PROGRAMME FUNDED BY THE EU

"Security of supply: Current outlook and future development"

Ukraine

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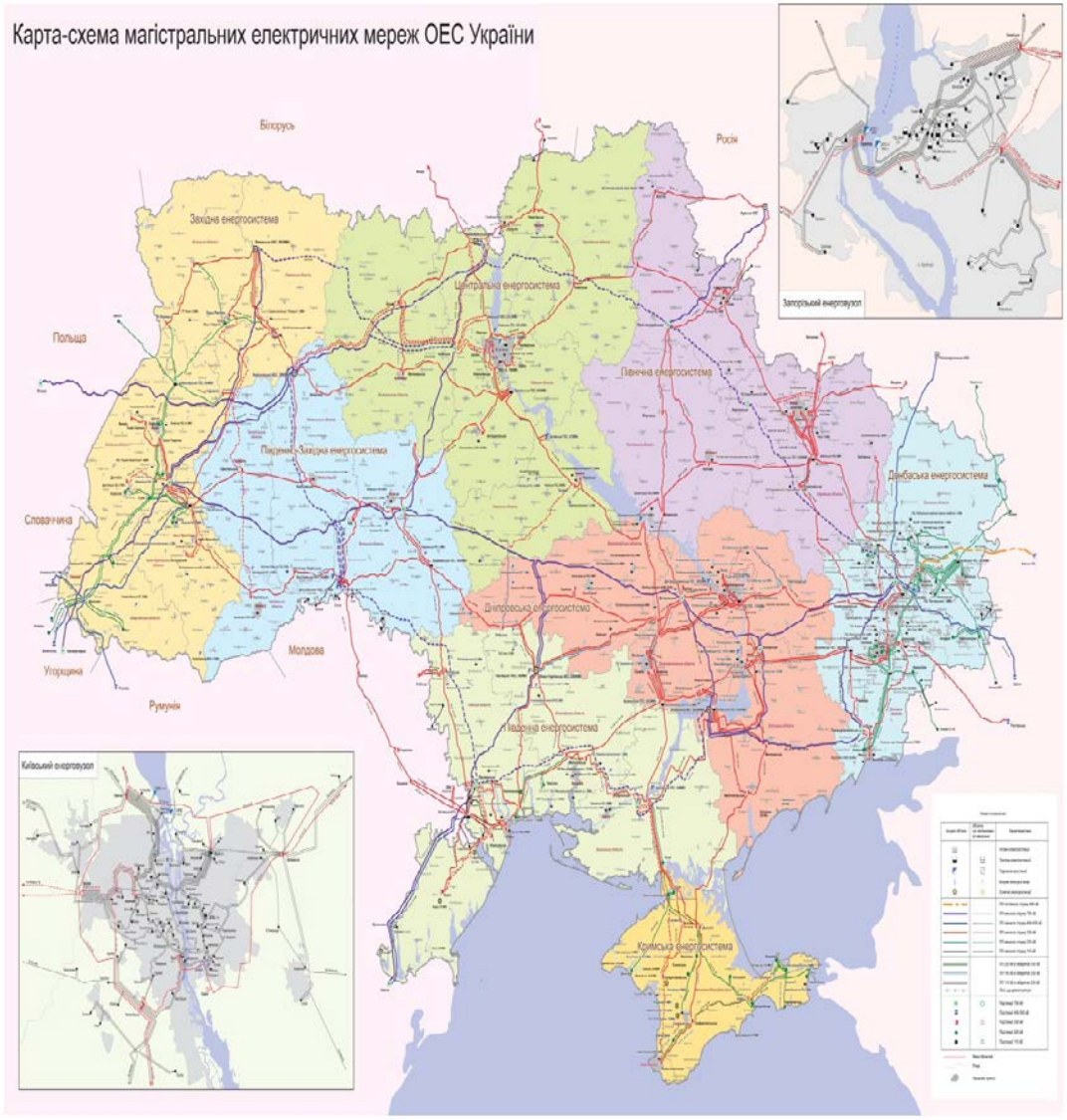
General characteristics of the Unified Energy System (UES) of Ukraine

