МИНИСТЕРСТВО ЭНЕРГЕТИКИ
РОССИЙСКОЙ ФЕДЕРАЦИИ

Development of hydrogen energy in the Russian Federation

March 2022

The Center for Energy Research of Russian Energy Agency
of the Energy Ministry of the Russian Federation

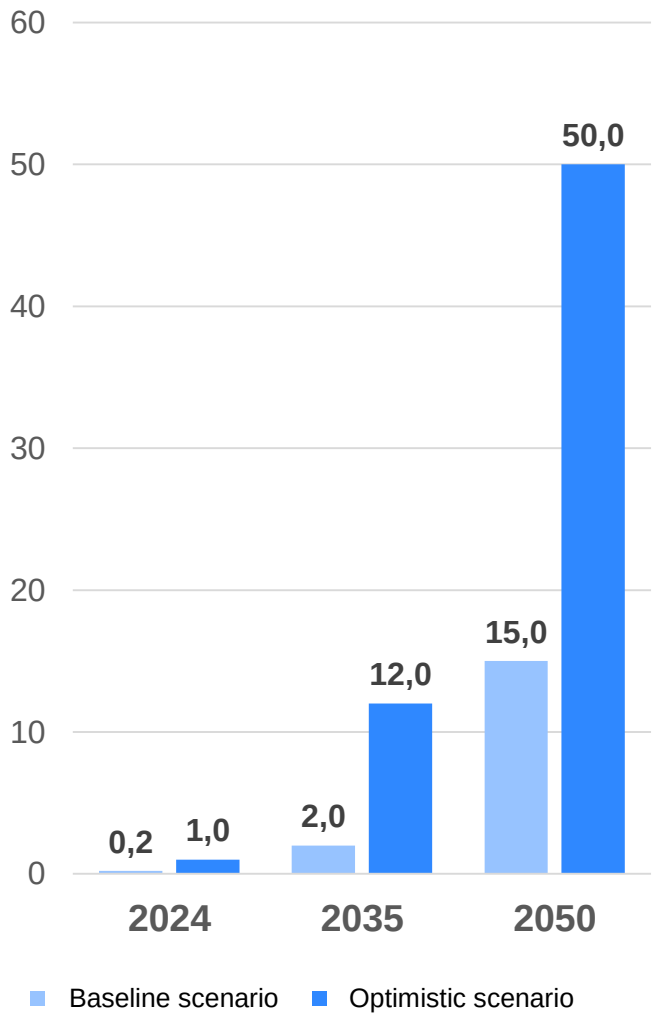
Hydrogen energy sector in Russia. Short-term roadmaps

Short-term planning	Status
Energy strategies	
Russian Energy strategy 2035	Approved by RF Government Decree No. 1523-p of 09.06.2020
Roadmap for the development of Russian hydrogen energy sector to 2024	Approved by RF Government Decree No. 2634-r of 12.10.2020
The concept of hydrogen energy development	Approved by RF Government Decree No. 2162-p 05.08.2021
Russian low-carbon hydrogen strategy	In development since Sept 2021, Expected by 2Q 2022
Organization activities	
Creation of a project office for implementing the Program for the development of the Russian energy sector	The project office has been established at the Russian Energy agency (Energy ministry of RF)
Creation of the Joint government working group and R&D Committee on hydrogen technology	3Q 2021
Creation of «Hydrogen infrastructure developers and equipment manufacturers» (non-profit organization)	2Q 2022

