

The European Union – Turkmenistan Sustainable Energy Days

International Conference

Sustainable Energy in Turkmenistan: prospects and challenges

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Evolution of renewable energy promotion in Kazakhstan – achievements and lessons learned

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DEVELOPMENT OF THE ELECTRIC POWER INDUSTRY IN KAZAKHSTAN FOR 2023-2029 – GOAL AND TASKS

Secure, reliable and stable operation of the electric power industry in Kazakhstan



GOAL
Commissioning new generation capacities, meeting the demand of energy consumers, protecting the rights of participants in the electric and thermal energy market, preventing speculations in the purchase and sale of electricity

TASKS

- 1 GENERATION**  Increasing installed capacity (*map of energy generation facilities*)
Reducing wear and tear of generation facilities - **40 %**
- 2 TRANSMISSION**  Reducing wear and tear of transmission networks - **47 %**
- 3 DIGITALIZATION**  Level of equipment with digital electricity meters- **100 %**
- 4 MARKET REFORMS**  Introducing a single electricity purchaser
Introducing a balancing electricity market (*minimizing discrepancies*)
- 5 HEAT SUPPLY**  Law “On Thermal Power Engineering”
Master plans for the development of regional heat supply

ELECTRIC POWER INDUSTRY OF KAZAKHSTAN

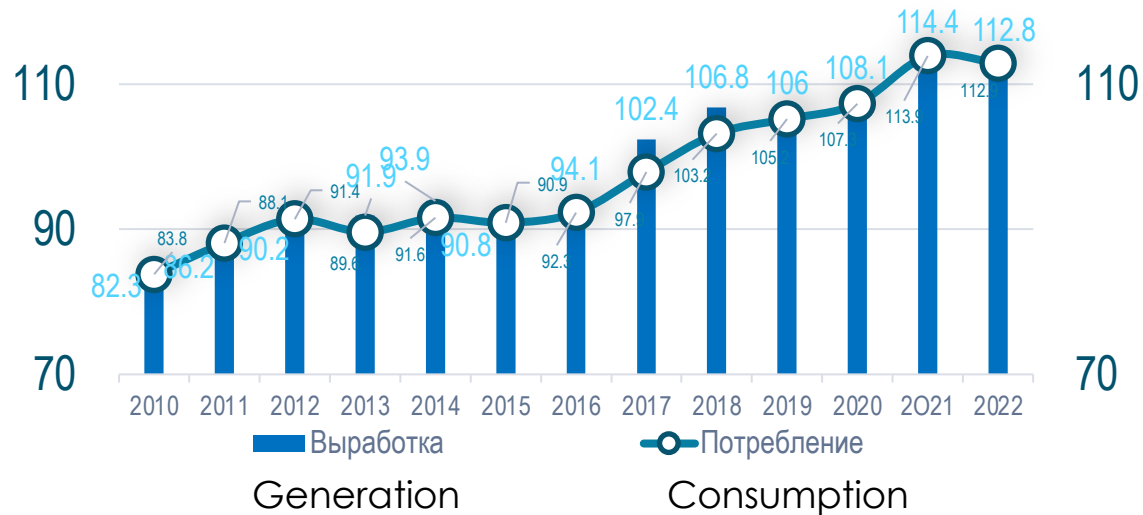


213 power stations

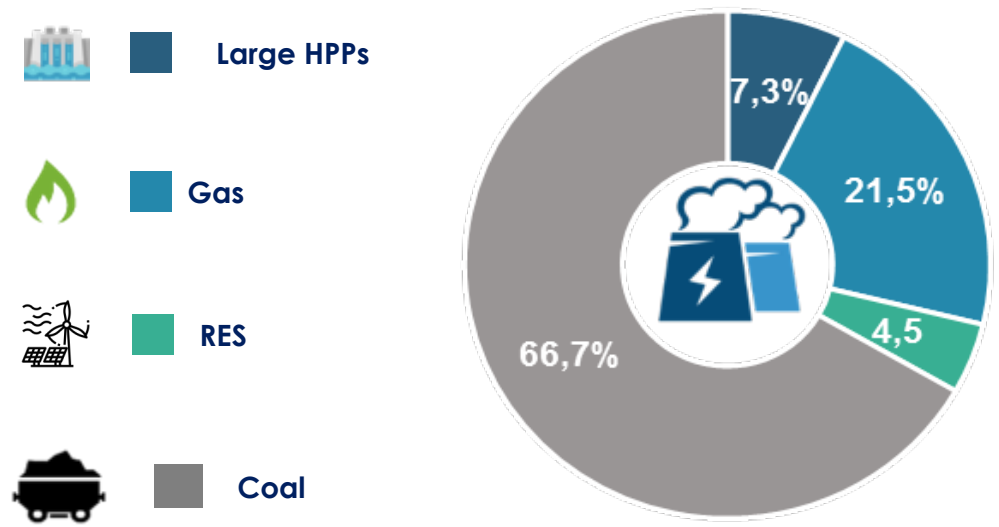


24,77 GW installed capacity

Dynamics of electricity generation/consumption in the Republic of Kazakhstan billion kWh.



