INFORMATION AND ANALYTICAL MAGAZINE

QazaqGreen

KONRAD ADENAUER STIFTUNG

SOLAR POWER ASSOCIATION OF QAZAQSTAN

www.kas.de www.spaq.kz

2021

№2 (02–03) September

DECARBONIZATION OF THE ECONOMY:

Kazakhstan and Central Asia

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NURLAN KAPENOV

Dear readers, colleagues!
Dear friends!

As a result of ongoing state policy, a new sector of the economy – renewable energy-has been developing in our country for several years. A lot has been done during this time. Firstly, large solar and wind parks, small hydroelectric power plants, and bioelectric power plants have been built in the regions. Thus, at the end of 1st half of 2021, the total installed capacity of renewable energy facilities amounted to 1897 MW, and renewable energy accounted for 3.5 % in the total volume of electricity production during this time. Secondly, auctions for RE projects have been held 4 years now and are open to companies from all over the world, and generally represent an understandable and transparent mechanism for selecting projects.

However, there are big systemic problems in the sector. Green energy, in fact, has exposed the key problems of the electric power industry, such as imbalances in the system, lack of maneuverable capacities, dependence on neighboring states, equipment wear, isolation of the Western Zone, energy security of our country. In addition, today there is a situation where the technical capabilities of the energy system do not allow further development of renewable energy sources to the full. Namely, the problem of shortage of maneuverable capacities is the problem that has been discussed for second decade.

The Schedule of auctions for RE projects for 2021, published at the end of July, reflects the real situation in the renewable energy sector. The total installed capacity auctioned in 2021 is 200 MW, broken down by type of power plants:

- solar power plants (SPP) – 20 MW;
- wind power plants (WPP) – 50 MW;
- hydroelectric power plants – (HPP) - 120 MW;
- biogas power plants (BGPP) – 10 MW.

There is a trend to reduce the selection of solar and wind power plant projects. Thus, the following volumes were put up for auctions for solar power plants in previous years: 2018-290 MW, 2019-80 MW, 2020-55 MW. For wind farms, there is also a decrease in volumes: 2018 – 620 MW, 2019-100 MW, 2020-65 MW. At the same time, there is a trend for construction of hydroelectric power plants that contribute less imbalances to the system: in 2018 – 75 MW, in 2019 – 65 MW, in 2020 – 120 MW. Thus, problems in the country's energy system actually hinder the development of renewable energy.

In this regard, the most important event for industry was meeting on the development of the electric power industry and renewable energy under the chairmanship of the President, which was held on May 26, 2021. If we talk about the results of the meeting, I should note that the instructions given by the President will lay the foundation for development of the industry for the next few years. Thus, in terms of the development of the electric power industry, the issues of ensuring the country's energy security, following the global trend of decarbonization of industry and the economy, prioritizing cleaner traditional energy sources, such as water and gas, ensuring the fairness and affordability of tariffs, the need to conduct a technical audit of energy sources, reducing regulatory losses of electricity and wear of power grids, the issue of training personnel for the industry, attracting investors, the need to restart the emissions trading scheme, use of innovation in the energy industry was raised.

The instructions of the President on development of the renewable energy sector are truly revolutionary. During the meeting, it was instructed to increase the share of renewable energy in electricity generation to 15% by 2030 (previously this figure was 10%), the task was set to develop alternative energy (the use of energy such as hydrogen, industrial gases, coalbed gas methane, and others), develop local content in the renewable energy sector, and stimulate the use of renewable energy among the population.

It seems that today all the resources of state bodies, national companies and development institutions should be aimed at fulfilling the tasks set in the industry. We don't have much time to solve them. As was justly noted by the President of the Republic of Kazakhstan, K. Tokayev, green vector of development is determined by both internal and external factors. Therefore, the issue of development of the electric power industry is not only the main component of the country's energy security, but also the overall self-presentation of our country at the world stage as a stable and developing state, because the development of the entire economy of the country depends on development of the industry.

We, as Solar Power Association of Qazaqstan are confident that in case of early solution of problems in the electric power industry, renewable energy sources will become the main driver of Kazakhstan's energy transformation.

MINISTER OF ECOLOGY, GEOLOGY AND NATURAL RESOURCES OF THE REPUBLIC OF KAZAKHSTAN MAGZUM MIRZAGALIYEV

MAGZUM MIRZAGALIYEV

Minister of Ecology,
Geology and Natural Resources
of the Republic of Kazakhstan

Dear readers!
Dear friends!

May I, on behalf of the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan, welcome the initiative of Konrad Adenauer Foundation and Solar Power Association of Qazaqstan on the issue of QazaqGreen information and analytical magazine on development of ‘‘green’’ economy.

Nowadays environmental agenda is one of the most relevant and discussed topics in the world. In general, ecology has become part of economic policy in countries, and processes of greening of economies, decarbonization and reducing the carbon footprint, building a sustainable and circular economy are gaining momentum all over the world, and energy transition to use of renewable energy sources is clearly visible.

Indeed, Kazakhstan being the player on the global stage participates in global transformation processes. And country’s first steps in this direction were focus on development of renewable energy sources.

Development of RES in Kazakhstan started 12 years ago with the adoption of Law of the Republic of Kazakhstan ‘‘On support for use of renewable energy sources’’ on July 4, 2009. Kazakhstan has set ambitious goals for development of renewable energy sources, which provide for increase in renewable energy share in total volume of electricity production to 6% in 2025, and in accordance with the latest instructions of the President, this indicator should reach 15% by 2030.

An important event that influenced Kazakhstan’s transition to sustainable economy was adoption of ‘‘Concept for transition of the Republic of Kazakhstan to ‘‘green’’ economy by the Decree of the President of the Republic of Kazakhstan on May 30, 2013. The Concept formed the basis for deep systemic transformations for transition to ‘‘green economy’’ and high indicators were set for monitoring its implementation in the field of water resources, agriculture, energy efficiency, electric power, air pollution and waste disposal.

On August 2, 2016, Kazakhstan has signed the Paris Agreement on Climate Change. According to

the Paris Agreement, Kazakhstan undertook to reduce greenhouse gas emissions by 15% by 2030 compared to the level of 1990. In order to achieve these goals, the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan has started developing the Strategy for low-carbon development of Kazakhstan until 2050. Development of this Strategy will be completed this year. This document is aimed at reducing greenhouse gas emissions, moreover, one of the tools for fulfilling these obligations is transition from the use of coal to renewable and alternative energy sources.

As you are aware, in December 2020, at Climate Ambitions Summit, President of the Republic of Kazakhstan K.-J. Tokayev announced about the assumption of obligation to achieve carbon neutrality in Kazakhstan by 2060. This means that all greenhouse gas emissions generated by economic activity should be compensated, i.e. on the one hand, this is a reduction in emissions into the environment, and on the other hand, compensation due to carbon-negative projects using new technologies. Many countries and companies have already joined this process. Thus, in 2019, at the UN Climate Summit, 66 countries, 10 regions, 102 cities, 93 companies and 12 investors announced their focus on achieving carbon neutrality. These figures are growing from year to year.

On January 2, 2021, a new Environmental Code of the Republic of Kazakhstan was signed, which came into force on July 1 this year. This document was widely discussed by the public of the country and incorporated both the opinions of domestic experts and best practices of the countries of the Organization for Economic Cooperation and Development (OECD).

The main innovation of the new Environmental Code of the Republic of Kazakhstan is the polluter-pays principle. This means that the enterprise shall compensate for damage caused to the environment. Therefore, starting from 2025, enterprises will have to switch to the best available technologies (BAT), which are aimed at improving energy efficiency, reducing resource consumption, reducing the negative impact on the environment. In case of refusal to introduce the BAT, a progressive penalty rate -twofold, fourfold, eightfold – will apply.

Legislative measures aimed at waste to energy mechanism were adopted last year. Waste-to-energy is a project that involves the construction of thermal waste utilisation plants. The project is primarily aimed at reducing the accumulation of waste, reducing fly dumpings and landfills. In addition, combustion generates the energy that will be supplied to the power grid.

Therefore, today the country's environmental policy and development of renewable energy sources are moving towards the same goal – environmental protection and ''greening'' of the economy. The ultimate goal is to preserve the ecology and unique nature of our country for future generations of Kazakhstanis. For my part, I'm convinced that all the ambitious goals and tasks set will be fulfilled.

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№ 2-3 / 2021
Information and analytical magazine

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MAGAZINE REGISTERED:
Ministry of Information and Social Development of the Republic of Kazakhstan.

INDUSTRY NEWS

ECOLOGICAL TOURISM

INDUSTRY NEWS

Certificate KZ57VPY00033826 dated 29.03.2021

Magazine coverage:
Republic of Kazakhstan, countries of near and far abroad

Total circulation:
1500 copies

Printed:
Print House Gerona LTD

The magazine is published with the support of the Konrad Adenauer Foundation

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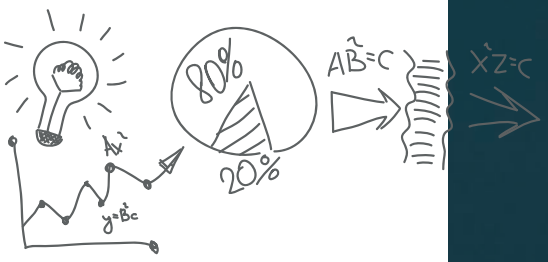


A NEW MILESTONE in development OF ELECTRICITY IN KAZAKHSTAN

> ***On May 26, a meeting on development of the electric power industry was held under the chairmanship of the President Kassym-Jomart Tokayev. During the meeting, reports were presented by Minister of Energy Nurlan Nogayev, Minister of Industry and Infrastructure Development Beibut Atamkulov, Minister of Ecology, Geology and Natural Resources Magzum Mirzagaliyev, Chairman of the Sovereign Welfare Fund Samruk-Kazyna Almasadam Satkaliyev, Chairman of the Board of Directors of Solar Power Association of Qazaqstan Nurlan Kapenov, General Director of Total Energies Kazakhstan Alem Friga-Noi.***

The issue under consideration on the agenda is of extreme importance, since the viability of the industry and the country's economy as a whole depends on electric power industry. In accordance with global trends in the energy sector, Kazakhstan has joined the so-called 4th energy transition, which provides for change in the structure of primary energy consumption and gradual transition from the existing energy supply scheme to new energy system, where the main leitmotif is set by renewable energy.

Currently, about 70% of the country's electricity is generated by traditional coal-fired thermal power plants. However, renewable energy sources account for 3%. According to the country goals, RES share in electricity generation in 2025 should be 6%, and by 2050, the share of alternative energy and RES should reach 50 %.

IN ADDITION, KAZAKHSTAN HAS SET A GOAL TO ACHIEVE CARBON NEUTRALITY BY 2060.

ELECTRICITY PROBLEMS

For three decades, a lot of problems have arised in the Unified Energy System of Kazakhstan. These are imbalances and shortage of maneuverable capacities, power exchange from neighboring countries, obsolescence of generating equipment and an increase in emergency repairs, isolation of the Western Energy Zone, shortage of electricity in the Southern zone. Development of renewable energy, especially over the past few years, has exacerbated the existing problems in the electric power industry and has actually become a driver for modernization and further development of the energy system. Solar Power Association of Qazaqstan presents the main results of the last meeting.

1. DEVELOPMENT OF THE COUNTRY DIRECTLY DEPENDS ON THE STABILITY OF THE POWER INDUSTRY

One of the main tasks is to ensure energy security. Energy consumption rate in Kazakhstan is growing from year to year. However, the new energy sources that are being launched do not correspond to the growth rate. Kazakhstan is one of the most energy-intensive countries in the world. The Kazakh economy is three times more energy-intensive compared to the OECD countries, despite the fact that the services sector occupies the main share in the structure of our GDP. This indicates that fixed assets and equipment at industrial enterprises do not meet modern standards of the OECD and other advanced countries. Often there is an imitation, and not a real modernization of the fixed assets of our industry.

The fairness and affordability of tariffs is an important economic and social issue. In order to mitigate the negative impact of the pandemic, all tariffs were fixed until the end of the first quarter of this year. At the same time, it is impossible to keep the tariffs at the same level all the time. Tariffs should cover reasonable costs and give the industry the opportunity to develop.

It is common knowledge that any increase in tariffs is usually set first for business and budget organizations. In some areas, the difference reaches 400%! This not only distorts the market, but also does not create incentives for lean energy consumption. Energy efficiency and reducing energy intensity tasks are not fulfilled. Why use more expensive energy-efficient materials and equipment, if electricity can simply be "burned", as they say. In addition, the main principle – targeted social assistance is not observed. As a result of such a dilution, the really needy categories of citizens do not receive benefits in the required amount.

Noting the importance of modernizing and launching new generating capacities, the President specially focused on the project of converting Almaty CHPP-2 to gas. This issue is of strategic importance. The ecology of the city of Almaty and, of course, improving the quality of life of citizens depends on solving this problem. Therefore, the Government, Samruk-Kazyna Fund, together with the Akim's office were instructed to finally decide on project of modernization of CHPP-2 and to start implementing it as soon as possible. As the President noted, delaying this project is absolutely unacceptable.

There is a steady trend in the world – decarbonization of industry and economy. The European Union countries plan to reduce greenhouse gas emissions by 55% by 2030. Kazakhstan plans to achieve complete climate neutralization by 2060. Since 2023, the European Union has been introducing a carbon tax, which can significantly complicate the export of our products. Taking into account the new realities, technical regulations, standards and requirements for goods will change. Therefore, we must be ready. It is obvious that adaptation process will not be simple.

Kazakhstan is one of the largest emitters of greenhouse gases in Europe and Central Asia. This is due to the fact that coal accounts for 70% of electricity production, and clean energy sources such as natural gas (20%), hydropower (7%) and renewable energy sources (3%) account for about one-third of Kazakhstan's energy balance. Therefore, the country will have to rely on traditional energy sources for quite a long time. This is reality. If we need to choose between them, we should choose cleaner ones, that is, water and gas. In this regard, work on development of electric power industry must be correlated with development of gas market as a key source of primary fuel. The Ministry of Energy of the Republic of Kazakhstan and JSC "Sovereign Welfare Fund "Samruk-Kazyna" should pay special attention to this issue.

"CLEAN" COAL

As to coal generation, it is important to ensure the introduction of new technologies, such as "clean" coal, modern combustion and filtration systems at stations. The main emphasis should be placed on a systematic and consistent increase in use of clean energy sources, primarily hydropower and renewable energy sources. It is important to understand that at this stage of global change, the status, authority and, accordingly, the international capabilities of any country will largely be determined by the contribution to the decarbonization of the world economy. In particular, this will be one of the criteria determining the possibility of our country's admission to the OECD.

Thus, the "green" vector of development is determined by both internal and external factors. In last year's message, the President instructed to develop a concept for low-carbon development of Kazakhstan until 2050. This document should contain a concrete vision of the deep and structural decarbonization of the economy. The Government is working on a national project for development of the electric power industry. This applied document should become the basis for development of the industry for the next five years as a minimum. It is necessary to ensure the mutual correlation of the two documents. These documents should be thoroughly discussed with international and domestic experts.

2. IN ORDER TO ENSURE ENERGY SECURITY, IT IS NECESSARY TO CLEARLY UNDERSTAND WHEN THE LAUNCH OR DISPOSAL OF POWER FACILITIES, THEIR REPAIR AND MODERNIZATION WILL TAKE PLACE

According to the instruction of the President of the Republic of Kazakhstan K.-J. Tokayev, the country's energy balance until 2035 is being prepared. At the meeting, its main characteristics and parameters were presented, which were generally approved. At the same time, these are estimated figures. It is important to have a true picture of energy generating facilities. The main generating capacities in Kazakhstan, including thermal power plants, have been in operation for forty or more years. According to experts, their total wear is more than 50%. This leads to an increase in technological disturbances at the stations. In 2019 – 4010 disturbances, in 2020 – 4458 disturbances; thus, an increase of 11%. There is a need for a large-scale technical audit of energy sources. The results of audit will become the basis for improving public policy, as well as further investments in the industry. Digitalization will allow carrying out this work qualitatively. The President drew attention to the fact that it is necessary to clearly understand where and when the launch or disposal of power facilities, their repair and modernization will take place. It is necessary to create a full-fledged digital map of power generation facilities, which will allow monitoring the condition of facilites in near real-time mode.

3. SUSTAINABLE COURSE FOR DEVELOPMENT OF RENEWABLE AND ALTERNATIVE ENERGY SOURCES

Our country has taken a steady tack towards the development of renewable and alternative energy sources. Due to a smart policy and progressive implementation, Kazakhstan managed to achieve a qualitative increase in RES' share in total energy balance, which reached 3%. This is a reasonable good result for our country. The previous target was to achieve 10% by 2030. Taking into account the new realities and the current positive dynamics, the President set the task to increase the RES' share in electricity generation to 15% by 2030. The country's power balance should proceed from this task. In addition, within the framework of program documents, the necessary measures of regulation and support of the industry should be provided for unconditional achievement of this target.

Next issue. It is important to use the potential of alternative energy as efficiently as possible. At the meeting of the National Council of Public Trust held in February, the President of the Republic of Kazakhstan K.-J. Tokayev instructed the Government to develop a new Law on the development of alternative energy sources, such as hydrogen, industrial gases, coal-bed gas methane and others. Kazakhstan, being a large energy country, should maintain its leading position in the new energy sector in the future. The Ministry of Energy, together with all interested parties, should work out this issue as thoroughly as possible within the framework of the working group. According to the President, it is necessary to invite representatives of the industry and domestic experts, international organizations, and involve science in this work. There are few similar laws in the world, so our law should be a model.

The share of Kazakh content in renewable energy sources projects is still extremely small. We will have to learn not only how to build new sparkling stations, but also how to develop local production, science and technology, and train qualified local personnel. Otherwise, it will turn out that the whole country invests in foreign goods and technologies, paying for it through tariffs. The Government was instructed to carefully study and use the best international experience of localization in the field of renewable energy sources and energy in general.

The next issue – projects in the field of clean energy and the economy- undoubtedly requires due attention from development institutions. The Government is instructed to prepare proposals together with JSC NMH Baiterek for support of state policy in the field of "green" energy and "green" economy.

PILOT PROJECTS

Promoting the use of renewable energy among the population plays a significant role. Distributed generation has long been practiced in the European Union, the United Kingdom and a number of other countries. Within the framework of development of "smart" cities, the President of the Republic of Kazakhstan K.-J. Tokayev instructed to implement pilot projects for operation of solar panels and micro-power plants for use of distributed generation by the population of the country. This is especially true for the southern regions. Within the framework of the pilot, when planning and constructing new residential complexes, it is necessary to provide the possibility for installing and operating solar panels for clean energy.

It is important to simplify the procedure of permits for generating clean electricity by households as much as possible. It is necessary to improve the mechanism for subsidizing capital costs for low-power home installations. The President instructed the Government of the Republic of Kazakhstan to make the necessary amendments to the legislation.

According to a number of experts, it is premature and wrong to completely put out of commission the nuclear power industry. Developed countries rely on nuclear energy. Phobias are out of place here. However, it is necessary to carry out persistent explanatory work among citizens. We will not rush to construction of nuclear power plants, but we should not be late with this matter either.

4. RELIABILITY OF POWER SUPPLY, REDUCTION OF ELECTRICITY LOSSES AND PHYSICAL WEAR OF NETWORKS

In addition to generation, electric grid companies are of great importance. The need to instil order into activities of electric grid companies was noted. In particular, it is necessary to minimize the number of enterprises that do not have the technical means and personnel to maintain the power grid. The companies were instructed to consolidate a long time ago, more than five years ago. This task is implemented with insignificant results. More than 32 thousand km of electric grids have not been transferred to the balance of large energy transmission organizations. They are still on the balance of local executive bodies. The normative electricity losses of national networks are kept at the level of 6% and have not decreased since 2014. In regional networks, losses are almost twice as high. High wear of power transmission lines. As to national networks, this indicator reaches 67%. This is a serious issue, which affects the security of supply. The Governments and Regional Akimats were instructed to take a set of measures to gradually reduce the level of physical wear and tear of electric networks.

5. THE IMPORTANCE OF ATTRACTING INTERNATIONAL INVESTORS FOR THE DEVELOPMENT OF THE INDUSTRY

There is a lack of electricians, repairmen of high-voltage lines and other specialists. And this is despite the fact that there are 24 universities in Kazakhstan that train personnel for the energy industry. The average age of engineering and technical personnel is about 50 years old. This situation is also complicated by the insufficient level of average wages. As a result, staff turnover increased from 4% to 15% in 2015-2020. This issue needs to be resolved promptly, otherwise we may face a personnel shortage in the near future.

> **The Government was instructed to implement measures to form the professional human resources for the industry and competitive level of wages.**

6. THE IMPORTANCE OF ATTRACTING INTERNATIONAL INVESTORS FOR THE DEVELOPMENT OF THE INDUSTRY

According to the instruction of the President, negotiations are underway with investors from the United Arab Emirates, France and other European countries. The President instructed to speed up this work and make agreed investment proposals by this September 1.

7. THE STABILITY OF SUPPLY AND AFFORDABILITY OF TARIFFS ARE THE KEY COMPONENTS OF NATIONAL COMPETITIVENESS

Power industry is important first of all as a supplier of the most important resource - electricity. The stability of supply and affordability of tariffs are the key components of national competitiveness. Therefore, it is important that the price of electricity is based on its fair market value. Today, only three companies dominate the wholesale electricity market, occupying 70% of the market. This is not quite right. The wholesale sale of electricity under bilateral agreements creates barriers for new retail companies, hinders the development of competition in the retail electricity supply market. This is a direct path to inflated prices for end users. The President previously instructed to take measures to develop exchange trade, including electronic trading. This is civilized and transparent mechanism that promotes competition and, as a result, reduces prices. Unfortunately, now the share of tender through the electronic and centralized KOREM platform is less than 1% of the total volume of the wholesale electricity market. The Ministry of Energy, together with the Competition Protection Agency, has been instructed to carefully study this issue. In particular, it is necessary to determine the share of electric energy that is subject to mandatory sale through centralized platforms.

8. ENVIRONMENTAL PROTECTION ISSUES ARE OF PARTICULAR RELEVANCE IN THE DEVELOPMENT OF THE INDUSTRY

One of the tools to encourage enterprises to reduce the negative impact on the environment is the system of emissions trading for greenhouse gas emissions. The system will allow enterprises to implement energy-efficient measures in a flexible way. Previous efforts to launch the domestic emissions trading market did not bring serious results. The Government was instructed to ensure the restart of the entire emission trading system. At the same time, it is necessary to provide for synchronization with similar global platforms.

9. IT IS NECESSARY TO GAIN EXPERIENCE IN USING HIGH-TECH INNOVATIONS IN THE ENERGY SECTOR.

In addition to tactical measures in development of power industry, it is important to forecast for medium-term period. New technologies for generating and storing energy are emerging and being tested in the world. Given the abruptness of technological progress, they may soon become a reality. In particular, we are talking about a possible breakthrough in the development of hydrogen energy. We must be prepared for such a scenario. It is necessary to have a pool of specialists who are able to work with such technologies. The President proposed to create a Competence Center for New Power Industry, where the experience of using high-tech innovations in the energy sector will be developed in an experimental mode.

In conclusion, the President recalled the importance of a proper and modern regulatory environment. In 2018, the amended Law "On Natural Monopolies" was adopted. The Law was developed jointly with the European Bank for Reconstruction and Development and was supposed to solve a number of systemic problems of the industry, such as the constant overstatement of tariff estimates and investment programs, lack of incentives to reduce tariffs. But not everything was implemented in practice. The Government has been instructed to deal with this issue and, if necessary, prepare appropriate amendments.
Growth in population and economy will inevitably require the introduction of new capacities. However, the possibilities are not unlimited, so reducing the energy intensity of the economy is the most important task. Solution of this task will have the most direct effect on the competitiveness of Kazakhstan's goods and industries. Therefore, the need to improve energy efficiency should be fully taken into account in development of relevant strategic documents and in implementation of practical measures. The President instructed the Government to keep this issue under control.

Source: SolarPower Association of Qazaqstan ALE

The first Waste-to-Energy Auction

The first auction for selection of Waste-to-Energy projects were successfully held on the trading platform of JSC "KOREM" in the Republic of Kazakhstan

On this July 15, for the first time in the history of our country, international auctions were held to select Waste-to-energy projects with a total capacity of 100.8 MW.

In 2020, Kazakhstan adopted the first legislative initiatives providing for stimulating measures for waste to energy. Changes are made to legislation of the Republic of Kazakhstan in the field of ecology and energy, which suggest the possibility of implementing the Waste-to-Energy project by processing solid household waste (SHW) into energy. The existing technologies for SHW incineration in the world are safe for the environment.

In order to increase the investment attractiveness of the new waste to energy (WTE) sector and create an integrated waste management infrastructure, it is planned to use a similar mechanism operating in the field of renewable energy sources. Auction bidding mechanism for selection of WTE projects allows creating a competitive field, reducing prices and selecting the most effective projects.

The Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan set the total volume of purchased installed capacity-100.8 MW, broken down by localities (Nur-Sultan-21.1 MW; Almaty-33.3 MW; Aktobe-10.9 MW; Ust-Kamenogorsk-4.5 MW; Shymkent-15.2 MW; Karaganda-15.8 MW.) for auction.

The trading system used the maximum auction price in the amount of 191.9 tenge/kWh per month (excluding VAT), approved by Order No. 103 of the Acting Minister of Ecology, Geology and Natural Resources of the Republic of Kazakhstan dated April 12, 2021.

During the trading session, an offer of 191.9 tenge/kWh (excluding VAT) from the auction bidder was recorded. In accordance with paragraph 60-17 of the Rules for organizing and conducting auctions, the auction participant accepted the offer of 172.71 tenge/kWh (without VAT). In this regard, the price range of the auction was from 191.9 to 172.71 tenge/kWh (excluding VAT).

Following the auction, the following company was recognized as the winner:Waste2Energy LLP (Kazakhstan) the installed capacity of the project is 100.8 MW, the auction price is 172.71 KZT/kWh (without VAT).

These auctions for selection of WTE projects showed a decrease in the auction price by 10% compared to the approved maximum auction price.

Source:
Kazakhstan Electricity and Power Market Operator JSC

EXTENSION OF TERMS OF CONSTRUCTION OF RENEWABLE ENERGY FACILITIES

According to the Ministry of Energy of the Republic of Kazakhstan, an opportunity to extend the deadline for submission of copy of certificate of acceptance of RE facility for a year was given to all renewable energy projects that have existing contracts with the Financial Settlement Center for Renewable Energy.

