Russian Renewable Energy Sector:
Current Status and Development Prospects

RRREDA
RUSSIA RENEWABLE ENERGY DEVELOPMENT ASSOCIATION

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ABOUT RUSSIA RENEWABLE ENERGY DEVELOPMENT ASSOCIATION

RREDA
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Russia Renewable Energy Development Association (RREDA) is a non-profit organization representing the interests of participants in the renewable energy sector in Russia and leading activities to **stimulate investment** and **popularize the use of renewable energy sources and low-carbon hydrogen** technologies in the Russian Federation.

We bring together a **wide range of stakeholders**, including generating companies, renewable energy project developers, equipment manufacturers and suppliers, research centers and financial institutions, in order to jointly ensure the formation of a **reliable institutional environment** and an **effective infrastructure** for investment in the **renewable energy sector**.

6
Years of activities in the Russian renewable energy market

27
Association Members and Partners

70%
Total capacity of RES generation facilities in Russia

ASSOCIATION MEMBERS

NOVAWIND ROSATOM
SOLAR SYSTEMS
HEVEL ENERGY GROUP
ЭЛ5 Энерго
UNIGREEN
ECO ENERGY
TGC-1
GAZPROM NEFT
RT-Invest
technospark
SBER
ЮНИПРО
EUROPEAN UNIVERSITY AT ST. PETERSBURG
Forward Energo
Vershina Development

INTERNATIONAL AND NATIONAL PARTNERS

РОССИЙСКАЯ АССОЦИАЦИЯ ВЕТРОИНДУСТРИИ
GAZPROMBANK
ENERG RENEWABLE ASSOCIATION
BAUMAN MOSCOW STATE TECHNICAL UNIVERSITY
ВОИР Основано в 1932 г. ВСЕРОССИЙСКОЕ ОБЩЕСТВО ИЗОБРЕТАТЕЛЕЙ И РАЦИОНАЛИЗАТОРОВ
APVIA ASIAN PHOTOVOLTAIC INDUSTRY ASSOCIATION
Ассоциация содействия экономике замкнутого цикла «Ресурс»
АРВИС Создаем цикличную экономику
АССОЦИАЦИЯ МЕНЕДЖЕРОВ

THE RREDA ACTIVITIES ARE AIMED AT BRINGING TOGETHER A WIDE RANGE OF STAKEHOLDERS INTERESTED IN THE RENEWABLE AND HYDROGEN ENERGY DEVELOPMENT

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Companies-RREDA Members

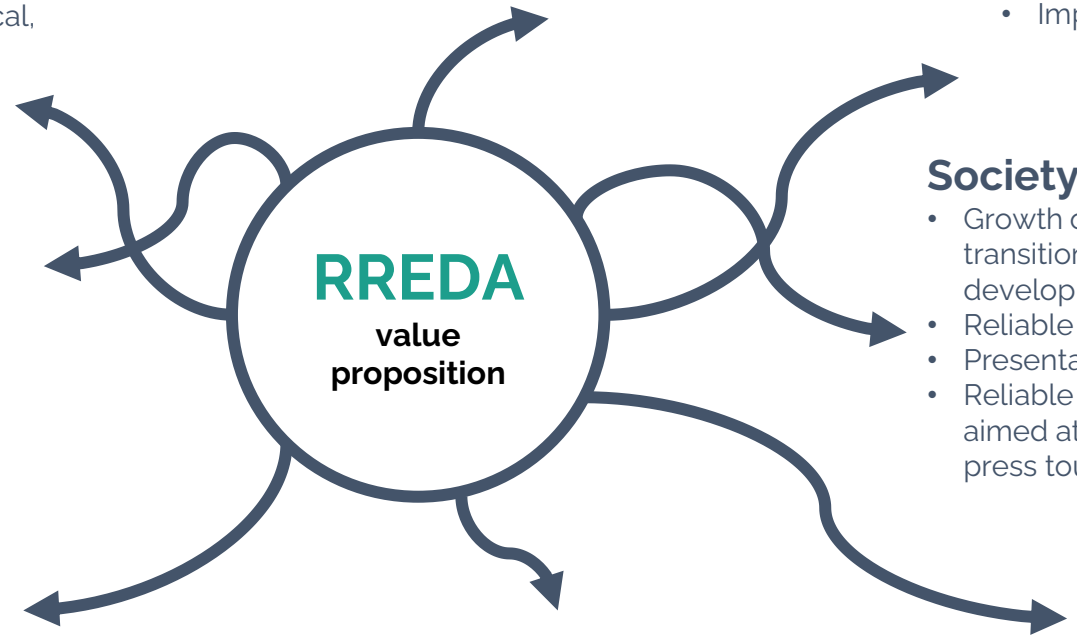
- Coordination of the RREDA members' positions on the issues of regulation and development of the industry
- Presentation of a consolidated position on behalf of the Association in the media, including on topics sensitive to individual companies
- Providing members with comprehensive analytical, normative, PR and GR support
- Presentation of consulting services