Generation mix in the Republic of Kazakhstan



ELECTRICITY GENERATION AND SHARE OF RES

1 Electricity generation, billion kWh

112,8

146

1,3 times

FORECAST INDICATOR

ELECTRICITY GENERATION

146 billion kWh

1,3 times

to the level of 2022

	2022	2023	2024	2025	2026	2027	2028	2029
Electricity generation taking into account economic needs, billion kWh	112,8	114,9	124,8	129,2	133,6	137,3	141,8	146

2 RES share, %

4,5

12,5

2,8 times

FORECAST INDICATOR

SHARE OF ELECTRICITY FROM RES

12,5 %

2,8 times

to the level of 2022

	2022	2023	2024	2025	2026	2027	2028	2029
Share of electricity from renewable energy sources in total generation, %	4,5	5	5,5	6	7	8	10	12,5

ELECTRICITY GENERATION FROM RES

141
facilities

with the total capacity of **2715 MW** (excluding large HPPs) as of October this year



Solar

1197 MW
44 facilities



Wind

1246 MW
55 facilities



Hydro

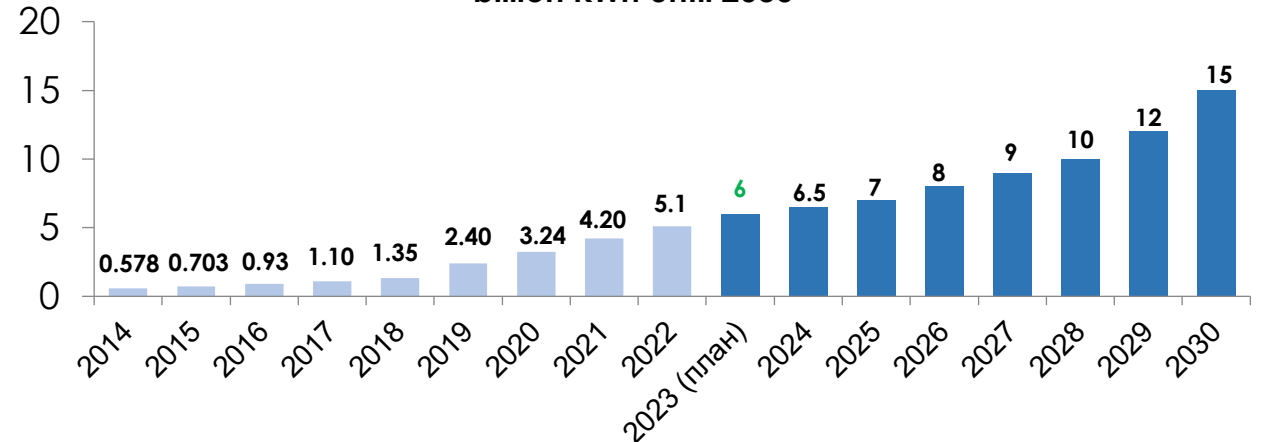
269 MW
39 facilities



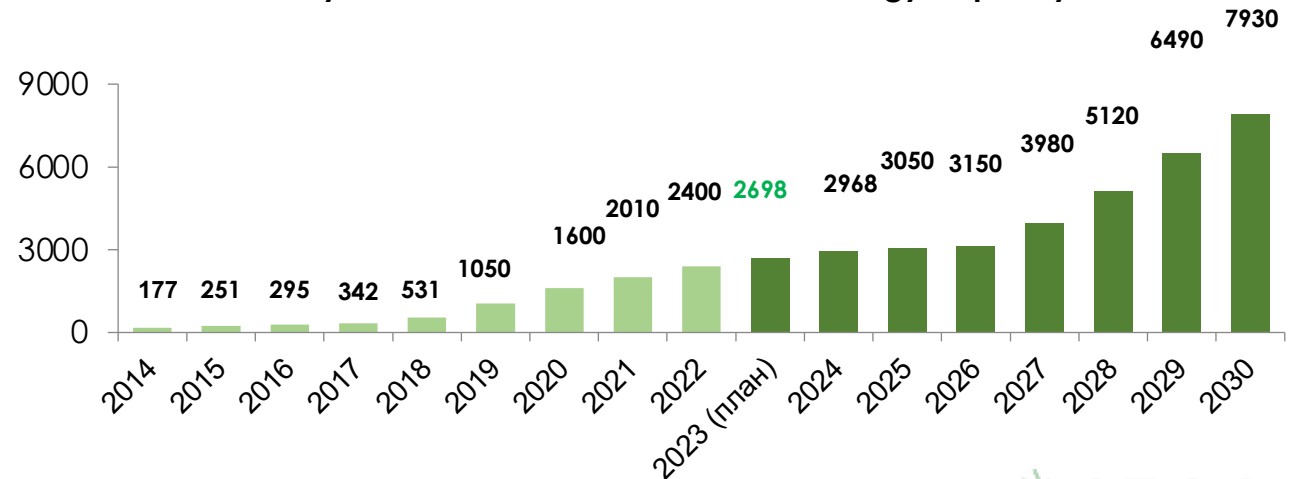
Bio

1,7 MW
3 facilities

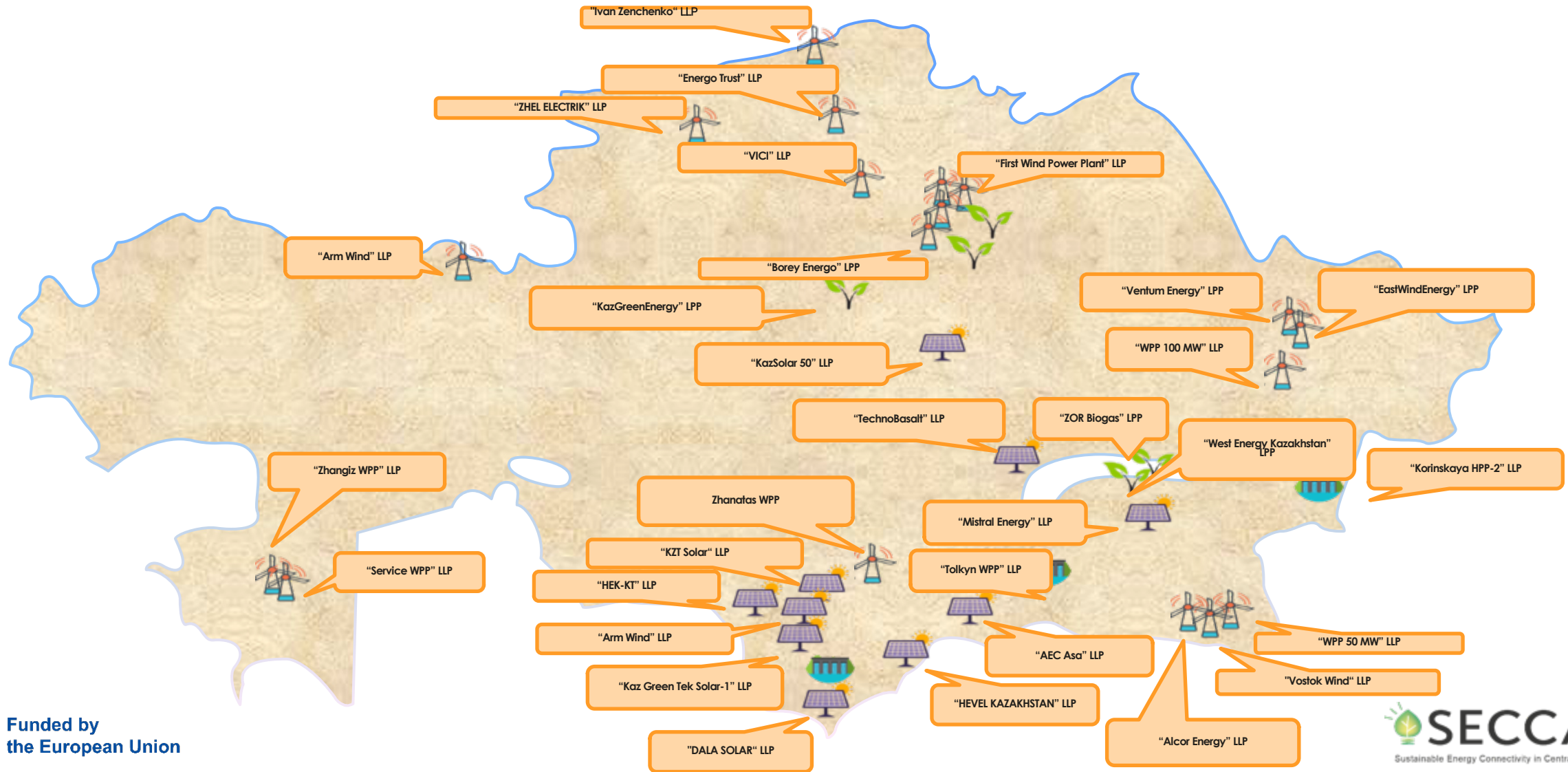
Volume of electricity generation from renewable energy sources, billion kWh until 2030



Growth dynamics of installed renewable energy capacity, MW



MAP OF OPERATING RES FACILITIES



Implementation of the policy to decarbonize the economy of Kazakhstan

Implementation of the policy to decarbonize the economy of Kazakhstan

Work is underway to integrate renewable energy sources (hereinafter referred to as RES) in the energy balance of the Republic of Kazakhstan. According to the results of 2022:

2,5 GW
Installed capacity

>5 billion kWh
Production volume

~5%
Of the total consumption in the country

2009

Start