In order to ensure favorable conditions for implementation of investment projects in the field of renewable energy, on the proposal of the National Chamber of Entrepreneurs of the Republic of Kazakhstan "Atameken", on July 31, 2021, by order of the Acting Minister of Energy No. 252, additions and amendments were made to the Order of the Minister of Energy of the Republic of Kazakhstan No. 164 dated March 2, 2015 "On approval of the Rules for centralized purchase and sale of REF electric energy by Financial Settlement Center".

In particular, in connection with the continuing restrictive measures imposed by the countries to prevent the spread of the COVID-19 coronavirus infection, and the corresponding problems with import of equipment related to downtime at the border and logistics failures, in order to preserve the investment attractiveness of the industry and implement target indicators for development of the renewable energy sector, an additional paragraph was introduced in the order, providing for possibility of extending the deadline for submission of a copy of the certificate of acceptance for RE facility for one calendar year subject to confirmation proving the force majeure circumstances.

At the same time, the validity period of the contract for purchase of RE facilities' electricity by Financial Settlement Center shall be reduced by an equivalent period (one calendar year). Extension of the period shall be executed by an additional agreement to the contract.

For more detailed information about the extension of the deadline for submitting a copy of the certificate of acceptance of RE facility for one calendar year, the Ministry of Energy of the Republic of Kazakhstan recommends contacting the FSC of RE LLP.

AUCTION SCHEDULE FOR 2021

Date of conduction	Type of RES	The volume of purchased installed capacity, MW	Zone	The value of the maximum auction price, tg/kWh
November 8	HPS	20	North and South	15,2
November 9	BioES	10	All zones	32,15
November 10	WPP*	50	North	21,53
November 11	HPS	100	North and South	15,2
November 12	SPP**	20	North	16,96

Information about reserved land plots for the planned construction of a renewable energy facility

* North Kazakhstan region, Musrepov district, Novoishimskoye village, land area of 100 ha, land category: land of settlements
** Kostanay region, Karabalyk district, Karabalyk settlement, land area of 40 ha, land category: land of settlements

Information about the possibility of connecting to the points of electric networks of energy transmission organizations

*Power transmission organization – KEGOC JSC, North Kazakhstan region, district-Novoishimskaya station, substation (name, coordinates) – 220 kV Kuibyshevskaya substation, 53.210875, 66.724119, busbars–110 kV, limit on connected power – 50 MW, limit on the number of new connections – 2
** Power transmission organization – MRET LLP, Kostanay region, Karabalyk district, HV 220 kV Priuralskaya – Troitskaya SDPP, Priuralskaya – Kachary, substation (name, coordinates) – SS–220/110/10 kV "Priuralskaya", 53°46 ' 25 "N, 62°4' 1 "E, busbars - 110 kV, limit on connected power – 112 MW, limit on the number of new connections – 3

Source:
Ministry of Energy of the Republic of Kazakhstan

7 BASIC PRINCIPLES OF THE NEW ENVIRONMENTAL CODE OF THE REPUBLIC OF KAZAKHSTAN

THE FIRST PRINCIPLE IS
THE POLLUTER PAYS AND CORRECTS

1. It implies pollution prevention and control measures, but also responsibility for recovery from environmental damage. Thus, the state should create such conditions under which it is more profitable for nature users to take measures to prevent negative impacts on the environment than to pay environmental fines. In a word, the mechanism of "prevention". In addition, the polluter who has caused environmental damage is obliged to restore the environment to its original level.

THE SECOND PRINCIPLE IS
NEW APPROACHES TO ENVIRONMENTAL IMPACT ASSESSMENT

2. According to the current Environmental Code, the requirement to pass the environmental impact assessment procedure (EIA) applies to almost all, that is, 19 thousand enterprises. Such an approach is ineffective and impractical. Therefore, the new Environmental Code proposes to apply this requirement only to 2.6 thousand enterprises of the "first category", which account for 80% of emissions. At the same time, the public participates in all stages of the EIA.

THE THIRD PRINCIPLE IS
THE INTRODUCTION OF THE BEST AVAILABLE TECHNOLOGIES (BAT) AND ECONOMIC INCENTIVES

3. To maximize the environmental situation, it is necessary to implement the best available technologies. For this purpose, industrial enterprises undergo a technological audit. They are offered technologies that will reduce emissions. Enterprises that have implemented BAT will be exempt from emission fees. If they do not switch to BAT, their emission fee rates will increase.

4. At present, the current legislation does not require spending on environmental protection measures of funds received from payments for emissions into the environment. Therefore, local executive bodies allocate from 0 to 400% for environmental protection, on average 45% only. The current situation with environmental payments and their spending has been repeatedly criticized by international experts. In this regard, the draft accompanying law provides for mandatory financing of environmental protection measures at the expense of incoming environmental payments in the amount of 100%.

5. In order to obtain timely and reliable information on the qualitative and quantitative composition of emissions and discharges, the draft Environmental Code provides for mandatory automation of industrial environmental monitoring with data transmission to the authorized body.

THE FIFTH PRINCIPLE IS
THE CREATION OF AN AUTOMATED EMISSION MONITORING SYSTEM

THE FOURTH PRINCIPLE IS
TO DIRECT THE PAYMENT FOR EMISSIONS TO ENVIRONMENTAL MEASURES

THE SEVENTH PRINCIPLE IS
TO IMPROVE THE MANAGEMENT OF PRODUCTION AND CONSUMPTION WASTE

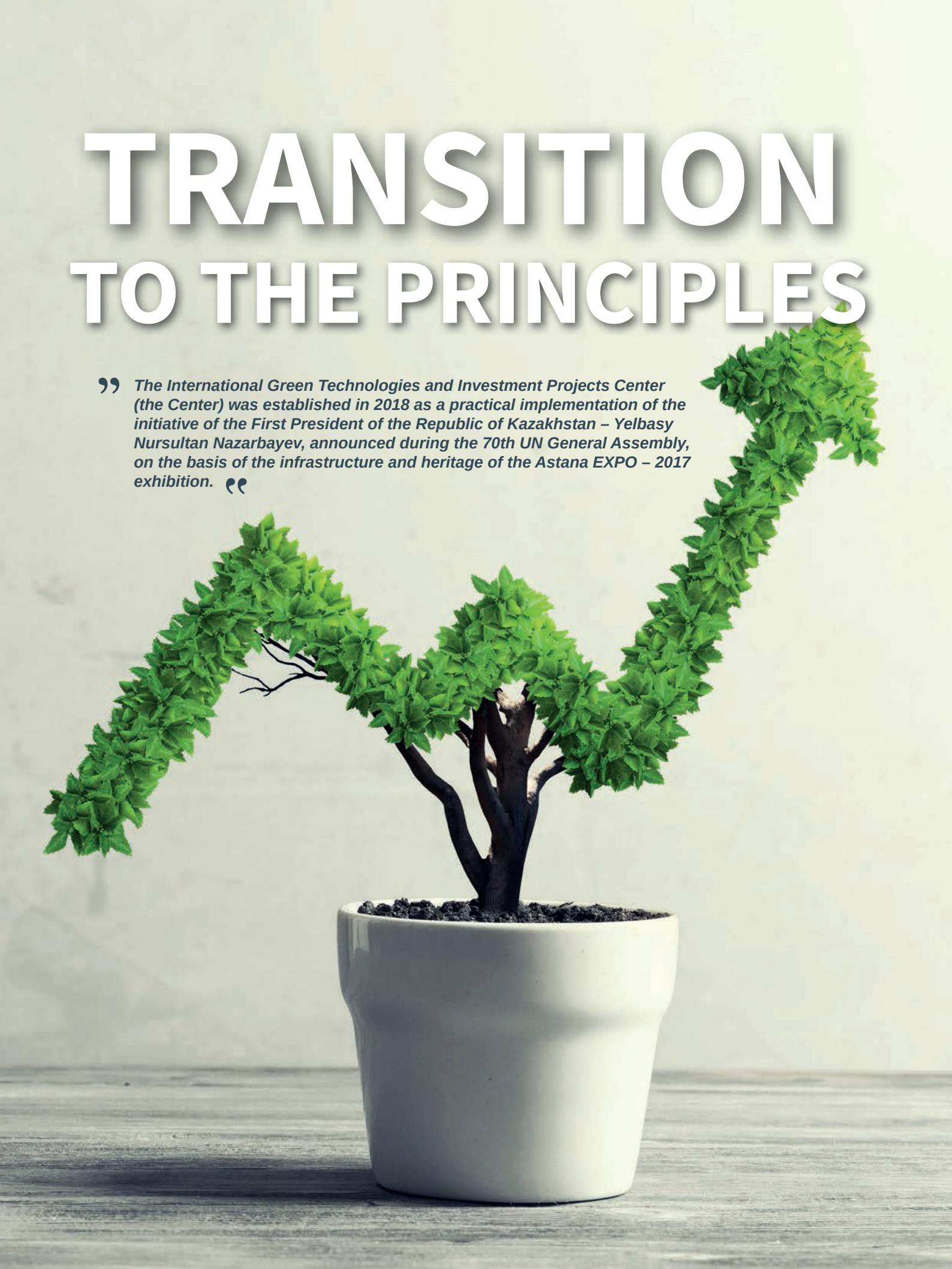
THE SIXTH PRINCIPLE IS
TO STRENGTHEN ENVIRONMENTAL CONTROL

7. The draft of the new Environmental Code focuses on the implementation of the principles of circular economy used in the OECD countries. Within the framework of this project, a waste hierarchy is envisaged, which is aimed at step-by-step waste management, that is, a sequence of measures aimed at preventing the formation, reuse, recycling, and disposal of waste. In order to reduce the number of unauthorized landfills, licensing of the activities of enterprises engaged in the processing and disposal of waste, and a notification procedure for garbage collection organizations will be introduced.

6. The draft accompanying law proposes to amend the Entrepreneurial Code in terms of conducting inspections on facts directly affecting the living conditions of the population. These changes are aimed at rapid response to the facts of negative impact on the environment. The responsibility for environmental offenses is strengthened by increasing administrative fines by 10 times.

TRANSITION TO THE PRINCIPLES

The International Green Technologies and Investment Projects Center (the Center) was established in 2018 as a practical implementation of the initiative of the First President of the Republic of Kazakhstan – Yelbasy Nursultan Nazarbayev, announced during the 70th UN General Assembly, on the basis of the infrastructure and heritage of the Astana EXPO – 2017 exhibition.



OF THE BEST AVAILABLE TECHNOLOGIES –

is a key trend of sustainable development

Acting Chairman of the Management Board of IGTIPC
Zhanar Igenova

The International Green Technologies and Investment Projects Center (the Center) was established in 2018 as a practical implementation of the initiative of the First President of the Republic of Kazakhstan– Yelbasy Nursultan Nazarbayev, announced during the 70th UN General Assembly, on the basis of the infrastructure and heritage of the Astana EXPO – 2017 exhibition.

The main scope of the Center's activity is to promote the accelerated transition of Kazakhstan to a "green" economy by promoting technologies and best practices, developing business and investment, strengthening international cooperation within the framework of the "Green Bridge" partnership program adopted in 2012 by the participating States of the United Nations Conference on Sustainable Development.

In a relatively short period of time, a lot of work has been done aimed at developing and institutional strengthening of the Center. We have also established very close contacts with many national and international organizations and development institutions dealing with the issues of the "green" economy.

One of the main tasks set by the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan to the Center is to facilitate the transition of Kazakhstan to the principles of the best available techniques (BAT).

For reference

The best available techniques mean the most effective and advanced stage of the development of activities and methods of their implementation, which indicates their practical suitability to serve as a basis for establishing technological standards and other environmental conditions aimed at preventing or, if this is practically impossible, minimizing the negative man-caused impact on the environment. At the same time:

1) techniques mean technologies used, as well as methods, processes, practices, approaches and solutions applied to the design, construction, maintenance, operation, management and decommissioning of the facility;
2) techniques are considered available if the level of their development allows introducing such techniques in the relevant production sector on economically and technically possible conditions, taking into account the costs and benefits, regardless of whether such techniques are used or produced in the Republic of Kazakhstan, and only to the extent that they are reasonably available to the operator of the facility;
3) the best techniques mean those available techniques that are most effective in achieving a high overall level of environmental protection as a whole.

In accordance with the Environmental Code of the Republic of Kazakhstan dated January 2, 2021, the Center performs the functions of a Bureau of the best available techniques.

The Center has developed a draft Concept for transition of Kazakhstan to the principles of the best available technologies based on international experience. This Concept of BAT is aimed at forming the institutional framework for Kazakhstan's transition to the principles of BAT by describing the mechanisms of interaction between state bodies, business structures, civil society and science. The main provisions of these documents were taken into account in the concept of the new Environmental Code. Experience of EU countries, the Russian Federation, the Republic of Belarus and other countries experience in transition to BAT was studied in detail, and cooperation was established with the OECD within the framework of the project "BAT: prevention and control of industrial pollution", the EU BAT Bureau (IPPC), BAT Bureau of the Republic of Belarus, etc.

In addition, in 2018-2019, the Center investigated 58 enterprises of the energy industry for their ability to transit to the principles of BAT. In particular, together with the German Society for International Cooperation (GIZ), an assessment of the current state of 9 large energy enterprises and their ability to transit to the principles of BAT was carried out. The enterprises were ranked based on degree of resource use, impact on the environment, all types of emissions, including greenhouse gases, equipment wear. Evaluation and comparison of alternative technologies, methods were carried out on the example of international experience. Recommendations have been developed for energy industry enterprises on implementation of BAT principles.

The Center also held three international conferences on "green" technologies and BAT "Creating a clean future", which became a platform for an open and constructive dialogue to discuss the introduction of the best available technologies, commercialization and transfer of "green" technologies.

Thus, in accordance with the new Environmental Code of the Republic of Kazakhstan, the Center, performing the functions of the BAT Bureau, shall ensure the development of best available techniques handbooks in all areas of application of the best available techniques before July 1, 2023.

For reference

The BAT Handbook is a document to be approved by a Government decree, which will reflect in detail technological and managerial approaches to regulating environmental emissions. These handbooks should become a reference book for the largest enterprises of I category. It is the emission levels defined in the BAT reference books that will create the basis for establishing prerequisits for environmental permits and are legally binding on industrial enterprises.

Handbooks provide the competent authorities with a technical basis for establishing permit prerequisites for industrial facilities, taking into account the technical characteristics of each facility, its geographical location and local environmental conditions.

BAT IS A STEP-BY-STEP PROCESS OF SUCCESSIVE STRENGTHENING OF REQUIREMENTS. THE CYCLE IS DEFINED BY PROVISIONS OF THE ENVIRONMENTAL CODE AND IS 8 YEARS. EACH SUBSEQUENT VERSION OF THE HANDBOOK SHOULD BE MORE RESOURCE-EFFICIENT THAN THE PREVIOUS ONE, THAT IS, IT SHOULD ENSURE THE CONSUMPTION OF AS LITTLE RAW MATERIALS AS POSSIBLE TO OBTAIN THE SAME AMOUNT OF PRODUCTS, AS WELL AS DISTRIBUTE UNDESIRABLE PRODUCTS (WASTE) IN FURTHER TREATMENT PROCESSES.

The first stage of the development and (or) revision of handbooks on the best available techniques is to conduct a comprehensive technological audit (CTA). In this regard, the Center organized a large-scale work on data collection and analysis by conducting CTA at industrial facilities. As of today, CTA was conducted at 82 enterprises. CTA provides an objective picture of the current state of enterprises and industry as a whole, which will allow us to develop fair handbooks.

A multi-stage procedure for discussing and approving BAT Reference Books has been organized. In order to ensure the principles of openness and transparency, the mandatory participation of stakeholders and their achievement of consensus, the subsequent development of BAT handbooks is succeeded by a number of coordination procedures of working bodies:

- technical work groups;
- Committee of the Best Available Techniques;
- public.

Currently, the scientific and academic community and members of technical work groups are developing and discussing five handbooks:

1. "Combustion of fuel at large installations for energy production".
2. "Oil and gas processing".
3. "Production of inorganic chemicals".
4. "Production of cement and lime".
5. "Energy efficiency in economic and (or) other activities".

At the first stage, handbooks are discussed and agreed upon at meetings of technical work groups (TWG) formed at the premises of BAT Bureau. For their formation, about 2.6 thousand organizations were covered, including industrial enterprises, state bodies, industry and environmental associations, scientific and design organizations, universities. Thus, a balanced composition of technical work groups is ensured and a broad and transparent

discussion process is guaranteed to ensure consistency of opinions and parity of interests of stakeholders.

To date, a total of 335 specialists from the above organizations are involved in development of handbooks, which were divided into 7 technical work groups. Also, 14 international consultants were involved in the development of BAT hand books . In addition, the Center receives constant consulting support from its colleagues from the European Bureau.

The main form of activity of TWG is a meeting in the volume and quantity necessary for the purposes of developing BAT handbooks. The decisions of TWG are made on the basis of consensus, taking into account the interests of all members. In case of failure to reach a consensus, decisions shall be made by holding an in-person or absentee voting.

Upon approval of handbooks at meetings of the TWG, the handbooks will be sent to a specially formed Advisory Committee of BAT, which includes representatives of the authorized state bodies in the field of environmental protection, industry and industrial development, energy, tax and budget policy, science, digital development, agro-industrial complex, as well as representatives of the national chamber of entrepreneurs of Kazakhstan "Atameken" and "Association of environmental organizations of Kazakhstan".

Composition and Regulations on BAT Committee were approved. The Committee consists of 15 experts from the above-mentioned state bodies and associations. Formation of such Committee's composition is determined by the goals and objectives of the Committee: ensuring compliance of BAT handbooks with the state policy on transition of the Republic of Kazakhstan to "green" economy.

After completion of all these stages, handbooks will be sent for further approval by the Government of the Republic of Kazakhstan. It is worth noting that the process of developing handbooks is quite complex, time-consuming and long-term. Now, the process of developing the first handbook in the EU countries took more than five years.

Process of introducing BAT has long been not associated only with environmental protection activities, it is a tool that can solve a number of environmental and economic problems and contribute to the development of industrial policy.

As to development of market of "green" technologies, the Center developed thresholds for each type of economic activity in the "green" taxonomy and a draft methodology for determining threshold values for classification of "green" projects. Methodology determines the interaction of market participants (financial institutions, public organizations, state and local executive bodies, business) when entrepreneurs receive financial support for a "green" project in accordance with the criteria of the "green" taxonomy, including obtaining financing under the "Business Roadmap" program. Draft methodology was sent to the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan for approval.

As part of work on uniting of representatives of scientific and academic community, large industrial sectors, state and local executive bodies, deputies of Mazhilis and Senate of the Parliament of the RK, in order to promote expert opinion and recommendations in the field of "green" development of the country, a Research and Technology Board was established at the Center, which consisted of dozens of scientists and experts in the main areas of "green" economy.

In addition, the Center is actively working on formation of a Registry of domestic manufacturers and suppliers of "green" technologies and equipment. The main purpose of its creation is to promote the transition to "green" economy through efficient and environmentally friendly technologies and innovations. Registry will simplify the choice and decision-making in the implementation of "green» projects and will allow uniting all participants of "green" technologies market to solve environmental problems in energy, agricultural, housing and municipal services and other sectors of the economy.

Registry is a list of Kazakhstani companies engaged in production and/or supply of technologies and equipment that meet energy and resource efficiency standards, as well as contribute to improving the environment.

Currently the Registry includes 38 organizations, half of which are engaged in both the production and supply of "green" technologies and equipment; 12 organizations are only manufacturers and 7 are only suppliers.

Developed Registry will be published on the Center's website and data will be further collected on an ongoing basis to replenish and systematically update the Registry.

In order to develop the educational platform and promote the ideas of "green" growth, an online project was launched in 2020 with the creation of GREEN WEBINAR platform at the premises of NTR and NTS. The platform has already managed to establish itself as an effective information and educational platform with a wide audience, allowing vigorous discussions when revealing the most pressing issues and acute topics. At the moment, GREEN WEBINAR has completed 13 successful webinars, which have gathered an audience of more than 2000 people from more than 90 different organizations.

As part of the work with international organizations and the implementation of joint projects, the Center conducts systematic work on issue of obtaining accreditation from "Green Climate Fund" (GCF) in order to attract funds from GCF for the implementation of low-carbon projects (up to $10 million).

For reference

GCF, being one of the most important financial institutions in the field of climate change, finances projects and programs with low emissions and resistance to climate change. Projects and programs developed by the public and private sector aimed at solving priority country tasks related to climate change are funded by the GCF through accredited organizations. To date, 103 organizations around the world are accredited by GCF, 165 organizations are at different stages of the accreditation process.

To date, the Center has submitted an application and all the necessary documents for accreditation. Further work on accreditation will continue, and by 2022 it is planned to sign an agreement with the GCF on accreditation of the Center.

In addition, in order to attract funds from international sources, work is also being carried out with GCF to obtain grant funds for implementation ofPrograms to support the readiness of the Republic of Kazakhstan for financing from GCF Readiness-2.

The project proposal for implementation of this program includes a number of activities that will lead to the following results:

- revised country programme;
- creation of an effective coordination mechanism;
- accreditation of at least two nominated organizations;
- raising awareness of the private sector and financial regulators about investments in projects and the possibility of "green" financing.

In February, the Center received confirmation of the full compliance of the financial potential and the capacity of the department for implementation of the Readiness-2 program and appointment as a partner for implementation, that is, the main executor of the program.

WORK IS ALSO BEING CARRIED OUT WITH THE GLOBAL ENVIRONMENT FACILITY THROUGH UNIDO AGENCY. THUS, IT IS PLANNED TO IMPLEMENT THE PROJECTTHE GLOBAL CLEANTECH INNOVATION PROGRAM FOR SMES IN KAZAKHSTAN (GCIP-KAZAKHSTAN). THE PROJECT WILL BE IMPLEMENTED WITHIN THE FRAMEWORK OF THE MAIN UMBRELLA PROJECT PLANNED FOR IMPLEMENTATION IN TEN MORE COUNTRIES. THE PURPOSE OF THE PROJECT IS TO PROMOTE INNOVATION IN CLEAN /"GREEN" TECHNOLOGIES THROUGH AN INTERSECTORAL AND MULTI-PRONGED APPROACH TO CREATE SUSTAINABLE INNOVATION ECOSYSTEMS FOR SMALL AND MEDIUM-SIZED ENTERPRISES AND STARTUPS.

The above-mentioned areas of activity are the main ones, but far not the only ones. The Center sets itself a number of other ambitious tasks to promote the implementation of national goals for transition to a "green" economy. The Center calls on all participants of the "green" market to actively cooperate and join efforts to ensure the sustainable development of the Republic of Kazakhstan in the near future.

INFORMATION
ON PRODUCTION OF ELECTRIC ENERGY BY RENEWABLE ENERGY

1st half of the year 2021

Installed capacity including: **1,897** *MW*

wind power plants	*small HPP*	*solar power plants*	*bioelectric power plants*
601.3 *MW*	255.08 *MW*	1,032.6 *MW*	7.82 *MW*




815 *million kWh*	385.2 *million kWh*	834.5 *million kWh*	1.6 *million kWh*
wind power plants	*small HPP*	*solar power plants*	*bioelectric power plants*

Electricity generation, including: **2,036.3** *million kWh*

Share of renewable energy generated in the total volume of electric energy production

3.5%

Increase in electricity generation by renewable energy facilities for the 1st half of the year 2021

42%

Mr. Christoph Schleissing:

Ecotourism– eco-friendly attitude to the nature,

Ecotourism is a form of tourism focusing on visiting untouched nature, national parks and natural reserves. The key principles in the development of ecological tourism is not to create any negative influence on environment, to have an "organized" approach for stay of tourists in beautiful places, to appreciate the nature and culture of the country and to educate the young generation. The Rixos Borovoe is one of the leaders and protagonists in pursuing the goals of ecological tourism in Burabay National Park. Mr. Christoph Schleissing, General Manager of the Rixos Borovoe shared his personal opinion and explained the further vision of the development of eco trend in tourism in the region with QazaqGreen magazine.

INTERVIEW

which has to become a lifestyle

– The first question that we cannot avoid is how the pandemic and quarantine measures affected tourism in Kazakhstan? Are there any changes now that we are emerging from the pandemic? Have tourists' preferences changed?

– Thank you very much for the chance to share my personal opinion about the ecology and tourism and what we as a Rixos Borovoe can actually do to develop the ecotourism trend.

Recycling issues and taking care of nature is our responsibility, where our goal is not just to run a business, but to deliver a sustainable business. I think the most important point about pandemic is that it showed everybody how precious time is. All of us had the feeling that life, we knew until then, just stopped in one day. For Rixos Borovoe the pandemic had finally a very positive effect on our business and we were able to deliver outstanding financial results.

PEOPLE ADAPT TO CERTAIN MARKET CONDITIONS. PREFERENCES OF TRAVELERS HAVE CHANGED A LOT OVER THE PAST TEN YEARS. I THINK WHAT'S HAPPENING NOW AS A CONSEQUENCE OF THE PANDEMIC IS THAT THAT ALL EXISTING CONCEPTS IN TOURISM LIKE LUXURY, FIVE STARS – HAVE ALL GOT A NEW MEANING AND DEFINITION. TWO YEARS AGO, WE UNDERSTOOD "LUXURY" IN TOURISM LIKE WITH PREMIUM CONDITIONS FOR YOUR STAY INCLUDING BUTLER SERVICE, A BEAUTIFUL VIEW, BREATHTAKING NEW EXPERIENCES … TODAY WE HAVE NEW CRITERIA SUCH AS HEALTH, SECURITY, SAFETY REGULATIONS. DO I FEEL SAVE? DO I HAVE ENOUGH SPACE? CAN I KEEP SOCIAL DISTANCING? WHAT IS THE HOTEL'S MANAGEMENT DOING TO MAKE SURE ALL AREAS ARE DISINFECTED?

Overall, the world has become more digital, all face-to-face meetings, conferences are canceled and we mostly communicate online via phones and computers. This digitalization has a huge impact on business travel in general. I don't believe it will continue to such extent, because people need to see each other, people need to meet and have live communication. In the near future there will

be less big meetings, more smaller ones and more valuable.

On the other hand, this pandemic has brought everybody back to the roots. People started to think about the meaning of life, about their life mission, about quality time spent with beloved ones, connecting back to mother nature. There is a feeling that people understood, that we are only visitors on this planet, and our time is counted. What we'll make out of this time is up to us. This understanding is forming the respectful attitude of people to their surrounding and nature. The willingness to preserve the environment is greater than ever before.

– Today ecological tourism is a big global trend. It has become especially relevant in the post-pandemic period: after long restrictions, indulgences are accepted and people strive, as they say, to ''reunite'' with nature. Based on example of your hotel and the Burabay National Park, what is the current state of ecological tourism?

– The trend for ecotourism has really developed over the past ten years. Now in our professional sphere we have new concept, for example, "glamping", which is "glamorous camping" – a style of camping with amenities. This concept pursued by tourists, who are looking for premium accommodation conditions alongside with escapism and solitude in nature.