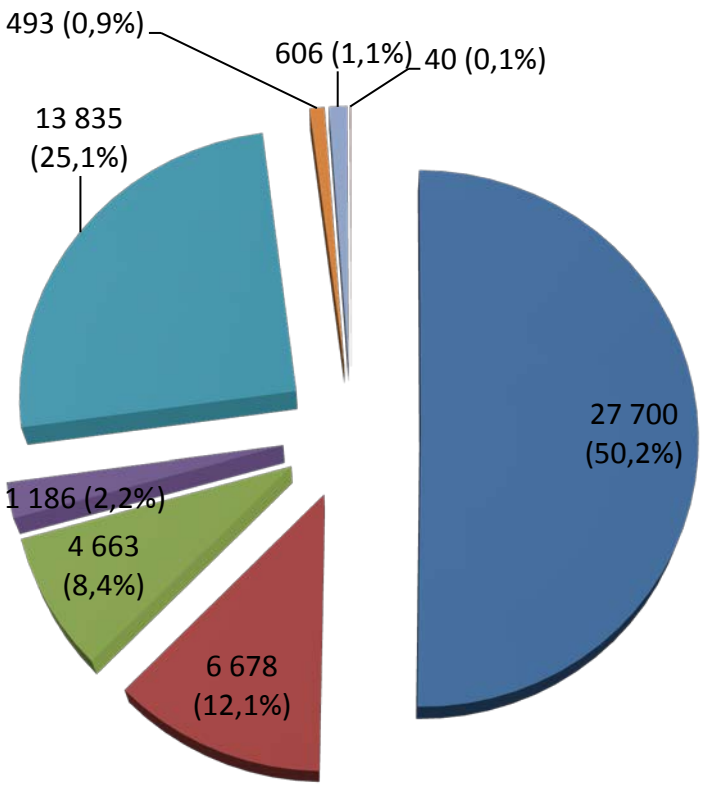


The UES of Ukraine works in parallel mode with the power systems of Belarus, Moldova and Russia except for so called “island Burshtyn TPP”, which is synchronised with the ENTSO-E. Electric connections between the UES of Ukraine and adjacent power systems are carried out through 110-750 kV networks. As of the end of 2014 the total installed capacity of power plants of Ukraine was 55.2 GW.

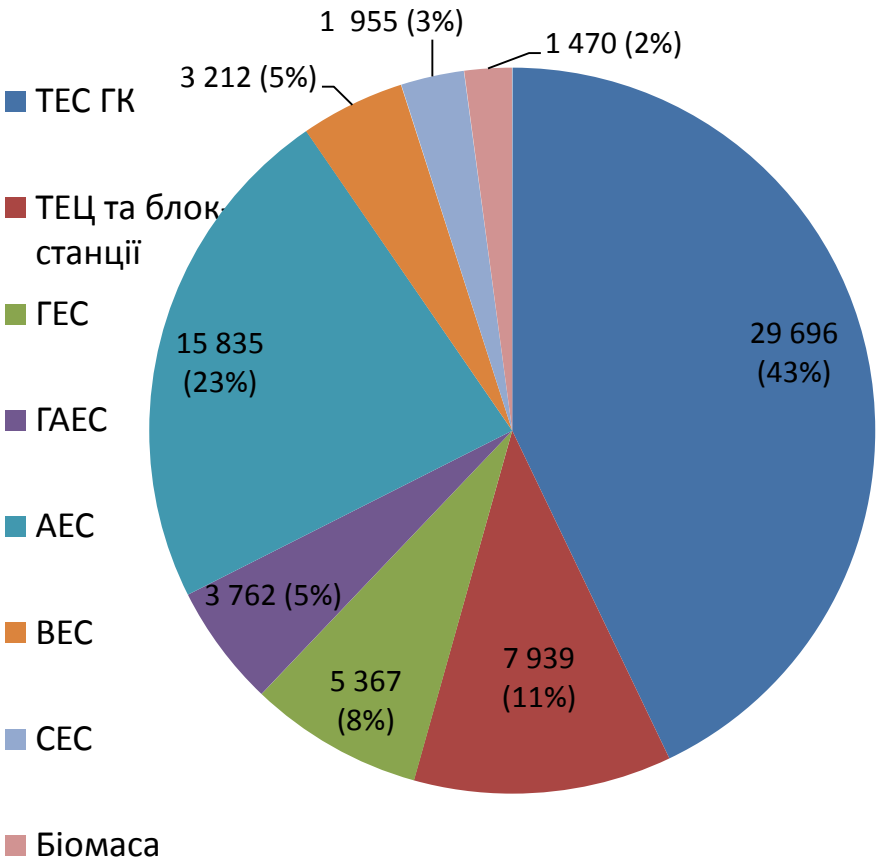
Performance indicators of the UES of Ukraine in 2014 and estimates for 2024