- The beginning of RES development in the country
- The first legislative initiatives to support RES

“Green” Economy

- The concept of the transition of the Republic of Kazakhstan to a «green» economy (2013)
- Application of fixed tariffs for RES (2014)

Fuel and Energy concept, Paris Agreement

- Tasks have been set for the development of RES in the overall energy balance of the country
- Support of ecological integrity and adaptation to the changing climate in the world

2013-15

2018

Launch of Renewable Energy Auctions

- An auction bidding mechanism has been introduced for the competitive selection of renewable energy projects
- Amendments have been made to the current legislation in the renewable energy support sector

2020-23

Setting goals and objectives to achieve carbon neutrality

- Forecast balance of electric energy of the Unified Electric Power System of Kazakhstan until 2035
- Revision of the law on RES support (exemption from property tax and land tax, as well as exemption from corporate income tax)
- Kazakhstan has joined the global movement to achieve carbon neutrality
- Strategy for achieving carbon neutrality of the Republic of Kazakhstan until 2060
- New Environmental Code of the Republic of Kazakhstan

RES IN KAZAKHSTAN

The Republic of Kazakhstan

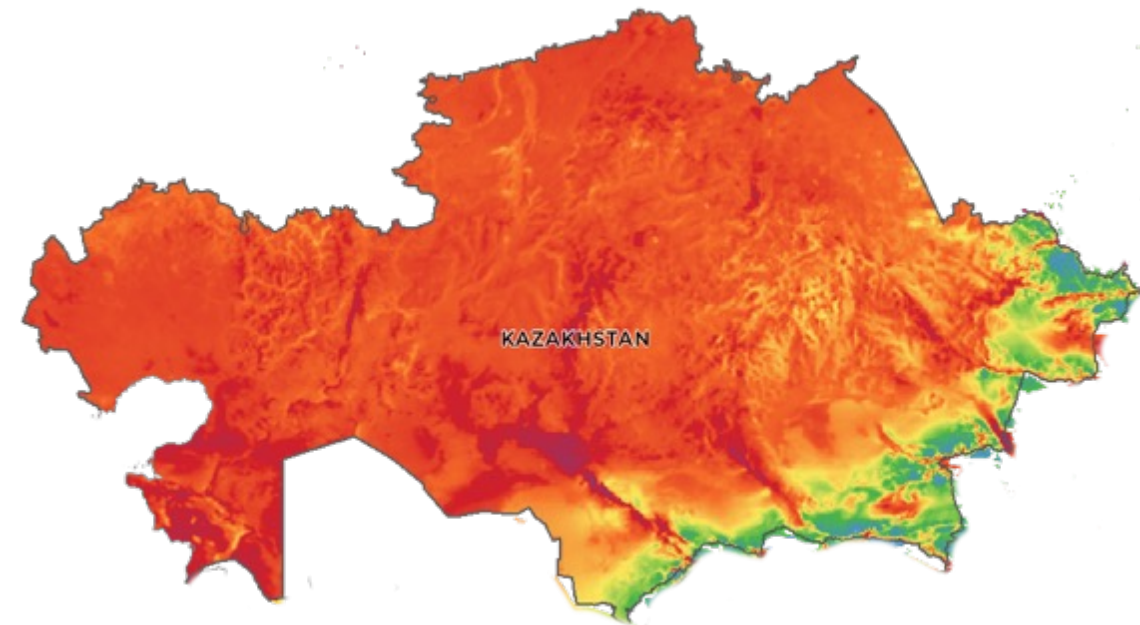
- occupies the 9th place in the world by area of territory
- significant potential of wind energy
- in the near future, it has every opportunity to take a leading position in the world in the development of wind generation, which will be:
 - as stable as possible;
 - evenly distributed (throughout the country);
 - minimally affect the growth of tariffs for end consumers.