Kazakhstan, from my point of view is predestine to have ecotourism. In your country you have a lot of beautiful places with fabulous nature. However, the biggest issue is the irresponsible behavior of tourists for natural resources, which consequently will destroy nature. Why ecotourism is growing? I think people really understood now, that we have to do something to preserve the nature.

Today many people travel and visit different places. But tourists should always travel with a purpose. This purpose is not just sitting in a hotel for two weeks and say: "Oh, I've been to a country. I've seen, for example, Africa". Thus, people would like to have the comfort and security of an international standard, coupled with an opportunity to be individual to explore and learn more about the country. People would like to visit local artists, to visit manufacturing, cultural objects, to learn about local traditions and culture.

I'm always worshipping local originality, despite the fact that we are a global player. I believe we have to go local; we need to support the country in which we operate. For example, all our fresh fish specialties are local, our delicious meat is locally supplied just to name the main items. It reduces the impact on nature and corresponds to guests' desire experiencing the local touch. People want to feel connected with the destination. And, when we say we connect to local means we connect back to the environment.

For example, in our hotel we had an issue with the garbage disposal, like the entire area. Until 1 year ago we just paid per month an important sum of money for the garbage truck to collect all of our garbage. A very dissatisfying situation as the collection was not regular enough for our needs and not corresponding to what we wanted to achieve. Recycle our garbage and create a positive effect for the future. After some research we found a company in Kokshetau which actually does recycling and we started collaboration. They separate the garbage for different categories: glass, plastic, paper, metals and they sell those items. The rest of the organics they're burning. The ash, which is remaining can be used for fertilization. Today the garbage collection happens daily without any interruption and as a nice side effect of our efforts, this new company also signed a contract with the local authorities and solved the garbage collection issues within the area.

If we look purely at numbers, we are all on the winning side. Finally, for us the garbage collection has become almost cost neutral and the recycling company runs at a much higher capacity occupation. It is an intelligent way of saving cost while serving the higher purpose. Any business can act responsibly toward the environment as long as there is a willingness to do so.

Today every international company has a corporate social responsibility as one of their main visions inscribed in their DNA and going green, being sustainable, is one of the most important

ones. As we are part of the group ACCOR we follow as much as we can the initiative called Planet 21. The company's commitment to drastically reduce CO2 output and the use of plastic. Today the straws used in the hotel are made out of paper. There is still a lot to do and we continue to strive for a more plastic-free operation.

I think we are missing a huge opportunity for the local economy. The development of recycling plants and a sustainable economy can help to create new jobs, to create new manufacturing plants, to develop own products under the brand "Made in Kazakhstan". For example, today almost all fashion brands are using recycled fiber for their clothing, many countries use recycled products to build houses, roads. So many great examples out there to learn from. This is happening, because countries have national recycling strategies and implement them day-to-day for local economies. This is what needs to happen here in Kazakhstan too.

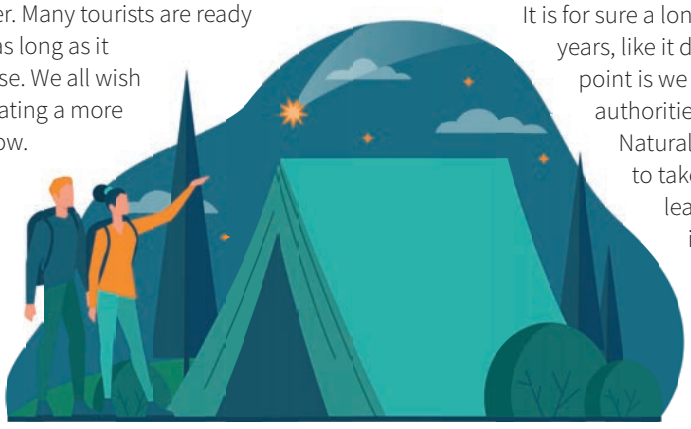
– An uncivilized approach to tourism has a detrimental effect on the environment. The development of ecotourism certainly requires investment in "organized" tourism. These are parking lots, camping, infrastructure facilities and etc. Could you share your international experience: what needs to be done, for example, in Burabay to avoid the harmful influence of tourists?

– What we see presently cannot continue for the future. On weekends, public

holidays and during the summer months the National Park is overcrowded and without any limitations nor control. One can see always the next days the very harmful impact of this unorganized tourism. Everywhere garbage leftovers and the nature is spoiled. There needs to be a clear development plan for the area with the necessary infrastructure to support it. In other countries we offer Park &Ride solutions to remove the massive amounts of cars from protected areas. Visitors shall pay an ecotax that could be used to build those necessary structures. Legislation shall prohibit the use of plastic bags in the shops and souvenir areas. Perhaps implement environmental police to ensure tourists are taking back all their garbage after having visited the park. Make the professional guides become more like rangers in Canada, protecting their natural resources. Have an environmental and sustainable construction manual that imposes new buildings to be 100% environmentally friendly. Like we have in most of the other countries around the World. Prohibit the use of petrol, charcoal and promote use of gas only. Audit all the existing buildings, hotels and sanatoriums, tourism installations on environmental friendliness. I would suggest Kazakhstan to search for assistance from other countries which are successful in developing eco-tourism and adapt some of their methods, laws. Of course, it is a long way forward and yet we need to start with a first step in the right direction.

– But antagonists will say that it's expensive. It's expensive to install solar panels, expensive to use energy efficiency technologies, it's expensive to recycle your waste, and finally it will influence the cost of touristic product. What do you think? How to find a balance between economy and ecological approach?

– I do understand that people will bring up this point of view. Change is difficult and needs strong commitment. Today almost every nation has understood that we need to reduce the use of plastic. Many alternative products are on the market mainly made out of recycled items. Many big brands have adapted a sustainable approach to their products and its packaging and we will see that it will grow further every year. It means the alternative products will become cheaper. Many tourists are ready to pay a little extra as long as it serves the right cause. We all wish to participate in creating a more meaningful tomorrow. Eco-tax should be discussed and implemented as long as it will serve for the development of sustainable tourism. We need to educate our children about the importance of recycling and sustainability. Believe me, we have a huge advantage presently. As we can see that most children are used to digital, since very young age, why not educate via those channels. Why not launch a competition amongst all the schools together with our talented film makers to produce a series of comics that would teach the youngster on how to preserve Mother earth? Once our children will understand, they will teach us. Kazakhstan is a young independent country and shall become the role model for its neighbors on how to be modernly sustainable.



– I think you mentioned very interesting topic. An important part of information work on the development of ecological tourism is the education of a conscientious tourist who would bear environmental responsibility on the principle of "do not harm". It is clear that punitive methods (for example, fines) cannot correct the situation here. How to ensure that tourism activities in protected areas would be "zero waste"?

– Guides, who work in tourism industry, should be professional, they have to have education and been licensed. Guides – should be like rangers in Canada. These guides are trained to protect the environment and at the same time they make a show around for visiting tourists. They are not just a people, who struggling through the forest. But they should educate tourists about the age of trees, how to find mushrooms, which mushrooms are dangerous, how to survive in the forest, how to cook and etc. Here in Borovoe you have a fantastic chance and nature to develop these professional guides. In Borovoe in the forest there are a lot of mushrooms and berries. There wild strawberries you can pick up here, it is unique just going pick up 10 kilos of wild strawberries, it doesn't exist anywhere in the world. This once again underlines the exceptional nature of Borovoe Natural Park. What is very obvious today that the damage to nature and the environment is purely linked to local tourism. There are almost no international travelers due to the current pandemic. It means we need to start urgently to educate our population on how to develop a responsible attitude towards their own natural resources. It is for sure a long way forward and it will take many years, like it did in many other countries. The point is we need to begin the process. The authorities can deploy "Green Angels" in the Natural Park reminding our local tourists to take back their garbage, hand out leaflets to make them understand how important it is to preserve nature. Provide the tourists with recycled garbage bags for their leftovers and provide guidance where to dispose those bags. Organize entertainment around the


RIXOS
BOROVOE

theme of “No garbage” with a dedicated team of ecologists. At the same time increase drastically the amount of garbage bins available in the park.

I also believe the authorities have to prohibit the use of plastic bags in all shops, bazars, restaurants and provide a recycled alternative. Educate the Owners and make as a start bags payable for the consumer.

Perhaps think about on how we can reinstate the manufacturing of children toys made out of wood and other plastic free materials “Made in Kazakhstan”. Children may have less toys and yet more valuable ones.

– I think this is a good point regarding the requirement to entrepreneurs, business who work in such kind of areas. You slightly mentioned this when we talked about investments, requirements for construction and so on. But, in general, what do you think for people who work here, I mean who run business here, who wants to run business here with tourists, what kind of requirement should be? What kind of the process for them not to make harmful influence?

– To my mind all business, working in and around the National Parks have to sign a Chart about sustainability, environment protection, recycling of garbage, rejection of plastics, following constructional recommendations and quality of service. The competent authority has to develop the legal platforms that only businesses following those charts / regulations are allowed to operate. Employees must be able to communicate in different languages with the tourists such as Kazakh, Russian and English. Businesses and tourists should pay ecotax, because what’s coming for free you don’t value it.

– Our association in 2019 successfully hosted Solar Fest Qazaqstan, an event that received positive feedback in the international business environment and received approval at the highest level in Kazakhstan. It was here in Rixos Borovoe that the RES Charter was signed and addressed to the Government of the Republic of Kazakhstan, which gave a new opportunity to the development of the sector. How do you feel about such an event? Do you see a broader organization of this event in the future? Are you ready to further support it?

– Solar Fest Qazaqstan is a great event and our hotel will always support this festival. But the key

point is that it needs to have many new initiatives and calls for actions integrated. In the hotel we have a perfect catwalk, where we can organize a fashion show or exhibition of crafts or sculpture made of plastic in order to initiate the audience and authorities.

It has to be call for involvement, for example to make an announcement among local citizens to pick up the garbage in the forest and the prize could be a 1,000 tenge per 1 kilogram of the garbage. We can invite local artists and ask them to make sculptures from the garbage collected and at the end to organize the auction of this sculptures.

In partnership with the business community we can think about an ecological fund, which gives money or which prizes for young people for their ecological initiatives. We have a new private high-school Iqanat here in Burabay. Why don't we use the talent and creative energy of students from this school?! Why don't use them and ask them to create those comics for environmental training for children? They will make it for you.

Good idea could also be to call the embassies to bring their know-how in eco technologies to the table. Recently I had a meeting with one Ambassador representing the EU. They have funding to be spent only on water recycling projects. And I invited them to come to Borovoe and check the water quality in the different lakes.

During the festival we can organize nation's cup between, embassies, ecological organization, corporate businesses. And we give them a task to build a boat to get across the lake. Of course, the boat to be made out of plastic bottles and other disposal items. We need action and we can think about such initiatives together to make the festival more fruitful and interesting for the greater audience. It is about creating awareness amongst the population.

– What kind of initiatives you have in your hotel in the framework of ecological tourism?

– A part from your continuous strive to further reduce the use of plastic, continue to further recycle our garbage and reducing intelligently the consumption of water, electricity, gas, we are planning to embrace the idea of eco-tourism and will hopefully start building our glamping / eco-ethno-village. Buildings could be constructed as low-energy consuming with glamping concept. The eco-village will follow the principles of zero-waste, carbon-neutrality, no plastics, only local products and food, no smart-phones (we can leave all our gadgets in special box for the period of stay of our guests).

In the eco-village we will promote Kazakh manufacture, handicraft, we will teach Kazakh culture, language to tourists, and we will organize this back-pack tourism through the forest: to pick up the berries, to pick up the mushrooms, cooking together, to use this all without sugar, gluten-free, and to see the sky, see the stars, play guitar and spend one night in the forest. In addition, we can organize great activities such as horse-riding, husky tours, fishing, bicycle and kayak rides ….

By implementing such projects recycling, eco-friendly approach has to become a lifestyle.

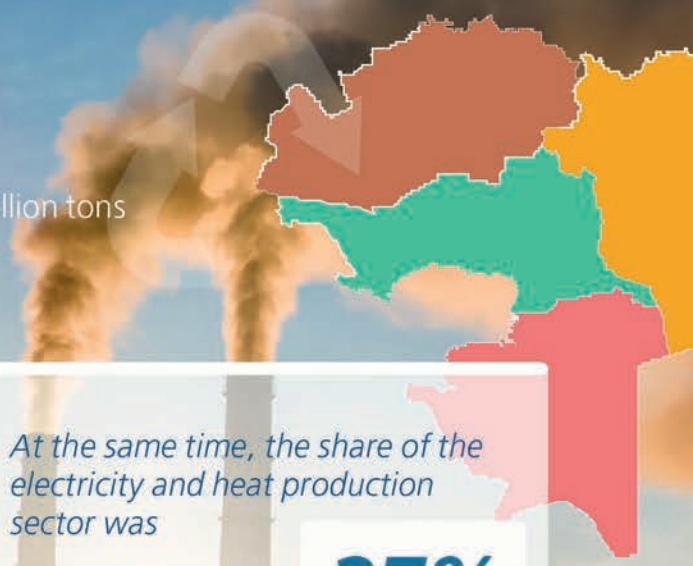
In this eco-village we will be able to organize summer camps, where we will educate our guests about recycling, how to pick mushrooms and berries and how to survive in the forest. And I think this is the right way for development of ecological tourism.

To leave a footprint, this is all that we set for. So, if we have a chance on my position to be able to bring people together, and make the world a little bit better, I think we should not miss that chance. And have fun! This eco-tourism is actually great joy!

EMISSIONS OF THERMAL POWER PLANTS IN THE CITIES OF KAZAKHSTAN

Within the framework of the Paris Agreement, Kazakhstan undertook to reduce greenhouse gas emissions by **15%**

compared to the level of 1990 or up to **328** million tons by **2030.**

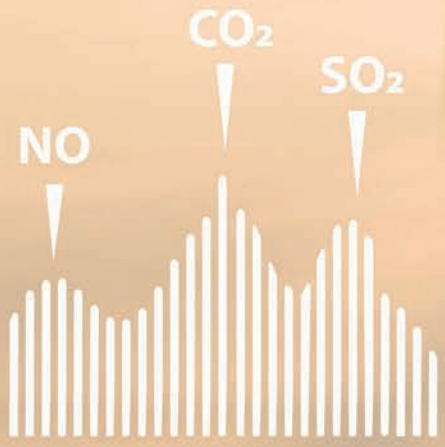


However, today greenhouse gas emissions already exceed the level of 1990. According to the results of the last inventory,

CO_2

emissions amounted to more than

400 million tons



At the same time, the share of the electricity and heat production sector was

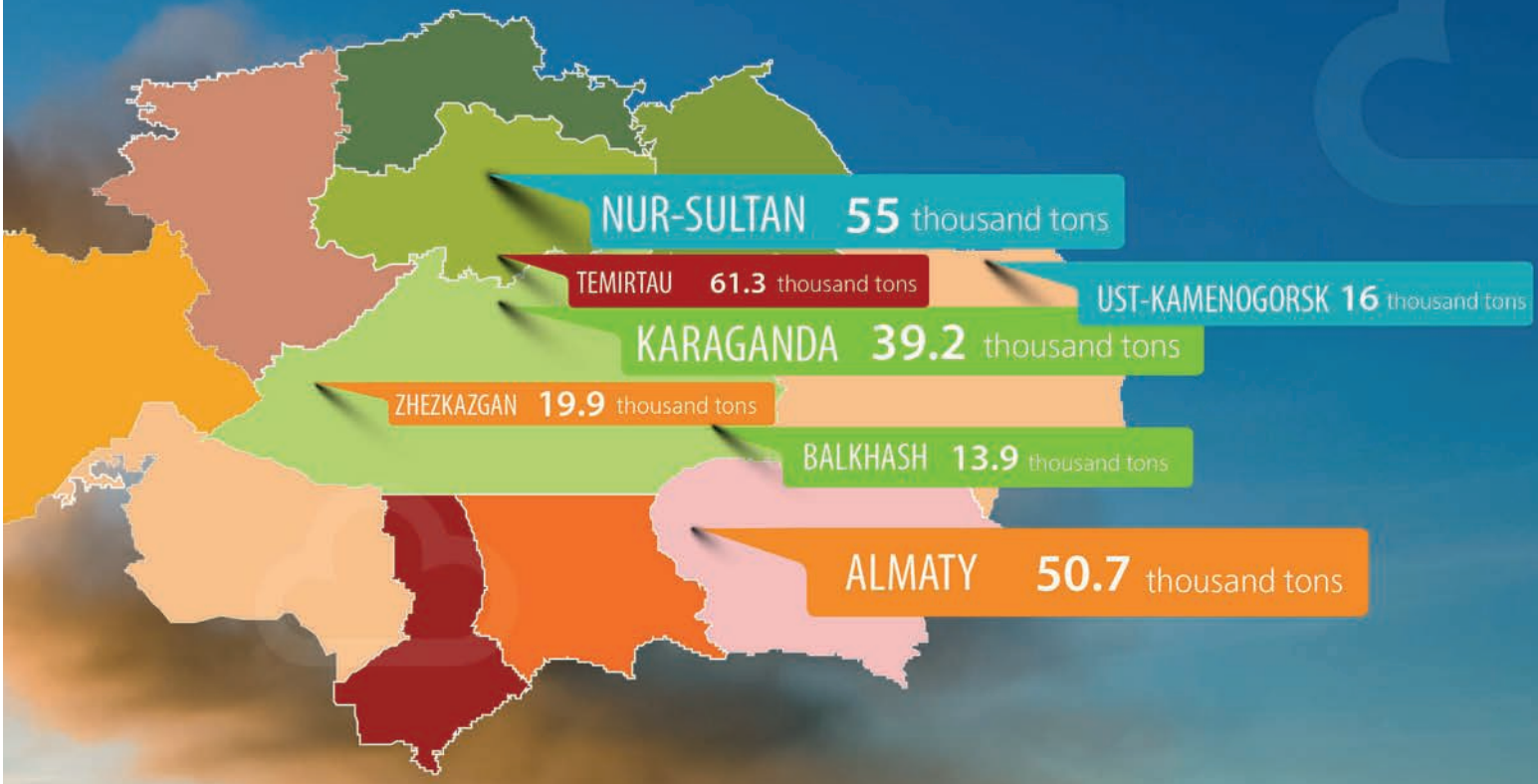
27%

or

110 million tons

According to experts, total emissions in the country will continue to grow and reach the level of **435** *million tons*

by 2030, if appropriate measures are not taken



Total gross emissions into the atmosphere was 2.5 mln tons in 2020 in the RK

Of them 37% (940 thousand tons) – coal-fired electric power industry
30% (760 thousand tons) – MMC
20% (520 thousand tons) – Oil production
13% (320 thousand tons) – other industries

11 thermal power plants are the largest polluters and located
in 7 most polluted cities.
4 million people or about 25% population of the country

Source: MEGNR RK, open data in the network

Shantanu Chakraborty,
Director Infrastructure Finance, Central Asia, and West Asia Private Sector Operations Department Asian Development Bank

FINANCING GREEN GROWTH IN CENTRAL

Asian Development Bank (ADB) is the premier multilateral development bank in Asia and plays a leading role in providing private capital. ADB recently won the Asia Pacific Development Finance Institutions (DFI) of the Year Award by IJ Global – for the second year in a row. In Central Asia, ADB has historically been more active in sovereign operations, but in recent times this has changed significantly, with the Bank's private sector portfolio and team growing to respond to the rapid growth in private sector investment needs of the region. We asked Mr. Shantanu Chakraborty (SC), Director in charge of infrastructure financing for Central and West Asia at the Private Sector Operations Department (PSOD) of the Asian Development Bank (ADB) to share highlights of ADB's private sector infrastructure operations, its products, and vision for the region.

S.C.: The division that I lead covers ADB's support for private infrastructure in 16 countries, including two of region's largest economies – Kazakhstan and Uzbekistan. My division's mandate is particularly important as under ADB's Strategy 2030, the private sector is expected to play a major role in its operations. ADB's private sector operations are expected to reach one-third of its operations by number of projects by 2024. In addition, at least 75% of its activities will promote gender equality and support climate change mitigation and adaptation by 2030.

Figure 1. ADB strategies 2030 and private sector's operations

ADB'S COMMITMENT TO FULL ALIGNMENT WITH PARIS AGREEMENT

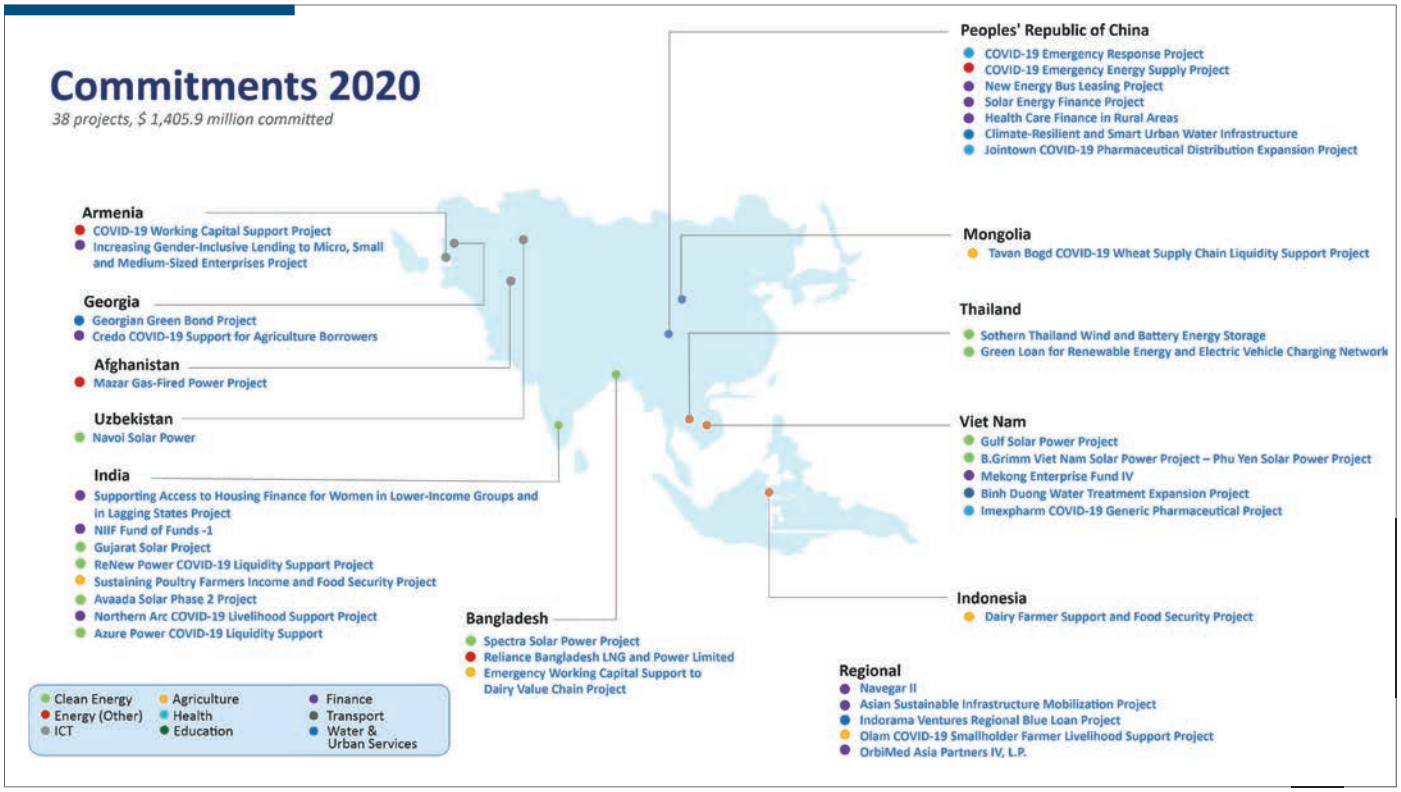
For several years, we have supported markets characterized by nascent regulatory set ups and identified and filled market gaps, where long-term commercial funding is not readily available for infrastructure projects. In recent years, ADB has set very ambitious targets on climate finance - if I were to describe one common thread that unites the thrust of ADB's operations in all countries in

ASIA AND BEYOND

the region, it would be decarbonization. ADB has recently committed to achieve full alignment with the Paris Agreement for its sovereign operations by 1 July 2023; alignment of its nonsovereign operations will reach 85% by 1 July 2023 and 100% by 1 July 2025. As Asia and the Pacific is expected to gradually recover from the coronavirus disease (COVID-19) pandemic, climate financing and green growth are expected to become mainstream. We also plan to significantly scale up our investments in adaptation and resilience, targeting cumulative financing of $9 billion in this area during 2019–2024.

To align its operations with the goals of the Paris Agreement, ADB will continue supporting the development and implementation of renewable energy and green growth-related plans of its developing member countries (DMCs) including in Central Asia. This includes supporting all forms of "transitions" away from fossil fuel-dependent industries, and mainstreaming climate resilience in all our investments.

Figure 2. ADB Private Sector Operations - Commitments 2020



ADB INSTRUMENTS AND PRODUCTS

ADB has access to a wide spectrum of financing instruments to provide bespoke solutions for its private sector infrastructure clients, in a diverse range of sectors such as energy, transport, water, housing etc. Whether through novel long term local currency solutions or arranging third party funding, we support our private sector clients' ambitious goals to help mobilize financing and other expertise necessary to complete projects in a timely fashion and help our member countries' progress towards the Sustainable Development Goals (SDGs). My division is responsible for structuring financial solutions to strike optimal risk-return balance for all parties. Most of the financings we support are capital intensive greenfield projects implemented under non- or limited-recourse project finance structure. This kind of financing is not readily available from commercial banks because it entails long-term debt, the repayment of which relies on the cashflows of the specific project as opposed to the investor's balance sheet. The projects that we co-finance with our partners, including climate funds, are innovative, demonstrational and implemented under tight schedules. Therefore, we believe we play a critical for our clients as their trusted partner. In addition to deploying our own balance sheet, our Strategy 2030 has put significant emphasis on third party mobilization, with a target of $2.50 in cofinancing for every $1.00 from our resources. We deploy our large number of cofinancing products extensively to maximize the amount of private capital that goes into development projects. These products include B-loans, various forms of guarantees, third party funds including some concessional funds, parallel loans, and risk transfers among others.

SUPPORT FOR PRIVATE SECTOR RENEWABLE ENERGY IN KAZAKHSTAN

In 1994, Kazakhstan became the first country in Central Asia to join ADB.

As the largest economy in the region, Kazakhstan is an important driving force for the green agenda in the region. ADB's Country Partnership Strategy (2017-2021) (CPS) with Kazakhstan strongly reinforces this and seeks to foster sustainable green growth. Our CPS responds to climate change by promoting renewable energy sources and supporting climate change mitigation and adaptation efforts.

