



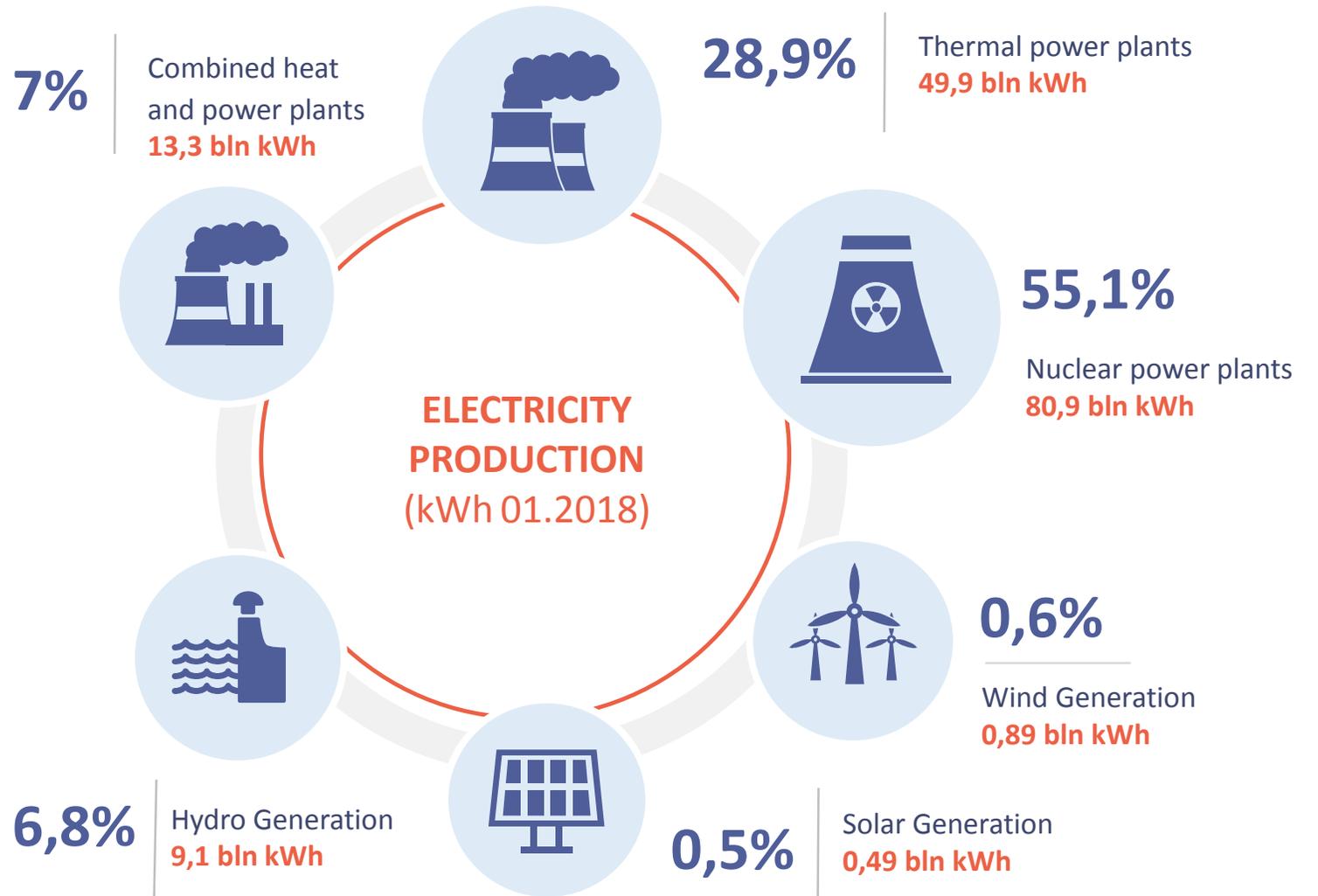
INTEGRATION TO ENTSOE: A NEW UNTOLD SUCCESS STORY FOR UA-US ENERGY SECURITY DOSSIER