Industry Communities

- Expert platform for interaction in order to balance the interests of different industry groups
- Experience exchange
- Joint implementation of regulatory initiatives

Market infrastructure

- Single window for submission of industry information
- Single window for presenting the consolidated position of RES industry participants
- Implementation of joint analytical initiatives within working groups
- Implementation of joint research and development



Federal executive authorities

- Single window for submission of industry information
- Single window for presenting the consolidated position of RES industry participants
- Elimination of the need to interact individually with market participants
- Initiation, support and implementation of regulatory initiatives

Society | Media

- Growth of public awareness on the aspects of energy transition, renewable and hydrogen energy development
- Reliable source of industry information
- Presentation of comments on hot topics
- Reliable partner in the implementation of joint initiatives aimed at popularizing the energy transition (conferences, press tours, interviews with industry participants)

Universities | schools

- Source of interesting complex content for the purpose of training young professionals
- Support in career guidance and advanced training
- Stimulating the development of competencies through thematic competitions
- Internships in specialized companies
- Platform for employment in industry companies

Research centers

- Reliable source of information on the status of renewable and hydrogen energy development
- Single order center for R&D
- In the future, a possible manager of a venture fund

Technology and manufacturing companies

- Providing reliable information about development plans and industry demands
- Joint study of aspects of localization and import substitution

Promotion of actual analytical and information products

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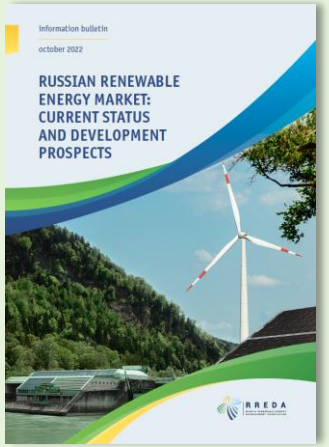
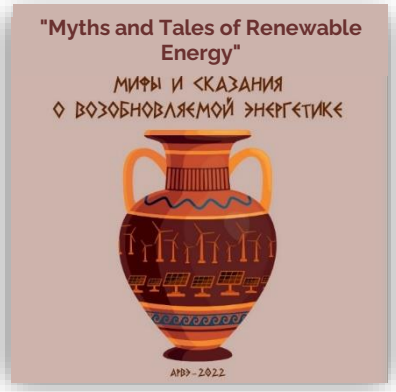
Annual RES reports in Russian and English

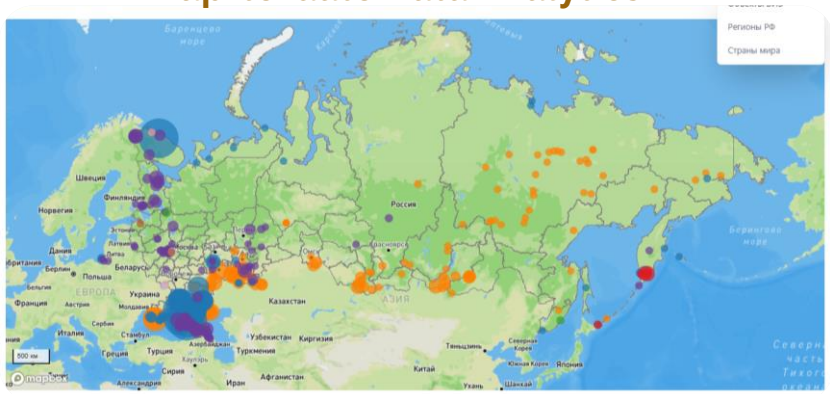


Quarterly market overviews

Thematic image booklets



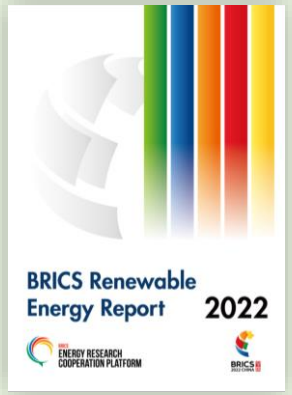
Interactive RES maps and reliable up-to-date Data Analytics