Since the adoption of the landmark "National Concept on Transition to a Green Economy until 2050" in 2013, Kazakhstan has repeatedly demonstrated its strong commitment to sustainable growth and clean energy – which is a commendable act given its predominance on fossil fuels. It has not only been successful in meeting its 2020 green targets, but also has set its eyes on even

more ambitious goals for 2050 to keep up with international developments and commitments of various countries. After several years of successful rollout of private sector led solar power generation, the country is now actively looking into proven and new hybrid and storage solutions, promoting merchant Power Purchase Agreements (PPAs) to partially open the market, and exploring the potential for hydrogen as a clean alternative source of energy.

To complement Kazakhstan's move towards a greener regime, ADB has provided long-term local currency loans to two large utility-scale private sector solar power projects: the 50MW Baikonyr Solar power plant in Kyzyl-Orda region and the 100MW M-KAT solar power plant in Zhambyl region. These will ease power supply shortages and boost the share of renewable sources in the country's energy mix. We currently have several renewable projects in our pipeline where we plan to support new market mechanisms (such as auction-based tariffs) by providing long-term financing. We also seek to add value in all these projects by ensuring compliance with our stringent environmental standards.

As climate change adaptation and mitigation finance is a core development focus for ADB, we regularly issue green bonds to fund our clean energy investments. In Kazakhstan, in November 2020 ADB issued its first Green Bonds in Kazakh Tenge. These were issued under ADB's Green Bond Framework aimed at financing ADB's portfolio of climate change adaptation and mitigation projects in Kazakhstan. The bond proceeds were used to fund the two solar projects in the Kyzyl-Orda and Zhambyl regions.

SUPPORT FOR PRIVATE SECTOR RENEWABLE ENERGY IN UZBEKISTAN

Uzbekistan is the other prominent renewable energy market in Central Asia, with widespread reforms currently underway that have succeeded in attracting significant investor interest in recent years. The country joined ADB in 1995 and is striving to build a vibrant and inclusive market economy led by the private sector, with a strong green agenda.

But Uzbekistan is also heavily reliant on fossil fuel with most of its electricity supplied by natural gas. Its aging power grid results in high transmission and distribution losses. Power deficits are especially acute in southern and western regions, where some schools and hospitals are unable to operate at full capacity due to unreliable electricity supply.

Yet given that Uzbekistan has one of the oldest solar laboratories in the world, it is no surprise that it is now taking the lead and has announced that by 2030, it plans to build 8GW of additional renewable capacity, and achieve carbon neutrality by 2050. As Uzbekistan opens its economy, makes long-term commitments and leapfrogs to competitive tenders, we are witnessing growing appetite from

top investors and lenders from all over the world who are interested in competing in its large-scale, transparent auctions with bankable PPAs under very well-structured contractual structures. These are designed through extensive transaction advisory work provided by multilaterals such as ADB, IFC and EBRD. The result of such a transparent approach to project design and awards has been three record-low tariffs in recent months - that are considerably lower than the average cost of generation in Uzbekistan.

UZBEKISTAN'S PROGRESS, OVER THE PAST TWO YEARS IS VERY IMPRESSIVE. IT HAS DEVELOPED A ROBUST PPP REGIME, EXPANDED ITS POOL OF BANKABLE RENEWABLE ENERGY PROJECTS, WHILE ACHIEVING RECORD-BREAKING TARIFFS, INCLUDING FOR THE ADB-ADVISED SHERABAD SOLAR POWER PROJECT, WHICH WILL BE THE LARGEST SOLAR PROJECT IN CENTRAL ASIA WITH 457 MEGAWATTS OF GREEN, AFFORDABLE, AND SUSTAINABLE POWER.

Several renewable projects have already reached financial close. The first one to do so is the 100MW Nur Navoi solar park, the first independent power project (IPP) that won Renewable Solar Frontier Market Deal of the Year by IJ Global and that we were privileged to finance along with our development partners.

The financing package for the plant includes loans from ADB; the Canadian Climate Fund for the Private Sector in Asia II (CFPS II), which will be administered by ADB; and from the International Finance Corporation (IFC), with an offtaker payment guarantee arranged by the International Bank of Reconstruction and Development (IBRD).

The plant is being built near Navoi City in central Uzbekistan by United Arab Emirates-based Abu Dhabi Future Energy Company Private – Masdar, a global leader in renewable energy.

This ground-breaking 100 MW project will generate around 258.2 gigawatt-hours of clean energy annually, avoiding 157,502 tons of carbon dioxide emissions a year. It will sell its energy output to the National Electric Grid of Uzbekistan, under a 25-year power purchase agreement.

THE WAY FORWARD IN REBUILDING A POST-COVID GREENER FUTURE

We are currently witnessing remarkable technological advancements, and sharply falling cost of renewables in Central Asia. This, coupled with strong commitments from the governments to decarbonize their predominantly fossil-fuel based economies, positions Kazakhstan and Uzbekistan well to respond to the energy transition challenges. We eagerly look forward to supporting this transition by mobilizing ADB's resources and helping to bring about a greener and cleaner tomorrow in Central Asia.

CARBON NEUTRALITY

IS THE MOST URGENT GLOBAL CHALLENGE

2030-2035

- Ethiopia
- Finland
- Maldives
- Uruguay

2040-2045

- Austria
- Iceland
- Germany
- Sweden

2050

- Andorra
- Argentina
- Australia
- Canada
- Chile
- Costa Rica
- Croatia
- Denmark
- Fiji
- France
- Hungary
- Grenada
- Ireland
- Japan
- Marshall Islands
- Nepal
- New Zealand
- Norway
- Panama
- Paraguay
- Peru
- Portugal
- Singapore
- Slovakia
- Slovenia
- South Africa
- South Korea
- Spain
- Switzerland
- United States
- Uzbekistan
- Vatican City

2060

- Brazil
- China
- **Kazakhstan**

Secretary General Antonio Guterres, speaking at the third annual Bloomberg Economic Forum in November 2020, said that the international community can and should achieve complete decarbonization of the world economy by 2050. The UN Head proposed to actively introduce a tax on carbon emissions, as well as to abandon coal mining and cancel subsidies for fossil fuels. He noted that today most countries of the world have announced their intention to achieve zero emissions by 2050. The European Union has expressed its commitment to achieving this goal. The United Kingdom, Japan, the Republic of Korea and more than 110 countries have done the same. The new Administration of the United States has expressed the same commitment. China has committed to do this by 2060.

Speaking at the virtual summit on climate ambitions, the President of the Republic of Kazakhstan K.-J. Tokayev said that our country would achieve carbon neutrality by 2060. ''Carbon neutrality'' or ''zero emissions'' does not mean their complete absence. These terms indicate that the volume of carbon dioxide emissions does not exceed its volumes absorbed by nature (oceans, forests).

TO DATE, 2 COUNTRIES HAVE ACHIEVED CARBON NEUTRALITY – BHUTAN AND SURINAME.

USAID IS SUPPORTING the Creation of a Regional Electricity Market in Central Asia

Mr. Armen Arzumanyan,
Chief of Party, USAID's Power the Future, Central Asia Regional Electricity Market Activities (CAREM)

Mr. Pedro Robiou,
Manager - Power Sector Projects, Tetra Tech ES, Inc. (USA)

Dr. Pramod Jain,
President, Innovative Wind Energy, Inc

Central Asia is rich in renewable energy (RE) resources like solar and wind energy. For instance, Kazakhstan currently has about 1,200 megawatt (MW) of installed RE capacity and it is expected to double the figure by 2025. While Uzbekistan has no RE plants yet, the government has prioritized constructing 1,000 MW of RE plants by 2023, about 5,000 MW and some 8,000 MW by 2025 and 2030. The country's sources of RE can be increased to reduce the greenhouse gas (GHG) emissions from the power sector. The cost of solar and wind power is also dropping rapidly as demonstrated in recent RE auctions in Uzbekistan where the offered cost of solar was about 1.8 US cents per kilowatt hour (kWh), which is lower than the cost of new fossil-fuel based generation.

In addition, the RE subsector is prime for investment and development; currently, there is increased foreign and domestic interest as well as available capital for RE development while governments are raising targets for RE generation and integration. However, there are impediments to the integration and generation of high levels of RE due to the costs of grid integration and the need to prepare grids to absorb RE. Fortunately, over the past two decades a strong body of international knowledge, experience and solutions has developed to resolve these impediments. Although the solutions are country-specific,

WHILE UZBEKISTAN HAS NO RE PLANTS YET, THE GOVERNMENT HAS PRIORITIZED CONSTRUCTING *1,000 MW* OF RE PLANTS BY 2023, ABOUT *5,000 MW* AND SOME *8,000 MW* BY 2025 AND 2030.

the methodology for modeling and analysis are common and the mitigation measures can be synopsized and applied from past experiences. The purpose of this article is to propose global best practice methodologies and measures to mitigate the impacts of integrating and generating high levels of RE at the national and regional levels in Central Asia.

This article will also address how a regional electricity market in Central Asia provides a sustainable long-term solution to developing large amounts of variable renewable energy at national and regional levels. In addition to lowering the costs of electricity, a regional market will help to mitigate the impacts of developing RE by facilitating the regional trade of flexible generation capacities. The available flexible generation capacities will support the initiatives of individual Central Asian countries to safely and securely generate large amounts of RE and transition to low-emission, climate resilient and clean energy economies.

HOW WILL RE DEVELOPMENT PLANS IMPACT REGIONAL SYSTEM OPERATION? LIVE EXAMPLES

As mentioned, RE power plants operation have impacts upon national and regional grids–some positive and some negative. For the purposes of this article, it is convenient to separate into two categories the impacts of connected utility-scale RE plants on the transmission system:

IMPACT ON TRANSMISSION SYSTEM

- *Reduce static and dynamic stability of the grid*
- *Cause congestion, and modify power transfer capacity on inter-regional transmission lines*
- *Change voltages and short-circuit profiles*
- *Introduce harmonics*
- *Require upgrades to the transmission network to mitigate the above impacts*

IMPACT ON SYSTEM OPERATIONS

- *Increase variability and uncertainty in generation, hence require more frequent re-dispatching*
- *Require higher amount of flexibility from existing generation fleet*
- *Require higher amount of dispatchable load following capacity*
- *Require higher amount of operating reserves*
- *Require higher amount of sharing of reserves among neighbors*

The technical and infrastructure costs to mitigate these impacts are paid for by a national power system and are called the costs of RE integration. The impacts of developing RE can be illustrated by examining a case where high amounts of RE generation are developed in the south region of Kazakhstan. Since the southern region has a power deficit and large quantities of power flows into this zone from the northern region, RE development in the south would result in the following impacts:

1. Impact on the regional transmission system:

1. Transfer capacity is an important operational parameter of a transmission network and is determined by the static stability limit of a power system. A System Operator uses transfer capacity for short-term planning, from day-ahead to real time. In the case of Kazakhstan, higher amounts of RE in the south will reduce both the transfer capacity requirement and limit. A detailed power systems modeling should be performed for different scenarios that correspond to time slices that represent extreme conditions in the south like high RE generation and load. This power system modeling would investigate if the reductions in transfer capacity limits are more than the RE generation in the south, which would impact the regional flow of power. To mitigate the impacts in such a case, investments would be required for instance in installation of synchronous condensers or series reactors.

2.1. Transient and small signal stability are important considerations during time periods when the RE penetration is close to 50 percent of average load. As RE generators have no inertia, this penetration can lead to lower grid inertia resulting in larger oscillations and poorer damping of oscillations. A detailed power systems modeling could be performed to quantify the impacts on the southern Kazakhstan region and the Central Asia Power System (CAPS). If there is significant impact, then appropriately sized synchronous condensers or power system stabilizers can mitigate the impact.

1.2.1. The regional power system is connected through 500 kilovolt (kV) lines that form a loop from eastern Kazakhstan to the Kyrgyz Republic to Tajikistan to Uzbekistan to southern Kazakhstan. In addition, Turkmenistan and Afghanistan are connected through Uzbekistan's grid. Higher penetration of RE, for instance in the Turkistan and Zhambyl provinces in southern Kazakhstan, and central zone of Uzbekistan, would alter the power flow in the loop and hence impact the regional power flow. In this case as well, a detailed power systems modeling could be used to assess the impact

on power flows and protection systems and develop appropriate mitigation measures.

2. Localized impacts on the southern Kazakhstan transmission and distribution network:

2.1. RE plants are usually located far away from load centers, or in weaker parts of the grid. The construction of RE plants in these weak grids necessitates that the network be strengthened near of the RE plants by building new transmission and distribution lines and upgrading substations. Additional interventions include reactive power compensation, more short-circuit current, and the redesign of protection system among other.

3. Impacts on regional system operations:

Large amounts of solar generation in a grid can cause sharp ramp cycles due to dropping solar generation from late afternoon to early evening, combined with a simultaneous increase in load. This is called the "duck curve" phenomenon. This scenarios would require larger amount of flexible dispatchable load following capacity (LFC) from thermal and hydro generators to counter the sharp ramp and ensure balance of supply and demand every moment. Given the Kazakh and Uzbek Governments' targets for solar power, the day-ahead schedule would require larger planned power exports during peak solar generation and imports during sharp ramps. In addition, thermal and hydro generators would need to operate at lower capacity factors, be required to ramp up and down and be subject to more frequent starts and stops.

3.1. The large-scale development of RE would require larger amounts of primary frequency response (PFR, or frequency containment reserves, FCR). The higher penetration of RE will result in high fluctuations in generation in the second to minute timeframe (higher unpredictable changes and higher ramping), which would require higher PFR. As present, PFR is provided by the Russian interconnection. Given the expected increase in PFR, the regional system operators may need to pool resources that can provide PFR.

3.2. Requirements for larger amount of regulation reserve (RR), and of frequency restoration reserves (FRR). The higher penetration of VRE will result in larger fluctuations in the minute by minute generation time-frame (higher unpredictable changes, higher ramping and forecast error), which would require higher RR. At present, RR is provided by local generators and the Russian interconnection. Given the expected need for the higher RR, the regional system operators may need to pool resources for RR.

All the above issues contribute to the cost of integration of RE. In most grids, experience shows that this cost of integration is very modest and there is no reason to believe that it would be different in Central Asia.

REGIONAL POWER SYSTEM OPERATION TO FACILITATE RE INTEGRATION

During the Soviet time, the five national power transmission system of Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, and Turkmenistan, were interconnected and operated synchronously and as one united system. The centralized coordination of operation and planning of all national systems was entrusted to a regional dispatch center based in Tashkent, Uzbekistan, which was assigned the function of managing the region's generation dispatch.

After the dissolution of the Soviet Union, the countries of Central Asia started pursuing a policy of self-sufficiency and energy independence, causing the disruption of power exchanges across national borders and a drastic reduction of trade volumes seen during Soviet time. In 2003, Turkmenistan unilaterally decided to disconnect its network from the CAPS and operate in parallel with Iran in island mode. Later in December 2009, due to disagreements with Tajikistan, Uzbekistan announced its withdrawal from the regional power grid.

Today, CAPS continues to operate in synchronous mode with only three national interconnected power networks, which trade power on a seasonal basis: Kyrgyzstan, Uzbekistan, and Kazakhstan, and through the latter with the Unified Power System of Russia. However, there are now expectations that all countries may return to operate their grids in a parallel and coordinated manner. Tajikistan and Uzbekistan have already reconnected their systems on islanded mode (asynchronous operation) as a first step to Tajikistan's full re-integration to CAPS, which is expected by 2022.

A synchronized, coordinated operation of all national power systems will enhance the required flexibility needed and will be critical to effectively integrate variable renewable generation projects across the region.

USAID SUPPORT FOR A CENTRAL ASIA REGIONAL ELECTRICITY MARKET (CAREM)

In 2018, the United States Agency for International Development (USAID) launched the Central Asia Regional Electricity Market (CAREM) Activity to provide technical assistance and capacity building to the countries of Central Asia in their efforts to establish an economically viable and sustainable regional electricity market. It is anticipated that the regional market will enhance the security of supply in Central Asia, bring substantial economic benefits to each country and promote their economic growth by attracting private investment into national power sectors. A competitive CAREM will ultimately serve as a platform for an expanded Central Asia - South Asia power market, facilitating commercial power exchange with Afghanistan and Pakistan via CASA-1000 transmission infrastructure. To achieve this objective, the CAREM Activity is promoting the efficient use of the region's resources to generate electricity, thus making it possible to increase the volume of power that can be traded by countries across national borders.

Through USAID's assistance, the CAREM Activity is partnering with the countries in Central Asia to carry out multiple activities that are intended to create the rules, procedures and institutions necessary to building a regional market. For example, the CAREM Activity is assessing the present electrical conditions and capabilities of the regional transmission grid and all interconnections and their potential to support larger volumes of cross-border power exchanges. The intent of the study is to determine the existing physical and operational limitations and propose measures for the countries to address them. The regional market is expected to be supported by robust high-voltage interconnections between the countries and upgraded national transmission infrastructures. Once all national power systems are integrated again, their operation will be synchronized and centrally coordinated by CDC-Energy. This will create larger volumes of cross-border power flows and allow power systems to share operating reserves and effectively support each other during system emergencies. At the same time, integrated operation will facilitate and encourage large-scale power generation, and the deployment of solar and wind power plants throughout the region.

USAID'S CAREM ROADMAP AND ACTION PLAN

USAID and the CAREM Activity worked closely with Central Asian partners to develop a CAREM Roadmap and Action Plan that envisions a phased approach to create a regional electricity market. To facilitate the implementation of CAREM, the Central Asian countries established three expert-level (WGs) groups: technical, market development, and legal/regulatory. In coordination with the CAREM Activity team, the working groups reviewed the Roadmap and Action Plan, a detailed guide to implement the regional electricity market. On October 20, 2020 USAID conducted a meeting where the deputy ministers of energy of Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan approved the Roadmap and Action Plan. The CAREM model and concept envisions that the market will be implemented in four phases and most of the benefits are to be achieved in the two initial phases. The initial phases require just a few regional agreements in order to be implemented.

THE REGIONAL ELECTRICITY MARKET - IMPLEMENTATION STRATEGY

Since USAID launched the CAREM Activity, the team has worked to create the market by following four parallel workstreams. This strategy is intended to maximize the effectiveness and impact of individual activities by focusing on the current challenges to expanded electricity trade in Central Asia: technical, legal/regulatory, commercial and staff training.

Through studies and assessments, the CAREM Activity is working to address the obstacles preventing the trade of electricity in larger volumes, including technical gaps in legal frameworks to establish commercial relationships, regulatory barriers, commercial issues (pricing), lack of clear procedures to trade, and absence of a coordinated transmission system operation.

The CAREM Activity team is also reviewing national policies, laws, regulations, and operating rules in an effort to harmonize them. In review, the team recommends the necessary amendments and adding provisions that would enable multilateral cross-border exchanges through a regional trading platform. Through work with counterparts, the team is also developing commercial rules and regulations to ensure bilateral contracts are honored and payments are provided.

Finally, the CAREM Activity is working closely with partner countries at the regional level to help overcome defined barriers and weaknesses, and create the necessary conditions for an intra-regional, multilateral electricity trading platform to become operational.

CAREM'S CAPABILITY TO FACILITATE RE INTEGRATION AND GREEN HOUSE GAS EMISSION REDUCTIONS

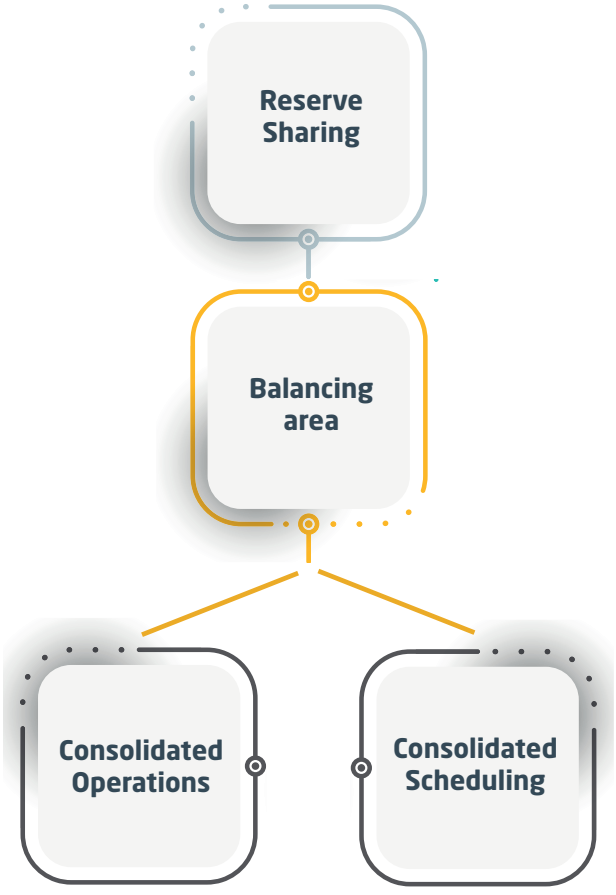
Around the world, national grids that have seen large penetration of RE, such as in Denmark, Ireland,

California, Texas, India, and China among others, have had to undergo significant transformations to integrate RE in effective and cost-efficient manners.

EXPANSION OF THE BALANCING AREA

One of the key transformations is increasing the balancing area (BA). BAs are geographic boundaries within which supply and demand are balanced by the system operator (balancing authority). Therefore, increasing the BA means increasing the coordination between neighboring balancing authorities to promote more efficient flows of energy. This is extremely important in BAs with high RE penetration as when generation is high in one BA, it may be lower in another. Cooperation between BAs gives system operators more operational flexibility and, thereby, reduces the impact of variability and uncertainty of RE generation.

Three types of approaches have been deployed around the world to increase BA cooperation and are relevant to Central Asia[1]:



1. Reserve Sharing. A higher penetration of RE requires higher amounts of reserves and hence the cost for balancing is higher. These costs can be mitigated by pooling of reserves across BAs—a simple way for each BA to increase reserves without physically adding new reserves to its own balancing area is to access a pool the reserves in the bigger balancing area. Given the abundance of hydropower in Tajikistan and the Kyrgyz Republic, these countries could pool the reserves and serve as key suppliers of PFR, RR and LFC. Supplying reserves to the regional balancing area can earn a premium for these countries that is much higher than providing baseload generation on a bilateral basis to a neighbor.

2. Coordinated Scheduling. The BAs can coordinate generation scheduling across different time frames (day-ahead, hour-ahead and intra-hour) to fill periods of under- and over-supply. In a regional power market, higher prices can be reduced at nodes during periods of under-supply through the use of locational marginal pricing and unit commitment and economic dispatch for the coordinated regional market.

3. Consolidated Operation. A higher penetration of RE is forcing the grid to be more dynamic and hence requiring the system operator to perform very fast and highly coordinated actions with generators (intra-hour dispatches and real time ancillary services). This cannot be managed through static bi-lateral or multi-lateral agreements. It will require consolidated operations akin to the European Network of Transmission System Operators for Electricity (ENTSO-E), which represents 42 electricity transmission system operators from 35 countries in Europe.

SYSTEM IMPACT STUDIES TO INTEGRATE RE INTO THE REGIONAL GRID

To assess and mitigate the impacts of RE on the regional power system, a variety of system impact studies should be performed to develop sustainable long-term solutions. Based on global best practice experiences, there are three primary types of system impact studies:

1. Power system study to assess the impacts of RE on static and dynamic stability. The outcome of this study is transmission network upgrades, including transmission lines, substations, reactive power compensation, protection systems, and active and reactive power controls.

2. Unit commitment and economic dispatch study to assess the impacts of RE on the dispatchability of conventional generation and

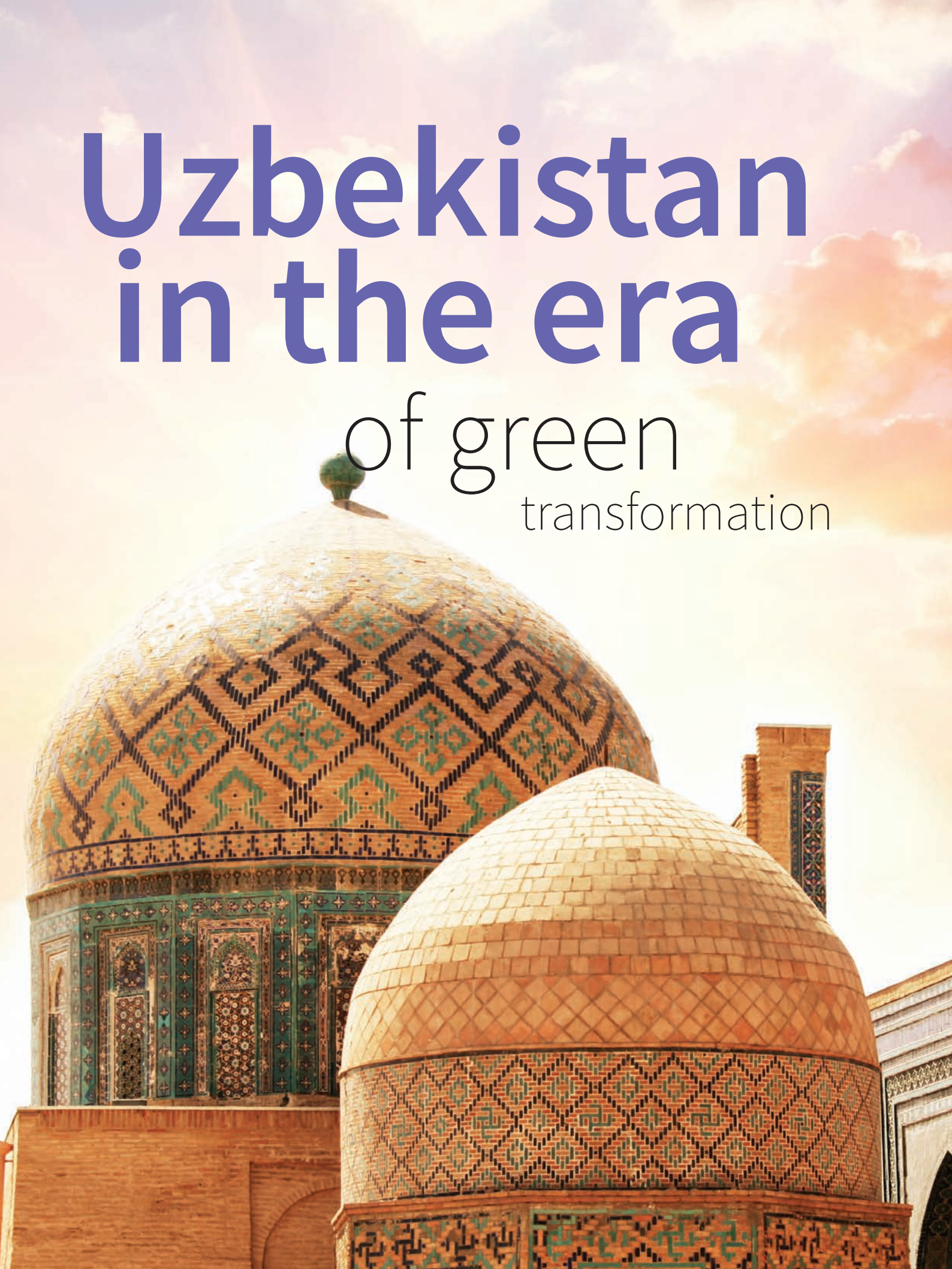
RE. It also determines the impact of RE on the production cost of electricity. The outcome of the study is upgrades to system operations, including faster dispatching, power markets, RE generation forecasting, automatic generation control, automated dispatch systems and others.