Investors

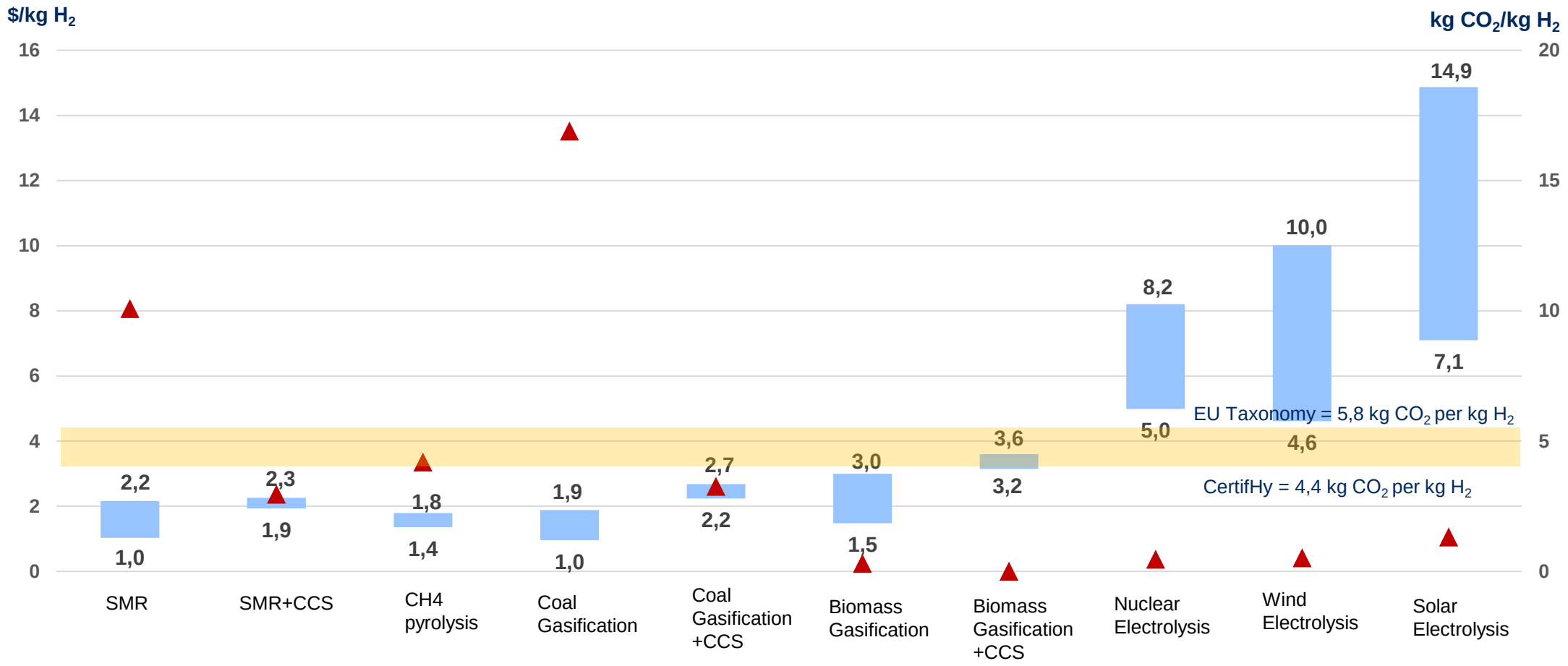
Oil and gas complex - "blue" hydrogen	Nuclear power plants – "yellow" hydrogen	RES – "green" hydrogen
GAZPROM	ROSATOM	RUSNANO
NOVATEK		En+ Group
ROSATOM		
Other oil&gas companies		

Hydrogen production KPIs, Mt



Technologies for hydrogen production

The cost of hydrogen production in the Russian Federation using various technologies



The Center for Energy Research analysis.
*Taking into account the decrease in LCOE of RES in Russia: Wind – to 0.06 $/kWh, PV – to 0.08 $/kWh.

Traditional and prospective areas of hydrogen usage

Traditional areas

Industry

- Chemical industry (ammonia, methanol)
- Metallurgy
- Glass industry
- Electronic industry
- Food processing industry
- The pharmaceutical industry

Oil refinery

- Hydrotreating of fuels and lubricants
- Hydrocracking
- Preparation of catalytic cracking raw materials

Consumption today **90 million tons per year***

Prospective areas of hydrogen use as an energy carrier

Transport

Fuel cell electric vehicle (FCEV):

- Passenger cars
- Buses and trucks
- Warehouse transport
- Railway transport
- Ships and air transport

In internal combustion engines:

- Methane-hydrogen mixtures
- In the form of ammonia

Energy sector

Application today:

- Cooling of turbo generators

Prospective application:

- Energy carrier, electric power storage systems
- Balancing of power systems
- Methane-hydrogen mixtures
- Gas turbines

Buildings

- Electricity supply (hydrogen power plants)
- Heat supply
- Local power supply systems
- Household fuel cells

Consumption today **less than 0,01 million tons per year***

*for pure hydrogen

Initiatives and policies to develop hydrogen economy

1	**Creation of hydrogen clusters**	• Deployment of infrastructural hydrogen solutions • Adoption of best international industrial practices in hydrogen economy • Gaining hydrogen engineering and industrial expertise • Boosting demand for Russian science-intensive hydrogen energy technologies • Export-oriented hydrogen production
2	**Scientific and technological infrastructure**	• Fundamental and applied research in hydrogen energy technologies, • Opening Russian scientific research to global competition • Creating business and legal framework for intellectual property in hydrogen economy • Establishing connection between public and corporate R&D in hydrogen technology
3	**State support mechanisms**	• Investment incentives for new production facilities • Roadmap for cutting the cost of hydrogen production to outperform global rivals • R&D incentives in hydrogen energy • Promotion of hydrogen as a prospective energy carriers for the Russian market • Regulatory and legal framework for hydrogen economy and management of GHG emissions
4	**Deployment of RES**	• Increasing the share of RES in national energy mix • Cutting the cost of CapEx and OpEx in renewable energy sources • Reducing the cost of renewable electricity • Achieving synergy between hydrogen technology and renewable power generation
5	**Promotion of international hydrogen trade cooperation**	• Building cooperation with future hydrogen importers to eliminate the barriers slowing the development of hydrogen economy • Cooperating on the development international hydrogen economy and technology standards • Establishing international organizations and alliances in hydrogen economy • Initiating and promoting international scientific and educational activities hydrogen economy