Annual Regional Investment Ratings

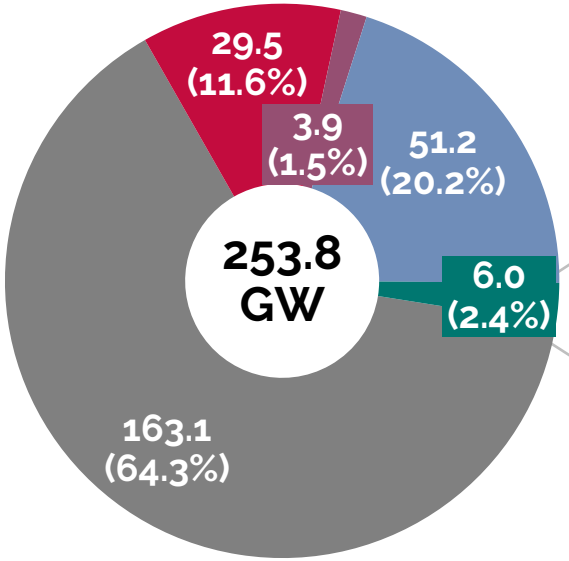
FIRST PLACE	SECOND PLACE	THIRD PLACE
Sakhalin region	**Kamchatka region**	**Yakutia**

RREDA participated in the research focused on RES development framework in BRICS countries and acted as the main coordinator of the presentation of the Russian part of the research

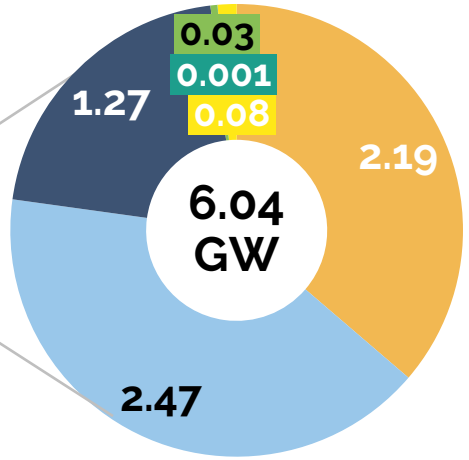


In 2022, the BRICS Energy Platform experts (for the Russian part – RREDA experts) prepared a study on the development of technologies in the field of renewable energy **"BRICS Renewable Energy Report 2022"**.

The installed RES generation capacity in Russia amounts to 6,04 GW



TPP
NPP
Generation by TITES
HPP (over 50 MW)
RES without huge HPP



SPP
WPP
sHPP (up to 50 MW)
BioPP
Tidal PP
GeoPP

As of September 2023, the installed renewable energy capacity in Russia is about **2.4% of the total installed capacity** (1.1% RES share in electricity consumption)

Federal **target share of renewable energy** in the energy consumption by **2035**

6%

Russian Renewable energy market segments and existing support instruments

Wholesale Market (WECM)
Support mechanism:
CSA RES 1.0, 2.0
(2013-2035)