Legislative measures to support renewable energy in Kazakhstan

- ① **At least 20 years**
GUARANTEED PERIOD OF MANDATORY PURCHASE OF ALL GENERATED ENERGY
- ② **Customs duties**
EXEMPTION FROM PAYMENT DURING THE CONSTRUCTION PERIOD
- ③ **Sales tariff**
PEGGED TO A FOREIGN CURRENCY



Wind potential map



The climate in Kazakhstan is favorable for the construction of wind power plants due to the presence of wind corridors with a wind speed of more than 5 m/s, which is necessary for the operation of wind turbines.

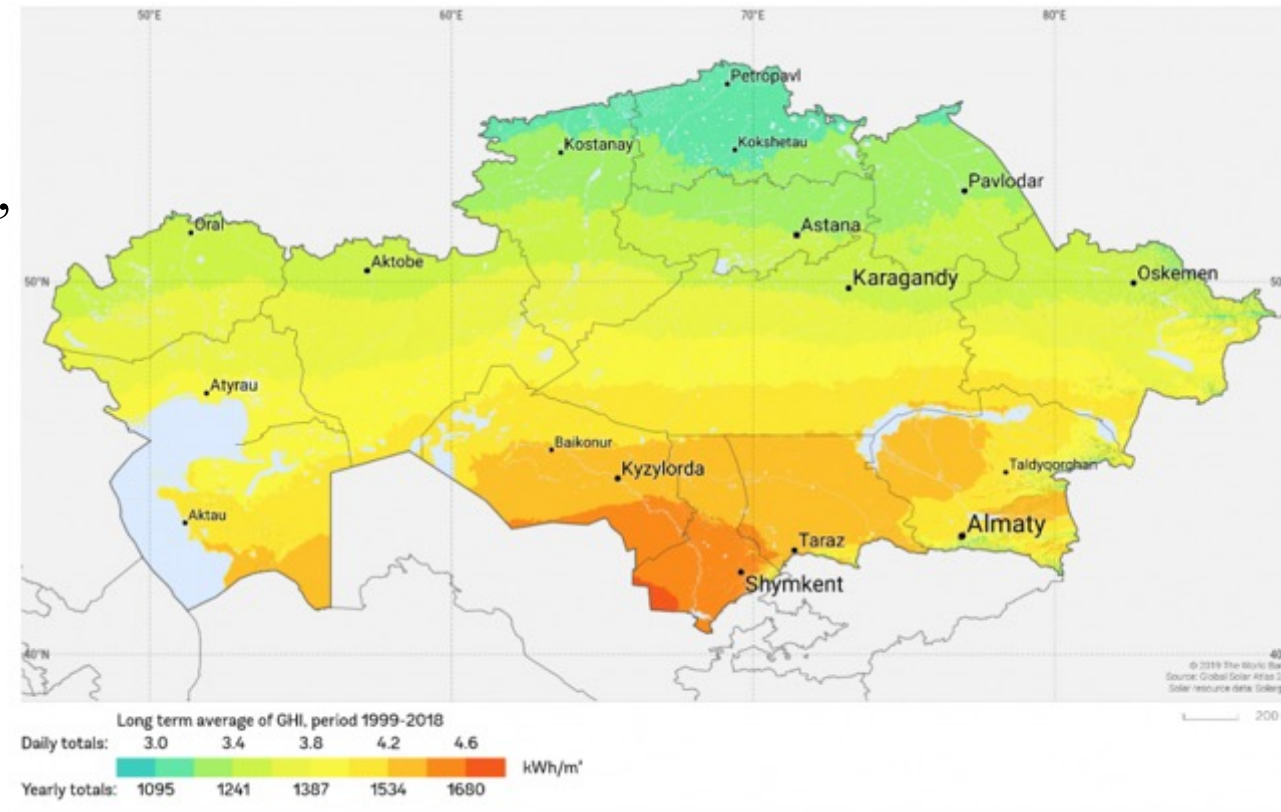
The Caspian region, central and northern Kazakhstan, as well as southern and southeastern Kazakhstan have the highest wind energy potential.

According to the Ministry of Energy of Kazakhstan, the country's wind energy potential is estimated at 920 billion kWh of electricity annually.