Breakdown of the installed capacity of the Ukraine's UES (MW, %)

2014 (55.2 GW)



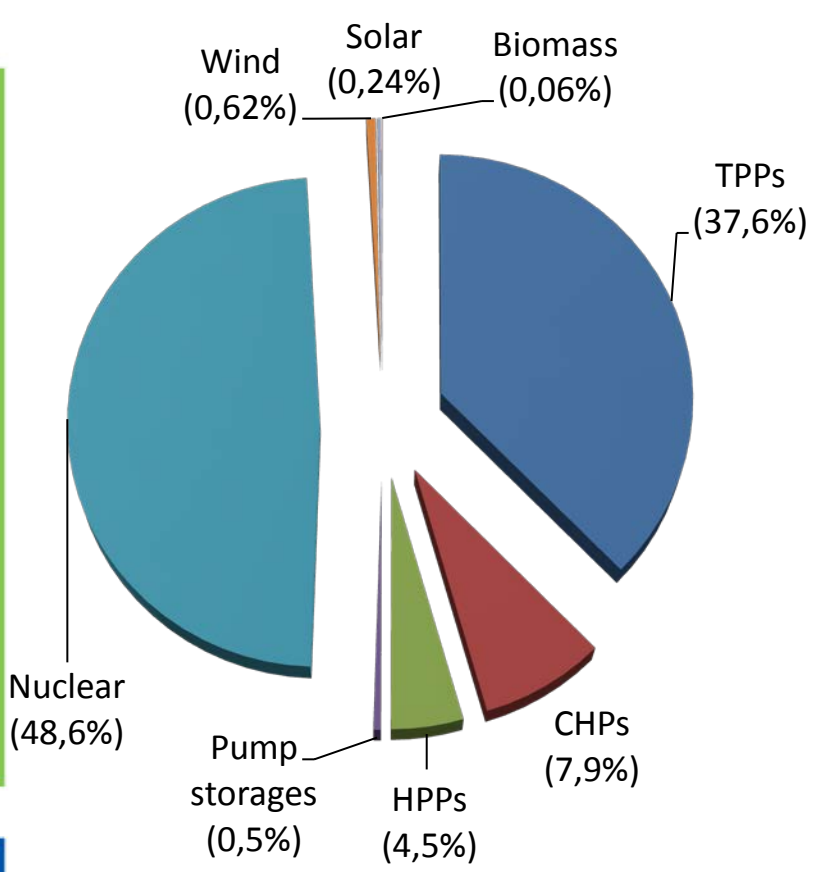
2024 (69.2 GW)