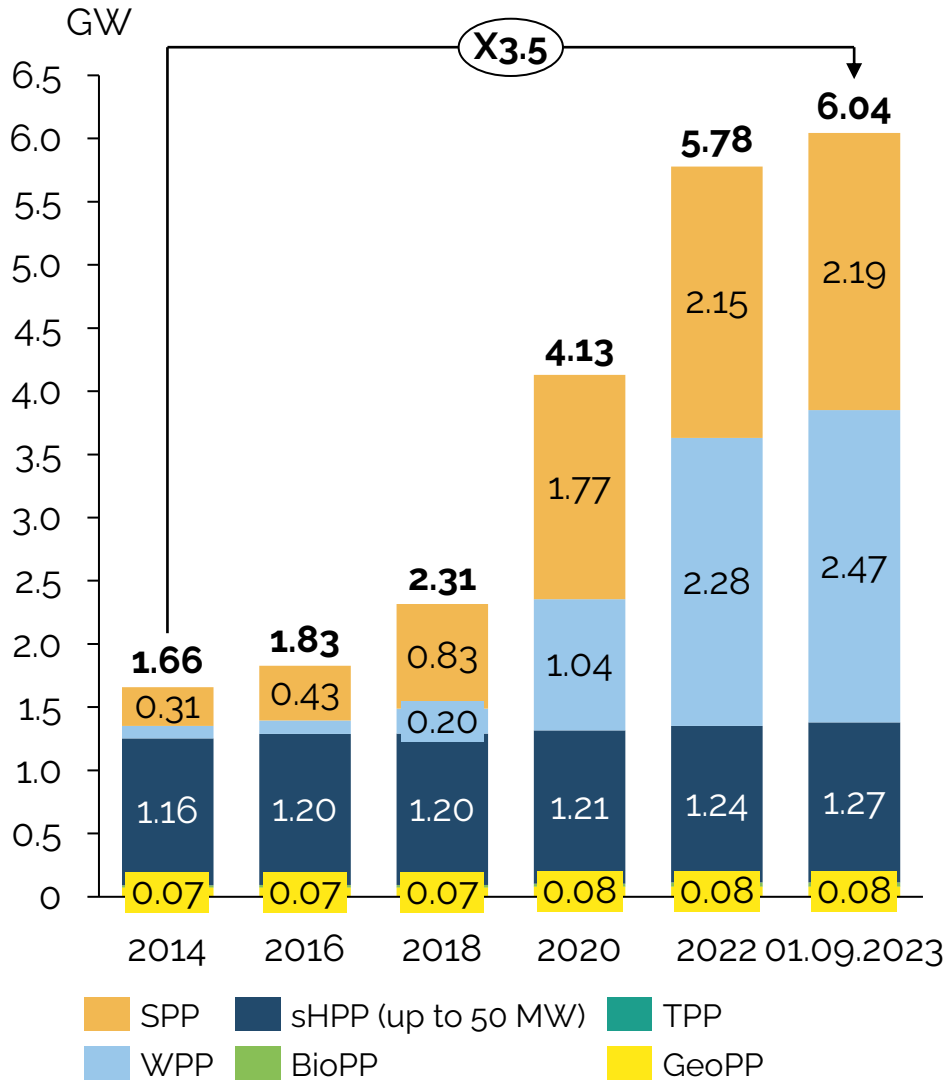
Isolated Territories (TITES)
Mechanism:
long-term tariff

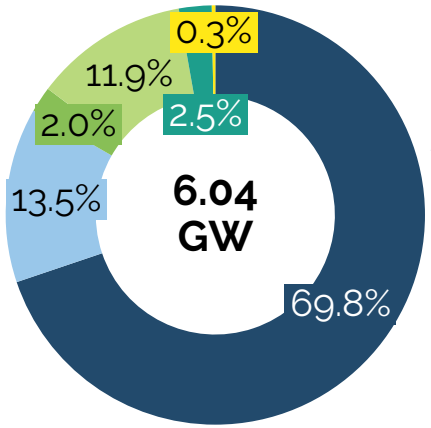
Retail Market (REM)
Support mechanism:
long-term tariff,
since 2015

Microgeneration Mechanism:
Possibility of selling surplus electricity to the grid, since 2021

Source: RREDA, SO UPS JSC, NP Market Council

CSA RES program, adopted in 2013, provoked RES capacity additions





- Wholesale market (CSA RES)
- Wholesale market (no support)
- Retail market (with support)
- Retail market (no support)
- RES in isolated energy systems
- Own generation of industry

RES support program on WCEM

First Stage (2013 – 2024)

01

CSA RES 1.0

RES sector starts developing!

Second Stage (2025 – 2035)

02

CSA RES 2.0

Strengthening localization and export!