SOLAR POTENTIAL MAP

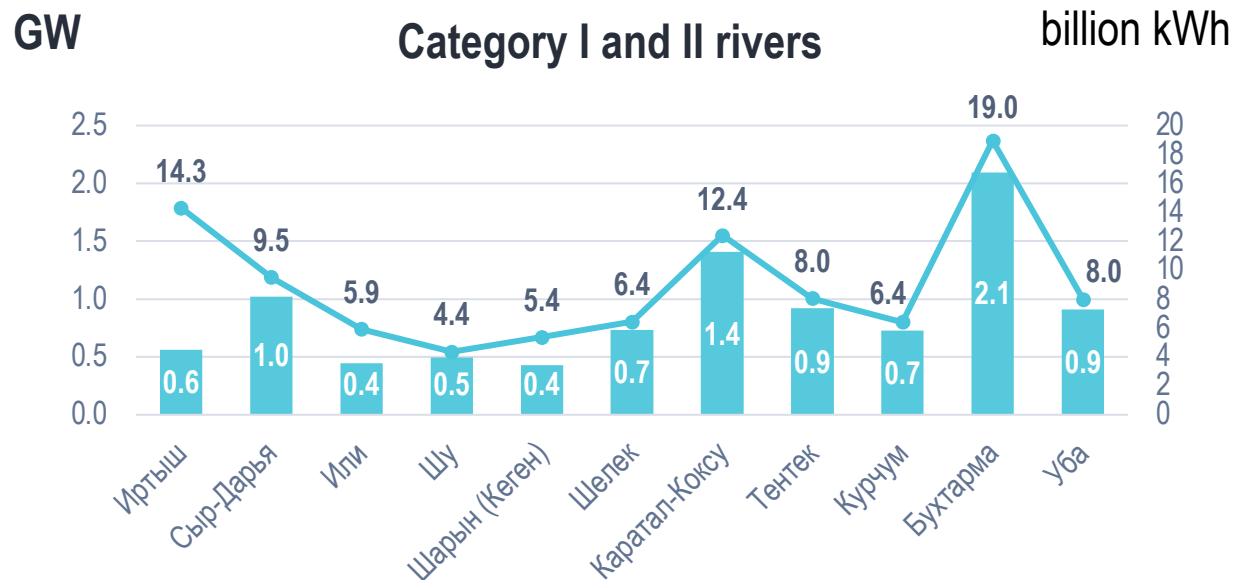
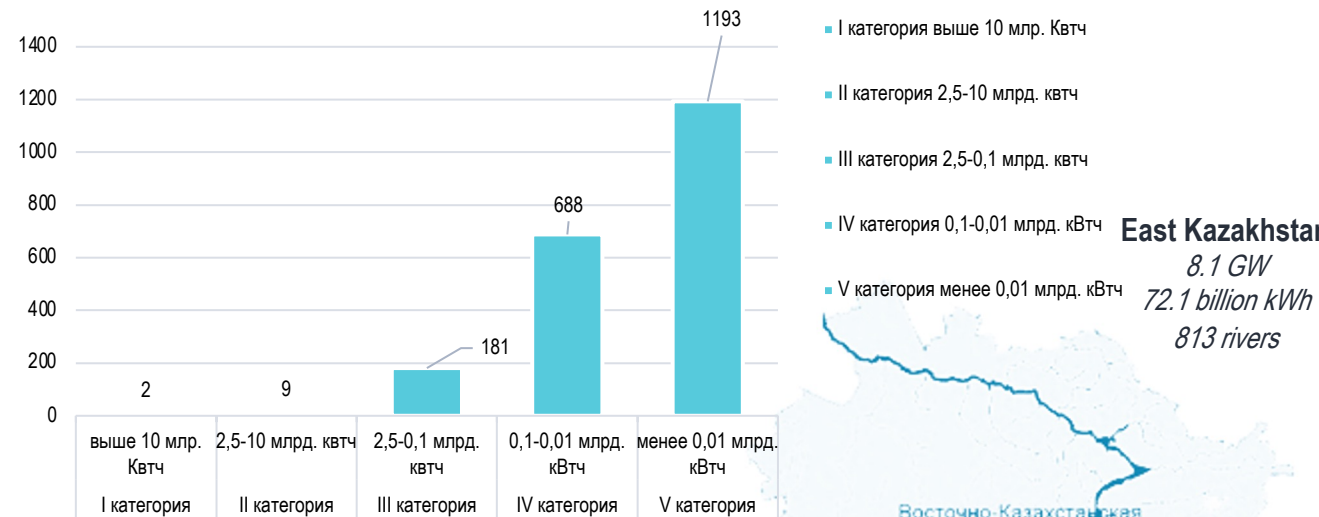
Solar energy has huge potential as a renewable energy source in Kazakhstan due to sparsely populated large territories and climatic conditions, especially in the south of the country, where the sun shines from 2,200 to 3,000 hours a year

In Kazakhstan, the solar energy potential is 2,5 billion kWh. The most preferred areas for solar generation are the Aral Sea region and the southern regions of Kazakhstan, experiencing a shortage of electricity.