3. Flexibility and reserves requirement study to assess impacts of RE. The outcome of the study is an estimation of the flexible capacity requirement (LFC, PFR, RR and others), and recommendations for upgrade of existing generators and installation of new generators to meet the new flexibility and reserve requirements.

Disclaimer: This article is made possible by the support of the American People through the United States Agency for International Development (USAID). The contents of this document are the sole responsibility of the Authors and do not necessarily reflect the views of USAID or the United States Government.

Summary. As this article discusses, individual countries in Central Asia, such as Kazakhstan and Uzbekistan, have set ambitious targets to increase the share of renewable generation. To meet these targets, these governments will need to develop diverse technical solutions to minimize the cost of integration of variable generation. This article presents various solutions, based on accepted practice, to assess and mitigate the impacts of variable renewable generation at the regional level. The technical solutions focus mitigating the impacts of RE on the grid through upgrades to the transmission system and system operations, and adoption of regional electricity market and balancing area. One of the lowest cost solutions is to increase the balancing area to encompass the entire Central Asian region, thereby sharing reserves and coordinate scheduling and operation. As discussed, these solutions can be effectively implemented in a functional and coordinated regional power market. At present, the USAID-funded CAREM Activity is supporting the Central Asian governments to develop the rules, procedures and institutional arrangements to create this market and increase the deployment and development of renewable generation throughout Central Asia.

Uzbekistan in the era of green transformation



Changing the old model of raw-material-intensive economy, which leads to an increase in costs and decrease in productivity, an increase in the negative impact on the environment, is one of the acute problems of our time. Today, many countries are stepping up their environmental policy in order to move from the traditional model of development, where environmental protection is considered a burden on the economy, to a model in which ecology is recognized as the engine of development, i.e. to a "green" economy.

Today, each of us begins to think: what is happening to the environment? The answer is obvious. We are not only witnessing a pandemic of nature, but also in many ways its culprits.

In our opinion, there is an idiom of the critical temperature theory. The planet Earth is a single whole, in some ways similar to a living organism.

A biological organism with impairment of functions of normal life demonstrates increasing in body temperature to protect against harmful bacteria and viruses, which helps to improve its resistance to harmful effects. At the same time, there is a critical limit to such actions: for a person, for example, an increase in body temperature to 42 degrees can lead to a fatal outcome.

The Earth also has a critical limit, exceeding which will lead to irreversible processes.

The proclamation of a new global "green" course is one of the ways of development that can restore stability of global economic and financial systems, ensure stable growth of human development.

In a simplified concept, a "green" economy is an economy with the efficient use of natural resources, the widespread use of renewable, resource - saving, waste-free and low-waste technologies, with low greenhouse gas emissions, with a significant reduction in risks to the environment.

That is why the President of Uzbekistan Sh. M. Mirziyoyev on June 14, 2019, at a meeting of the Council of Heads of SCO member States in Bishkek, proposed to adopt the "green belt" Program in order to widely introduce modern resource – saving and environmentally friendly technologies in the SCO countries.

Development of "green" economy, including in the context of reducing the negative consequences of the Aral crisis and socio-economic, environmental rehabilitation of the Aral Sea region are of urgent importance not only for Uzbekistan, but also for the whole Central Asia.

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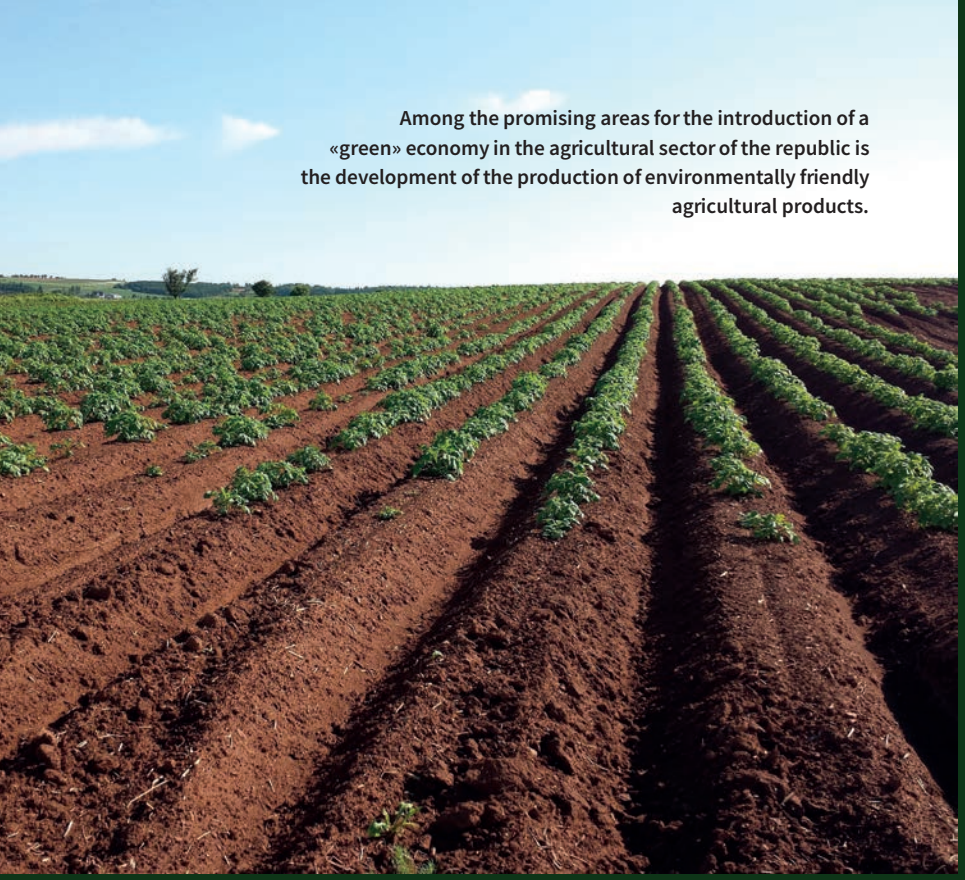
Chairman of the Committee of the Senate of Oliy Majlis of the Republic of Uzbekistan on Development of the Aral Sea region, Chairman of the Ecological Movement of Uzbekistan, Academician of the International Academy of Ecology and Life Safety

F. T. Ganiyeva,
Head of the Department for development of Relations with Foreign and International Environmental Organizations of the Ecoparty and Eco-movements of Uzbekistan



Among the promising areas for the introduction of a «green» economy in the agricultural sector of the republic is the development of the production of environmentally friendly agricultural products.

Today, many states of the Organization for Economic Cooperation and Development (OECD) have already made political decisions on transition to renewable energy sources, fully encourage organic agriculture, increase subsidies for the development of environmental projects and the renewable energy industry, increase land and water capacity, improve regulatory documents in the field of development and stimulation of the "green" economy.

In these circumstances, as part of consistent and phased implementation of reforms in the field of state and public construction in Uzbekistan, tasks aimed at accelerating the process of transition of our republic to a "green" economy and effective achievement of sustainable development goals are brought to the fore. Moreover, this is becoming a key issue in the fight against climate change.

Intensive desertification of the territories of the Aral Sea region, accompanied by the process of pasture degradation, soil salinization, development of Aeolian processes, led to the formation of a new Aralkum desert that gives rise to about 100 million tons of dust and toxic salts annually spreading for hundreds of kilometers.

Due to the drying up of the sea, climate changes in the Aral basin are much more severe than in other regions, twice as intense as the average values in the world (0.29 ^{0}C vs. 0.14 ^{0}C, respectively), the daily temperature range has increased, the relative humidity of the air has decreased, especially in the warm period of the year, the number of days with an air temperature of more than 40 ^{0}C has increased.

In this regard, Uzbekistan is taking the following measures:

- implementation of political decisions in the field of strengthening regional cooperation;
- improving the regulatory framework in the field of environmental protection;
- development and adoption of development programs and strategies;
- implementation of investment projects;
- organization of scientific and practical forums with the participation of leading experts in the field of ecology.

It should be noted that today the large-scale work that has no analogues is being carried out in the Aral Sea region to improve

the economic, social and environmental situation. Only for the period from December 2018 to March 2021, about 1.7 million hectares were sown with saxaul seeds on the dried-up bottom of the Aral Sea (including with the help of aviation).

Planting desert-resistant plants on the bottom of the Aral Sea simultaneously solves several important tasks.

1. Conditions are being created to mitigate the state of the environment and prevent further degradation of natural resources.
2. The maximum volume of sand is retained on the drained bottom of the Aral Sea.
3. A favorable ecosystem is being formed for distribution and reproduction of various species of fauna.
4. Increasing the area of desert forests and biodiversity will create conditions for climate mitigation in this region.

Promising areas for introduction of a ”green” economy in the agricultural sector of the country include development of the production of environmentally friendly agricultural products.

Another initiative of Uzbekistan was the development and adoption of the Concept of Cooperation in the field of ”smart” agriculture and introduction of agro-innovations that will contribute to solving the problems of food security in the region, which are getting worse against population growth, depletion of land and water resources and climate change.

Currently, many farms in Uzbekistan produce environmentally friendly products. At the same time, technologies of effective microorganisms (EM-technology) and biological plant protection products are used – the most advanced alternatives to the use of pesticides in agriculture. This is a practical transition from chemical to organic ‘‘smart’’ agriculture, i.e. to growing agricultural products without mineral fertilizers and chemicals.

At the same time, there is an acute need for scientific and innovative developments in such areas as organic farming, personalized and ‘‘smart’’ agriculture, creation of genotypes of agricultural crops with high yields and resistant to harsh edaphoclimatic conditions. In addition, about 90% of the water resources of the Central Asian region are still used in agriculture with inefficient irrigation methods. In these circumstances, the issue of exchange of experience between countries in the field of development and implementation of modern environmentally friendly resource – and water-saving technologies in agriculture is becoming relevant.

The most important directions of ”greening” of the water sector of the country are also improvement of the drinking water supply system and development of environmentally safe sewerage systems.

The modernization of water supply networks carried out in areas with insufficient development of centralized drinking water supply represents practical steps to ‘‘greening’’ this sector. Thus, in the Aral Sea region, the development of this sector is planned both on the basis of improving the main water pipelines, and on the basis of creating local systems, desalination plants.

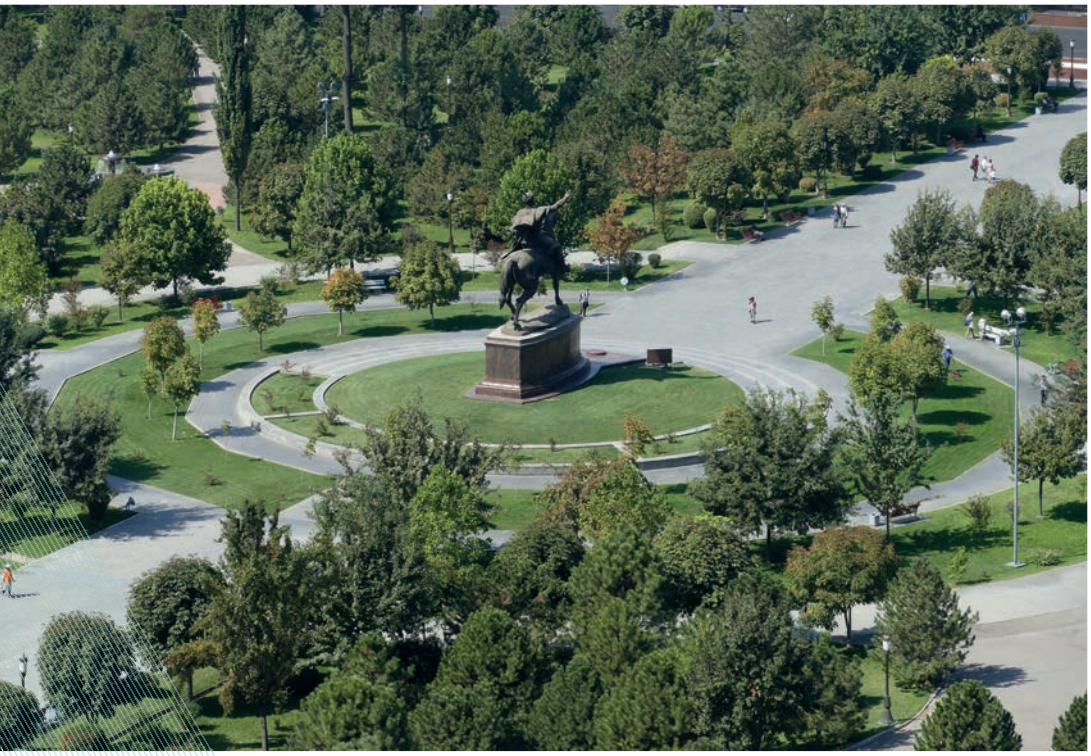
In order to improve the drinking water supply and sanitation of settlements, as well as to improve the health of the population, decisive measures are being taken in the country to strengthen the protection of drinking water sources from pollution and depletion, to provide drinking water to hard-to-reach and remote rural settlements, to improve the systems for treatment of industrial and domestic wastewater in cities and settlements.

«GREEN» ECONOMY

Development of renewable energy sources plays a special role in transition of the energy sector of Uzbekistan to ‘‘green’’ economy.

In the structure of primary fuel and energy resources of the Republic of Uzbekistan, the main place is occupied by oil, gas, as well as coal and partly by hydropower. Despite the great potential of renewable energy sources, their share does not reach even one percent.

The factor of resource limitations of hydrocarbon energy sources, the scale and rate of their depletion encourage us to take the necessary measures not to fall out of the global trend of



large-scale development of alternative energy. According to expert estimates, the possibilities of using renewable energy sources in our country are equal to the equivalent of 51 billion tons of oil. The existing technologies allow obtaining energy equivalent to 179 million tons of oil, which is almost three times the volume of fuel produced in the country, as well as to prevent emissions of 447 million tons of carbon dioxide, sulfur compounds, nitrogen oxide and other pollutants.

In order to create a legal framework, systematically consolidate priority areas and a set of state policy measures in the field of renewable energy sources, increase energy efficiency in economic sectors, the social sphere and the level of diversification of the fuel and energy balance, financial incentives for renewable energy producers, as well as strengthen the country's energy security, the Law of the Republic of Uzbekistan ''On use of renewable energy sources'' was adopted in 2019.

One of the important aspects of Uzbekistan's transition to ''green'' economy is development of environmentally friendly transport.

Structure of vehicles used in the country is dominated by automobile, the total number of which is more than 2.7 million units. Despite the relative efficiency and economy, motor transport is the second largest consumer of energy resources and, along with the industrial sector, is one of the main environmental pollutants. In general, the share of emissions of pollutants into the atmosphere from vehicles currently reaches 65% in the country, and in large cities, such as Tashkent, exceeds 80%. At the same time, the annual volume of emissions of pollutants due to the use of gasoline and diesel fuel in motor transport is more than 1.5 million tons.

In our opinion, one of the most effective and environmentally impeccable is the conversion of internal combustion engines to cryogenic hydrogen or gasoline-hydrogen composite fuel. Many countries are engaged in development of technology for transition to hydrogen fuel, but, unfortunately, separately.

In addition, the advantages of hydrogen as a fuel are associated not only with the fact that its combustion produces environmentally friendly water vapor, but also with the fact that, compared with organic fuel, it has a large energy reserve: when a ton of hydrogen is burned, the same amount of heat is released as when 3.5 tons of organic fuel is burned.

Education and science play a special role in Uzbekistan's transition to a ''green'' economy.

In May 2019, the Government of our country approved the Concept for Development of Environmental Education in the Republic of Uzbekistan, which provides for phased introduction of a system of continuous environmental education and upbringing at all stages of training.

This requires further improvement of state standards, development of the scientific potential of the country, revision of the educational process and system of advanced training for training personnel in relevant specialties, as well as preparation and publication of teaching aids, textbooks, visual and didactic materials for educational institutions of preschool, general secondary, secondary special, professional and higher education.

Thus, responding to the most the transition to a sustainable, more environmentally friendly ''green'' economy will also have an impact on labor market, creating additional jobs and improving the quality of existing jobs in agriculture, processing industries, the construction industry and other areas.

DEVELOPMENT
OF RENEWABLE ENERGY SECTOR
IN UZBEKISTAN
AS PART OF THE ENERGY SECTOR REFORM

> ***A critical energy reform is being carried out in power industry of Uzbekistan, which includes demerger of Uzbekenergo and tariff reform in order to recover costs in the sector. Significant investments are required mainly to ensure the growth in load and replacement of old inefficient thermal power plants. According to experts, by 2025, $11.67 billion of investments in generating assets and $0.71 billion in transmitting assets will be required.***
> ***The Government is fully committed to improving the country's energy security and increasing the capacity of assets with cost-effective and environmentally friendly renewable energy projects, by implementing up to 5 GW solar power projects by 2030, as described in the Master Plan for Electric Power Industry of the Government of Uzbekistan.***

Legislative initiatives on RES

In accordance with the Decree of the President of the Republic of Uzbekistan dated 01.02.2019 No. УП-5646 ''On measures to radically improve the management system of fuel and energy industry of the Republic of Uzbekistan'', the Ministry of Energy was established, which was assigned a function of authorized body for implementation of the unified state policy in the field of renewable energy sources (RES).

In May 2019, the Laws of the Republic of Uzbekistan ''On use of renewable energy sources'' and ''On Public-Private Partnership'' were adopted creating a regulatory framework for accelerating the implementation of RES projects.

In addition, the Resolution of the Cabinet of Ministers No.610 dated 22.07.2019 approved the Regulations for connecting business entities producing electric energy to the unified energy system, including from renewable energy sources, defining the main technical aspects of integrating renewable energy facilities into the UES of Uzbekistan.

In addition, the Decree of the President of the Republic of Uzbekistan dated 23.10.2018 No. ПП-3981 ''On measures for accelerated development and ensuring financial stability of the electric power industry'' instructs the following:

to develop a modern scheme for organizing the production of electric energy, while providing for the broad attraction of private, including foreign, direct investments in electric energy production enterprises, including on terms of public-private partnership, and to work with potential investors on new investment projects in the field of electric power on PPP terms, based on the available resource base, modern technological trends and use of alternative sources of electricity.

In this connection, the Ministry of Energy is currently implementing a set of measures aimed at implementing investment projects in the field of RES on the principles of public-private partnership (PPP) in order to diversify the generation structure for increasing the share of RES.

The introduction of PPP mechanisms in the field of RES will ensure the attraction of foreign direct investment to the generation market of leading foreign companies with advanced innovative technical and technological solutions as independent electricity producers (IEP).

It should be noted that the implementation of investment projects in the field of RES on PPP terms has many advantages, since the entire process of project implementation (attracting financing, carrying out a feasibility study, choosing technologies, the logistics process, construction and installation work, operation of energy facility during the life cycle and the ownership process) lies with the investor, and the task of a single buyer of electric energy, i.e. ''National Power Grids of Uzbekistan'' JSC is to carry out a guaranteed purchase of generated electricity.

Target parameters for development of the renewable energy sector

In accordance with the Decree of the President of the Republic of Uzbekistan dated 27.03.2019 No. PP-4249, the Ministry of Energy, together with the relevant ministries and departments, as well as with the technical assistance of international financial institutions (the World Bank, the Asian Development Bank), developed the concept of fuel and energy supply of the country for 2020-2030.

In addition, the international consultant Mott MacDonald (Great Britain) has developed a Master Plan for the long-term development of the electric power sector of Uzbekistan, including in terms of RES.

It should be noted that the Decree of the President of the Republic of Uzbekistan dated 21.09.2018 No. УП-5544 ''On approval of the Strategy of Innovative Development of the Republic of Uzbekistan for 2019-2021'' determined an increase in share of electric energy production using RES to the level of at least 20% by 2025.

In addition, in accordance with the Decree of the President of the Republic of Uzbekistan dated 22.08.2019 No. ПП-4422 ''On accelerated measures to improve the energy efficiency of economic and social sectors, introduction of energy-saving technologies and development of renewable energy sources'', long-term target parameters for development of RES and plan of organizational and practical measures for further development of RES were approved.

This Decree defines an increase in RES share to at least 25% by 2030.

To achieve the targets, it is planned to build almost 10 GW new renewable energy facilities, including 5 GW solar (excluding the capacity of individual households), 3 GW wind and 1.9 GW hydroelectric power plants.

At the same time, the construction of new RES facilities with a total capacity of more than 10 GW and modernization of existing HPPs will ensure the production of more than 37 billion kWh of electricity from RES facilities (in 2018 – 5.9 billion kWh), as well as conditional annual savings of more than 8.1 billion m3 of natural gas.

Stimulating the RES sector

In order to stimulate the use of renewable energy sources, the Law of the Republic of Uzbekistan ''On use of Renewable Energy Sources'' provides a number of benefits and preferences:

exemption of producers of RES installations from paying all types of taxes for a period of five years from the date of their state registration;

exemption of RES energy producers from paying property tax for RES installations and land tax on sites occupied by these installations (with a nominal capacity of 0.1 MW or more) for a period of 10 years from the date of their commissioning;

property tax is not levied on property owned by persons using renewable energy sources in residential premises with complete

disconnection from the existing energy resources networks, for a period of three years starting from the month of using renewable energy sources;

and land tax is not levied on persons who use renewable energy sources in residential premises with complete disconnection from the existing energy resources networks for a period of three years starting from the month of using renewable energy sources.

Also RES energy producers and RES installations producers are granted the right to create local grids (electric, thermal and/or gas) and conclude contracts with legal entities and individuals for sale of electric, thermal energy and (or) biogas produced from RES supplied through the local grid.

In order to further stimulate the use of renewable energy sources, the Decree of the President of the Republic of Uzbekistan No. ПП-4422 dated 22.08.2019 provides for introduction of an order according to which, from January 1, 2020, the following activities are financed from the State Budget of the Republic of Uzbekistan within the annually approved parameters:

a) providing compensation to individuals in the amount of 30% of costs for purchase of solar photovoltaic stations, solar hot water heaters, as well as energy-efficient gas-burning units, but no more than:

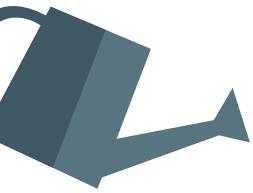
3 million soms – for solar photovoltaic plants;

1,5 million soms – for solar hot water heaters;
200 thousand soms – for gas-burning units;

b) providing compensation to individuals and legal entities to cover interest on loans of commercial banks for the purchase of RES installations, energy-efficient gas-burning units and boilers, as well as other energy-efficient equipment:

individuals – on loans whose amount does not exceed 500 million soms-in the part exceeding the refinancing rate of the Central Bank of the Republic of Uzbekistan, but not more than 8 percentage points;

for legal entities - on loans, the amount of which does not exceed 5 billion soms – with regard to portion exceeding the refinancing rate of the Central Bank of the Republic of Uzbekistan, but not more than 5 percentage points.



Investment projects

Thus, according to the resolution of the Cabinet of Ministers of 08.08.2018 No. 633, the International Finance Corporation carried out a competitive selection of potential companies for implementation of pilot investment project of solar power plant with a capacity of 100 MW in Navoi region on the basis of PPP, and as a result (04.10.2019) Masdar Energy (UAE) was recognized as the winner with a tariff of 2.679 cents USA/ kWh.

On October 18, 2019, taking into account the positive result of the tender, an agreement was signed between the Government of the Republic of Uzbekistan and the International Finance Corporation to attract consulting services and increase the capacity of the Scaling Solar project to 1000 MW of solar thermal power plants.

Currently, the EBRD, on the basis of Memorandum of Understanding dated 14.01.2019 signed between the EBRD, the State Investment Committee and Uzbekenergo JSC concluded agreements with Juru Energy (Great Britain) and Synergy Consulting (India) at the expense of donor funds for consulting services and relevant technical studies within the framework of auctions for construction of 100 MW wind power plant in the Republic of Karakalpakstan.

In addition, on August 16, 2019, the Ministry of Energy, the Ministry of Investment and Foreign Trade and the Asian Development Bank signed a Memorandum on provision of consulting services in implementation of investment projects of solar power plants with a total capacity of up to 1 GW in 2019-2025. The Ministry of Energy is taking a set of measures to announce and conduct competitive bidding in 2020 for construction of solar power plants with a total capacity of up to 600 MW in the Jazakh, Samarkand and Surkhandarya regions based on PPP principles.

On May 3, 2021, an agreement for implementation of wind power plant project was signed between ACWA Power, the Ministry of Energy of Uzbekistan and the Ministry of Investment and Foreign Trade of the Republic. The project includes development, construction and operation of wind power plant project with a capacity of 1,500 MW and after commissioning, it will become the largest wind power plant in Central Asia and one of the largest in the world. ACWA Power is also an investor in two wind power plant projects in Bukhara and Navoi, concluded earlier this year, with a combined power generation capacity of 1000 MW. Under these projects, agreements for purchase of electricity (PPA) and investment agreements were signed. In addition, the Saudi company implements a project for construction of highly efficient gas power plant with a capacity of 1500 MW in Syrdarya.

The Ministry of Energy of Uzbekistan is implementing a project to build a second solar photovoltaic station in Sherabad area, Surkhandarya region (Sherabad II). The plant with a capacity of 300 MW should be built by 2024 in the immediate vicinity of Sherabad I project (200 MW), which was announced in February 2020. Project will be implemented by the Ministry of Energy within the framework of general memorandum between the Government of Uzbekistan and the Asian Development Bank on providing technical assistance for conducting competitive bidding for 1 GW solar energy. Total capacity of two photovoltaic plants is 500 MW with an annual output of more than 1.1 billion kWh will be sufficient to provide about 30% of annual electricity consumption in the region. On May 12, 2021, auctions were held for implementation of Sherabad SPP project (Phase 2). The results of auction showed new records in minimum tariff for implementation of the project. Thus, the winner was Masdar company (Abu Dhabi Future Energy Company PJSC), which offered a tariff of $0.018045 / kWh (7.7 KZT/ kWh at the exchange rate of the National Bank of the Republic of Kazakhstan effective on May 12, 2021).