Target volume	
5.43 GW	RUB360 billion
Selection criterion	
Capital costs minimizing	Efficiency indicator
Local content requirements	
Existing	Increased targets
Export requirements	
Not existing	Introduced

Source: RREDA, SO UPS JSC, NP Market Council, Association "Hydropower of Russia"

Leading participants in the industrial production of renewable energy equipment in Russia

Hevel Group HJT plant (Novocheboksarsk)

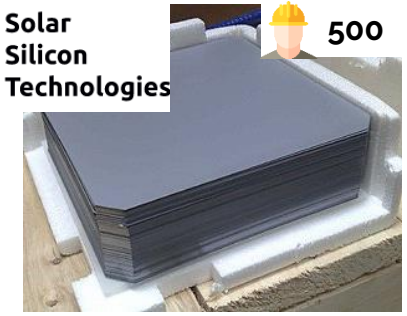
350 MW/year – PV module manufacturing capacity (expansion to 669 MW by 2024)

The first factory in Russia for the production of PV cells and modules of a new generation.
Export deliveries - since 2018.
For 8 years, the cell efficiency has increased from 9% to more than 23.5%.

EnKOR (Kaliningrad region)

1.3 GW/year – silicon wafer production plan
>1 GW/year – PV cells production plan

Creation of the largest industrial complex for serial production of high-tech products for solar generation in 2024.
675 jobs with an increase to 1150 by 2030.



400 MW/year – PV module production plan
> 500 MW ingots and wafers produced

Mono- and multi-crystalline silicon ingots and wafers production, in the future – PV modules.
The possibilities of using PERC and TopCon technologies are being considered.
Creation of more than 500 new jobs.

NovaWind plant
(Volgodonsk, Rostov Region)

300-400 MW/year – generators and wind turbine nacelles production

Serial production of 2.5 MW gearless wind turbine nacelles and generators was launched at the Atommash production site in Volgodonsk.
Investments - over 2 bln RUR.
More than 70 domestic suppliers are involved in the supply chain

ВетроСтройДеталь

Technological partner JSC "NovaWind"

VetroStroyDetal plant
(Volgodonsk, Rostov region)

120 towers/year – production of modular steel wind turbine towers

Investments - more than 1.2 bln RUR.
About 300 jobs created.
The project is being implemented as part of a SPIC with the Russian Ministry of Industry and Trade and the Rostov Region.

More than 2,500 jobs have been created, and by 2030 it is expected to reach up to 4,000. In total, the sector provides more than 10,000 jobs.

RES generation facilities distribution by price and non-price zones and isolated territories