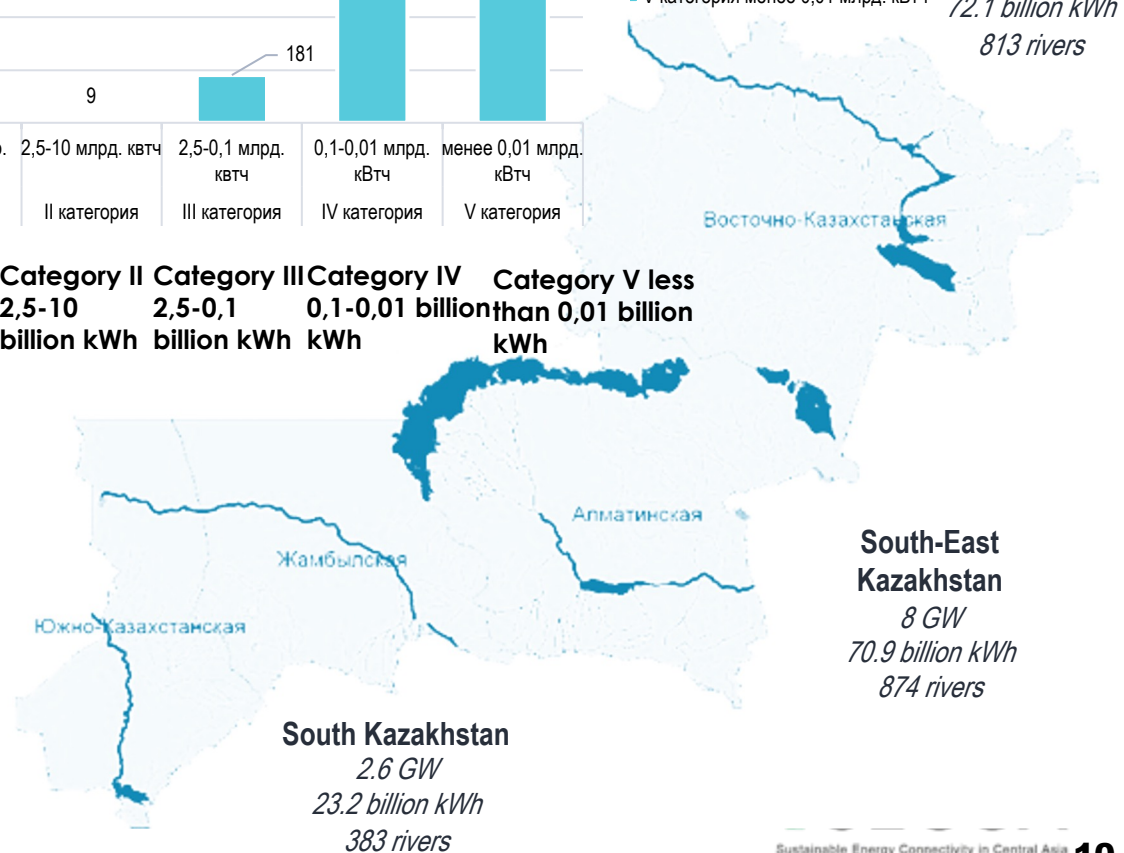


INFORMATION AND CHARACTERISTICS OF KAZAKHSTAN'S HYDROPOWER POTENTIAL

Hydropotential	Number of rivers	Category I over 10 billion kWh	Category II 2,5-10 billion kWh	Category III 2,5-0,1 billion kWh	Category IV 0,1-0,01 billion kWh	Category V less than 0,01 billion kWh
South Kazakhstan	383	1	1	20	74	287
South-East Kazakhstan	874	-	5	89	340	440
East Kazakhstan	813	1	3	72	274	466
TOTAL	2070	2	9	181	688	1193

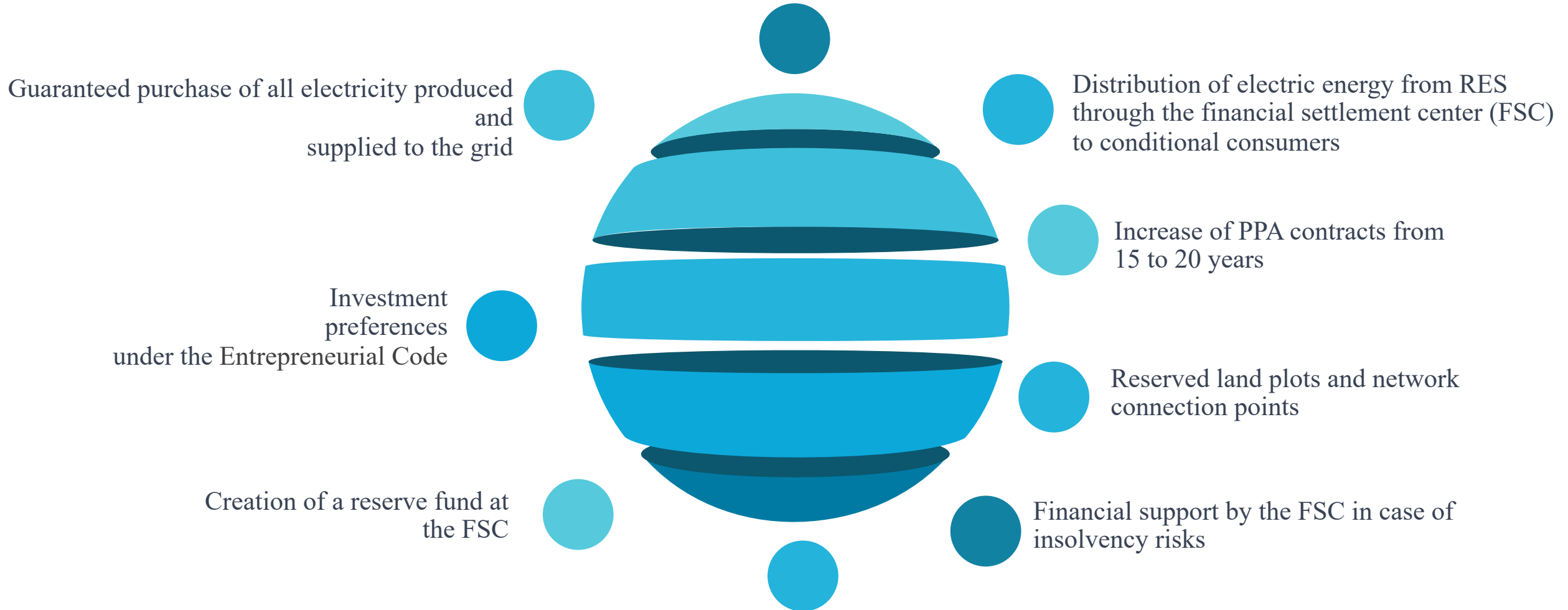


Category I over 10 billion kWh
Category II 2,5-10 billion kWh
Category III 2,5-0,1 billion kWh
Category IV 0,1-0,01 billion kWh
Category V less than 0,01 billion kWh



PREFERENTIAL CONDITIONS FOR THE DEVELOPMENT OF RENEWABLE ENERGY IN KAZAKHSTAN

Agreement on integrating renewable energy facilities to the grid



KEY INDUSTRY DEVELOPMENT INDICATORS BY 2050

5 year SCHEDULE

of organizing and conducting auctions for the selection of projects to construct renewable energy facilities

50% of production volume

share of alternative energy sources and renewable energy sources by 2050.