Sources: Ministry of Energy of the Republic of Uzbekistan, open sources

EMISSIONS OF POLLUTANTS *INTO THE ATMOSPHERE* IN KAZAKHSTAN IN 2020

Total gross emissions into the atmosphere – **2,5** million tons

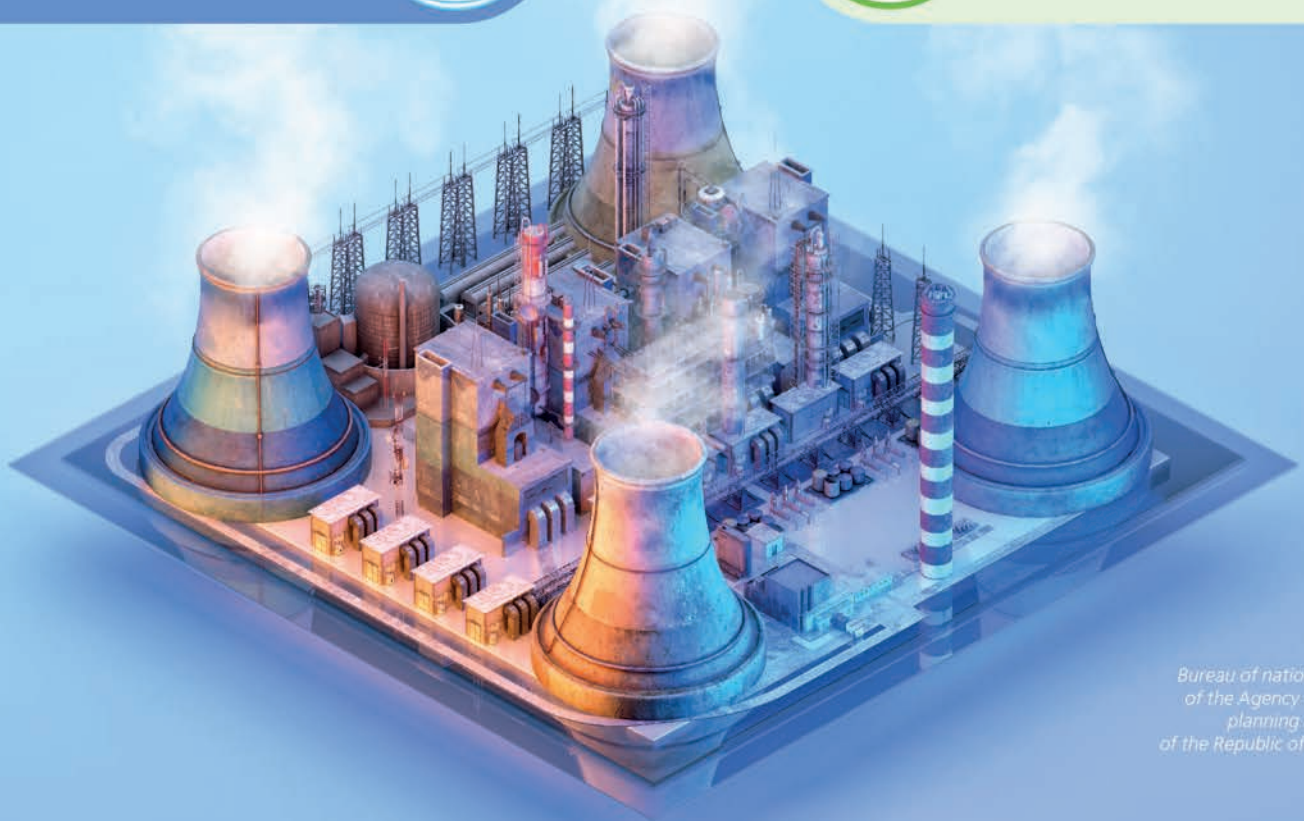
Top polluters by industry:

940 thousand tons – coal-fired electric power industry — **37%**

520 thousand tons – oil production — **20%**

30% — **760** thousand tons – MMC

13% — **320** thousand tons – other industries



Source:
Bureau of national statistics of the Agency for strategic planning and reforms of the Republic of Kazakhstan

WITHDRAWAL from coal

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Johannes Schumann,
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for low-carbon economic
development"

In the early 1990s, the overwhelming majority of scientists came to the general opinion that greenhouse gases played a significant role in most climate changes, namely carbon dioxide emissions from man-caused human activities. The new understanding was made possible thanks to scientific observations and computer modeling of climate change processes.

But if earlier the topic of climate change was rather a concern of the scientific community, now it has become an integral part of the global agenda, affecting all of humanity, the state of the environment and the biosphere.

Today, we are already witnessing that climate change carries serious physical risks for ecosystems, infrastructure, human life and health, and therefore causes changes in international and national management methods aimed at reducing greenhouse gas emissions. The essence of these changes are economic and political reforms that change economic and financial systems, create prerequisites and risks of transformation for national economies.

Speaking about international efforts to combat climate change, there is no doubt that the Paris Agreement, adopted in December 2015, is a turning point in international climate policy. As you know, the Paris Agreement obliges all countries to take measures to reduce greenhouse gas emissions and strengthen environmental sustainability. The goal of the Paris Agreement is to limit the increase in global temperature levels significantly below 2 °C, preferably to 1.5 °C, compared to pre-industrial levels.

The Republic of Kazakhstan signed the Paris Agreement on August 2, 2016 and ratified it on December 6, 2016, committing itself every five years to submit its climate action plans (nationally determined contributions – NDC) and to prepare a low-carbon development strategy (LCDS), which outlines the long-term planning horizon for NDC and describes the vision of the future national low-carbon development.

DECARBONIZATION is the reduction of greenhouse gas emissions over time in order to keep the growth of the average global temperature at a level significantly below 2 °C compared to the pre-industrial level

The Kazakhstan's NDC assume the following goals to reduce greenhouse gas emissions:

- Unconditional reduction of GHG emissions by 15% by December 2030 compared to 1990;
- Reduction of GHG emissions by 25% by December 2030 compared to 1990, subject to additional international investment, access to a low-carbon technology transfer mechanism, funds from the Green Climate Fund and a flexible mechanism for countries with economies in transition.

In this regard, there is a need to carry out serious work and involve international experience in the field of combating climate change. Thus, in order to support the transition to low-carbon development and within the framework of joint work of the German Society for International Cooperation and the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan, the project "Support of the Green Economy in Kazakhstan and Central Asia for low-carbon Economic Development" was initiated, funded by the Federal Ministry of Environment, Nature Protection and Nuclear Safety of Germany within the framework of the International Climate Initiative (IKI).

The aim of the project is to develop a Strategy for low-carbon development of Kazakhstan, to improve the institutional and technical potential for low-carbon development. This experience will also have a concomitant positive impact on other Central Asian countries.

At the moment, activities on the working draft of the strategy has been completed and work on modeling scenarios for low-carbon development of Kazakhstan has almost been finished.

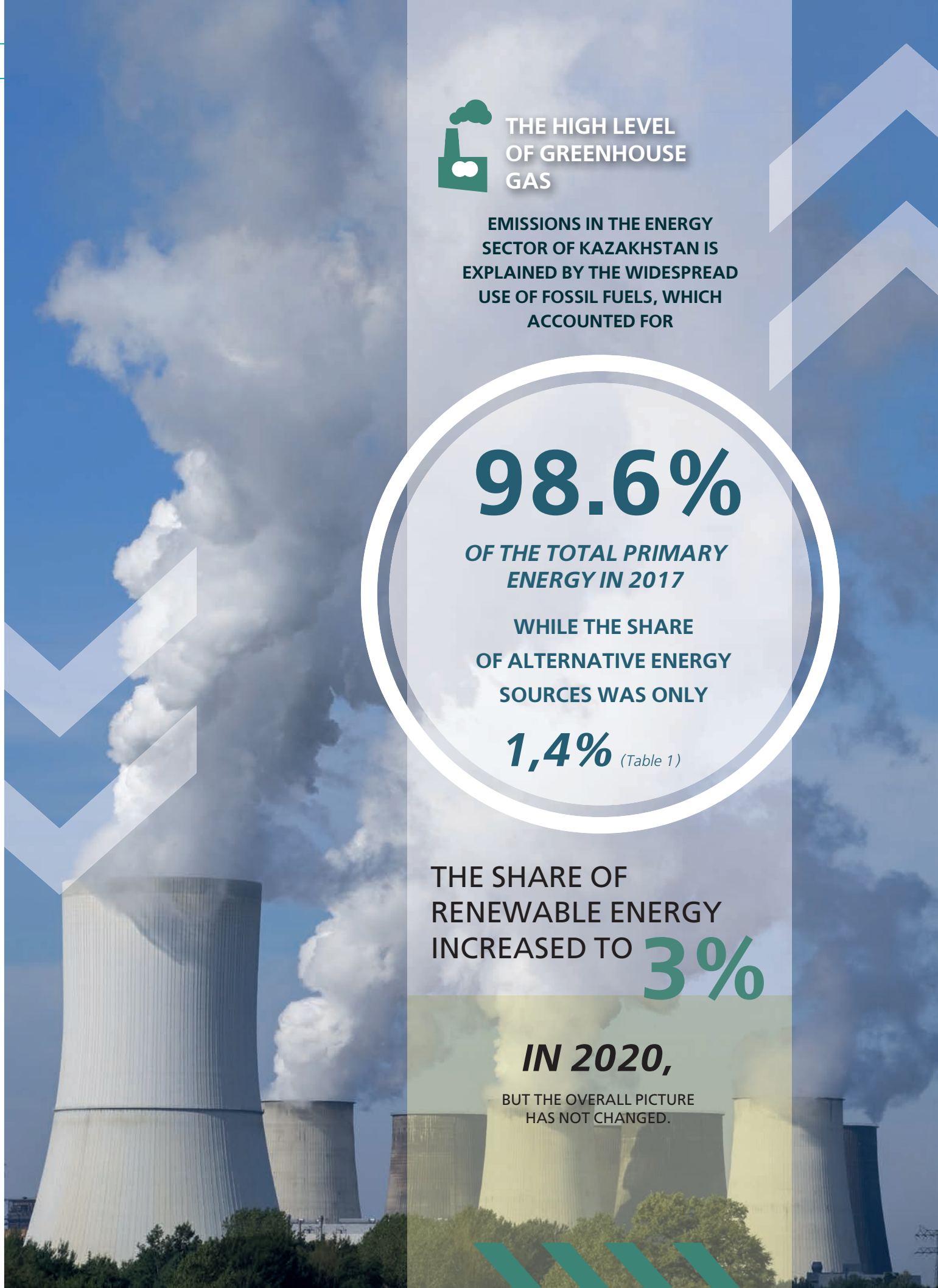
Global decarbonization trends create both opportunities and risks for Kazakhstan at the same time. For example, the mechanism of border carbon adjustment of carbon products introduced by the European Union contributes to an increase in taxation on products with high emissions and on a decrease in demand.

The international spread of GHG pricing mechanisms, the withdrawal of investments from projects and assets related to fossil fuels – all this is a direct signal of the need to transform all sectors of the economy towards decarbonization, so as not to be left behind the world economy.

Thus, there is a choice between the costs of modernizing production processes to reduce emissions associated with energy production and energy consumption in industry, transport and housing, as well as with industrial processes, agriculture, waste management, and the loss of export income, hence the income of both the private and public sectors. This means that, although international efforts to reduce GHG emissions increase external risks for the economy of Kazakhstan, nevertheless, the new requirements enable the Kazakh industry to receive powerful incentives for investment in decarbonization to maintain its position in international markets.

Decarbonization in all sectors of the economy helps to reduce risks and increase the attractiveness of the economy of Kazakhstan. New opportunities are opening up for the country in the field of attracting "green" finance, the transfer of carbon-free technologies, integration into the global carbon market, the implementation of climate projects under the auspices of the Paris Agreement, as well as participation in new international markets for "green" energy resources, products and innovative technologies.

According to the simulation results, the main contribution to the reduction of GHG emissions will come from the energy sector, since this sector is being their main source. In order to transform such a huge sector of the economy as energy in a country that is economically dependent on the export of its energy carriers, serious costs for deep decarbonization are required. However, adherence to old technologies and economic models could be worth much for the country. International financial institutions and investment companies are redirecting their investments into infrastructure and technologies that correspond to low-carbon development and especially renewable energy, so coal and oil production is rapidly moving into the department of unprofitable assets. In this regard, it becomes especially important to start paying attention to the "correct" investments that can provide both short-term benefits which are: jobs and economic growth; and long-term benefits – decarbonization and increased economic stability.



THE HIGH LEVEL OF GREENHOUSE GAS

EMISSIONS IN THE ENERGY SECTOR OF KAZAKHSTAN IS EXPLAINED BY THE WIDESPREAD USE OF FOSSIL FUELS, WHICH ACCOUNTED FOR

98.6%

OF THE TOTAL PRIMARY ENERGY IN 2017

WHILE THE SHARE OF ALTERNATIVE ENERGY SOURCES WAS ONLY

1,4% *(Table 1)*

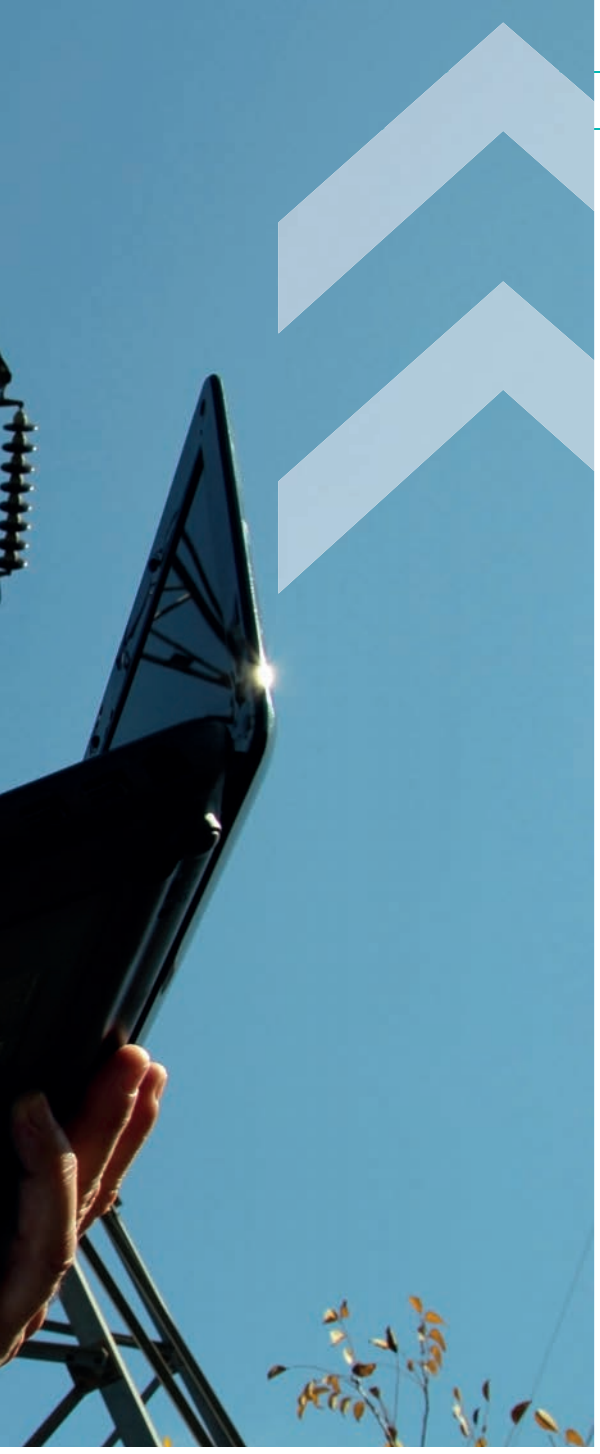
THE SHARE OF RENEWABLE ENERGY INCREASED TO **3%**

IN 2020,

BUT THE OVERALL PICTURE HAS NOT CHANGED.

Table 1. Structure of total primary energy supplies and final energy demand in 1990 and 2017

	General deliveries of primary energy		Final demand for energy	
	1990	2017	1990	2017
Coal	55%	49%	26%	24%
Oil and oil products	29%	25%	26%	31%
Natural gas	15%	24%	13%	14%
Biomass	0,8%	1,4%	0,2%	0%
Electricity	–	–	14%	16%
Heat	–	–	21%	15%



Currently, coal is the main source of energy in Kazakhstan, while it has the largest carbon footprint. In 1990, coal accounted for 65% of GHG emissions in the energy sector, and in 2017 it still was 59%.

Moreover, during primary energy production (for example, associated gas during oil production and coal bed methane released during coal mining) and during distribution (for example, leaks from pipelines), volatile emissions occur.

ALTHOUGH VOLATILE EMISSIONS FROM THE ENERGY SECTOR HAVE BEEN DECLINING IN RECENT YEARS, THEY STILL ACCOUNTED FOR ABOUT 9% OF THE ENERGY SECTOR'S GHG EMISSIONS IN 2018.

The transition from steam coal to natural gas will significantly reduce greenhouse gas emissions in the energy sector. Since natural gas is a cleaner fuel with a higher energy content, its combustion produces fewer emissions of almost all types of air pollutants and produces half as much carbon dioxide as when burning coal to produce the same amount of energy. But at the same time, gas is a transition source of energy. Over the longer term the energy system should be based on renewable energy sources and electrification.

Investments in the transition to carbon neutrality not only stimulate GDP growth, but also bring huge benefits for the economy, as well as the social sphere and the environment. For example, environmentally sustainable farming methods not only contribute to reducing GHG emissions, but also help to conserve water resources, reduce soil erosion, increase yields, bring additional income, increase production volumes and reduce the risks of damage from negative weather and climatic factors. Each tenge invested in "green" development can bring 3 times more income in the form of added value in agriculture.

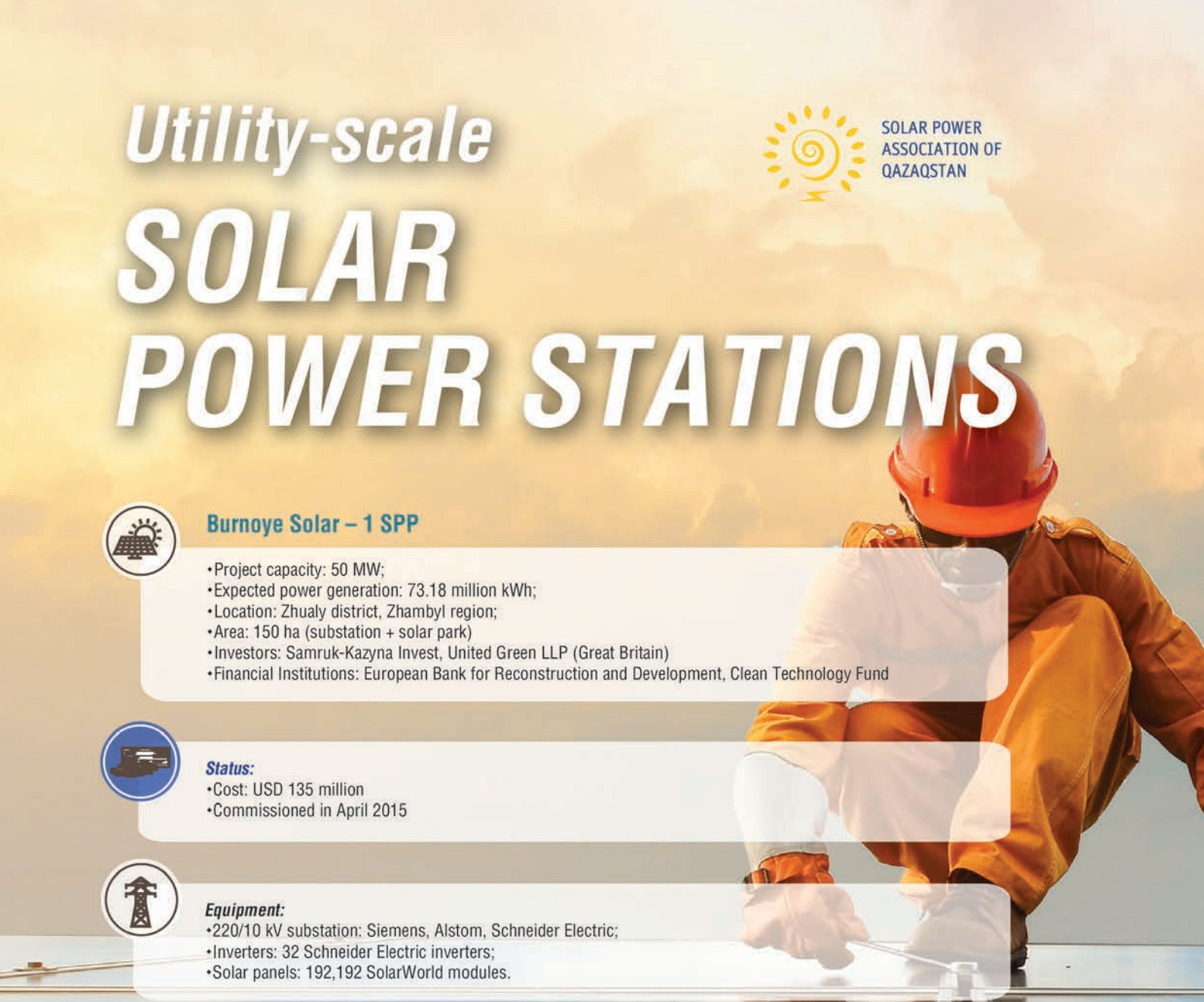
However, we should not forget that in the process of transferring the national economy to the rails of decarbonization, the main goal is the well-being of the people of Kazakhstan. Therefore, it is important to ensure that an active transition to low-carbon development will not bring economic losses for the population. According to the rules of the Paris Agreement, all countries should be provided with relatively flexible conditions in accordance with their capabilities, which would allow them to fulfill their obligations and report on their implementation consistently and transparently.

For a successful transition to a low-carbon economy, it is important to get the support of various social groups in each state. To do this, it is necessary to share the burden and benefits of actions to reduce GHG emissions on a socially equitable basis and support the population groups that will become vulnerable when decarbonization measures are implemented. The State should provide support to citizens employed in the sectors of the economy related to fossil fuels, while efforts should be made to create high-quality jobs in low-emission industries.

The principle of social justice of transition is one of the guiding principles of the Concept of Low-carbon Development of Kazakhstan until 2050. The Government of Kazakhstan assumes responsibility for ensuring a fair and effective transition to a low-carbon future. The planning of the stages of transformation should be based on the coordination of interests acceptable to the whole society.

Utility-scale SOLAR POWER STATIONS

SOLAR POWER ASSOCIATION OF QAZAQSTAN



Burnoye Solar – 1 SPP

- Project capacity: 50 MW;
- Expected power generation: 73.18 million kWh;
- Location: Zhualy district, Zhambyl region;
- Area: 150 ha (substation + solar park)
- Investors: Samruk-Kazyna Invest, United Green LLP (Great Britain)
- Financial Institutions: European Bank for Reconstruction and Development, Clean Technology Fund

Status:

- Cost: USD 135 million
- Commissioned in April 2015

Equipment:

- 220/10 kV substation: Siemens, Alstom, Schneider Electric;
- Inverters: 32 Schneider Electric inverters;
- Solar panels: 192,192 SolarWorld modules.

Burnoye Solar – 2 SPP

- Project capacity: 50 MW;
- Expected power generation: 78.9 million kWh;
- Location: Zhualy district, Zhambyl region;
- Area: 74 ha (solar park)
- Investors: Samruk-Kazyna Invest, United Green LLP (Great Britain)

Status:

- Cost: USD 77.7 million
- Commissioned on June 4, 2018

Equipment:

- Extension of 220/10 kV substation: Siemens, Schneider Electric;
- Inverters: 16 Sungrow inverters;
- Solar panels: 185,174 Jinko Solar modules.

in Kazakhstan

Gulshat SPP

- Project capacity: 40 MW;
- Expected power generation: 57.9 million kWh
- Location: Gulshat village, Karaganda region;
- Area: 100 ha (substation + solar park);
- Investors: Risen Energy (China)
- Financial Institutions: European Bank for Reconstruction and Development

Status:

- Cost: USD 46 million
- Commissioned in February 2019

Equipment:

- 110/35 kV substation: TBEA
- Inverters: 530 string Huawei inverters
- Solar panels: 122,960 Risen Energy modules

Zadariya SPP

- Project capacity: 14 MW;
- Expected power generation: 21.6 million kWh;
- Location: Arys village, Turkestan region;
- Area: 30 ha
- Investors: UrbaSolar (France)
- Financial Institutions: European Bank for Reconstruction and Development, Clean Technology Fund

Status:

- Cost: USD 12.7 million
- Construction and installation work is underway;
- Commissioning is planned in autumn 2019

Equipment:

- 35/10 kV Substation: Alageum Electric;
- Inverters: 6 SMA inverters;
- Solar panels: 50,000 Trinasolar modules.

New Environmental Code – opportunities for greening the business

ECOJER

Alan Bokayev,
Chief Specialist of EcoJer
Kazakhstan association of
regional ecological initiatives ALE

In recent years, the issues of decarbonization and greening of the global economy have become increasingly important at local levels. What once seemed so far away for resource-based economy of Kazakhstan already affects the daily life of every citizen. We not only feel the pollution of the city air by exhaust gases, but also observe an annual increase in temperature. In this regard, most countries, including Kazakhstan, committed to contribute to the global reduction of greenhouse gas emissions, which directly affect global warming.

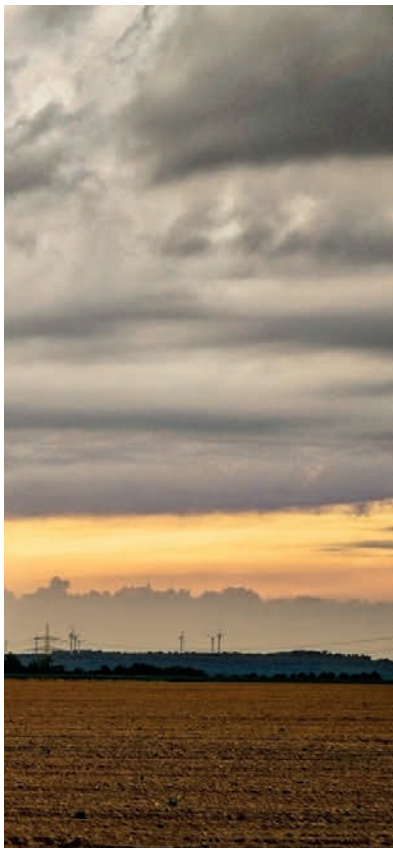
Natural resources are of crucial importance for the economic development of the country, and are an important source of income. Effective management of natural resources, the introduction of "green" technologies and improving environmental sustainability are among the main prerequisites for economic growth and social progress.