SPP 1,5 MW in Moma (Honuu) – 2022

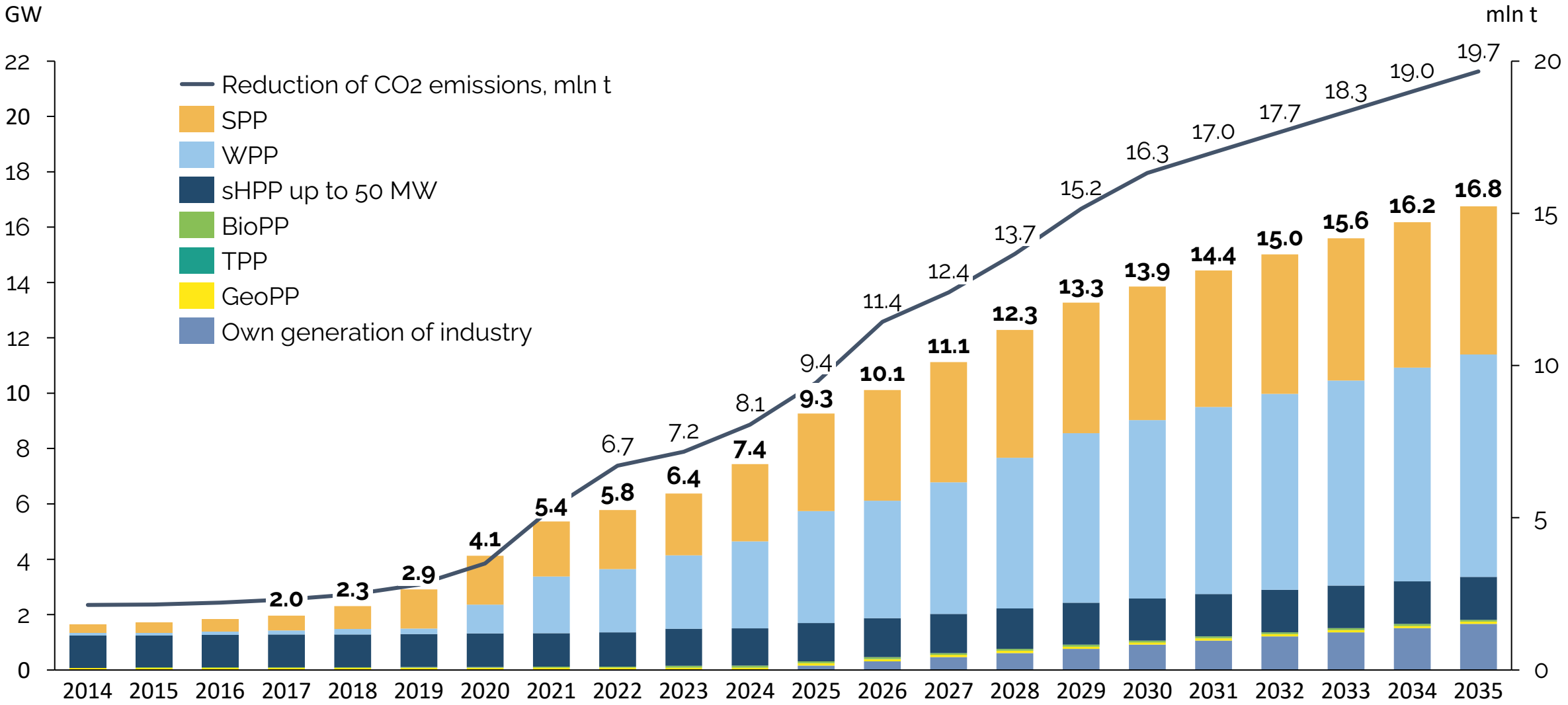
620 MW
135 MW
596 MW
156 MW
3,845 MW
270 MW
13 MW
408 MW

UES of Russia
First price zone
Second price zone
Non-price zones
Isolated energy areas

SPP
WPP
sHPP (up to 50 MW)
BioPP
TPP
GeoPP

Source: RREDA

Forecast of the total renewable energy generation capacity and reduction of CO2 emissions



Source: RREDA, TSA JSC, SO UPS JSC, NP Market Council

Climate Policies of the Russian Federation

2020 **Energy Strategy** of Russia for the period up to 2035	Increasing the competitiveness of the **renewable energy industry** / Development of **isolated energy systems** in Russia using renewable energy sources
2021 **Strategy for Socio-Economic Development** of Russia with Low Greenhouse Gas Emissions until 2050, approved by the Government	The target is to achieve **carbon neutrality with sustainable economic growth by 2060**
2021 Federal Law No. 296-FZ "**On limiting greenhouse gas emissions**" was published	This law aims to ensure Russian economy **sustainable and balanced development while reducing GHG emissions**
2022 Federal Law No. 34-FZ "On conducting an **experiment to limit greenhouse gas emissions** in certain constituent entities of the Russian Federation"	Experiment is carried out on the territory of certain Russian regions; the goal is to achieve carbon neutrality (**for Sakhalin region - by the end of 2025**)
2022 Mechanism of **climate projects** started	**7 climate projects** and first **84500 carbon units** registered. First climate project was based on solar energy in the Sakhalin Region
2023 **Mandatory state accounting for GHG emissions** generated by regulated organizations started	First **annual reports on GHG emissions** submitted to the competent body
2023 Second stage of the **National Action Plan for Adaptation to Climate Change** for the Period up to 2025 was adopted	Regional **climate change adaptation plans** have been adopted in 54 regions of the Russian Federation
2023 The legislative basis for the **national system of origin for electricity** was submitted in July	In August, the **Energy Certification Center** structure was created to launch a national certification system for low-carbon electricity

