

[2] *"Tariff concession for imports of electric vehicles to Kyrgyzstan for 2024-2025 extended", https://mineconom.gov.kg/ru/post/9836*
[3] *https://ourworldindata.org/electric-car-sales#:~:text=Globally%2C%20around%201%2Din%2D,these%20trends%20across%20the%20world.*
[4] *Norwegian EV policy, https://elbil.no/english/norwegian-ev-policy/*
[5] *https://www.youtube.com/watch?v=R5DbRyeZNRk*
[6] *"On measures on state support for the organisation of production of electric vehicles" Decree of the President of the Republic of Uzbekistan No. IIII-443 dated 19.12.2022 https://lex.uz/ru/docs/6316585*
[7] *"On measures to expand the infrastructure for the operation of electric vehicles" Decree of the President of the Republic of Uzbekistan of 19.12.2022, No. PP-444, https://lex.uz/docs/6316595*

In addition to the exemption from customs duties, in Kazakhstan, electric vehicles are also exempt from transport tax until 31 December 2025 on the basis of Paragraph 9 of Annex 3 to the Decision of the Council of the Eurasian Economic Commission of 20.12.2017 "On Certain Issues Related to Goods for Personal Use"[8]. At the same time, according to Annex 3 to the Order "On Approval of the Methodology for Calculating the Recycling Fee" of the Minister of Ecology, Geology and Natural Resources of the Republic of Kazakhstan[9] dated 2 November 2021, from 4 July 2021, owners of electric vehicles are exempt from paying the recycling fees.

CHARGERS AND INFRASTRUCTURE AND THEIR PROBLEMATICS

A major limitation to the development of electric vehicles is the so-called "EV range anxiety", afear of electric vehicle drivers that the battery charge may not be sufficient for the planned route and that there will be no charging station along the way[10]. Accelerating the development of charging infrastructure is one of the key solutions to the range anxiety. Regardless of their destination, electric vehicle drivers need the confidence that they can conveniently find charging points along their route and be assured of the reliability of these chargers. In Norway, the most densely populated country with electric vehicles, there are still reliability issues and a lack of standardisation of chargers, related payment systems and apps - each company has its own apps and payment methods.

Currently there are 269[11] charging stations across Kazakhstan, which is rather few given the country's size, as shown in Figure 2 below. The main problem in Kazakhstan is the low number of EV charging stations outside major cities such as Almaty, Astana, Shymkent, and their absence on highways, which prevents travelling by car between cities and countries.

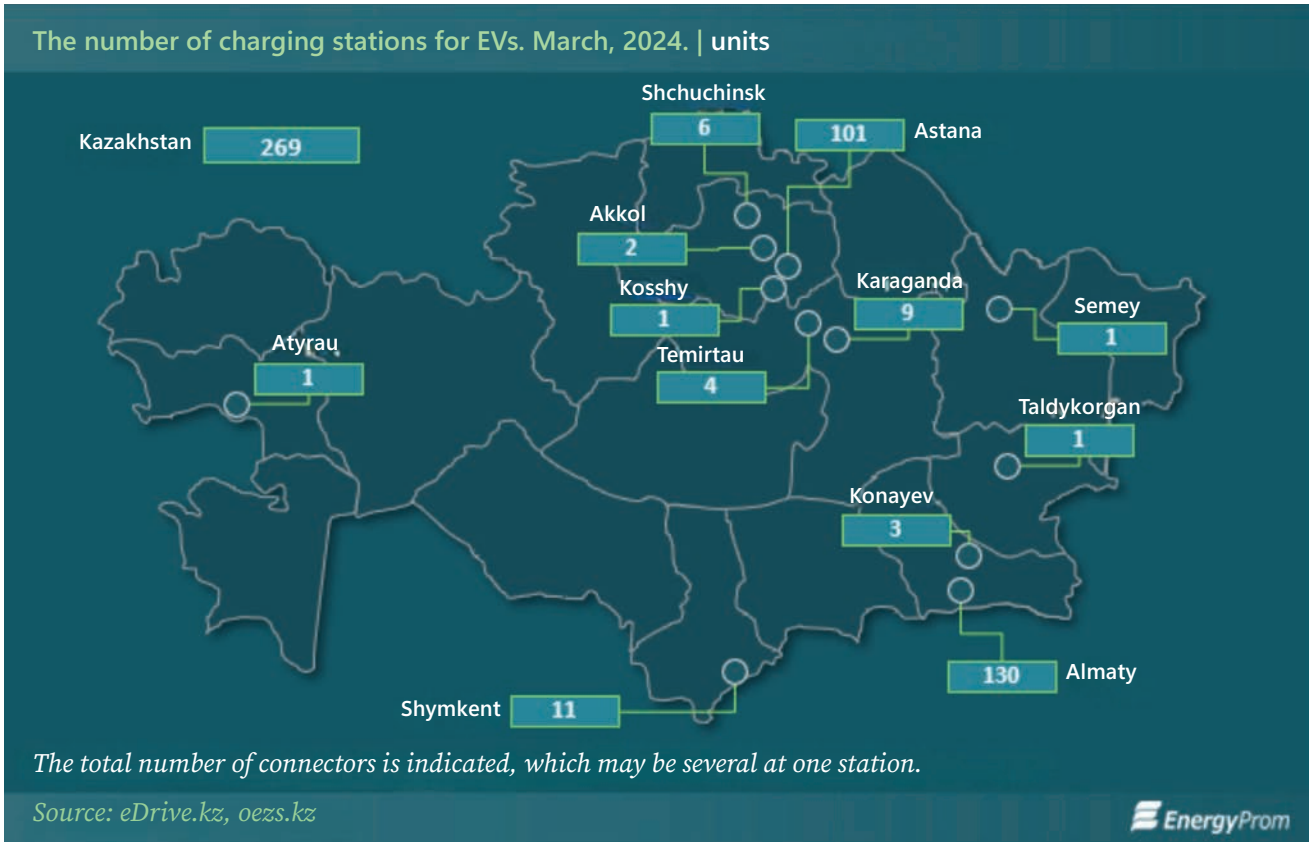
In large cities of Kazakhstan there is charging stations that recharge cars in garages, parking lots, charging stations and in houses. However, there is currently a ban on the installation of charging stations in residential buildings, which creates a number of inconveniences for the citizens of Kazakhstan.