Kazakhstan is a country rich in natural resources, including fossil fuels. Therefore, we are constantly looking for a balance of development between hydrocarbon and renewable energy sources.

On July 1, 2021, the new Environmental Code of the Republic of Kazakhstan entered into force, containing a number of system proposals that should ensure the improvement of the country's environmental safety, stimulate the modernization of industry and reduce the negative impact on the environment.

The new version of the Code provides for introduction of a widespread principle throughout the world: "The polluter pays". This measure is supposed to raise environmental awareness among natural resource users.

An important element of the new Code is transition of enterprises of Kazakhstan to new environmental regulation related to use of the principles of best available techniques (BAT)



from 2025, with the introduction of which companies will be exempt from payment for emissions.

According to the European Environment Office, introduction of BAT such as technology for cleaning of emissions in the EU resulted in significant reduction of emissions of nitrogen oxides – by 69%, sulfur oxides SO2 – by 94%, dust – by 94%.

The introduction of BAT contributes to solving not only environmental, but also economic problems of the real sector of the economy: it reduces energy intensity, water consumption and costs.

The largest polluters will receive comprehensive environmental permits and be exempt from tax payments. They will have the opportunity to use these funds for the modernization of enterprises. Such steps will contribute to the technological development of the industry and environmental friendliness of production.

BAT are based on modern achievements of science and technology in the field of environmental protection. However, BATs are not limited to technologies only. They include methods, processes, approaches and solutions, management practices.

It is widely known that by implementing and improving, for example, operational management systems, companies achieve a reduction in operating costs and expenses, as well as non-financial indicators of their activities, for example, indicators in the field of security, are also improved by an order of magnitude.

The main idea of BAT

The main idea of BAT is that they should not result in excessive costs for the companies. After all, the techniques should not only be the best, but also affordable. That is, the introduction of such techniques in the relevant production sector should be economically and technically possible.

The transition of industry to a new regulation, which, on the one hand, is focused on reducing the negative impact on the environment, and on the other – on the modernization of production and encouragement of enterprises to use BAT, will significantly improve the environmental situation in the country and move to preventive measures.

By joining the Paris Agreement, Kazakhstan undertook to make efforts to achieve the set goals for reducing greenhouse gas emissions. Development of ‘‘green’’ market requires development of national strategic documents, special policies and consistent implementation, which will encourage market participants to implement activities on introduction of ‘‘green’’ technologies, ‘‘greening’’ of financial sector and promote the transition to ‘‘green’’ economy.

Kazakhstan has adopted national and statutory programs and strategies to create conditions for sustainable development. Our country became the first country in Central Asia to create an organizational and legal basis for transition to ''green'' growth through the adoption of a number of legislative documents, including the Concept for Transition to "green" economy, the Law on Support for Use of Renewable Energy Sources. Currently, a draft Concept of low-carbon development and roadmap for achieving updated NDC (nationally determined contributions) are being developed.

In this regard, there is an urgent issue regarding the financing necessary to achieve the goals set. Some investments are probably more ''green'' than others. There is no single definition of what is considered ''green'' or sustainable financing in the world. Some asset managers want to support only clean energy. There is a concern that broad definitions of sustainability do not make sense, allowing some funds to sell themselves as ''green'' or ethical, even if they are not of benefit for the environment.

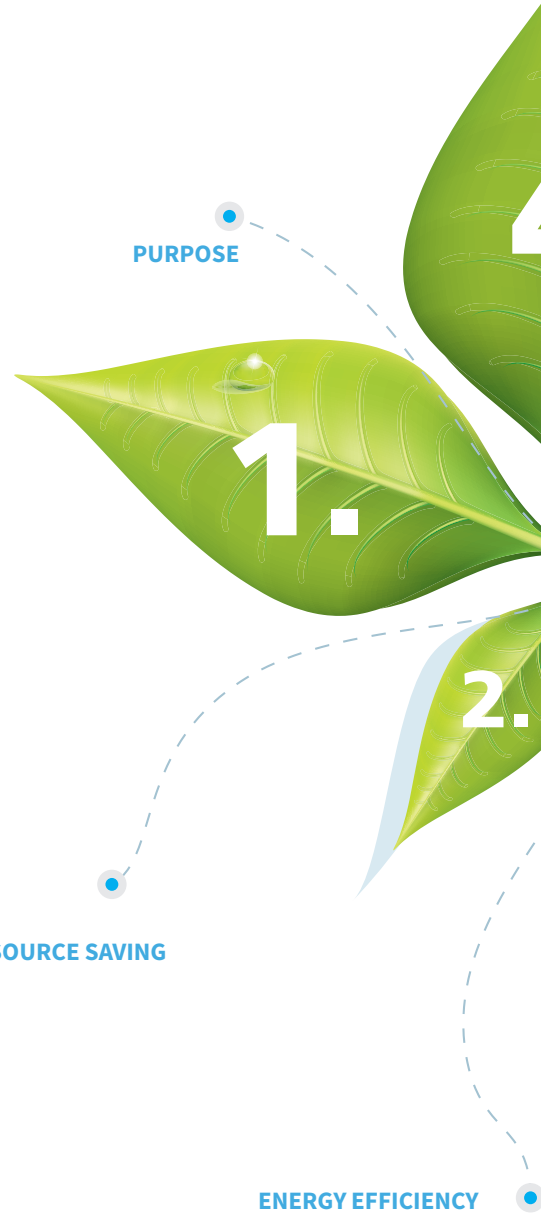
Before the adoption of the new Code, the main issue in promotion of ''green'' technologies and ''green'' financing was the separation of green from brown. First of all, when implementing measures for economic stimulation of activities aimed at protecting environment, it is necessary to clearly differentiate what is considered ''green'' in order to ensure the flow of ''green'' investments. Thus, the following key concepts are introduced in the new version of the Environmental Code of the Republic of Kazakhstan:

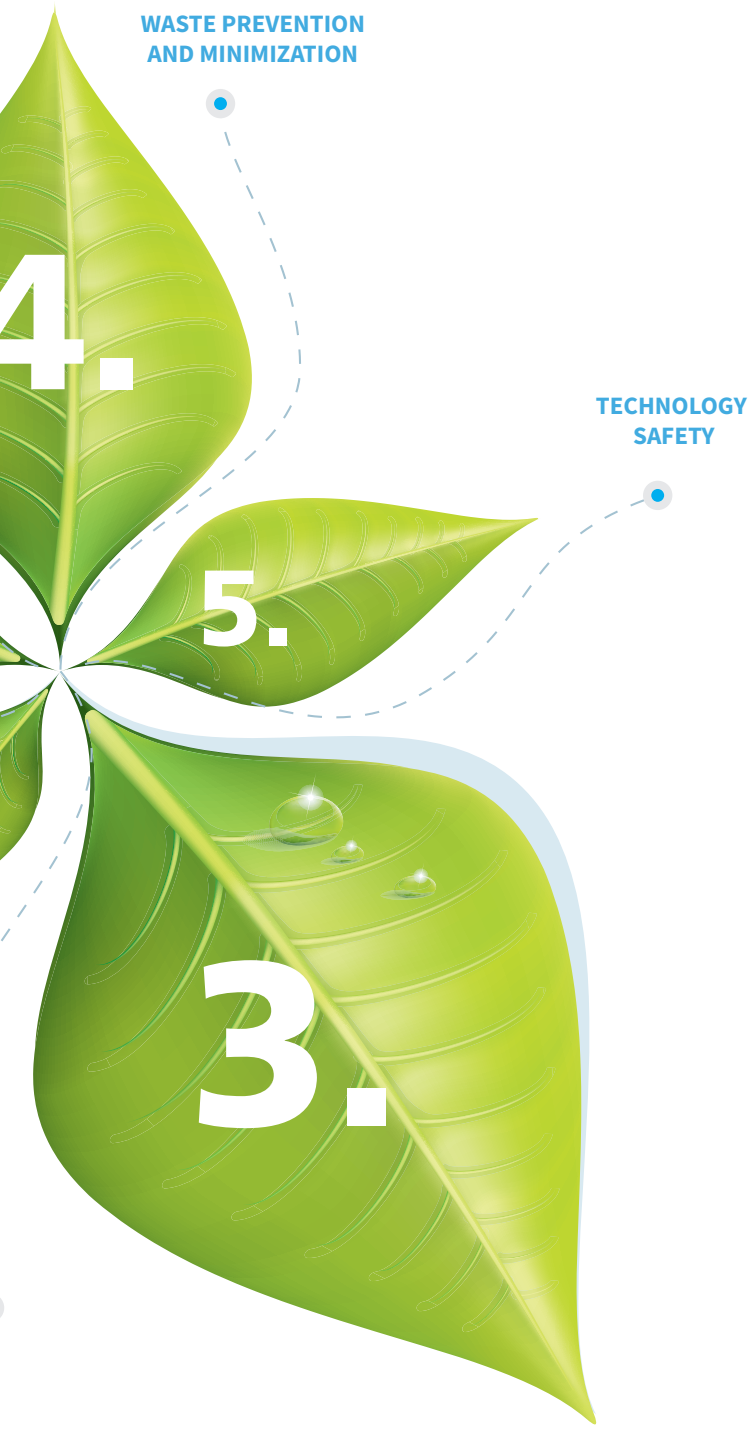
1) ''green'' technologies;
2) service operator of ''green'' technologies;
3) ''green'' financing;
4) ''green'' projects;
5) classification of ''green'' projects (Taxonomy);
6) ''green'' bonds;
7) ''green'' loans.

Importance of ''green technologies''

''Green'' technologies can help reduce carbon intensity, increase energy efficiency and resource efficiency, as well as prevent serious environmental degradation. Their successful application can lead to improved environmental quality, human well-being and social justice, while reducing the risk of resource scarcity and achieving the Sustainable Development Goals (SDGs).

The definition ''green'' technologies in the new version of the Code is developed on the basis of approach of the countries of the Organization for Economic Cooperation and Development (OECD), which also includes the definition of areas of application of ''green'' technologies. At the same time, it is important to note that the accompanying document to the Code ''Rules for recognizing technologies as ''green'' technologies» defines the following criteria for ''green'' technologies:





If "technology safety" criterion is met and only one of the first four criteria is met, the technology is recognized as "green" and is included in the Register of "green" technologies and projects (hereinafter-the Register).

The register is maintained by the Service Operator of "green" technologies and contains up-to-date information about "green" technologies, "green"projects, as well as investors and other market participants. Service operator also evaluates the technology for compliance with the "green" definition with the further issuance of an opinion.

For example, in case of purchase of an energy-efficient refrigerator, any individual can potentially take a "green" loan, but with definition of "green" projects, things are somewhat more complicated. The fact is that the project includes an implementation plan, a number of implemented technologies, cost estimates, and "green" project must also contain information about the (planned) achievement of environmental indicators, which must be confirmed by a third independent organization.

It is obvious that "green" financing should be more attractive for an entrepreneur than traditional loan, otherwise why prove the environmental benefits of project? In this regard, the relevant amendments were made to the Entrepreneurial Code of the Republic of Kazakhstan on subsidizing the interest rate on granted "green" loans and coupon interest rate on "green" bonds within the framework of the Business roadmap-2025.

As mentioned above, some investments are more "green" than others. How to determine whether the project is "green" enough to get access to preferential lending or other debt instruments, such as "green" bonds? Developed classification of "green" projects (the Taxonomy) helps not only to classify projects, but also contains a number of thresholds for the project to be "green". For example, if an enterprise's energy efficiency project is aimed at reducing energy consumption by more than 20%, then in accordance with the Taxonomy threshold, it qualifies for "green" financing. Of course, if we are talking about renewable energy sources, there is no question of threshold values, since renewable energy technologies are a priori "green".

The reader can get acquainted with other classes of "green" projects and threshold values directly in the Taxonomy.

"Green" taxonomy of Kazakhstan is a unified system of classification of economic activities and categories of environmentally sustainable projects. Each type of economic activity has a corresponding

quantitative/qualitative indicator (threshold), the achievement of which will grant the enterprise access to "green" financing.

The taxonomy is developed on the basis of the Mongolian taxonomy, and thresholds are based on European similar values reflected in the technical report on the EU "green" taxonomy. Using EU methods, the threshold values of the Taxonomy of Kazakhstan are agreed with market participants and experts and adapted to local technical capabilities and conditions.

In addition, Taxonomy is an international tool. In other words, if the threshold value of the Taxonomy is met, the project can potentially attract foreign private investors, many of them have adopted a mandate to support "green" activities. Thanks to the new Environmental Code of the Republic of Kazakhstan, it is possible to confirm projects as "green" on the territory of the Republic of Kazakhstan. In this connection, it is possible to legitimately prove the "greenness" of investments in the reports on the funds spent.

Of course, international environmental standards are one step ahead of the expectations of Kazakhstani entrepreneurs, and therefore there is a debate about how "green" an enterprise should be in order to count on the support of the state or foreign investors. The answer is simple: as "green" as possible.

At the same time, there is also the creation of various development institutions aimed at supporting "green" activities, such as decarbonization. One of the positive examples in international practice is the creation of non-state environmental funds that support business in transition to a low-carbon and circular economy, as well as support the implementation of "green" projects aimed at reducing greenhouse gas emissions. In order to promote the achievement of carbon neutrality goals, on May 13, 2021, the NGO "Eurasian Environmental Fund" (hereinafter referred to as the Fund)

The answer is simple:
as "green" as possible.

was registered in the jurisdiction of the AIFC. Creation and development of the Fund is supported by the ECOJER Association and corresponds to the approved Development Strategy of the Association for 2021-2025.

The main goal of the Fund is to support and develop the market of carbon units through the mechanism of implementation of low-carbon projects. In this regard, the following tasks have been formed:

- attracting financing: search for partners, investors, sponsors, donors, crowdfunding, formation of an investor base;
- promoting the development of carbon market through the implementation of offset projects and development of motivation tools for participants in the carbon units market;
- creation of offset projects and sale of formed carbon units, implementation of eco-projects at the expense of sponsors, donors;
- establishing a partner network with major emitters of greenhouse gases to consolidate efforts in the field of decarbonization.

As of today, the Fund has implemented a pilot project with the Eurasian Bank and Mastercard, within the framework of which the bank issues multi-currency eco-cards made of recycled plastic. The Bank will send 0.5% of non-cash transactions on eco-card to the Fund for the implementation of eco-projects.

Creation of such development institutions in Kazakhstan will allow fulfilling the potential of "green" financing in full, as well as demonstrating the transparency and ethics of the local market to the world community. Diversification of sources of "green" financing, as well as increasing the accessibility of programs and tools, will have a favorable impact on local entrepreneurs not only from an economic point of view, but also "greening" of business and improving of environmental culture.

KEY INDICATORS
CONCEPTS FOR THE TRANSITION OF THE REPUBLIC OF KAZAKHSTAN TO A "GREEN" ECONOMY

Sector	Goal description	2020	2030	2050
Water resources 	Eliminating water supply deficit at the national level	Provide water to the population	Provide water for agriculture (by 2040)	Solve water supply problems finally
	Elimination of water scarcity at the basin level	The fastest possible coverage of the deficit for the basins as a whole (by 2025)	No shortage for each basin	
Agricultural industry 	Labor productivity in agriculture	Three-fold magnification		
	Wheat yield (t/ha)	1,4	2,0	
	Water consumption for irrigation (m^3/t)	450	330	
Energy efficiency 	Decrease in the energy intensity of GDP from the level of 2008	25% (10% by 2015)	30%	50%
Electric power industry 	Share of alternative sources in electricity generation	Solar and wind: at least 3% by 2020	30%	50%
	Share of gas-fired power plants in electricity generation	20%[2]	25%	30%
	Gasification of the regions	Akmola and Karaganda regions	Northern and Eastern regions	
	Reduction of the current level of carbon dioxide emissions in the electric power industry	Level of 2012	-15%	-40%
Air pollution 	Emissions of sulfur and nitrogen oxides into the environment		European emission level	
Waste disposal 	Covering the population with the removal of solid household waste		100%	
	Sanitary waste storage		95%	
	Percentage of recycled waste		40%	50%

Source: Decree of the President of the Republic of Kazakhstan dated May 30, 2013. "On the Concept for the transition of the Republic of Kazakhstan to a "green economy"

[1] *Solar power plants, wind power plants, hydroelectric power plants, nuclear power plants*
[2] *With the transfer in the largest cities of thermal power plants to gas, if there are available volumes of gas and an acceptable price for gas.*

SOLAR FEST QAZAQSTAN

INTERNATIONAL BUSINESS FESTIVAL ON RENEWABLE ENERGY

Solar Fest Qazaqstan is organized in the heart of the National Park Burabay in the Rixos Borovoe hotel

Solar Fest Qazaqstan was supported by:

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ESR

Power industry of Kazakhstan – status: in active search

Over the past six months, important changes have been taking place in the electric power industry of Kazakhstan, which generally lay the foundation for a deep modernization of the industry. On the one hand, it is our country's attempt to keep up with global challenges, such as the energy transition and the process of decarbonization of economies, which determines the green vector in power industry. On the other hand, it is an active search for solutions to meet the needs of the country's growing economy with electricity in the medium term. We will try to understand the key changes and initiatives.

Timur Shalabayev,
Executive Director of SPAQ

MANEUVERABLE GENERATION IS THE KEY TO FURTHER DEVELOPMENT OF ''GREEN'' ENERGY.

As it is commonly known, profile of electricity generation by renewable energy facilities has significant irregularities, both in the context of days and months. According to the research of KEGOC JSC, with the maximum generation of about 450 MW by renewable energy facilities in the Republic of Kazakhstan in January, the maximum deviations were up to 230 MW for over generation of energy into the system and up to 113 MW for under generation. In July, with the maximum generation of renewable energy of about 600 MW, the maximum deviations were up to 102 MW for over generation of energy into the system and up to 250 MW for under generation. In the annual context, the range of deviations of renewable energy generation from the plan was about ± 250 MW.

Due to the lack of flexibility of generation in the UES of Kazakhstan, due to the high share of low-maneuverable coal generation, and the shortage of regulation power, the attracted regulation resources are not enough to fully compensate for unstable renewable energy generation and deviations of other market entities. The imbalances of the UES of Kazakhstan that are not covered by its own resources are compensated by the Russian energy system (in the form of unplanned balances of power exchanges at the borders of the two energy systems).

In order to solve this problem in December 2020 the President signed amendments to the legislation on electric power and renewable energy, which involve the construction of maneuverable capacities and attracting investors through an auction.

In January 2021, the President instructed the Government of the Republic of Kazakhstan to adopt a set of measures with local executive bodies in order to attract investors to projects for construction of maneuverable generation. It is important to start projects for construction of gas generation facilities in the south of the country and accelerate the development of hydropower in the south and east of the country.

At the beginning of this July, Minister of Energy N. A. Nogayev, speaking at a meeting of the CIS Electric Power Council, said that auction for promising projects for construction of generating units with a maneuverable generation mode are planned to be held in this December with a capacity of about 1000 MW. The Minister also said that it is planned to increase the renewable energy capacity from the current 1800 MW to 2100 MW by the end of 2021.

Thus, practical steps are being taken in the country to solve the problem that hinders the development of ''green'' economy, which will serve as a guarantee for creation of new capacities based on generation facilities cleaner than coal (gas turbine stations, hydroelectric power plants).

STRATEGIC INITIATIVES IN THE POWER INDUSTRY ARE THE SOLUTION TO THE ACCUMULATED PROBLEMS.

Over the past decades, many problems have accumulated in the country's power industry, such as imbalances in the system, a shortage of maneuverable powers, dependence on neighboring countries, equipment wear, and isolation of the Western Zone. Indeed, all these problems have a negative impact on the country's energy security.

On January 26, 2021, speaking at an expanded meeting of the Government of the Republic of Kazakhstan, the President noted that due to historical dependence on the energy systems of neighboring countries, cases of power outages in the southern regions have become more frequent recently. In particular, the accident that occurred on this January 10 in the power system of western Kazakhstan showed unreliable operation of the isolated power system of this region.

THE GOVERNMENT OF THE REPUBLIC OF KAZAKHSTAN AND SAMRUK-KAZYNA FUND WERE INSTRUCTED TO START WORK ON STRENGTHENING THE SOUTHERN ZONE OF THE ELECTRIC POWER SYSTEM AS SOON AS POSSIBLE, AS WELL AS TO DEVELOP A SCHEME FOR STRENGTHENING TRANSIT LINKS BETWEEN THE WESTERN REGIONS OF THE COUNTRY, AND IN THE FUTURE TO ENSURE THEIR INTEGRATION WITH THE UNIFIED ELECTRIC POWER SYSTEM OF KAZAKHSTAN.

The Government was also instructed to develop the Energy Balance of the Republic of Kazakhstan until 2035. This document should take into account not only internal aspects – consumption, generation of maneuverable powers, an increase in share of environmentally friendly energy, but also plans for the development of our neighbors' energy systems.

In addition, the Ministry of Energy of the Republic of Kazakhstan is currently developing a National project for development of the electric power industry. This is a new regulatory document in the State Planning System, which is actually a document for development of the industry. The National project is a document that ensures comprehensive interdepartmental cooperation and priority budget financing for implementation of a set of measures aimed at solving tasks (projects), certain critical tasks for achieving National priorities, goals, objectives and strategic indicators and indicators within the established time frame. National projects are approved by the Decree of the Government of the Republic of Kazakhstan after approval by the Supreme Council for Reforms under the President of the Republic of Kazakhstan.

It seems that this document should reflect specific measures aimed at systemic changes in the electric power industry, which are due to internal (reducing the energy intensity of the economy, reducing the electricity deficit in the Southern zone, joining the Western Zone to the UES of Kazakhstan, upgrade of generating equipment, etc.) and global tasks (decarbonization of energy, "greening" of the economy, carbon neutrality, fulfilling obligations under the Paris Agreement, the UN Sustainable Development Goals, etc.) set to the industry. The national project for development of electric power industry is designed for 2021-2025 and, as it seems, will require large investments.

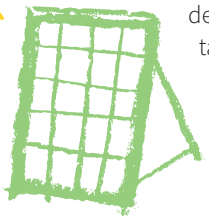
Solar Power Association of Qazaqstan is a member of the Working Group on development of these strategic documents for the industry.

THE DEVELOPMENT OF ALTERNATIVE ENERGY – SEARCH FOR NEW TECHNOLOGICAL SOLUTIONS

On February 25, 2021, President of the Republic of Kazakhstan Tokayev K. K, speaking at the V Meeting of the National Council of Public Trust again drew attention to the electric power sector, placing special emphasis on the fact that the paradigm of economic development based on traditional energy sources is irrevocably receding into the past. In this, the President sees measures to diversify the economy, reduce its energy intensity, and move towards "green" technologies. The President instructed to develop a separate Law on development of alternative energy, which would regulate the use of all sources of alternative energy, such as hydrogen, industrial gases, coalbed methane gas, biofuels, solid household waste. This will be a separate regulatory document that is not related to the Law of the Republic of Kazakhstan "On Support of Renewable Energy Sources", which regulates solar, wind, hydropower (small hydroelectric power plants) and biomass energy.

In continuation of this topic, foreign investors became interested in development of alternative energy in the country. Already in this, the Swedish-German company Svevind Energy Gmbh signed an agreement on mutual understanding with NC "Kazakh Invest" JSC for construction of plant in Aktau for production of "green" hydrogen. Svevind plans to install wind

and solar power plants with a total capacity of 45 GW, mainly in the steppe regions of Western and Central Kazakhstan. "Green" electricity for 30 GW will feed the electrolysis cells for production of about 3 million tons of "green" hydrogen annually. It is expected that the stages of development, design, procurement and financing will take from three to five years, the stages of construction and commissioning – about five years, says Svevind.



Speaking in this May the President stressed that there are few similar laws on alternative energy in the world, so our Law should become a model. As far as is known, this Law should be developed and adopted by the end of next year.

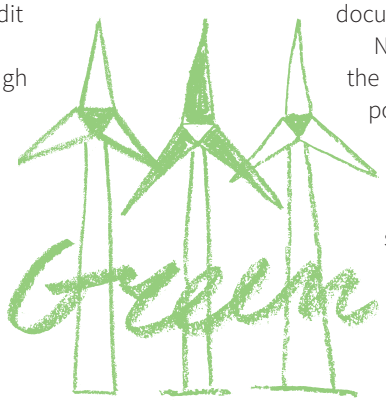
A NEW STAGE IN THE DEVELOPMENT OF KAZAKHSTAN'S ELECTRIC POWER INDUSTRY

On May 26, 2021, a meeting on development of electric power industry was held under the chairmanship of the President. Meeting discussed strategically important issues and gave specific instructions for the further development of the industry. Thus, it was decided to recognize systematic and consistent increase in clean energy sources, primarily hydropower, renewable energy sources and gas-powered maneuverable capacities, as well as phased transition to new "clean coal" technologies using modern combustion and filtration systems as the main priorities of energy development.

Strategic indicator for development of renewable energy until 2030 was increased from 10 to 15%, instructions were given for development and promotion of use of small renewable energy installations by households, development of local content for renewable energy.

Separate instructions were given to conduct a technical audit of energy sources, increase the volume of electricity sales through centralized sites, reduce the level of physical wear of power grids, tariff policy and develop human resources for the industry.

This meeting on development of the electric power industry can rightfully be called historical, because it determined strategic directions for development of the industry which determines development of the entire economy of the country. The results of the meeting are fixed in the relevant minutes, the control procedure is defined and responsible state bodies and organizations for execution of the instructions of the President of the Republic of Kazakhstan are distributed.



INSTEAD OF A CONCLUSION: AN EQUATION WITH SEVERAL UNKNOWN VARIABLES

Despite the fairly consistent policy and vision of development of the industry, which the business community has seen in recent months, it seems that there is still imbalance in its implementation. The fact is that on the one hand, the task of decarbonizing the economy is not only the task of the Ministry of Energy of the Republic of Kazakhstan, but also issues of ecology, industry, trade, regulation, personnel training, investment and fiscal policy. But it is the decarbonization and "greening" of the economy that has become one of the 7 principles of the new economic policy of the country (The Message of the President of the Republic of Kazakhstan to the people of Kazakhstan dated September 1, 2020. "Kazakhstan in a new reality: action time"). Its implementation requires effective interdepartmental correlation and development of common directions, principles, measures, and ways to achieve it. So far, we, as representatives of the business community, do not see such synchronous work. The Ministry of Energy of the Republic of Kazakhstan is developing the Energy Balance until 2035, the National Project for Development of Power Industry until 2025, the draft law on alternative energy sources, and the Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan is developing the Concept of Low-Carbon Development of Kazakhstan until 2050, which, according to the President of the Republic of Kazakhstan, should contain a specific vision of deep and structural decarbonization of the economy. It seems that high correlation between these documents is necessary as minimum.