Next challenges for Russia and fields for experience exchange

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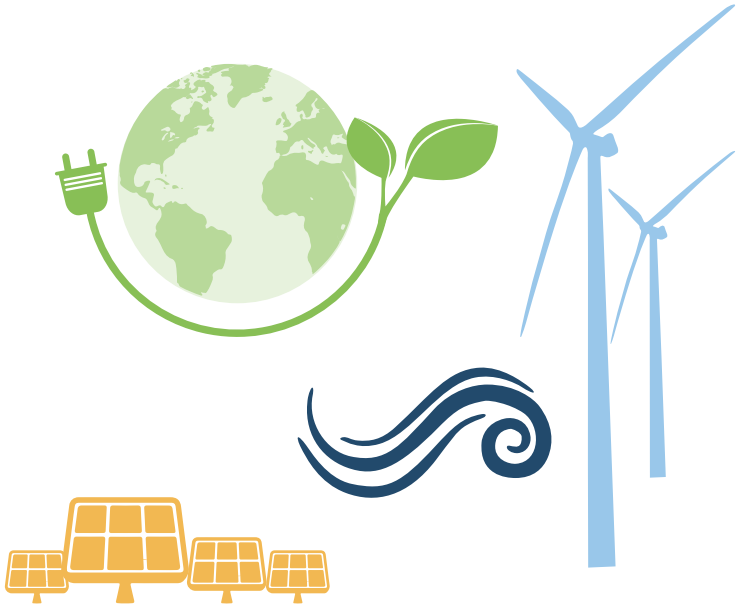
Adapting market design and incentive mechanisms to higher shares of variable renewable energy to ensure an effective integration into the Russian power system:

- Contribution of renewable energy sources to peak load demand
- Redesigning balancing markets for the efficient integration of renewable energy
- Implementation of technological solutions that allow variable renewable energy technologies to provide ancillary services and such to contribute to system flexibility
- Integration of energy storage systems into the power system

Creation of integrated forecasting systems for meteorological parameters and renewable power generation:

- Developing best short-term forecasting models
- Building effective interaction between federal meteorological services, system operator, consulting provider and scientific institutes
- Approaches of accounting for variability and flexibility in long-term planning models

Digital solutions for optimizing renewable energy generation into the energy grid