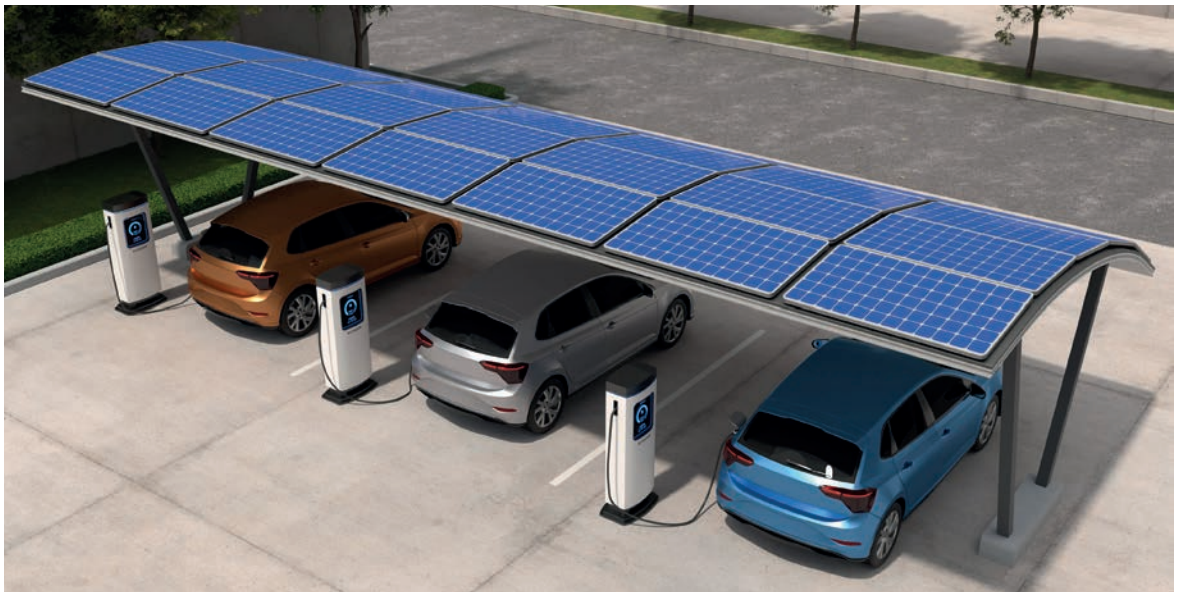
So, to overcome the range anxiety of electric vehicle drivers, the key solution is to create an appropriate and efficient charging infrastructure for electric vehicles. This will help to establish drivers' trust and reassure them that they can easily find charging stations on their route and rely on their reliability, which ultimately helps to accelerate the development of EV adoption infrastructure.

DEVELOPING THE ELECTRIC VEHICLE SECTOR IN KAZAKHSTAN

A key factor for development is the adoption of legislation and regulations that promote the development of electric vehicles

Figure 2: Geography of charging station locations in Kazakhstan, March 2024.





and infrastructure, including safety standards, environmental requirements and economic incentives, to improve the current situation. To encourage the purchase of electric vehicles, it may be necessary to make additions-amendments to current legislation and develop regulations aimed at:

• additional support measures for the acquisition of electric vehicles;

• regulations to standardise charging station networks;

• acts to integrate charging infrastructure into new construction of roads and buildings.

New mandatory standards for charging stations for electric vehicles were adopted in Kazakhstan on 22 April 2024. In accordance with the order of the Committee for Construction, Housing and Utilities of the Ministry of Industry and Construction, in the part "Urban planning, layout and development of urban and rural settlements" of the Construction Norms of the Republic of Kazakhstan[12] provides for the addition of paragraph 11.1.5, which prescribes the installation of charging service infrastructure for electric vehicles on the territory of settlements. Charging stations can be located at petrol and gas stations, service stations, parking lots, roadside service facilities, as well as in residential, public, business and industrial areas. In addition, the construction of parking lots is now required to provide spaces for electric vehicles with equipped chargers, and only factory charging stations may be used. It is recommended that fast and super-fast charging stations be installed at petrol stations and gas filling stations, and that at least one charging space for electric vehicles at petrol stations and gas filling stations be mandatory for wheelchair users.

Besides creating charging station infrastructure for electric vehicles, it is important to encourage private entrepreneurs and companies to invest in renewable energy. A programme for investment in electric vehicle infrastructure could include subsidies, grants or preferential loans for private entrepreneurs and companies that wish to invest in the development of charging infrastructure. Such a programme could also combine mechanisms to encourage private investment with, for example, tax incentives or public-private partnership mechanisms.

Investment in charging infrastructure would create new workplaces and boost economic growth, while stimulating demand for electric vehicles and related goods and services such as maintenance, repair and technical support. It is also important to be able to influence the development of new renewable energy technologies - for example, the Norwegian experience of building and installing charging stations powered by their own solar panels or wind turbines that generate their own electricity could be adopted. In addition to the incentives already available, a programme could be developed to subsidise rural areas from the government to develop charging station infrastructure.

