Integration of IPS of Ukraine to ENTSO-E

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UKRAINE’S INTEGRATED POWER SYSTEM (IPS)

- Installed capacity 54,83 GW
  - TPPs - 27,80 GW
  - CHPPs and other TPPs - 6,59 GW
  - NPPs - 13,84 GW
  - HPPs, HPSPPs – 5,81 GW
  - WPPs – 0,43 GW
  - Solar PPs - 0,36 GW
- Electricity Generation in 2015 was 157,67 TW·h
- Electricity consumption - 118 billion kW/h
INTEGRATION OF UKRAINE TO ENTSO-E

Feasibility Study on Synchronous Interconnection of Ukrainian and Moldovan Power Systems to CE ENTSO-E – completed at the beginning 2016 (final report – 16.01.2016)

**Preliminary conclusion** – synchronization is possible, but there is some technical problems

Project Group Ukraine/Moldova (RG UA/MD)

- **Created** – 15 June 2016
- **Members**: Transelectrica (head), PSE, MAVIR, EMS, Swissgrid, SEPS, Ukrenergo, Moldelectrica
- 1st Meeting of RG UA/MD – 8 September 2016
- 2nd Meeting of RG UA/MD – 24 November 2016
- 3rd Meeting of RG UA/MD – 26 January 2017
- **Tasks of RG UA/MD**:
  - Catalogues of Measures of the future Connection Agreements with Ukrenergo and Moldelectrica (January 2017)
  - Determination of additional studies
After conclusion of Connection Agreement with ENTSO-E, NPC “Ukrenergo” shell provide:

- Compliance to requirements of Operational Handbook*, namely: power and frequency regulation quality, regulation reserves, data transmission, under-frequency load shedding, planning methodology and other requirements.

- Completion of additional studies for analysis of dynamic stability of IPS of Ukraine in the frames of synchronous operation with the power system of continental Europe ENTSO-E.

- Successful trial island and synchronous operation of IPS of Ukraine with power system of continental Europe ENTSO-E.

*Operational Handbook – is obligatory technical document for all TSOs of ENTSO-E.
According to p. 1 of Article 9 of Directive of 2009/72/EC, NPC “Ukrenergo” shall comply to the following requirements:

- each undertaking which owns a transmission system acts as a transmission system operator;

- the same person or persons are entitled neither:

  - directly or indirectly to exercise control over an undertaking performing any of the functions of generation or supply, and directly or indirectly to exercise control or exercise any right over a transmission system operator or over a transmission system; nor

  - directly or indirectly to exercise control over a transmission system operator or over a transmission system, and directly or indirectly to exercise control or exercise any right over an undertaking performing any of the functions of generation or supply;
the same person or persons are not entitled to appoint members of the supervisory board, the administrative board or bodies legally representing the undertaking, of a transmission system operator or a transmission system, and directly or indirectly to exercise control or exercise any right over an undertaking performing any of the functions of generation or supply; and

the same person is not entitled to be a member of the supervisory board, the administrative board or bodies legally representing the undertaking, of both an undertaking performing any of the functions of generation or supply and a transmission system operator or a transmission system.
To date NPC “Ukrenergo” in its activity is aiming to obtain the Observer Membership Status in ENTSO-E.

Without prejudice to legal rules applicable to the candidate, the Assembly may decide to admit Observer Members, subject to the following minimum requirements:

a) the candidate is a legal person constituted under the laws of its country of origin.

b) the candidate is designated as a transmission system operator in accordance with the laws of its country of origin.

c) the candidate demonstrates that it is unbundled from all activities related to generation or supply of electricity under Article 9 of the Directive 2009/72/EC or similar provisions in the laws of its country of origin.

d) the candidate is located in a country with a physical link relevant for the IEM in terms of market conditions and/or in terms of the physical reality of its transmission interconnections; and

e) the candidate has entered into an Observer Membership agreement.

An application by a candidate designated as a TSO in compliance with Regulation (EC) № 714/2009 and/or Directive 2009/72/EC shall be considered positively by the Assembly in light of Article 4 of Regulation (EC) № 714/2009 even if the TSO does not comply with the technical criteria and standards of the relevant synchronous area.
THE "BURSHTYN TPP ISLAND"

**Technical specifications:**

- Installed capacity: **2.5 GW**
- Production: **9.8 TWh**
- Burshtyn TPP: **2300 MW**
- Kaluska CHPP: **200 MW**
- Tereblia-Rikska HPP: **27 MW**

Export possibilities: **650 MW**
Project goal:
- expanding the “Burshtyn TPP Island” area by means of connecting Khmelnitska NPP and putting OHL 750 kV Khmelnitska NPP – Rzeszow (Poland) into operation;
- involvement of foreign investments into the development of trunk electrical networks and generating capacities of Khmelnitska NPP and Kaluska CHPP in order to create conditions for integration of Ukrainian power system to EU power system

Project foresees the following:
1 stage (2016-2020)
- expansion Burshtyn Energy Island by connecting in parallel operation with ENTSO-E Khmelnitsky NPP (unit number 2 of 1000 MW) by the OPL-750 kV Khmelnitsky NPP - Rzeszow (Poland) and Khmelnitsky NPP - Zakhidnoukrainska - Albertirsa (Hungary)
- Reconstruction and construction of new power units in Kaluska CHP
- NPP units capacity increasing

Project realization will ensure the following:
- increasing the electricity exchange between Ukraine and European countries.
- creation of transit electricity corridor with transfer capability of 12 TWh annually in order to provide the electricity supply from surplus Northern Europe countries to the deficit ones of SEE.
KEY FACTORS OF SUCCESS AND FURTHER STEPS OF PROJECT REALIZATION

In the frames of the international partnership the Investor will be chosen on transparency basis

- Project support at ENTSO-E level - perform a feasibility study of the Project within the Project Groups Ukraine / Moldova - ENTSO-E
- Project consideration and approval on Intergovernmental commissions on economic cooperation Ukraine – Poland and Ukraine – Hungary
- Performance the Catalogue of measurements from “Extension Burshtyn TPP Island”
- Development and adoption of organizational and legal structure of the Project and identifying ways of finance
- Project realization
MARKET COUPLING

Ukrainian Electronic Auction Platform (UNICORN) for cross-border trade:

- Burshtyn Island – CE ENTSO-E
  - Yearly / Monthly / Daily explicit unilateral auctions
  - Planned to start – in 2017
- Ukraine - Moldova
  - There is technical possibility to organize of Yearly / Monthly / Daily common explicit auctions

Could be launched in the nearest future after:
- Harmonization of secondary legislation UA/MD
- Harmonization of secondary legislation UA/4M MC

Forward markets

- Single trading platform & standard for explicit capacity products

Spot markets

- Market Coupling (implicit trading of capacity with the exchanged energy)
- Increasingly shared responsibilities

Could be launched after:
- Adoption of Ukrainian Electricity Market Law
- Harmonization of secondary legislation for internal electricity markets
- Implementation of requirements of EC Regulation – FCA, CACM, EB*

*after adoption by European Commission
## CROSS BORDER ELECTRICITY TRADE
(PRESENT TIME AND PERSPECTIVES)

### CURRENT SITUATION

Ukrenergo holds unilateral auctions for cross border directions:
- Burshtyn TPP Island – Power System of Hungary
- Burshtyn TPP Island – Power System of Slovak Republic
- Burshtyn TPP Island – Power System of Romania
- Dobrotvirska TPP – Zamosc
- IPS of Ukraine – Power System of Moldova
- IPS of Ukraine – Power System of Bilorus
- IPS of Ukraine – UPS of Russia

**Basis:**
- Current legislation of Ukraine
- Order of holding of electronic auctions (current)
- Electronic auctions platform (planned to introduce in 2017)

### SHORT TERM PERSPECTIVE

Introduction of common (bilateral) auctions for cross border directions:
- Dobrotvirska TPP – Zamosc
- IPS of Ukraine – Power System of Moldova

**Basis:**
- Change of primary and secondary legislation of Ukraine

### FINAL GOAL

Introduction of coordinated auctions at JAO platform for cross border directions, Interconnecting IPS of Ukraine with ENTSO-E networks

**Basis:**
- Directives of the Energy Community Secretariat