Noticing the existing dissonance, the business community of the electric power industry under the auspices of ALE Kazakhstan Electric Power Association has put forward the initiative to develop a long-term strategy for development of the electric power industry, taking into account the country's decarbonization policy. In theory, such general strategic document should serve as

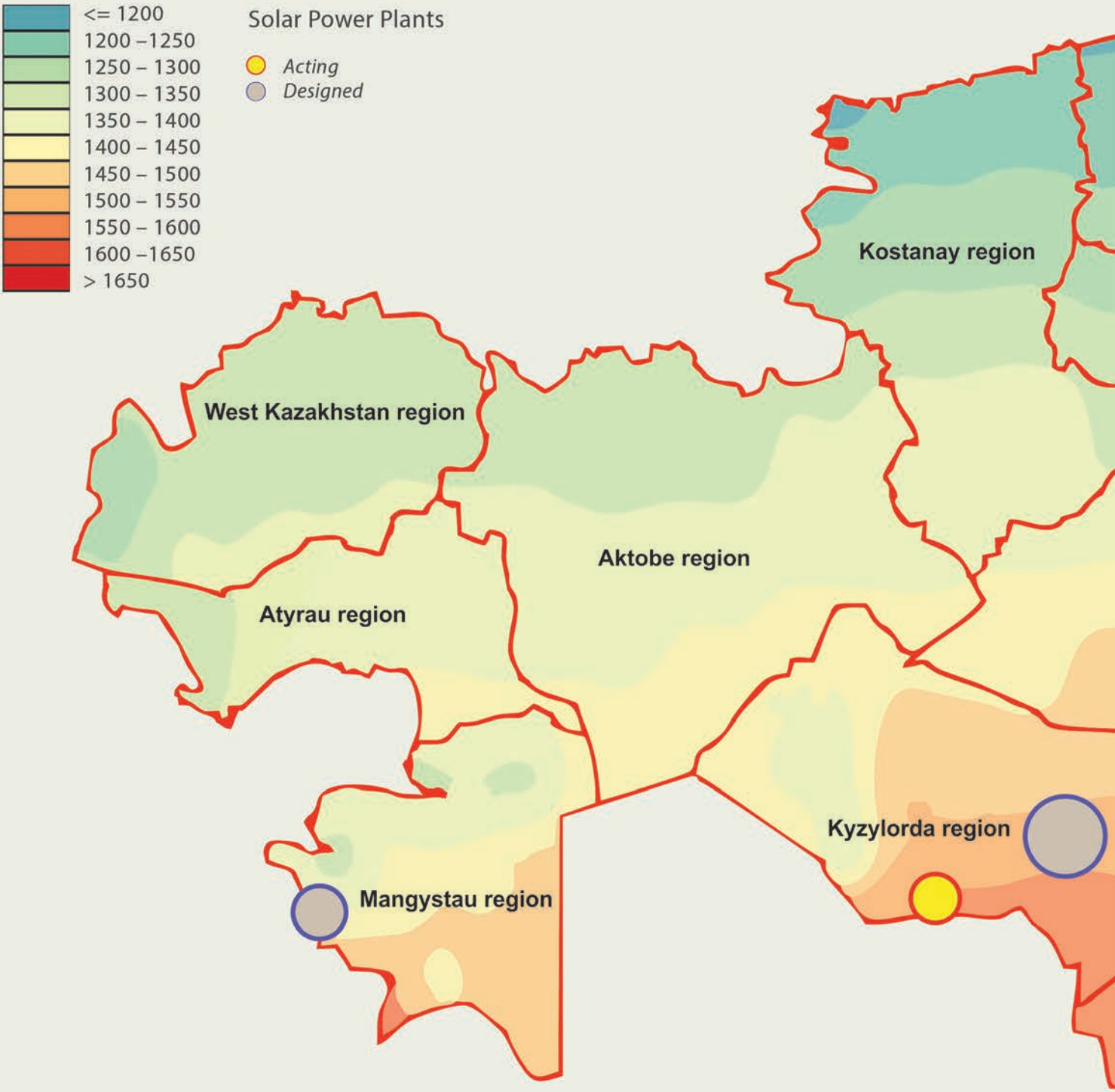
the basis for Energy Balance until 2035 and the National Project for the Development of the Electric Power Industry until 2025. In this regard, SPAQ believes that at the initial stage it is necessary to determine the regulatory status of the Strategy and its place in the state planning system.

Moreover, it is necessary to insert external factors into the general equation for development of the electric power industry, such as the introduction of common electricity market of the countries of the Eurasian Economic Union (2025), introduction of a carbon footprint tax in the European Union (2023), Kazakhstan's obligations under the Paris Agreement (2030). How will our electric power industry solve the old problems accumulated from the Soviet Union and the new challenges dictated by the global conjuncture? How to build a common policy for all sectors of the economy? How structurally should the electric power industry change? What energy sources will the industry use to fuel our economy in the long term: coal, gas, nuclear energy? How much should the share of renewable energy be in order to implement all the country's obligations?

So it turns out that there are still more questions than answers, and so far the state of affairs in the electric power industry looks like an equation with several unknown variables, which the Government must solve in the near future. However, the latest initiatives in the industry, which we have reflected in this article, which have occurred just in the last few months, inspire due optimism and understanding that the industry is actively searching for ways to solve the tasks and modern challenges.

Solar Atlas of Kazakhstan

Total radiation on horizontal surface (source – NASA SSE), kWh / m^2/ year



It is important to notice, that the effectiveness of helio collectors mostly depends on number of clear days per year, rather than on average annual temperature

This map with Solar Atlas of Kazakhstan demonstrates the high potential of solar insolation in Kazakhstan – annual duration of sunlight is 2200-3000 hours and estimated capacity is 1300-1700 kW / m² per year, that exceeds the same indicators in Europe

Thus, responding to the most popular question – yes, in winter they work no worse than in summer, the daylight just shorter in winter

The fairness and affordability of tariffs is an important economic and social issue

The main event in electric power industry this year is the meeting held on May 26 under the chairmanship of the President. The meeting discussed key problems and challenges faced by power industry today. A separate and very important issue that was discussed at the meeting was tariffs. The President drew attention to the need to ensure the principles of fairness and affordability of tariffs. To understand the current situation in tariff formation in the electric power industry, the Solar Power Association of Qazaqstan has addressed the Ministry of National Economy of the Republic of Kazakhstan.

CURRENT SITUATION

It is commonly known that the state regulation of the activities of natural monopoly entities is carried out by the Committee for the Regulation of Natural Monopolies of the Ministry of National Economy of the Republic of Kazakhstan. The Committee also implements state policy in the field of natural monopolies, including state regulation and control of natural monopoly entities, as well as carries out state price regulation and state control over compliance of subjects of a socially significant market with the pricing procedure.

Currently, the price structure for end user includes:

- about 55% - costs for purchase of electric energy from stations (according to subclause 70-1 of Article 5 of the Law of the Republic of Kazakhstan ‘‘On Electric Power Industry’’ the maximum tariffs

of energy-producing organizations for electric energy are approved by the Ministry of Energy of the Republic of Kazakhstan);

- about 40% - costs for transmission of electric energy;

- about 5% – costs associated with production activities of the energy supplying organization.

As of today, 354 enterprises have received a license to carry out activities for purchase of electric energy for energy supply, and about 128 of them actually provide services, according to the Entrepreneurial Code of the Republic of Kazakhstan, state regulation applies to 34 enterprises.

At the same time, since July 1, 2020, there has been an increase in maximum tariffs of energy-producing organizations by an average of 17%. This increase led to an increase in ultimate prices for electric energy by an average of 7.4%.

In addition, by the Order No. 108 dated March 30, 2021 "On amendments to the Order of the Minister of Energy of the Republic of Kazakhstan dated December 14, 2018, Order No. 514 "On approval of maximum tariffs for electric energy», the Ministry of Energy approved the maximum tariffs for 37 energy-producing organizations, where, according to the Ministry of Energy, there was an increase in tariffs of energy-producing organizations by an average of 15%.

Moreover, starting from this April 1, 27 enterprises out of 37 energy-producing organizations with approved maximum tariffs sell electric energy to energy supplying organizations that are subject to state regulation, the increase in these tariffs is on average 20 %.

PRICE DIFFERENTIATION FOR DIFFERENT CONSUMER GROUPS

Also today there is a difference in tariffs for different categories of consumers: individuals (population), legal entities (business) and budget organizations. In addition, tariffs vary depending on the region. If we bring it to some average value, then our electricity will not seem so cheap.

Tariffs of energy supplying organizations by region
(for 2019-2020.)

№	Region/city	№	Article	Tariff KZT/kWh
			Tariff	17,04
1	Zhambyl region	Group No.	Name of consumer group	
		1	Population	12,39
		2	Legal entity	18,49
		3	Budget organizations	28,09
2	Atyrau region		Tariff	15,07
		Group No.	Name of consumer group	
		1	Population	4,46
		2	Legal entity	18,68
		3	Agricultural producers	15,07
		4	Budget organizations	19,35
3	West Kazakhstan region		Tariff	16,91
		Group No.	Name of consumer group	
		1	Population	11,29
		2	Legal entity	19,48
		3	Budget organizations	36,99
4	Aktobe region		Tariff	14,73
		Group No.	Name of consumer group	
		1	Population	8,75
		2	Legal entity	17,97
		3	Budget organizations	17,97
5	Kyzylorda region		Tariff	15,89
		Group No.	Name of consumer group	
		1	Population	14,20
		2	Legal entity	15,89
		3	Budget organizations	25,61
6	Almaty		Tariff	17,12
7	Almaty region		Tariff	19,32
		1	Population	13,63
		2	Legal entity	22,57
		3	Budget organizations	29,90
8	North Kazakhstan region		Tariff	14,21
		Group No.	Name of consumer group	
		1	Population	11,00
		2	Legal entities	15,95
		3	Budget organizations	15,95

№	Region/city	№	Article	Tariff KZT/kWh
9	Kostanay region		Tariff	18,92
		Group No.	Name of consumer group	
		1	Population	14,60
		2	Legal entity	23,30
		3	Budget organizations	25,25
10	Pavlodar region		Tariff	12,80
		Group No.	Name of consumer group	
		1	Population	9,46
		2	Legal entity	15,14
		3	Budget organizations	21,15
11	Karaganda region		Tariff	15,62
		Group No.	Name of consumer group	
		1	Population	10,02
		2	Legal entity over 750 kVA	18,25
			Legal entity from 0 to 750 kVA	21,87
		3	Budget organizations	33,42
12	Turkestan region and Shymkent		Tariff	18,92
		Group No.	Name of consumer group	
		1	Population	13,86
		2	Legal entity	24,70
		3	Budget organizations	24,70
13	Nur-Sultan		Tariff	14,10
		Group No.	Name of consumer group	
		1	Population	11,36
		2	Legal entity	16,87
		3	Budget organizations	16,87
14	Akmola region		Tariff	18,24
		Group No.	Name of consumer group	
		1	Population	14,55
		2	Legal entity	22,08
		3	Budget organizations	22,08
15	Mangystau region		Tariff	16,11
		Group No.	Name of consumer group	
		1	Population	15,96
		2	Legal entity	16,25
		3	Budget organizations	16,25

Source: open data in the network

Thus, according to the Rules of pricing in socially significant markets, approved by Order No. 36 of the Minister of National Economy of the Republic of Kazakhstan dated February 1, 2017, the calculation of limit price for retail sale of electric energy of subjects of a socially significant market is carried out taking into account the differentiation of prices for retail sale based on consumer groups.

In order to establish a differentiated limit price for retail sale of electric energy, energy supplying organizations have identified the following groups of consumers:

- **The 1st group of consumers –** household consumers who use electric energy for their own domestic needs, not related to the production (sale) of goods, works and provision of services;
- **The 2nd group of consumers –** consumers who use electric energy not for domestic needs;
- **The 3rd group of consumers –** legal entities financed from the state budget.

Differentiation of tariffs for electric energy for energy supplying organizations depending on volume of consumption by individuals is carried out in accordance with the Rules of Differentiation of tariffs for energy supplying organizations depending on the volume of consumption by individuals, approved by Order No. 57-ОД of the Chairman of the RK Agency for Regulation of Natural Monopolies on February 20, 2009.

In general, the situation with the differentiation of electricity tariffs by consumer groups actually blurs the true cost of electricity and shifts the burden of payment from population to business and budget organizations.

At the meeting, the President drew attention to the fact that any increase in tariffs is usually passed first on business and budget organizations. "In some areas, the difference reaches 400%! This not only distorts the market, but also does not create incentives for lean energy consumption. Energy efficiency and reducing energy intensity tasks are not fulfilled. Why use more expensive energy-efficient materials and equipment, if electricity can simply be "burned", as they say. Also, the main principle – targeted social assistance- is not observed. As a result of such a dilution, the really needy categories of citizens do not receive benefits in the required amount – said the President.

SUPPORT MEASURES DURING THE PANDEMIC

During the pandemic last year, in the situation with quarantine restrictions, in order to support certain categories of citizens, the President of the Republic of Kazakhstan and the Government of the Republic of Kazakhstan introduced a mechanism of compensation in the amount of KZT 15 thousand for utilities. Thus, this measure has become targeted support for the most vulnerable category of the population.

In particular, in accordance with the decrees of the President of the Republic of Kazakhstan dated March 15, 2020 No. 285 "On imposition of state of emergency in the Republic of Kazakhstan", dated March 16, 2020 No. 286 "On measures to ensure socio-economic stability», the President of the Republic of Kazakhstan instructed to reduce utility bills for population of cities where quarantine was imposed, with an emphasis on socially vulnerable categories of the population.

The Committee for Regulation of Natural Monopolies of the Ministry of National Economy of the Republic of Kazakhstan has taken measures to reduce tariffs for utility services for individuals, as well as to defer payments for legal entities and individuals for the period of state of emergency and quarantine.

Thus, the Committee implemented measure to reduce tariffs for end consumers for regulated services of natural monopoly entities and subjects of socially significant markets. As a result of work done, tariffs were reduced by about 7.4 % for population for the period of state of emergency, including 5% for electricity supply services.

In addition, within the framework of this instruction, the Committee for Construction and Housing and Utility Services of the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan developed a mechanism of payment for utilities by vulnerable social groups, such mechanism provides for transferring payment to local executive bodies for subsequent redirection to utility suppliers for the period of the state of emergency (Rules for reimbursement of payments for utilities during state of emergency in the Republic of Kazakhstan were approved by Order No. 212 of the Minister of Industry and Infrastructure Development of the Republic of Kazakhstan dated 18.04.2020, with amendments and additions No. 277 dated 9.05.2020).

In addition, as the President of the Republic of Kazakhstan K.-J. Tokayev emphasized at a meeting on development of the electric power industry, in order to mitigate the negative impact of the pandemic, all tariffs were fixed until the end of the first quarter of this year. At the same time, it is impossible to keep the tariffs at the same level all the time. According to the President, tariffs should cover reasonable costs and give the industry the opportunity to develop.

Thus, in general, it can be concluded that electricity tariffs of traditional generation tend to constantly increase. This is due to the need to modernize and repair obsolete generating equipment, ensure the profitability of production, cover all costs. However, it is widely known that today the "green" power industry hits fresh highs in reducing the electricity tariff, which is associated with a decrease in cost of equipment and technologies. This is a progressive trend, which is confirmed by reduction of tariffs for solar and wind projects at auctions.

Analysis of prices obtained following the auctions for wind and solar generation over the past three years shows a significant decrease compared to starting maximum auction prices. So, at SPP auctions in 2018, the maximum price was 34.61 KZT/kWh, while the minimum price at auctions was 18 KZT/kWh. In 2019, with a maximum price of 29 KZT/kWh, the minimum price offered at auctions was 9.9 KZT/kWh. In 2020, the maximum auction price was 16.97 KZT/kWh, and the minimum price was 14.58 KZT/kWh. In fact, since 2018, the price of solar energy has decreased by 60%.

As to WPP auctions in 2018, the starting maximum price was 22.68 KZT/kWh, the minimum price was 17.39 KZT/kWh. In 2019, with a starting maximum price of 22.66 KZT/kWh, the minimum price obtained was 19.27 KZT/kWh. In 2020, the starting price was 21.69 KZT/kWh, and the minimum price was 15.9 KZT/kWh. The price of wind energy has decreased by 30%.

For reference: for example, the tariffs of energy-producing organizations vary depending on the region in the range of 6-9 KZT per kWh. In 2019, during the auction for construction of a solar power plant, there were already precedents when the participant offered a price of 9.9 KZT per kWh. Thus, in the future, in our country, the tariffs for renewable energy in the coming years may become lower than the tariffs of traditional generation and renewable energy may become the cheapest source of energy, as has been already observed in some countries. At least, everything is heading in that direction.

According to the materials of SPAQ

FORECAST BALANCE OF ELECTRIC CAPACITY OF UNIFIED ELECTRIC POWER SYSTEM OF THE REPUBLIC OF KAZAKHSTAN FOR AN HOUR OF COMBINED MAXIMUM LOADS DURING

THE PERIOD OF 2021-2027

01

FORECAST

MW

	2021	2022	2023	2024	2025	2026	2027
Requirement	17 932	18 631	18 867	19 433	20 251	20 607	21 247
Maximum electrical load	16 146	16 797	17 017	17 533	18 277	18 609	19 206
Required power reserve	1 786	1 834	1 850	1 901	1 974	1 998	2 041
Generation (available power)	18 042	18 810	18 804	19 304	20 025	19 932	19 784
Existing power plants	17 896	17 899	17 783	17 708	17 423	17 175	16 560
Commissioning of new capacities (reconstruction, expansion, new stations)	145	910	1 020	1 596	2 601	2 757	3 223
Deficit (+), surplus (-) without taking into account the necessary reserve	-1 895	-2 012	-1 786	-1 771	-1 748	-1 324	-578
Deficit (+), surplus (-) taking into account the necessary reserve	-109	-179	63	129	226	674	1 463

ADJUSTING POWER

	2021	2022	2023	2024	2025	2026	2027
Required amount of adjusting power	1 585	1 700	1 749	1 804	1 901	1 968	2 056
Available volume of adjusting power	1 122	1 122	1 132	1 157	1 157	1 157	1 157
Deficit of adjusting power	463	578	617	647	744	811	898

02

FORECAST

MW

Northern Zone

	2021	2022	2023	2024	2025	2026	2027
Requirement	11 438	11 753	11 926	12 274	12 850	13 057	13 521
Maximum electrical load	10 231	10 512	10 672	10 983	11 510	11 701	12 132
Required power reserve	1 207	1 242	1 254	1 291	1 341	1 355	1 389
Generation (available power)	13 574	13 983	13 934	14 414	14 716	14 661	14 618
Existing power plants	13 457	13 460	13 368	13 293	13 008	12 820	12 335
Commissioning of new capacities (reconstruction, expansion, new stations)	117	523	566	1 121	1 708	1 841	2 283
Deficit (+), surplus (-) without taking into account the necessary reserve	-3 343	-3 471	-3 262	-3 431	-3 206	-2 959	-2 486
Deficit (+), surplus (-) taking into account the necessary reserve	-2 135	-2 229	-2 008	-2 140	-1 865	-1 604	-1 097
Exchange with the Southern zone (+reception, - transmission)	-2 100	-2 100	-2 100	-2 100	-2 100	-2 100	-2 100
Deficit (+), surplus (-) taking into account the needs of the Southern Zone	-35	-129	92	-40	235	496	1 003

ADJUSTING POWER

Required amount of adjusting power	918	989	1 020	1 062	1 121	1 157	1 196
Available volume of adjusting power	695	695	695	720	720	720	720
Deficit of adjusting power	223	294	325	342	401	437	476

FORECAST BALANCE OF ELECTRIC CAPACITY OF UNIFIED ELECTRIC POWER SYSTEM OF THE REPUBLIC OF KAZAKHSTAN FOR AN HOUR OF COMBINED MAXIMUM LOADS DURING THE PERIOD OF 2021-2027

01

FORECAST

MW

Southern Zone	2021	2022	2023	2024	2025	2026	2027
Requirement	4 137	4 218	4 264	4 446	4 623	4 774	4 941
Maximum electrical load	3 830	3 905	3 948	4 117	4 280	4 420	4 575
Required power reserve	306	312	316	329	342	354	366
Generation (available power)	1 969	2 042	2 070	2 072	2 090	2 109	2 127
Existing power plants	1 966	1 966	1 942	1 942	1 942	1 942	1 942
Commissioning of new capacities (reconstruction, expansion, new stations)	3	76	128	130	149	167	185
Deficit (+), surplus (-) without taking into account the necessary reserve	1 861	1 863	1 878	2 044	2 190	2 312	2 448
Deficit (+), surplus (-) taking into account the necessary reserve	2 167	2 176	2 194	2 374	2 532	2 665	2 814
Exchange with the Northern zone (+reception, - transmission)	2 100	2 100	2 100	2 100	2 100	2 100	2 100
Non-covered deficit	67	76	94	274	432	565	714

ADJUSTING POWER	2021	2022	2023	2024	2025	2026	2027
Required amount of adjusting power	426	471	489	502	537	564	606
Available volume of adjusting power	200	200	200	200	200	200	200
Deficit of adjusting power	226	271	289	302	337	364	406

02

FORECAST

MW

Western Zone

	2021	2022	2023	2024	2025	2026	2027
Requirement	2 357	2 660	2 677	2 713	2 777	2 776	2 785
Maximum electrical load	2 085	2 380	2 397	2 433	2 487	2 487	2 499
Required power reserve	272	280	280	280	290	289	286
Generation (available power)	2 499	2 785	2 800	2 818	3 219	3 163	3 038
Existing power plants	2 474	2 474	2 474	2 474	2 474	2 413	2 283
Commissioning of new capacities (reconstruction, expansion, new stations)	25	311	326	344	745	750	755
Deficit (+), surplus (-) without taking into account the necessary reserve	-414	-405	-403	-385	-732	-676	-539
Deficit (+), surplus (-) taking into account the necessary reserve	-141	-125	-123	-104	-441	-387	-254

ADJUSTING POWER

Required amount of adjusting power	240	240	240	240	243	247	254
Available volume of adjusting power	227	227	237	237	237	237	237
Deficit of adjusting power	13	13	3	3	6	10	17

IMPLEMENTATION OF RENEWABLE ENERGY

I. Participation in the auction

1. Check the auction schedule

Order of the Minister of Energy of the Republic of Kazakhstan No. 202 of May 21, 2020 "On approval of the auction schedule for 2020"

2. Register at the website of KOREM JSC, conclude an agreement and undergo a training on the use of the trading system

- title documents *
- documents on the land plot
- documents on the connection point

* Foreign legal entities shall provide the equivalent documents with notarized translations of each document into the Kazakh and Russian languages

3. Financial guarantee for auction participation

- for auctions without documentation - 2000 KZT per 1 kW of installed capacity
- for auctions with documentation - 5000 KZT per 1 kW of installed capacity

4. Auction participation

- FSC provides envelopes with financial guarantee
- observers gather in the hall
- 30 minutes before the auction, the envelope is opened, and the data is entered into the system
- trading session opens (accepting and changing bids)
- trading session closes, auction results

5. Auction results

- auction winners
- auction prices
- volumes of selected capacity

II. Post-auction activities and project implementation

1. Inclusion in the RE Facilities Siting Plan and the List of Energy Producing Organizations Using RES

The Ministry of Energy of the Republic of Kazakhstan shall include the winners in the RE Facilities Siting Plan and the List of Energy Producing Organizations Using RES within 5 working days from the date of receipt of the Register of winners from the organizer

2. PPA conclusion

The winner submits an application for the conclusion of the PPA to the FSC within 60 calendar days from the date of inclusion in the List of Energy Producing Organizations using RES

3. PPA financial guarantee

The amount of financial guarantee of the fulfillment of the terms of the purchase agreement is 10,000 (ten thousand) KZT per 1 (one) kW of installed capacity

4. Project implementation terms (from the date of PPA conclusion)

- for SPP - 24 months
- for WPP and BioPP - 36 months
- for HPP- 48 months

5. Registration of land rights, design and survey works

- land plot selection
- obtaining the permit to use the land plot for design and survey works
- design and survey works (D&S)
- obtaining the land plot rights
- obtaining the water use rights (for HPP)

Learn more: USAID, guidance for investors on the RES projects implementation in Kazakhstan, 2018

PROJECTS IN KAZAKHSTAN

6. Grid connection

- request to identify the closest connection point to the energy transmitting organization
- development of power generation scheme
- obtaining technical specifications for a connection to the electric grid
- approval of the power generation scheme by the system operator
- conclusion of an agreement on RE facility connection

7. Preliminary project procedures and design

- obtaining source materials to develop construction projects
- approval of schematic design with the construction authority
- development of project documentation (Feasibility study, Design and estimate documentation), approval, expert examination of DED by a design institute (state or private)
- installation and construction works

8. Environmental Permit

- environmental impact assessment (Ministry of Ecology)
- environmental emissions permit (egov.kz)

9. Investment preferences under Entrepreneurial Code

10. State registration of the right to a constructed renewable energy facility

- inclusion of identification and technical information on newly created immovable property in the information system of the legal cadastre (egov.kz)

III. Commissioning *

** SPP as an example*

1. The contractor notifies the customer of the facility's readiness for commissioning

2. The customer asks to provide (within 3 days):

- contractor -declaration of compliance
- technical and designer supervision - conclusion on the quality of the works performed
- technical supervisor- conclusion on the quality of the completed construction and installation works

3. Substation commissioning

Grid connection:

- Acceptance in Commercial Operation of Automated Commercial Energy Metering System (ACEMS) and registration in the ACEMS register
- signing contracts for system services with SO and REC
- compliance with technical conditions for grid connection
- notification of FSC about carrying out complex tests in set period
- successful completion of complex tests
- connecting the substation to the grid

Substation commissioning:

- signing of the commissioning act by the customer, general contractor, authorized technical supervisor
- registration of the act with the justice authorities
- registration of rights to immovable property
- creation of a facility's technical passport
- sending documents to FSC in the set period

4. Solar park commissioning

- signing of the commissioning act by the customer, general contractor, authorized technical supervisor
- registration of the act with the justice authorities
- registration of rights to immovable property
- creation of a facility's technical passport
- sending documents to FSC in the set period

SOLAR POWER ASSOCIATION OF QAZAQSTAN

TEAM OF ASSOCIATION

PLATFORM FOR NATIONAL AND INTERNATIONAL PLAYERS IN SOLAR ENERGY INDUSTRY

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

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Chairman of the Board of Directors

ISLAMBEK SALZHANOV
Chairman of the Supervisory Board

AINUR SOSPANOVA
Board Chairman –
Member of the Board of Directors

KALIYA KHISSAMIDINOVA
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YERNAR BILYALOV
Member of the Board

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Independent Director

TIMUR SHALABAYEV
Executive Director

ZHANAR NURLYBAYEVA
Manager

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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