In conclusion, the development of the electric vehicle sector in Kazakhstan requires a comprehensive approach, including the adoption of appropriate legislation to encourage investment in the infrastructure of accessible and easy-to-use charging station networks. These measures help to improve the environmental situation, reduce dependence on traditional energy sources and stimulate economic growth through innovation and the creation of new workplaces.

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[8] *Decision of the Council of the Eurasian Economic Commission of 20 December 2017 № 107 "On Certain Issues Related to Goods for Personal Use" (Moscow) (as amended as of 09.12.2023) https://online.zakon.kz/Document/?doc_id=33509536&pos=218;7#pos=218;7*

[9] *"On Approval of the Methodology for Calculation of the Recycling Payment" Order of the Acting Minister of Ecology, Geology and Natural Resources of the Republic of Kazakhstan dated 2 November 2021, https://adilet.zan.kz/rus/docs/V2100025100*

[10] *https://www.theguardian.com/business/2023/dec/09/stranded-electric-car-ev-range-anxiety-charging-network*

[11] *News portal Kapital KZ, https://kapital.kz/auto/124307/za-god-kolichestvo-legkovykh-elektrokarov-v-kazakhstane-vyroslo-v-devyat-raz.html*

[12] *Official website of the Committee for Construction and Housing and Communal Services of the Ministry of Industry and Construction https://www.gov.kz/memleket/entities/kds/documents/details/649644?directionId=2306&lang=ru*

CHARTER

APPEAL TO THE GOVERNMENT OF THE REPUBLIC OF KAZAKHSTAN

ON BEHALF OF THE BUSINESS COMMUNITY IN THE ENERGY INDUSTRY AND

RENEWABLE ENERGY SOURCES

(based on the results of Qazaq Green Fest, III International Business Festival on Renewable Energy, May 30-31, 2024 in Burabay district of Akmola region)

ON BEHALF OF THE BUSINESS COMMUNITY IN THE ENERGY INDUSTRY AND **RENEWABLE ENERGY SOURCES**

(based on the results of Qazaq Green Fest, III International Business Festival on Renewable Energy, May 30-31, 2024 in Burabay district of Akmola region)

THE BUSINESS COMMUNITY OF THE ENERGY INDUSTRY AND RENEWABLE ENERGY SOURCES (HEREINAFTER REFERRED TO AS RES) SUPPORTS THE INITIATIVES OF THE PRESIDENT OF THE REPUBLIC OF KAZAKHSTAN K.K.TOKAYEV REGARDING THE TRANSITION TO A GREEN ECONOMY AND SUSTAINABLE DEVELOPMENT IN THE COUNTRY.

As is well known, the Republic of Kazakhstan has declared its commitment to the goal of achieving carbon neutrality by 2060. In February 2023 The Head of State signed the Strategy for achieving Carbon Neutrality of the Republic of Kazakhstan by 2060. Under the Paris Agreement, Kazakhstan has committed to an unconditional 15% reduction in greenhouse gas emissions, as well as a 25% reduction (conditional on international support) by 2030, compared to the 1990 levels.

Today, more than ever, Kazakh society understands the great responsibility we have for the ecological future of our country and the health of our nation. One of the ways to achieve all set goals is through the introduction of renewable energy technologies.

At the same time, there are currently constraints to the development of renewable energy in the Kazakhstan's market, which were discussed at length at the III International Business Festival Qazaq Green Fest. The Festival brought together over 400 representatives from the business sector in the fields of both traditional and green energy. Based on the outcomes of the event, the business community has submitted the following proposals to relevant state authorities and the Government of the Republic of Kazakhstan:

2024

CONSIDERATION AND ADOPTION OF THE STRATEGY FOR THE DEVELOPMENT OF THE ELECTRIC POWER INDUSTRY OF THE REPUBLIC OF KAZAKHSTAN UNTIL 2035

1 The further development of renewable energy directly depends on the state of the energy industry, which has accumulated many problems today: a shortage of maneuverable capacities, obsolescence of generating equipment and an increase in accidents at stations, a shortage of power reserves in the system, isolation of the Western energy zone, dependence on flows from neighboring countries, social orientation of tariff policy in the absence of targeted assistance mechanisms, and shortage of personnel.

In general, all these problems pose a real threat to Kazakhstan's energy security. It is understood that the future development of all sectors of the economy will depend on the development of the energy sector, given the increasing consumption dynamics and the growing energy deficit.

Apart from that, it is important to consider such external factors as the introduction of the common electric power market of the Eurasian Economic Union (2027), the implementation of a carbon footprint tax in the European Union (2026), and Kazakhstan's commitments under the Paris Agreement (2030).

Considering all the challenges and obstacles, the Kazakhstan Electric Power Association and the "Qazaq Green" Renewable Energy Association have taken the initiative to elaborate a Strategy for the development of the electric power industry in the medium term (hereinafter referred to as the Strategy). The main objective of this document is to provide clear signals, understanding and a vision to all stakeholders: the state, business and the public on further ways to develop the electric power industry considering economic and financial indicators.

As part of the Strategy development, the following topical issues in the industry have been considered: a further vision for the development of coal generation, with regard to Kazakhstan's realities and environmental challenges, the development of the gas industry, considering the need for gas consumption in the domestic market, the development of renewable energy sources (issues of construction of maneuverable capacities, integration of solar and wind power plants into the energy system, development of hydropower), the development of the national electric grid and transnational flows, issues of heat supply development, tariff policy. We would like to emphasize that the developed Strategy meets, first of all, the interests of the country, the population and domestic business.