KEY INDUSTRY DEVELOPMENT INDICATORS BY 2050

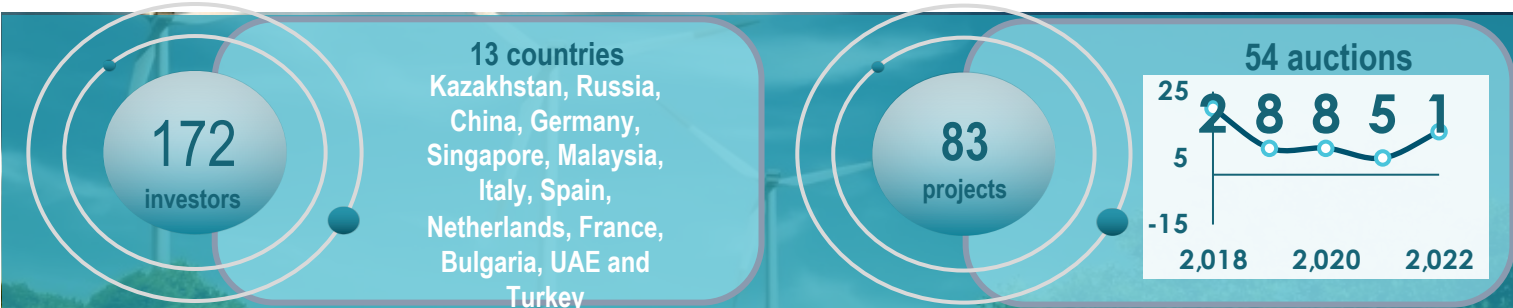
Implementation of the strategy to achieve carbon neutrality of the economy of the Republic of Kazakhstan by 2060

7 GW by 2030

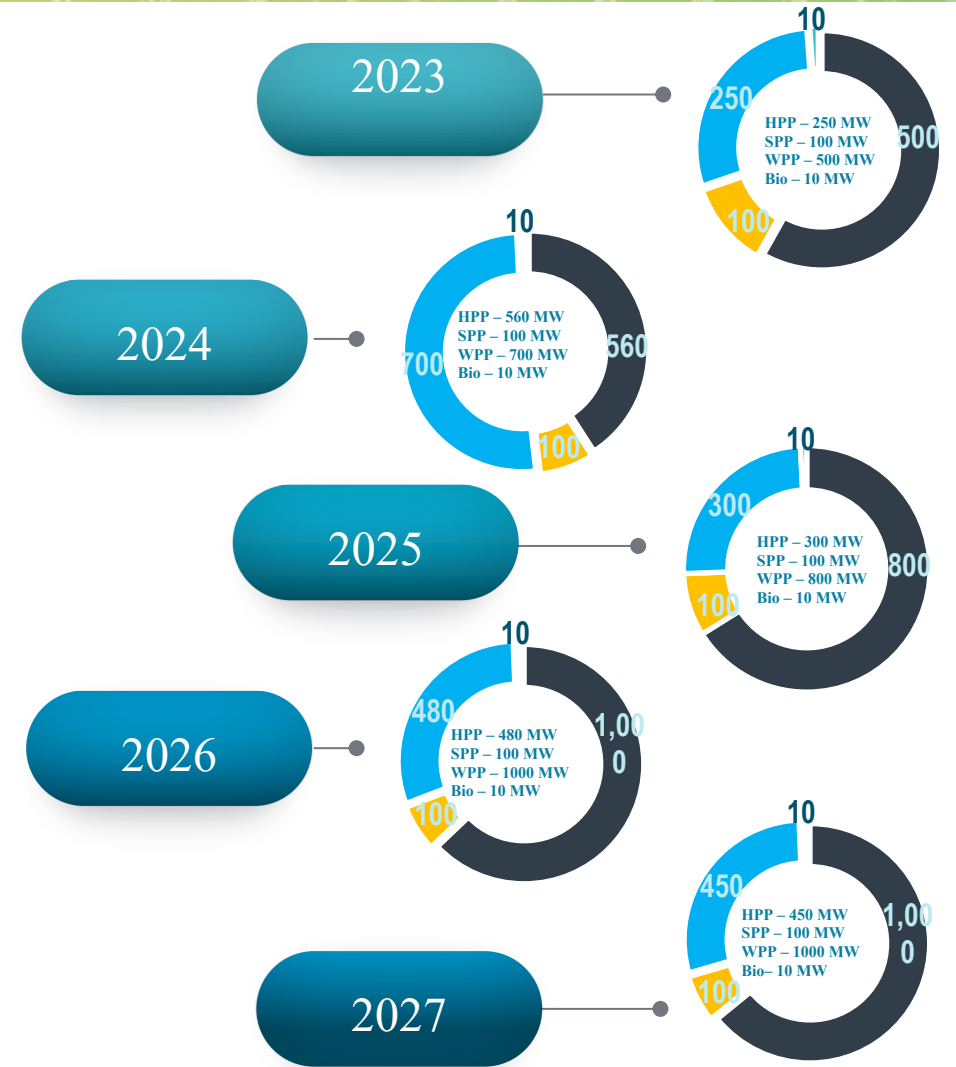
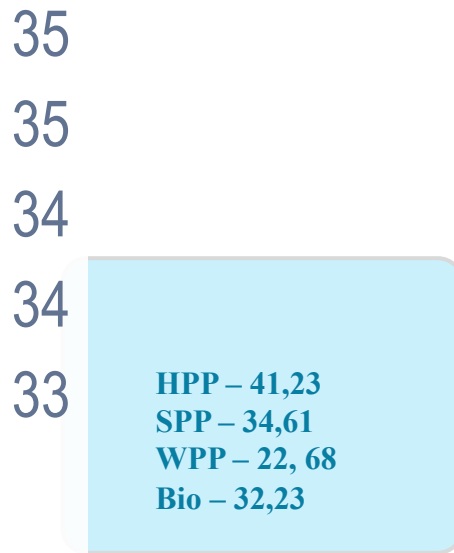
of RES generating capacities are planned to be commissioned