UKRAINE'S ENERGY SYSTEM IN FIGURES | 2018

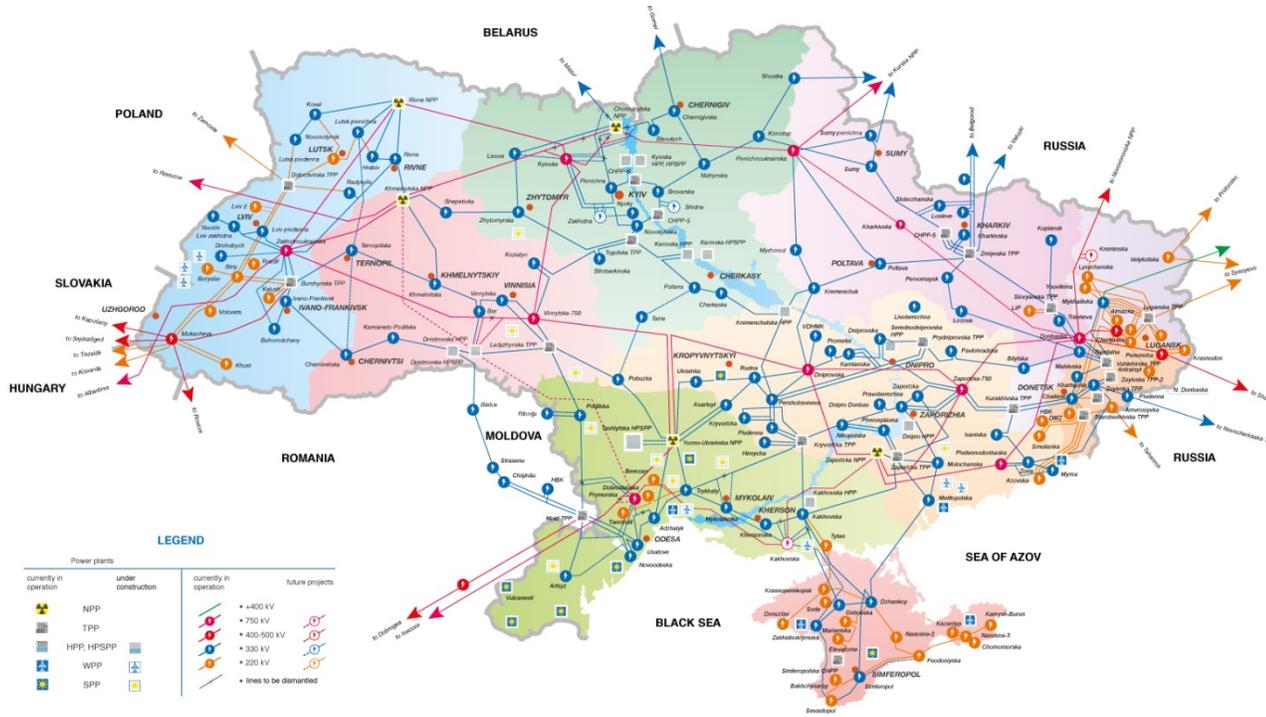
Energy balance (bln kWh)

	2016	2017
Generation	154,8	155,4
Consumption	149,3	149,7
Export	4,0	5,2



UKRENERGO AND ITS ROLE IN ENERGY SECTOR

TRANSMISSION COMPANY (state-owned, consists of 8 regional systems)



Substations – 137

8 – 750 kV

92 – (330 – 500) kV

37 – (110 – 220) kV



Transmitted electricity

115,3
Billion kW/h



Peak load

24 GW

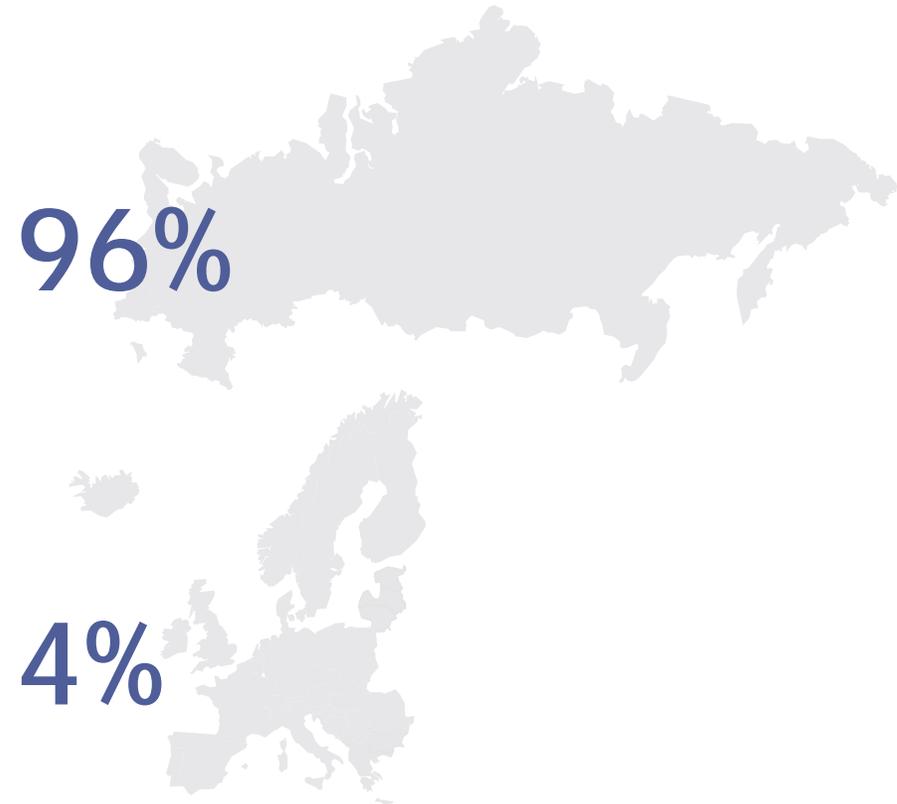


Revalued cost of the
noncurrent assets
2,75 billion EUR



Personnel – 8100

HOW UKRAINE'S ENERGY SYSTEM OPERATES



The Integrated Power System of Ukraine is technologically related to and operates in parallel with the power systems of Russia, Belarus and Moldova depending mainly on Russia in case of severe emergency in the grid
The full synchronization of the power system of Ukraine with the European power grid ENTSO-E and separate it from the parallel operation with the power systems of Russia and Belarus is the only possible way to change this situation

ENTSO-E VS IPS/UPS: KEY DIFFERENCES



Installed capacity
1 136 GW



Electricity consumption
3,300 bln kWh



Population **278 mln**



Installed capacity
300 GW



Electricity consumption
1200 bln kWh



Population **280 mln**

**UPS/IPS
(former USSR energy
system)**

1. Free interstate trade in electricity
2. Market pricing
3. Distributed (partial) contribution to the system's stability
4. Unified technical operation standards
5. Single legislation base

1. No free interstate trade in electricity
2. No market pricing
3. No legislation base
4. Dependence on the Russian Federation as the key balancing power

The differences between the systems are conceptual: the European system fully responds to the eurointegration strategy of Ukraine

INTEGRATION TO ENTSOE: CONNECTION AGREEMENT

On June 28, 2017 in Brussels



Agreement on the Conditions for Future Interconnection of Power System of Ukraine with Power System of Continental Europe was signed

The agreement contains:

- ✓ **Catalogue of Requirements;**
- ✓ **List of necessary additional researches;**
- ✓ **Road map**



The Agreement came into force

On July 7, 2017

INTEGRATION TO ENTSO-E: KEY OUTCOMES FOR UKRAINE

Strengthening of competition

Synchronization with ENTSO-E will create effective competition in the domestic electricity market

Trade development

The parallel regime with ENTSO-E will allow Ukraine to **increase in five times** the volume of trade in electricity with the EU countries due to more efficient use of available generation capacities (including nuclear power plants)



Attraction of investments

Free electricity trade between Ukraine and ENTSO-E countries will automatically increase the investment attractiveness of Ukraine's power sector. This will encourage investors to build new generating capacities in Ukraine, including renewable energy sources

Synchronization with ENTSO-E stipulates **the disconnection from the Russian Federation**

INTEGRATION TO ENTSO-E: KEY OUTCOMES FOR EUROPE

BENEFITS OF INTEGRATION INTO ENTSO-E

Reduction of the active members' primary reserve shares due to the synergy (by \pm 140-160 MW, rateably)

1

Easier to control the energy system in peak loads (due to non-coincidence of the Ukrainian and European peak hours)

2

Increasing stability of the energy system (due to addition in the Ukrainian energy system inertia)

3

Strengthening of the interconnection between the Northern and Southern parts of the Continental Europe power system

4

INTEGRATION TO ENTSO-E: WHAT SHOULD BE DONE

The amount
to be spent

352
m EUR

Grid development

130 m EUR

Generation readiness to ensure reserves and automatic
voltage control

130 m EUR

Development of communication channels for dispatching
operations

92 m EUR

Additional studies on the static and dynamic stability
Implementation of the Operation Handbook ENTSO-E