We request the Government of the Republic of Kazakhstan to consider the draft Strategy and determine its place as an official document in the state planning system.

SOLVING CHALLENGES RELATED TO THE PERSONNEL IN THE ENERGY SECTOR

2 In course of the meeting of the Supreme Council for Reforms on June 23, 2023, the Head of State K.J. Tokayev outlined the problems that require attention, that is, a shortage of qualified personnel, staff turnover at heat and power facilities and the energy system.

The main reasons for this situation include the low level of wages for power engineers as approved in tariff estimates, a lack of employee benefits, insufficient funding for professional development and retraining of personnel, as well as difficult working conditions.

Retaining qualified personnel and attracting young experts in companies is an urgent and priority area in the work of personnel management services of energy companies. The volume of accumulated issues has reached a point where their resolution requires immediate action from the government.

In this regard, we would like to request the Ministry of National Economy of the Republic of Kazakhstan to review the rules for tariff formation with a view to increasing the cost of personnel, both in terms of determining an objectively fair number of employees based on standards and in terms of ensuring salaries that are not lower than the republican average. Salaries that are not lower than the national average should be considered fair. In those regions where the average salary is higher than the national average, it is recommended to use the regional average instead.

We note that the current binding to the regional average does not allow most regions to raise the wage level above the indicator of the forecast of socio-economic development. The Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan is asked to develop a program of state social support for employees of the electric power industry: for the purchase and construction of housing for resettlement to labor-deficient regions, medical and sanatorium services for workers engaged in work with harmful and dangerous conditions. The Ministry of Science and Higher Education of the Republic of Kazakhstan to increase the formation of a state educational order for personnel training in the educational programs "Electrical Engineering and Energy", "Thermal Power Engineering", "Electrical Engineering and Automation".

The above measures will serve as the foundation for maintaining optimal conditions for the operation and growth of the industry. This will ensure its viability, reduce the exodus of skilled personnel, and, consequently, enhance the reliability and quality of electricity supplies to consumers and the economy of our nation.

3 THE OPERATION OF RENEWABLE ENERGY FACILITIES WITHIN THE FRAMEWORK OF A SINGLE BUYER AND BALANCING ELECTRICITY MARKET IN REAL TIME

On July 1, 2023, a new market mechanism was implemented: the single buyer and real-time balancing of the electricity market. Conceptually, the introduction of new rules of the game for renewable energy facilities (hereinafter referred to as RES) implies: the sale of generated electricity to a "Single Buyer" and the application of financial liability measures for the imbalances in the energy system.

It should be noted that the renewable energy facilities that concluded long-term contracts for the purchase and sale of electricity before July 1, 2023, remained within the framework of the previous operating modes and conditions. For RES projects that enter into contracts with Accounting and Finance Center for RES LLP after July 1, 2023, financial liability is provided for positive and negative imbalances in the energy system, which are related to increasing and decreasing factors.

Specifically, in accordance with the Rules of Functioning of the balancing market of electric energy, for energy-producing organizations using renewable energy sources that have concluded a long-term contract for the purchase and sale of electric energy with a single buyer of electric energy after July 1, 2023, the values of the increasing and decreasing coefficients, as well as the values of permissible deviations specified in this paragraph, are to be determined in accordance with the procedure approved by the authorized body in accordance with paragraph 16 of Article 15-10 of the Law of the Republic of Kazakhstan "On Electric Power Industry".

It should be noted that the values of the increasing and decreasing coefficients, as well as the range of permissible deviations, are not determined at the moment. In this regard, based on the work of the balancing electricity market and the Single Buyer mechanism over the past year, we request the Ministry of Energy of the Republic of Kazakhstan to conduct analytical work and submit the above issues for discussion with the RES business community.

In addition, we would like to point out that in order to better predict and adjust planned generation volumes from renewable energy sources, the rule for adjusting planned applications two hours before the relevant hour has a conditional nature and is only applied if the balance between production and consumption of electricity is maintained. That is, before the beginning of the operating hour for which the adjustment was scheduled, an application for a reverse adjustment from another entity should appear in the designated area. If this does not happen, the controllers of the National Dispatch Center of the System Operator will reject such adjustments. In turn, this condition makes the adjustment norm practically non-functioning. We ask you to consider the possibility of further improving the adjustment mechanism. We believe that this will provide an opportunity to more quickly adjust the schedule of generation by RES facilities, which will reflect the real conditions under which these facilities operate (weather conditions, technical conditions of the lines, etc.).

These measures will contribute to the successful implementation of renewable energy projects and significantly reduce risks for investors.

DEVELOPMENT OF THE MARKET FOR BILATERAL RES CONTRACTS

4 It is essential to adopt a flexible approach towards the development of renewable energy in our country, taking into account the interests of both consumers and investors in order to meet our strategic goals of achieving carbon neutrality. The opportunity to implement these projects for their own needs and take advantage of the existing package of support measures for renewable energy should be available to all businesses, regardless of their ownership structure. Thus, the development of RES as a direct tool for decarbonizing the economy should become a national task.

One of the tools for the development of the RES market is the segment of bilateral renewable energy contracts, when an industrial enterprise enters into a direct contract with a renewable energy generator to purchase green electricity in order to reduce its carbon footprint. According to experts, this segment has great prospects due to the fact that most companies in the real sector of the economy have adopted strategies at the corporate level aimed at decarbonizing production processes. In general, the market of bilateral contracts can be much larger than the RES auction market and become a driver of further development of the sector, while not affecting the growth of tariffs for households and businesses in the country.

