Panel Debate VI – Working towards coordinated connection

Athens, 29th May 2019
The „colourful“ world of an energy market requires...

Regulatory Framework
- 3rd Energy Package
- Network Codes
- Joint Capacity Allocat.
- Tariff Regimes
- Etc.

Functional Infrastructure
- Physical Connectivity
- Security of Supply (N-1)
- System Stability
- Different Sources and Routes

IEM
- Social Welfare
- Coupling
- Single bidding zone
- Alternative supply/route
- Market Integration
- Source Competition

Energy Community Secretariat
 Athens, 29th May 2019
Mid term projects (TYNDP) PECIs

1. Transbalkan corridor – phase 1
   • 400 kV OHL Resita (RO) – Pancevo (RS)
   • 400 kV OHL Kragujevac (RS) – Kraljevo (RS)
   • 400 kV OHL Obrenovac (RS) – B.Basta (RS)
   • 400 kV OHL B.Basta (RS) – Pljevlja (ME) – Visegrad (BA)
   • 400 kV OHL Pljevlja (ME) – Lastva (ME)

2. 400 kV OHL Bitola (MK) – Elbasan (AL)

Mid to long term projects:

3. 400 kV OHL Mukacheve (UA) – V.Kapusany (SK)
4. 400 kV OHL with B2B Substation, Isacea (RO) – Vulcanesti (MD) – Chisinau (MD)
5. 400 kV OHL Pivdennoukrainska NPP (Ukraine) – Isaccea (Romania)
6. Transbalkan corridor – phase 2
   • 400 kV OHL B. Basta (RS) - Kraljevo (RS)
   • 400 kV OHL Kraljevo (RS) – Nis (RS)
   • New interconnection between Serbia and Bulgaria
7. New interconnection between Serbia – Croatia
8. New interconnection between Serbia – Romania (+ internal reinf.)
9. 400 kV OHL B. Luka (BA) – Lika (HR)
In October 2014, the European Council called for all EU countries to achieve interconnection of at least 10% of their installed electricity production capacity by 2020, and 15% by 2030 (Council Conclusions of 23 and 24 October 2014 http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf)

This means that each country should have in place electricity lines that allow at least 10% (15% by 2030) of the electricity produced by its power plants to be transported across its borders to neighbouring countries. 17 EU MSs are already on track to reach that target by 2020, or have already reached the target, but more interconnections are needed in some regions.
New potential DC links in EaP region:

1. HVDC interconnection - asynchronous interconnection between Georgia and Romania or Bulgaria, and

2. HVDC interconnection - asynchronous interconnection between Ukraine and Belarus (two DC links foreseen)
Thank You!
PECI/PMI 2018 projects

1. Back-to-Back (B2B) High Voltage DC (HVDC) interconnection - asynchronous interconnection between Moldova and Romania,

2. 400 kV OHL Ukraine – Slovakia,

3. 400 kV OHL Ukraine – Romania,

4. Transbalkan corridor – (RO), RS, ME, BA and (IT)

5. 400 kV OHL Albania – North Macedonia
Two different technology based projects are considered for the physical connection of the power systems of Ukraine and Moldova to the Continental European power system:

1. **Alternative Current (AC) connection** - Joint Moldova-Ukraine synchronous interconnection with ENTSO-E – UA/MD synchronization project.

2. **Back-to-Back (B2B) High Voltage DC (HVDC) interconnection** - asynchronous interconnection between Moldova and Romania, through B2B station and usage of DC-Direct Current technology, so called ROMOL project, and
Synchronous connection of UA/MD to Continental European power system (AC)

• Agreements on conditions for integration of power systems of Ukraine and Moldova with ENTSO-E were signed on 28th June 2017 by ENTSO-E, Ukrenergo and Moldelectrica. The agreements require Ukrenergo and Moldelectrica to meet legal, regulatory, market and technical requirements before connecting to the European synchronous grid.

• The following Studies, defined by the ENTSO-E Project Group UA/MD, are necessary to be done as part of the preparation for the full synchronization of the Ukrainian and Moldovan power systems to the Continental European power system:
  • UA/MD synchronization Study, part II, continuation of UMPSI2015 Feasibility Study performed by the international consortium of TSOs/ENTSO-E, 2014-2016.
    ▪ “Steady state calculations for a synchronous interconnection of the grids of Continental Europe and Ukraine/Moldova using the present network”
    ▪ “Dynamic calculations for a synchronous interconnection of the grids of Continental Europe and Ukraine/Moldova using the present network and detailed, planned dynamic model of the Ukrainian and Moldovan grid”
Synchronous connection of UA/MD to Continental European power system (AC)

Additional studies/analysis needed:

- Analyzing a pure DC or hybrid AC/DC interconnection of the grids of CE and Ukraine and Moldova (if after finalizing the requested dynamic studies the synchronous interconnection is not considered the best option; shall start, if necessary, mid of 2019)

- Burstyn island extension study, so called “Power Bridge”. Study will show techno-economic viability of the Burstyn island extension, especially focusing on the technical feasibility and connected security/stability issues.

- ENTSO-E Continental South East Regional Group – CSE RG, under System Development Committee, is about to launch study on Ukraine-Moldova Network Connection sensitivity analysis (Market and Network simulations included), which will be used later on for inclusion of UA/MD projects into ENTSO-E TYNDP2020, as agreed with Energy Community Secretariat in January 2017.
Asynchronous interconnection – ROMOL (DC)

Full Feasibility Study and ESIA Study, on ROMOL DC-B2B connection (asynchronous connection) are completed and agreed with EIB, EBRD and WB. EBRD, EIB, European Union (EU) and the WB are providing a €270 million package to finance a permanent interconnection between the electrical networks of Moldova and Romania. The package includes EIB and EBRD loans of EUR 80m each, a EUR 70m loan from the World Bank and a EUR 40m investment grant from EU funds (NIP).
The lack of modelling data for Ukrenergo and Moldelectrica.

Geographical scope of ENTSO-E

The lack of appropriate ENTSO-E Network & Market modelling geographical coverage

- European Union / ENTSO-E members
- European Union & CEE RG ENTSO-E members
- WB6 region & CEE RG ENTSO-E members
- Eastern Partnership region
- EnC Observers / ENTSO-E members

covered
semicovered
not covered