+ 5 m EUR

138 m EUR
financing for the cost
of the IFIs

Ukrenergo costs

(grid and communication channels for dispatching
operations development)

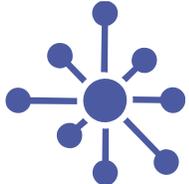
222 m EUR

INTEGRATION TO ENTSO-E: WHAT HAS BEEN ALREADY DONE



Dimension 1. Building coalition

- SE NPC «Ukrenergo» is preparing to test generation units;
- SE «NPC «Ukrenergo» signed a memorandum on the joint actions within the future integration of the Integrated Power System of Ukraine into ENTSO-E with key electricity producers: NNEGC «Energoatom», PrJSC «Ukrhydroenergo», PrJSC «Tsentrenergo», LLC «DTEK Energo» and PrJSC «Donbasenergo»



Dimension 2. Networking

- SE NPC «Ukrenergo» is building partnerships with the countries whose experience is useful to Ukrenergo. Compliance with global principles and standards, as well as a proactive position in the international arena, has made the company more predictable and understandable for international partners. There were about 30 visits to Europe, the US and Canada



Dimension 3. Capacity building

- On May 15, 2017, a Memorandum of Understanding aimed at promoting the integration into ENTSO-E was signed with Elia Grid International GmbH/Germany. On April 5, 2018, Ukrenergo signed an agreement for consulting services regarding the integration into ENTSO-E within the Second Power Transmission Project (PTP-2) with Elia Grid International GmbH/Germany, funded by the World Bank;
- Ukrenergo is successfully building relations with the French transmission system operator RTE in the framework of the experience exchange regarding the integration into ENTSO-E;
- There is ongoing collaboration with USAID/UNOPS and USEA on electricity sector related projects.

INTEGRATION TO ENTSO-E: STRATEGY PRIORITY FOR UKRAINE



Integration into ENTSO-E is currently recognized as a strategic priority for the whole country and constitutes a part of new Reform strategy of «Ukrenergo» 2017-2026

«The Energy Strategy of Ukraine», a fundamental document for the state energy policy, provides for the integration of the IPS of Ukraine into the synchronous energy zone of the Continental Europe and the development of legal regulation.

Moreover, the President of Ukraine Petro Poroshenko approved the sustainable development strategy «Ukraine – 2020». The goal of the Strategy is to implement the European living standards in Ukraine and ensure the leading positions of Ukraine in the world

This Strategy defines the Program for Energy Independence as a Top-10 priority task

The main task of the Program for Energy Independence is to ensure energy security and the transition to energy-efficient and energy-saving use and consumption with the introduction of innovative technologies. The implementation of the Program stipulates a complete abandonment of Russian gas, reduction in its transit, integration into the European energy system, as well as an increase in the share of electricity from renewable sources (solar and wind power plants).

INTEGRATION TO ENTSO-E: NEW PRIORITY FOR INTERNATIONAL PARTNERS



Integration into
ENTSO-E in strategic
documents

ASSOCIATION AGREEMENT between the European Union and its Member States, of the one part, and Ukraine, of the other part

Countering America's Adversaries Through Sanctions Act, section 257 sets broadening of Ukraine's electric power transmission interconnection with Europe as one of the key elements of the US Government plan to promote energy security in Ukraine.

A preliminary agreement has been reached regarding the attraction of funding on the part of USAID for the testing of blocks and starting new joint activities in ENTSO-E integration direction

THERE ARE ONGOING NEGOTIATIONS REGARDING THE LAUNCH OF CREDIT FACILITIES FOR UKRENERGO

Loan from EIB

130 mln euros

Loan from EBRD

150 mln euros

Loan from KfW

32.5 mln euros

INTEGRATION TO ENTSO-E: US POSSIBLE SUPPORT



CAPACITY BUILDING

it is necessary to expand the support for the projects aimed at increasing capacity building, in particular



FINANCING THE ACTIVITIES

Ukrenergo is interested in receiving technical assistance to carry out specific actions within integration with ENTSO-E



SUSTAINABILITY

There are potentially much more difficult tasks that could be supported by the US Government regarding security of the grid



POLITICAL SUPPORT

Integration to ENTSO-E should become a key priority for *UA-US bilateral energy agenda*



INTERNATIONAL SUPPORT

Some involvement could be beneficial in joint Ukraine-Moldova activities regarding integration to ENTSO-E



UKRENERGO

State enterprise | National power company