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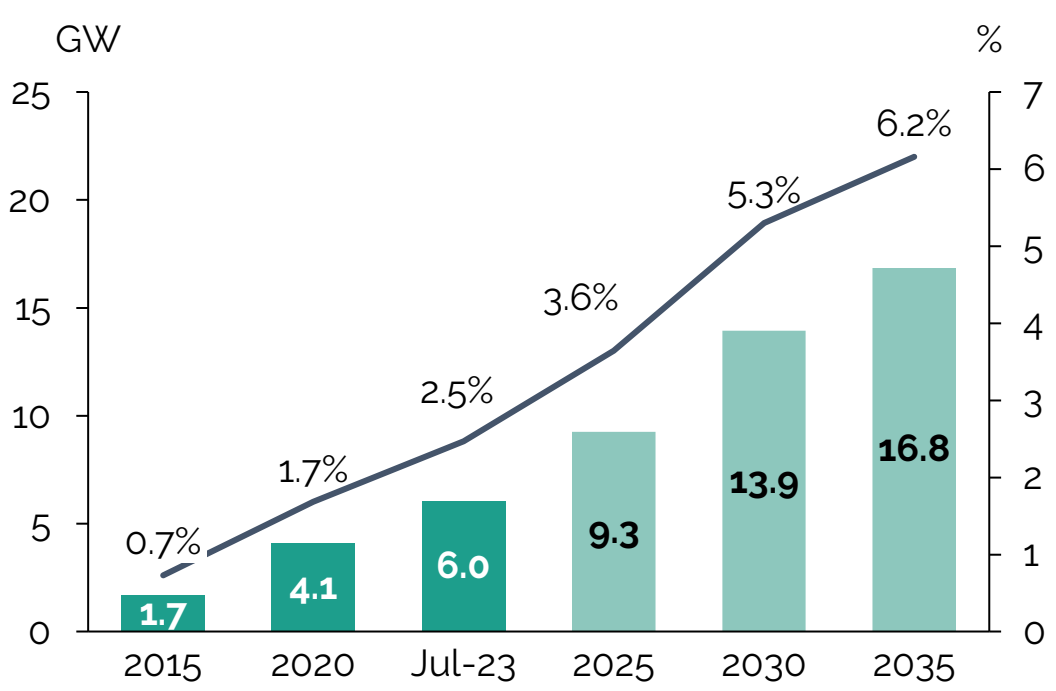
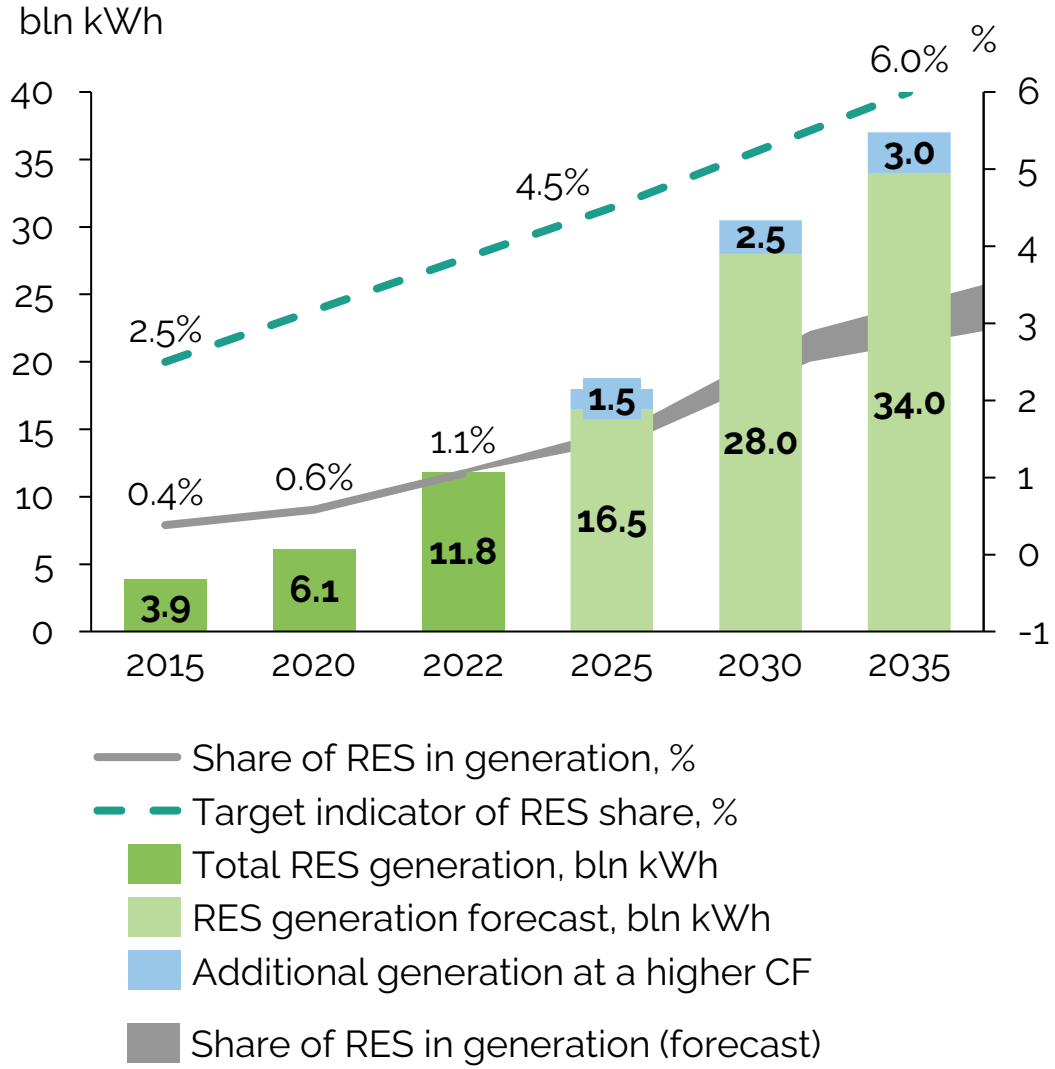
Actual and target share of renewable energy* in the structure of Russia energy consumption

Current and forecast RES share in installed capacity and in electricity generation in Russia





*excluding the generation of small HPPs with a capacity of more than 25 MW

Source: RREDA, TSA JSC, SO UPS JSC, NP Market Council, Executive Order of the Government of the Russian Federation No. 1-r dated 08.01.2009