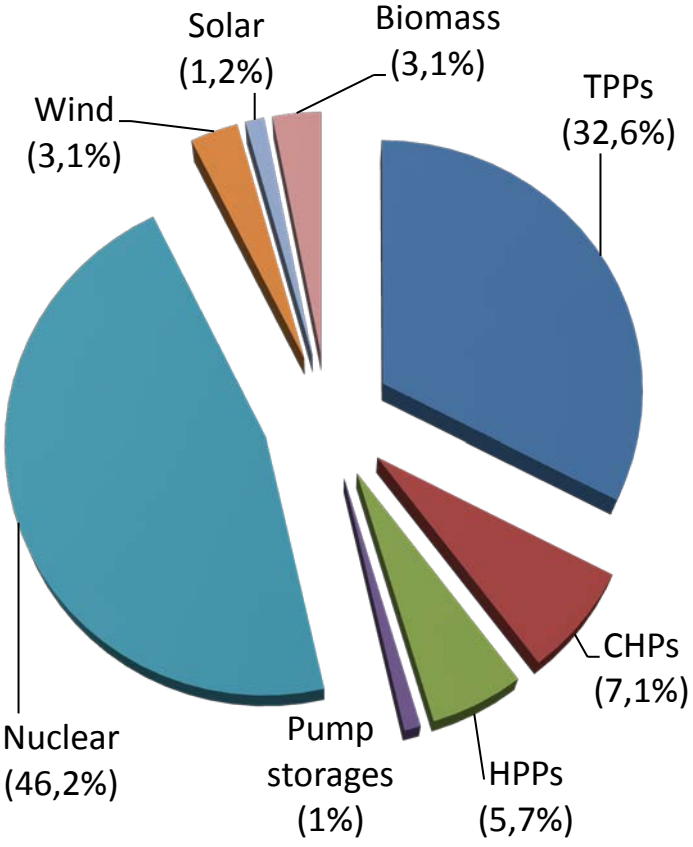
Performance indicators of the UES of Ukraine in 2014 and estimates for 2024

Electricity generation (%)

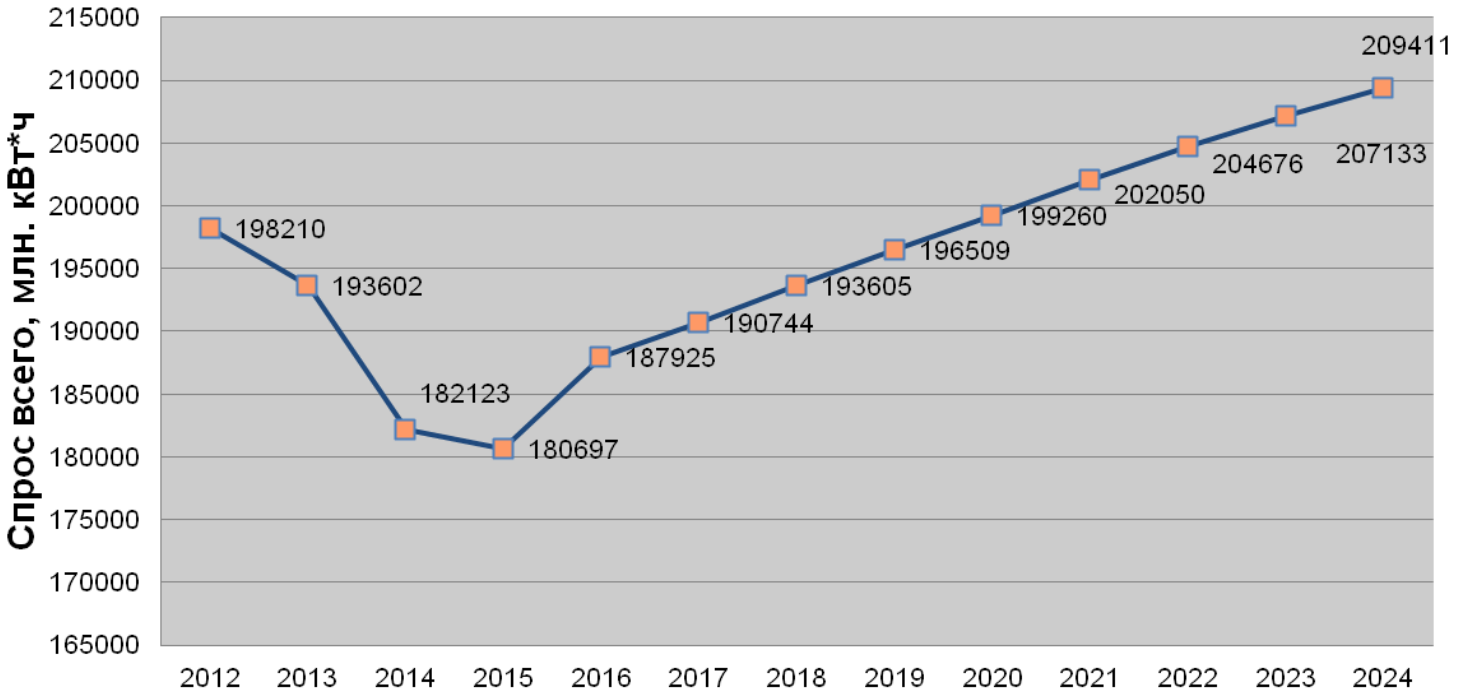
2014 (182 B kWh)