Despite the fact that the legislation regulating the development of renewable energy sources does not exclude the development of the market of bilateral contracts, the key barriers to the development of this segment include the following:

- uncertainty of the rules of operation of bilateral renewable energy contracts in the light of the introduction of the "Single Buyer" model;
- the lack of "rules of the game" for market participants in general;
- strict requirements of the system operator for connecting such facilities, despite the fact that renewable energy facilities are not directly connected to the network;
- The issues of balancing, free transportation and

priority dispatching for such projects remain debatable;

- the possibility of selling surplus electricity under bilateral contracts to a single buyer;
- there is no understanding of how financial organizations can lend to such projects, given the absence of any risk reduction mechanisms, in the event of termination of the purchase of electricity from a renewable energy facility by an industrial enterprise;
- for the state and quasi-public sectors that would like to implement RES projects, the access to a package of state support measures (investment, customs, tax preferences) is limited. The Business Code limits the share and duration of participation by such organizations in investment priority projects, making the implementation of renewable energy projects problematic for them.
- allocation of land plots for bilateral renewable energy projects.

In this regard, we request the Ministry of Energy of the Republic of Kazakhstan to develop and implement rules for the implementation of bilateral projects in this area in cooperation with the renewable energy business community, and if necessary, to initiate legislative changes.

FURTHER STIMULATION OF SMALL-SCALE RES

5

In the spring of 2024, the Majilis of the Parliament of the Republic of Kazakhstan adopted the draft Law of the Republic of Kazakhstan "On Amendments and Additions to Several Legislative Acts of Kazakhstan Regarding Support for the Use of Renewable Energy Sources, the Electric Power Industry, and Natural Monopolies." The draft Law of the Republic of Kazakhstan was recently adopted by the Senate of the Parliament of the Republic of Kazakhstan (hereinafter – the draft Law of the Republic of Kazakhstan).

In accordance with the draft Law of the Republic of Kazakhstan, there are plans to introduce the concept of small-scale RES projects, to increase the capacity of renewable energy projects to 200 kW, to create the attractive conditions for connecting net consumers to the networks of energy transmission organizations and selling electric energy to energy supply organizations, as well as incentive measures to purchase surplus electricity generation of small-scale renewable energy from net consumers.

These measures will contribute to the development of the use of renewable energy technologies by households and small and medium-sized enterprises in the country. According to the UNDP assessment, the potential for the development of small-scale RES can reach 2-3 GW. In this regard, the issue of monitoring the development of small-scale RES becomes relevant. It should be noted that official statistics from a sample household survey do not provide a comprehensive picture of the development of small-scale RES in the country. Furthermore, the collection of data on small-scale RES through local executive bodies does not accurately reflect the actual situation. In addition, the population and business of the country, having no experience in implementing RES projects, are practically deprived of the opportunity to receive qualified information about the development opportunities of small-scale RES projects. To address this information gap, it would be beneficial to establish an Information and Analytical Center to support small-scale RES projects. This center could be based on the Qazaq Green Renewable Energy Association, following the principles of a market council, in accordance with the laws of the Republic of Kazakhstan.

Therefore, such a Center could have the status of a non-profit organization engaged in monitoring the development of small-scale RES in the country and at the same time would perform the following functions:

- monitor the development and operation of small-scale RES facilities connected to electric grids;

- receive and process information from regional power grid companies on issued technical connection conditions, connected small-scale renewable energy facilities, refused connections to small-scale RES facilities;
- to receive and process information on the purchase of excess electricity generated by net consumers (volumes, tariffs) from energy supply organizations divided up by months;
- submit analytical information on the development of small-scale RES by region to the authorized body;
- to make proposals to the authorized body on improving the legislation of the Republic of Kazakhstan on the development of small-scale renewable energy sources;
- to carry out information and explanatory work with the public and business on the development of small-scale renewable energy sources, as well as maintenance of renewable energy plants
- perform other functions determined by the authorized body.

We request the Ministry of Energy of the Republic of Kazakhstan to consider this proposal and, if approved, initiate necessary amendments to the legislation of the Republic of Kazakhstan and the development of Rules for the operation of the Information and Analytical Center for the development of small-scale RES.

6

IMPROVING THE INDEXING MECHANISM FOR RENEWABLE ENERGY PROJECTS

To reduce currency risks in the implementation of renewable energy projects, a mechanism for currency indexing of fixed and auction tariffs has been implemented since 2017. It was approved by the Decree of the Government of the Republic of Kazakhstan No. 271 dated March 27, 2014 "On Approval of the Rules for Determining Fixed Tariffs and Auction Prices". In addition, in 2022, a new system of indexing was introduced for the construction period of renewable energy facilities. According to fixed standards, this process can take from 2 to 5 years, depending on the specific technology used. The indexing formula has also been significantly improved.

However, in all existing currency indexing mechanisms, the US dollar is fixed in the current Rules. It should be noted that today the geography of investors working in the renewable energy sector covers countries such as China, Germany, France, Russia, etc., which allows them to attract affordable financing in other currencies, for example, yuan, euro, Russian rubles. Thus, the current mechanism does not allow full use of the opportunities of foreign investors for the development of "green" energy in Kazakhstan. In this regard, it would be beneficial to provide investors with the option to choose the currency when implementing the indexing mechanism, rather than being restricted to the US dollar alone.

Apart from that, in order to ensure the flexibility of the indexing mechanism, it is important to provide investors with the opportunity to convert the US dollar to another foreign currency once, both during the indexing for the construction period and during the operational phase during the life cycle of the project.

