



CURRENT STATUS, URGENT NEEDS, AND OPPORTUNITIES

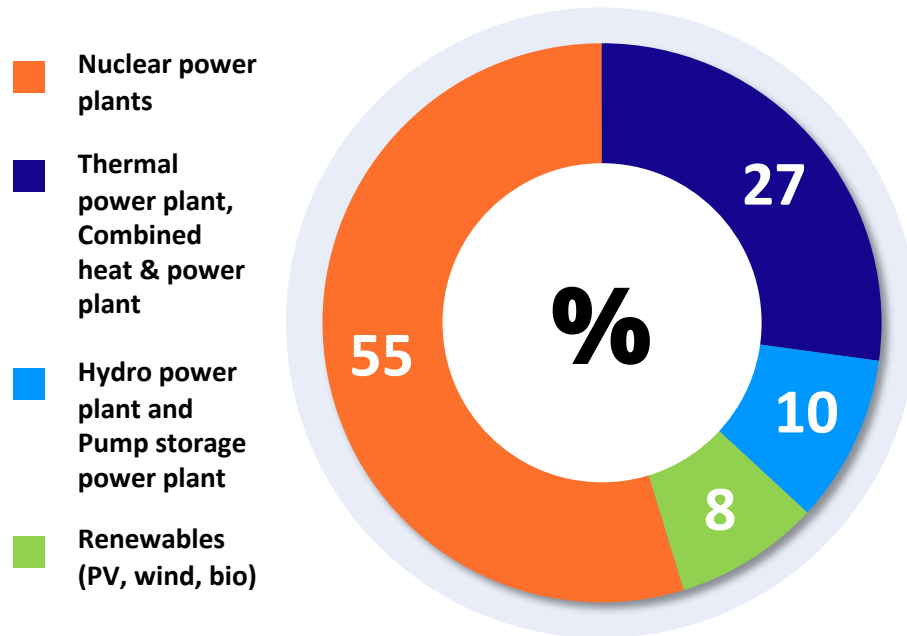
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NPC UKRENERGO – COMPANY OVERVIEW



- a state-owned company, one of the largest transmission system operators in Europe
- operates synchronously with the power system of Continental Europe

Approximate energy mix of Ukraine 2022



≈ **20 000 km**
total length of high-voltage lines

94 substations
220-750 kV
(in the controlled territory)

 **100.7 bln kWh**
Annual transmission volume
(in the conditions of war)


ENTSO-E observer member

IMPACT OF ATTACKS AGAINST UKRAINE'S POWER SYSTEM INFRASTRUCTURE

SINCE OCTOBER 2022 TO FEBRUARY 2023 – **15 MASSIVE MISSILE ATTACKS AND 18 DRONE ATTACKS** against Ukraine's power system

43%

of high-voltage networks were severely damaged or destroyed



all large thermal and hydropower plants were damaged

≈ 10 GW

were temporarily lost by the Ukrainian power system because of Russian occupation of Ukraine's territories

Ukrenergo's Dispatch Centre was forced to restrict consumption given a significant deficit in generation capacities within the system

20-50%

**UP TO
12 MLN**

Ukrainians

from the end of October 2022 till February 2023 every hour were without power supply

Ukraine's energy sector suffered losses of more than USD 11 billion*

*According to the World Bank and UNDP

COUNTERACTING AGGRESSION IN THE ENERGY SECTOR

The courage and professionalism of Ukrainian energy workers and the support of international partners made it possible to restore power plants and infrastructure

UKRENERGO IN-HOUSE REPAIR TEAMS:



70

mobile
repair
teams



≈ **1500**
employees

24/7 REPAIR WORKS



SINCE 12 FEBRUARY 2023
electricity consumption in the country has
been covered almost without restrictions



Partial functioning of **95%** of
Ukrenergо facilities was restored

As of now, the trunk power grids managed by
Ukrenergо have already been restored to a level
that allows the uninterrupted transmission of
winter volumes of electricity

UKRENERGO EQUIPMENT NEEDS FOR RESTORATION AFTER SHELLINGS

Autotransformers



Circuit breakers



Disconnectors



**Gas-insulated switchgears
330-750-110 kV**



Relay protection



**Open switchgear
equipment**

WHAT NEEDS TO BE BUILT **GRIDS***

Grid type



What needs to be done

- Reconstruction with automation of 220-750 kV substations
- Construction of interconnectors
- Construction of fiber-optic communication lines
- Construction of new 330-750 kV substations
- Construction of new 330-750 kV overhead lines
- Reconstruction and repair of existing 220-750 kV overhead lines

- Development of power centres
- Development of 6 kV network
- Development of 20-35 kV networks
- Reconstruction of 0.4-10 kV networks
- Reconstruction of transformer substations 0.4-10 kV
- Measures to support operational security





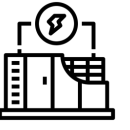

Investments (\$ bln),
14.5

2.5

12

* According to the Network Development Plans of Ukrenerg and oblenerg

WHAT NEEDS TO BE BUILT | GENERATION

Generation type	 Nuclear power plant	 Thermal power plant, incl. new highly flexible plants			 Solar energy			 Wind energy		 Energy Storage	 Dnistrovska pumped-storage plant, Kanivska pumped-storage plant
Installed capacity today	13.8	0.3	0	0.3	6.2	0.5	0	2.0			
Will be constructed, 17.6 GW	4	2.5	1.4	1.1	3.8	4.5	0.8	2.0			
will be	17.8	2.8	1.4	1.4	10.0	5.0	0.8	4.0			
What needs to be done	Construction completion of Units 3 and 4 at Khmelnytska nuclear power plant or building small modular reactors	Building new High-maneuvering capacities with a control range of at least 80% of the installed capacity and the startup time not exceeding 15 minutes			Building new generating capacities on biogas, biomass, etc. at the expense of international financial institutions			Building new solar and wind power stations to replace existing thermal power plants that will be decommissioned as part of the National Emission Reduction Plan		Building energy storage systems that can deliver captured energy for 2–4 hours to balance the power system with a large number of solar and wind power stations	Building 5-7 hydropower units at Dnistrovska pumped-storage plant; Building 1-2 hydropower units at Kanivska pumped-storage plant
35.1 Investments (\$ billion)	20.0	2.3	1.1	1.2	2.5	5.4	1.2	3.7			
Expected payback period (years)	15	6	7	4	5	6	5-8				



 **UKRENERGO**
National power company

**THANK YOU
FOR YOUR
ATTENTION!**