2024 (209.4 B kWh)



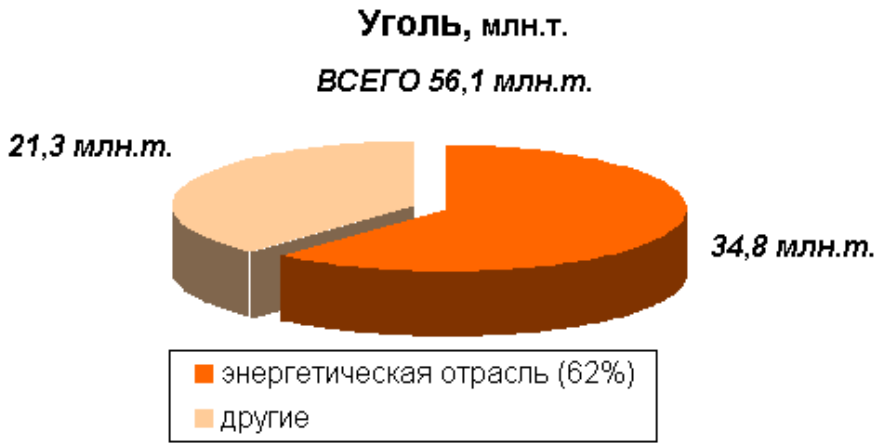
Dynamics of estimated electricity demand until 2024

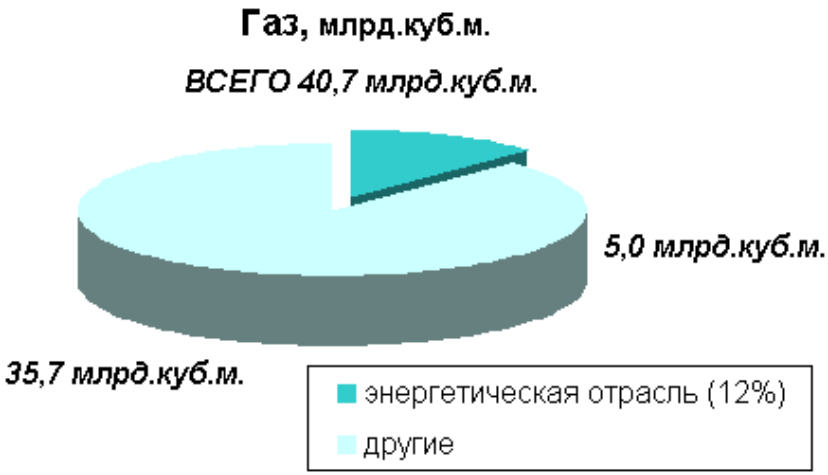


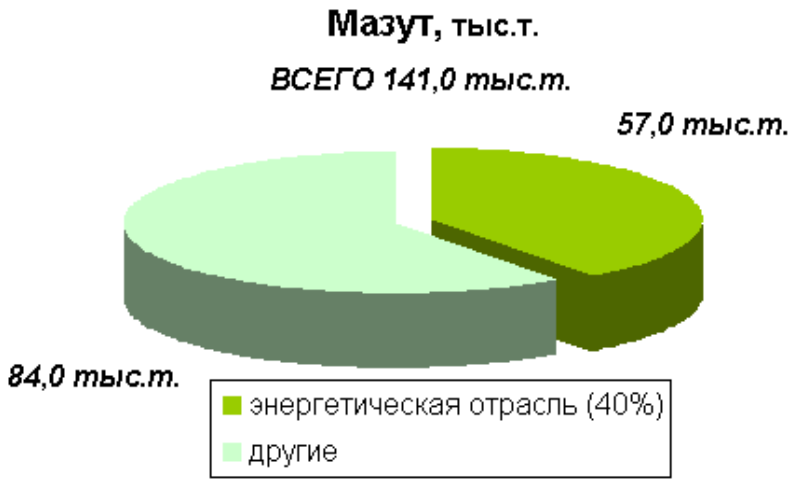
Export – 8 000 mln. kWh annually starting from 2016