It should also be noted that, at the moment, the indexing formula in the rules is selected only once when a purchase agreement is concluded for the entire duration of its validity. However, as a rule, the attraction of investments or loan funds from financial institutions (including international ones, such as the EBRD, EDB, etc.) is carried out after signing the purchase agreement. Therefore, all the conditions for financing the project are to be discussed after signing the purchase agreement. At the same time, the chosen indexing method plays an important role in the financial structuring of the project. It is necessary to provide investors with the right to change the indexation formula once, both during the construction period and during the operational phase of the agreement.

We request the Government of the Republic of Kazakhstan to consider the proposals of the business community to improve the indexing mechanism.

7 EXCLUSION OF RES FACILITIES FROM THE LIST OF VULNERABLE TO TERRORISM

In accordance with the Regulations and Criteria for classifying facilities as vulnerable to terrorism, approved by Decree of the Government of the Republic of Kazakhstan No. 234 dated April 12, 2021, facilities vulnerable to terrorism include: TPP, SRPP (State Regional Power Plant), HPP, GTPP (Gas Turbine Power Plant), CHP and boiler houses. At the same time, local executive bodies have included renewable energy producing organizations in the list of facilities vulnerable to terrorism (solar and wind power plants).

According to the Law of the Republic of Kazakhstan "On Support for the Use of Renewable Energy Sources", an energy production organization using renewable energy is a legal entity that produces electric and/or thermal energy using renewable sources, excluding net consumers. Renewable energy sources include solar radiation, wind, hydrodynamic energy from water, and geothermal energy from heat within the soil, groundwater, and rivers. These are not energy-producing organizations as defined in Decree No. 234 of the Republic of Kazakhstan.

Renewable energy producing organizations do not meet any of the criteria for listing objects as vulnerable to terrorism:

1. They are not a part of the critical state facilities (central state bodies, judicial bodies, local executive bodies, etc.);
2. They do not belong to strategic objects, objects of economic sectors of strategic importance, vulnerable to terrorism (military units, state reserve facilities, etc.);
3. They are not a part of dangerous production facilities;
4. They are not places where people gather in large numbers.

Pursuant to the Law of the Republic of Kazakhstan "On Civil Protection" (paragraph 75 of Article 1), life support facilities include an energy supply facility, upon termination (suspension) of operation of buildings, structures, technological installations and aggregates of which the activities of social and engineering infrastructures of settlements and territories are disrupted. It should be noted that RES facilities are not energy supply organizations, the electricity generated by them enters the Unified Energy System of the Republic of Kazakhstan and cannot disrupt the activities of social and engineering infrastructures of settlements and territories.

If energy-producing organizations that use renewable energy sources are considered vulnerable to terrorist attacks, investors may face unforeseen expenses that could directly affect their capital and operating expenses, leading to a decrease in profitability and a loss of interest in investing in renewable energy projects in Kazakhstan. This could result in a decrease in foreign and domestic direct investment in this sector.

We request the Government of the Republic of Kazakhstan to exclude energy-producing organizations using renewable energy sources from being vulnerable to terrorism and to make appropriate amendments to the regulatory framework.

INFORMATION SUPPORT FOR THE DEVELOPMENT OF RENEWABLE ENERGY SOURCES

8

Today, one of the few industry news online publications is the QazaqGreen.com information portal. Every year, the portal publishes about 1,500 materials in state, Russian and English languages and thye news on the development of the green economy. The users of the portal come from various countries, including Kazakhstan, Russia, the United States, Kyrgyzstan, Uzbekistan, Ukraine, Belarus, the United Kingdom, Germany, and Japan.

Therefore, today the Qazaq Green.com portal has become practically the only platform in Kazakhstan that systematically and purposefully provides information and analytical support for the development of renewable energy sources. This work is extremely important due to the fact that the awareness of the population about the issues of energy transition, the principles of lean consumption of energy resources, and the use of clean energy sources is currently extremely low. In addition, unfortunately, at the state level, there is either no work done to inform the public and businesses, or it is done in a fragmented manner.

In this regard, we request the Government of the Republic of Kazakhstan to consider the possibility of allocating a state order for the implementation of state information policy at the republican level for the placement of materials on the development of a green economy, the development of clean energy sources, decarbonization, achieving the goals of carbon neutrality and ecology for the Internet portal "Qazaq Green.com".

9

"RENEWABLE ENERGY WORKER DAY" PROFESSIONAL HOLIDAY

An additional measure to stimulate the development of renewable energy sources could be the initiation of a professional holiday - the Day of the Renewable Energy Worker. This would not only encourage employees in the sector from an economic perspective, but also promote renewable energy as a whole.

It is commonly known that "people make all the difference" and the renewable energy sector is no exception to these rules. Thousands of specialists work in the sector today: power engineers, engineers, builders, economists, civil servants, investors, scientists, and analysts. Thanks to their work, a completely new sector of the economy has appeared in the country in a short period of time, and 148 renewable energy facilities with a total installed capacity of about 2.9 GW generate renewable energy.

In the period from 2018 to 2023 over 297 companies from 13 countries took part in the auction for the selection of renewable energy projects. A large amount of investment has been attracted to this sector.

International organizations such as UNDP, USAID, as well as international financial institutions (EBRD, ADB, EDB, Clean Technologies Fund, Green Climate Fund, etc.) operate in the Republic of Kazakhstan on renewable energy, and all of them have completed or ongoing projects in their portfolios. A separate division of the Astana International Financial Center is dedicated to the topic of "green finance". Global oil and gas companies ENI, Shell, Total are engaged in the implementation of renewable energy projects in different parts of our country.

Students studying energy at universities in the country are taught courses in renewable energy and a successful renewable energy landfill operates at Nazarbayev University. In addition, a full-fledged master's program in "Strategic Management of Renewable Energy and Energy Efficiency" was launched at the Kazakh-German University. Specialists are defending doctoral dissertations on renewable energy.

We request the Government of Kazakhstan to consider establishing a professional holiday for renewable energy workers as a means to encourage young professionals to enter the industry.

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III International business festival on renewable energy sources

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Energy security of Kazakhstan: low-carbon transition

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Railway station/Nurly Zhol/Nur-Sultan 1, Almaty 1/Almaty 2

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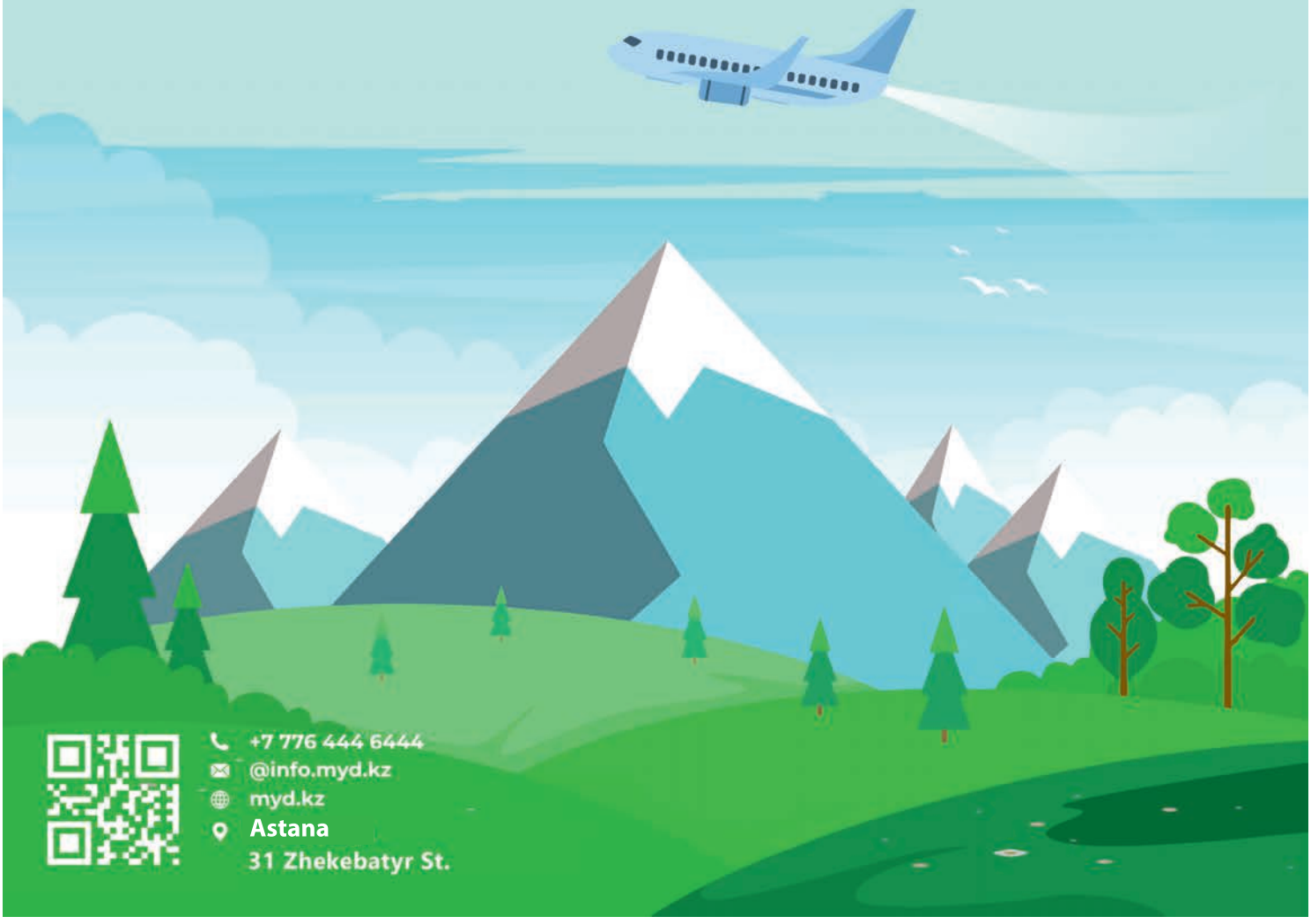

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QAZAQ GREEN Association

PLATFORM FOR NATIONAL AND INTERNATIONAL PLAYERS IN RENEWABLE ENERGY SOURCES

NURLAN KAPENOV
Chairman of the Board of Directors

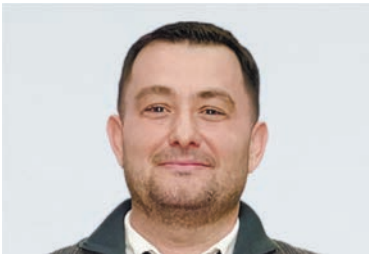
ISLAMBEK SALZHANOV
Chairman of the Supervisory Board

AINUR SOSPANOVA
Chairperson – Member of the Board of Directors

ORAZ JANDOSOV
Member of the Board

ANATOLIY SHKARUPA
Independent Director

VALERIY TYUGAY
Member of the Board



MIKHAIL KADYMOV
Member of the Board

ARSENIY KATERUSHA
Independent Director

ZHOMART MOMINBAYEV
Member of the Board

ASSOCIATION AS INFORMATIONAL RESOURCE

The Association is a resource that will allow members of the Association to receive information about changes in legislation immediately.
Association is a resource that creates public opinion, and also contributes to the promotion of renewable energy. It will allow you to form a positive image around an event in the activities of both a member of the Association and the Association itself.

ARTYOM SLESARENKO
Independent Director

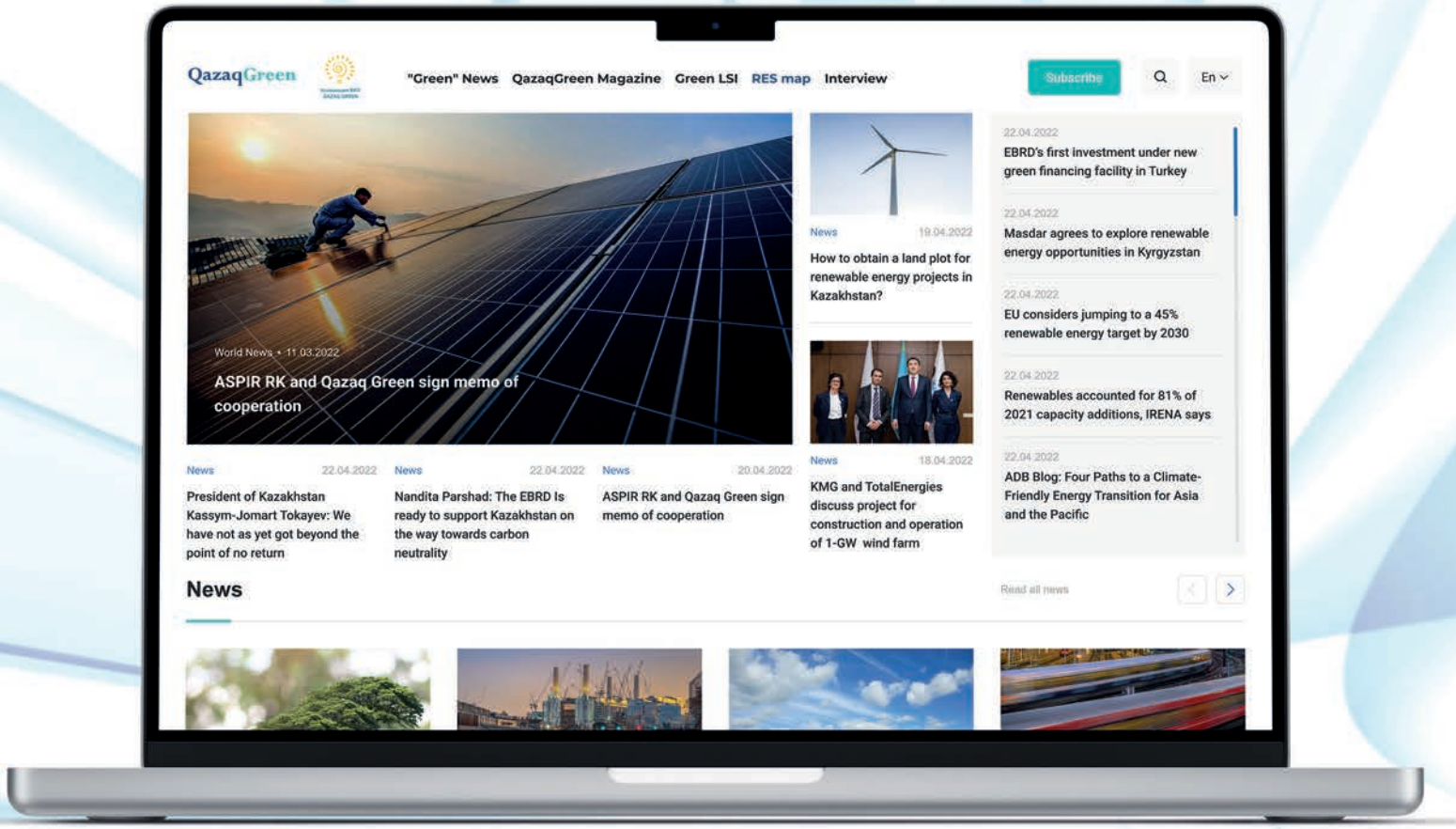
AIDA MAKSUT
Independent Director

TIMUR SHALABAYEV
Executive Director

ZHANAR KUANYSHBEK
Manager

QAZAQ GREEN Association

KONRAD ADENAUER STIFTUNG



Qazaq Green has launched information portal on "green" economy of Kazakhstan

www.qazaqgreen.com

information portal will present latest news from Central Asia, Kazakhstan and all over the world, as well as articles of QazaqGreen magazine.

KONRAD ADENAUER STIFTUNG

The Konrad Adenauer Foundation is a political foundation of the Federal Republic of Germany. With its programmes and projects, the Foundation actively and effectively promotes international cooperation and mutual understanding.

The Representative Office of the Foundation in Kazakhstan began its work in 2007 at the invitation of the Government of the Republic of Kazakhstan. The Foundation works in partnership with government agencies, the Parliament of the Republic of Kazakhstan, civil society organizations, universities, political parties and enterprises.

The main purpose of the Foundation's activities in the Republic of Kazakhstan is to strengthen mutual understanding and partnership between the Federal Republic of Germany and the Republic of Kazakhstan through cooperation in the field of political, educational, social, cultural and economic development, thus contributing to the further development and prosperity of Kazakhstan.

The Konrad Adenauer Foundation has the following priorities in the Republic of Kazakhstan:

- **Policy and Party Counselling**
- **Interparliamentary Dialogue**
- **Energy and Climate**
- **Local Self-Governance**
- **Political Education**
- **Media**
- **Sur-Place Scholarships**

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