15% of total generation share of renewable energy sources from total generation in the country in 2030

AUCTIONS FOR THE SELECTION OF PROJECTS TO CONSTRUCT RES FACILITIES



AUCTION PRICES, KZT/kWh



RES IN KAZAKHSTAN

For auctions in 2023, the maximum starting auction prices are:



34,61



41,23



22,68



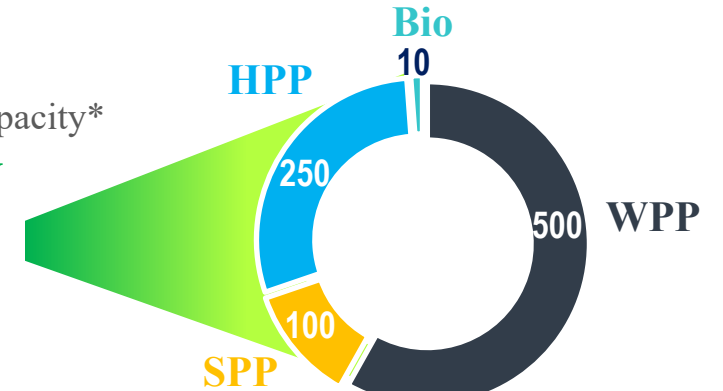
32,23

Based on the results of the 2023 auctions, the maximum reduction in the auction price was: SPP – 59.86%, HPP – 57.5%, WPP – 54.23%, BioPP – declared failed.

2023

volume of installed RES capacity*

860 MW



*Based on the results of the auction for the selection of renewable energy projects. According to the order of the Minister of Energy of the Republic of Kazakhstan No. 187 dated May 23, 2023



HPP 250 MW

1) 206.01 MW - November 24,

For Northern and Southern zones

- 33.1 MW at 34.8
- 10.01 MW at 34.81
- 15 MW at 34.9
- 14.9 MW at 35.01
- 12.8 MW at 35.3
- 42 MW at 35.32
- 10.2 MW at 35.33
- 18 MW at 35.8
- 50 MW at 38.99

1) 31.9 MW – November 22,

For Northern and Southern zones

- 2.4 MW at 19.8
- 2.5 MW at 19.88
- 4.9 MW at 20.35
- 3.2 MW at 20.36
- 2.0 MW at 22.35
- 3.5 MW at 22.36
- 2.0 MW at 23.00
- 4.5 MW at 25.44
- 2.0 MW at 25.89
- 4.9 MW at 26.9



SPP 100 MW

- 1) 20 MW - November 23, for the Western zone at 34.19
- 2) 20 MW - November 24, for the Southern zone at 17.38
- 3) 20 MW - November 27, for the Southern zone at 17.34
- 4) 20 MW - November 28, for the Southern zone at 14.5
- 5) 20 MW - November 29, for the Southern zone at 13.89



WPP 500 MW

- 1) 10,001 MW - November 21, for the Northern zone at 10.38
 - 2) 50 MW - November 20, for the Southern zone at 10.49
 - 3) 50 MW - November 17, for the Southern zone at 11.78
 - 4) 50 MW - November 16, for the Northern zone at 11.88
 - 5) 50 MW - November 15, for the Northern zone at 12.33
 - 6) 100 MW - November 14, for the Northern zone at 13.49
- 1) 100 MW - November 13, for the Northern zone at 10.5



BioPP 10 MW

- 1) 10 MW November 30 Failed



Funded by the European Union

AUCTIONS FOR RENEWABLES IN KAZAKHSTAN

Before the start of auction trading (hereinafter referred to as AT)

CD – calendar days
 ME RK – Ministry of Energy of the Republic of Kazakhstan
 FSC – financial settlement center

Ministry of Energy of the Republic of Kazakhstan

- Publishes the auction trading schedule 90 CDs before the AT

Ministry of Energy of the Republic of Kazakhstan

- Sends a list of AT observers of no more than 8 people

Single purchaser (FSC)

- Confirms collateral 2 days before the AT

KOREM

- Registers AT participants in the system no later than 5 CDs before the AT
- Uploads documents into the system according to the list
- Concludes agreements for participation in the AT (deadline 1 CDs before the AT)
- Conducts training on how to work in the trading system (according to the schedule)

Start

60-90 days

5-30 days

1-5 days

Auction

After AT

WD – working days
 EPO - energy producing organization
 KOREM – Kazakhstan operator of the electric energy and power market
 RES – renewable energy sources

Single purchaser (FSC)

- Concludes agreements with the AT winner (application is accepted within 60 CDs after the inclusion in the list of RES EPOs)

Ministry of Energy of the Republic of Kazakhstan

- Within 30 CDs includes winners in the plan for the placement of renewable energy facilities
- Within 5 CDs includes winners in the list of RES EPOs
- Publishes the names of auction winners within 30 CDs

Single purchaser (FSC)

- Returns collaterals within 3 CDs to non-winning AT participants
- Collateral for the use of the agreement is provided by the AT winners within 30 CDs after signing the agreement

KOREM - Auction

- Condition: at least 2 participants and the total volume of applications must be at least 130% of that stated in the AT schedule
- Opens an envelope with a collateral for the application



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