Transmission to the free economic area “Crimea” – 5 000 mln. kWh annually starting from 2016

Use of coal, natural gas, fuel oil in Ukraine (including in the energy sector) in 2014







Challenges for functioning of the UES of Ukraine

- Physical deterioration and aging of the majority of units at TPPs, CHPs and significant sections of transmission lines and substations;
- Approaching of the end of service lives of NPPs' units; lack of maneuvering and regulating capacities;
- Insufficient through capacity of main power lines for output capacity of the NPPs and power transmission from the Western region to the Central and Eastern regions in Ukraine;
- Deficit of anthracite coal for power generation at TPPs due to the situation in the Donbas region.

Assessment of system limitations

- Imperfect structure of generating capacities;
- Reduction in base power consumption;
- Non-completion of the design schemes of capacity output at the Zaporizhzhia, Khmelnytsky and Rivne NPPs;
- Insufficient levels of static and dynamic stability of separate components of the energy system;

  Insufficient value of reserve capacity at TPPs.

Key areas of development of Ukraine's UES

- Construction of new units at TPPs and CHPs;
- Reconstruction and modernisation of generating capacities at TPPs and CHPs;
- Extension of service life of operational units at NPPs; completion of the 3rd and 4th units at the Khmelnytsky NPP;
- Construction of generating capacities using renewable (HPPs and pump storages) and alternative (wind, solar and biomass) energy sources;
- Construction of new substations and transmission lines, reconstruction and modernisation of existing main (interstate) power networks;
- Decommissioning of power equipment that exhausted its operational lifespan

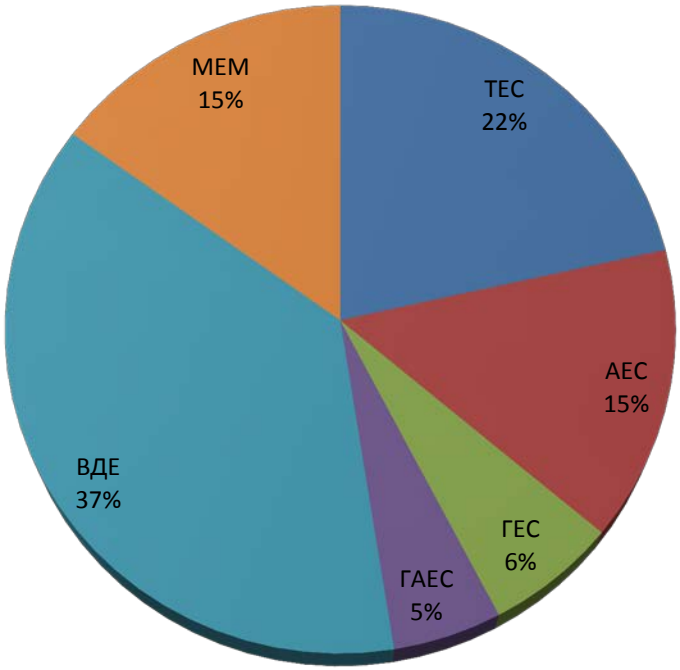
Commissioning of new generating capacities until 2024

Total increase in capacity by 14.1 GW, including:

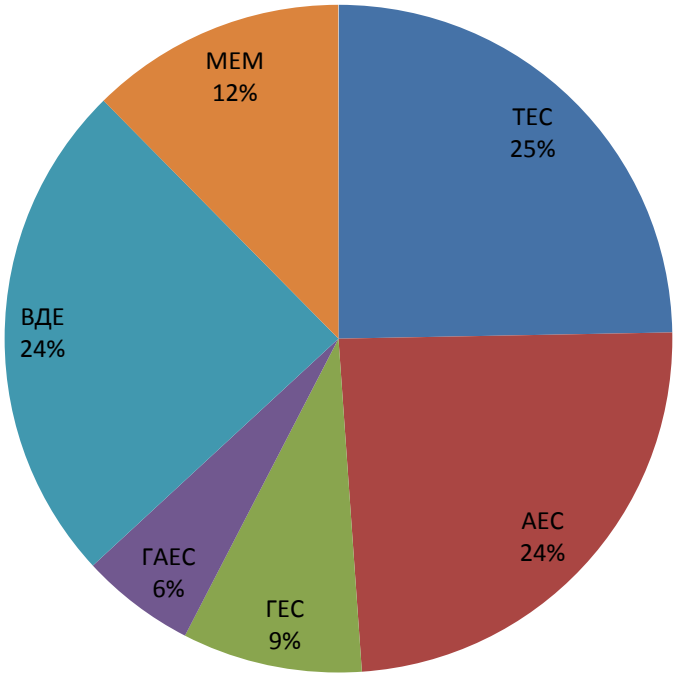
- commissioning of 2 new units 1000 MW each at Khmelnytsky NPP (14%);
- increase in HPP capacity by 804 MW (6%);
- Construction of Dniester pump storage of 972 MW (7%);
- Construction of Kanev pump storage of 1000 MW (7%) ;
- Completion of construction of Tashlyk pump storage of 604 MW (4%);
- TPP capacity increase thanks to new construction and reconstruction of existing ones with total increase in capacity by 3257 MW (23%);
- Construction of solar, wind and biomass power plants of total capacity around 5.500 MW (39%).

Investments needs until 2024

Investment structure during 2015-2017



Investment structure until 2024



Identification of strategic investments/projects at the national level

Power Industry

SE "NEC Ukrenergo"

- Power transmission project (IBRD)
- Second power transmission project (IBRD)
- HVL 750 kV Rivne NPP - Kievska (EBRD, EIB)
- HVL 750 kV Zaporizhia NPP - Kakhovska (EBRD, EIB)
- Modernisation of substations (KfW)
- Second project on modernisation of substations (KfW)

PJSC "Ukrhydroenergo"

- HPPs rehabilitation (IBRD, EBRD, EIB)

Nuclear industry

SE "NNEC Energoatom"

- Integrated programme of NPPs' safety improvement (EBRD, Euroatom)

Oil and gas sector

PJSC "Ukrtransgaz"

- Reconstruction of the gas transportation system (EBRD, EIB)

Total:

9 projects
USD 2.8 Bln

Energy policy and current legal framework to ensure security of supplies

- Law of Ukraine “On main principles of electricity market functioning”
- Law of Ukraine “On power industry”
- Law of Ukraine “On natural gas market”
- Law of Ukraine “On oil and gas”
- Law of Ukraine “On pipeline transport”
- Law of Ukraine “On ratification of the protocol on Ukraine’s accession to the Treaty establishing the Energy Community”

Ukraine cooperation with the EU within the framework of different instruments

- EU Association agreement
- ✓ Plans on implementation of EU legal acts are prepared
- ✓ Working groups for effective implementation are established
- Treaty establishing the Energy Community
- ✓ The Law of Ukraine “On natural gas market” is developed and adopted, development and adoption of secondary legislation is underway
- ✓ Works on draft legislation “On electricity market” and “On national energy regulator” are being completed.
- Energy Charter Treaty
- Work with donors

Harmonisation with regulatory and technical requirements of the European energy system

- Grid Code is developed
- The 10-year Plan for Development of the UES of Ukraine is developed
- The methodology for calculation of through capacity of the interstate sections of the UES of Ukraine in compliance with ENTSO-E rules is approved
- The procedure of electronic auctions on connection to the through capacity of intersections of the UES of Ukraine is approved
- Comprehensive analysis of EU standards on planning and operating energy networks with a view of their harmonisation with national standards is being carried out
- National Technical Committee On Electricity has been established

Research

- Studies of opportunities of synchronous coupling of the Ukrainian and Moldovan energy system with the ENTSO-E's continental energy system
- Research to determine measures on ensuring reliable works of near-border networks of Ukraine's UES in the isolated regime with the energy systems of Russian Federation and Belarus

THANK YOU!

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INOGATE Technical Secretariat and Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives