



CROSS BOrder management of variable renewable energies  
and storage units enabling a transnational Wholesale market

# TRANSMISSION GRIDS AND ENERGY MARKET LEGISLATION AND REGULATORY FRAMEWORKS

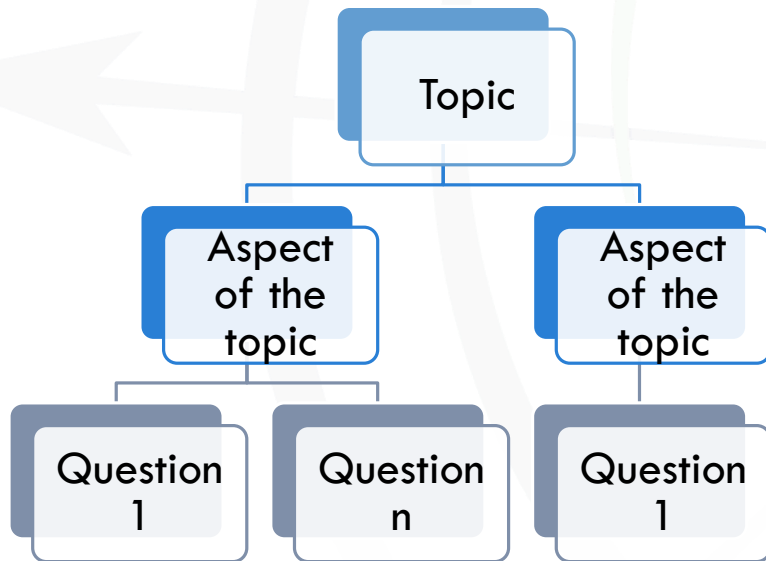
WP1, T1.1  
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- Objective - provide an overview of legislation and regulative framework for the region represented by the countries participating in the CROSSBOW consortium
  - A complex task for a region consisting of EU MS and Energy Community Contracting Parties
  - Technical and regulative aspects of the electricity sector in the countries of the region are investigated to provide a representation of current state of play
- Purpose - investigate the regulative framework for implementation of the High Level Use Cases (HLUs)
  - CROSSBOW shall provide a set of feasible and innovative technical

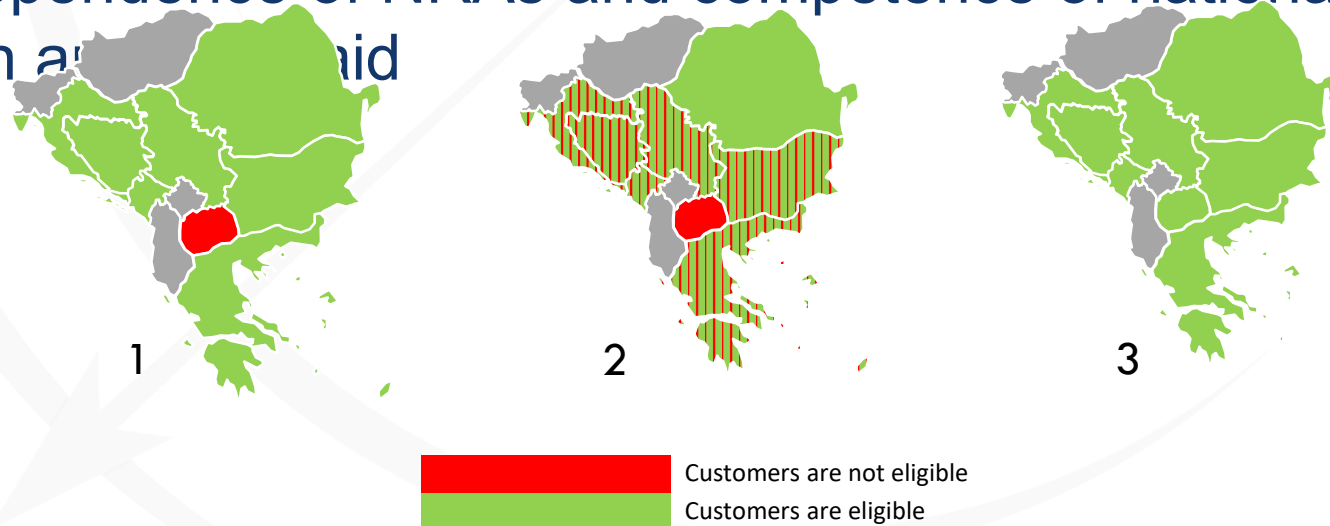


- Questionnaire developed by UKIM and UL, organized in several topics:
  - Implementation of required legislation related to electricity markets development
  - Cross-border trading and balancing
  - Capacity allocation
  - System operation
  - Infrastructure development projects
  - Level of penetration of renewable energy sources (RES), capabilities for demand response (DR) and storage
  - Development of Smart Grids

# IMPLEMENTATION OF THIRD ENERGY PACKAGE



- The assessment of compliance of the primary energy law with TPEGM from the aspect of electricity is assessed by investigating several aspects
  - eligibility of customers, elimination of electricity price regulation, consumer protection, especially for vulnerable customers, legal unbundling, certification of TSOs, independence of NRAs and competence of national authorities for competition and aid



# ANCILLARY SERVICES



## ○ Current procurement of Ancillary Services (AS) by TSO/DSO

- **BiH:** Yearly and monthly auction. If necessary, additional arrangements with providers
- **RS:** TSO purchases all AS for a regulated price from one provider
- **ME:** TSO purchases all AS for a regulated price
- **BG:** TSO purchases all AS for a regulated price
- **HR:** TSO procures AS in a regulated way
- **RO:** TSO procures AS by auction
- **GR:** Primary and secondary reserves at the day-ahead market prices.  
Generators not compensated for providing tertiary reserve, volumes are determined on a day-ahead basis.

AS Procurement



	Auction
	Procured at regulated prices
	Procured at regulated price from state owned company

- **Availability of flexibility assets**
  - ***BiH:*** Pumped storage hydro (2x220 MW), they lost one 180 MW
  - ***ME:*** Manually activate up to 50 MW from an industrial consumer
  - ***BG:*** 3 Pumped storage hydro (932 MW), 3 contracts with industrial consumers
  - ***HR:*** 1 Pumped storage hydro (276 MW), no other storage facilities
  - ***RO:*** Many pumped storage hydro (200-285 MW), 2 wind power plants with storage of 500 kW for 30mins, 1 wind with storage of 1,26 MW for 1h
  - ***GR:*** 2 Pumped storage hydro exists, but the regulatory framework for them to operate in such way is not sufficient

# PRECONDITIONS FOR ORGANIZED MARKET PLACES



- **Steps to establish an organized day-ahead market**
  - ***BiH:*** Certain incentives, but everything is still at an early stage
  - ***RS:*** Day-ahead spot market already in operation
  - ***ME:*** EnC provides technical assistance for finding a viable model
  - ***RO:*** Day-ahead market coupled with CZ, SK, HU
  - ***BG:*** IBEX 2015/2016
  - ***HR:*** CROPEX – market coupling with BSP on 19.6.
  - ***GR:*** Mandatory pool day ahead market
  - ***MK:*** In active preparations/talks
    - Helped by BSP SouthPool and Borzen (Slovenian market operator)

# CROSS BORDER BALANCING



- **Status of implementation of a market-based balancing model**
  - ***BiH:*** Established in 2016
  - ***RS:*** No balancing market, balancing capacity is procured by TSO, regulated price
  - ***BG:*** Implemented in 2014
  - ***GR:*** Network codes are prepared and given for public consultation
  - ***MK:*** Dry-run is in progress



# FORWARD CAPACITY ALLOCATION



- **Legal obstacles for TSO participation in SEE CAO**
  - *BiH:* NOSBiH participates in SEE CAO
  - *RS:* No legal obstacles for Serbian TSO
  - *ME:* Member since 2015
  - *BG:* JAO is chosen capacity auction agent. Planned for 2019.
  - *HR:* Participates in SEE CAO
  - RO: Will join JAO according to SAP document
  - GR: Participates in SEE CAO
  - MK: Founder and partner in SEE CAO
- **Use of capacity calculations from regional operational centre**
  - *RS:* Coordinated calculations are in dry-run phase.
  - *ME:* Receive daily calculations but do not use them officially.
  - *BG:* Yes
  - *HR:* Currently they get flow-based calculations from another company. Coordinated calculation is planned
  - *GR:* Methodologies to be finalised, approved and tested

# SYSTEM OPERATION



- System operation issues – the activities of the TSOs guided by ENTSO-E
- Participation of TSOs in Regional Security Coordinator Initiatives
  - Founders and shareholders of SCC (EMS, NOS BiH and CGES) and service users (MEPSO, IPTO, ESO)
  - HOPS participates in TSCNET
  - Pending information on TRANSELECTRICA

Participation in RSCI



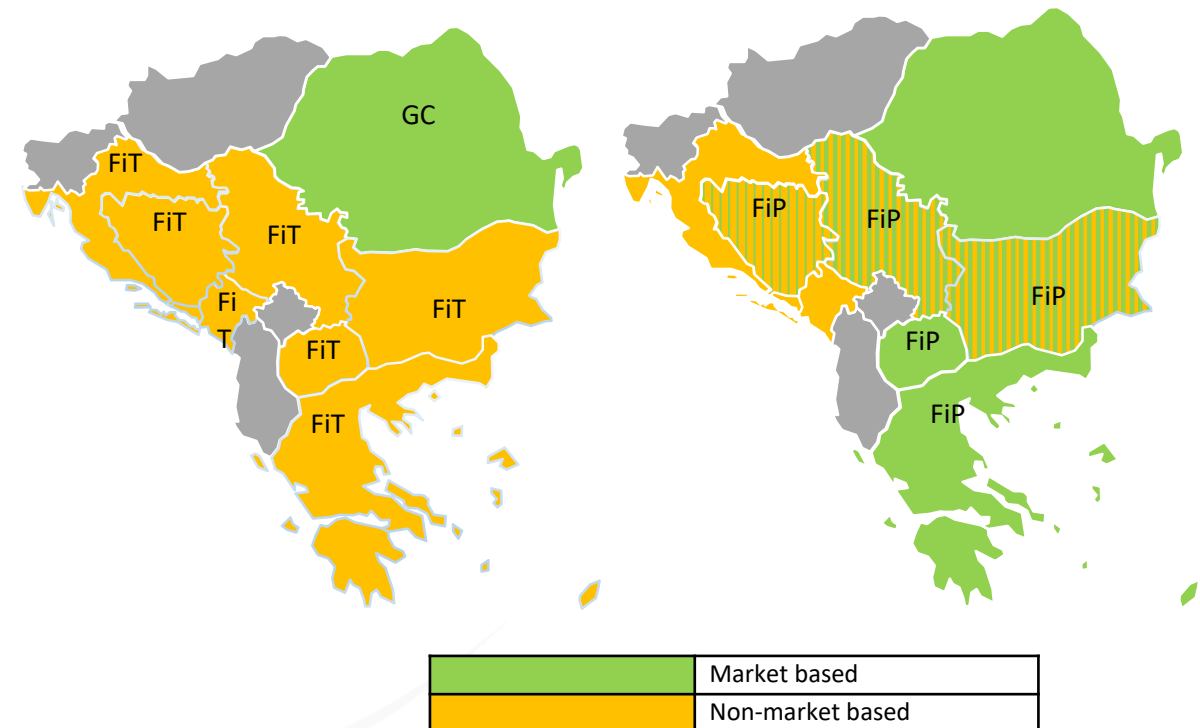
	Not a RSC shareholder/user
	RSC shareholder/user

# RES SUPPORT



- Barriers to implementation of the support schemes:
- too low or high installed capacities of certain RES technologies that receive support, which are administratively set by state bodies
- frequent changes in the mechanisms may lead to low confidence of investors into state institutions responsible for implementation of RES support.

RES support schemes – current and future developments



# RES OPERATION



- Non-discriminatory connection of RES generators is applied in most of the countries in the region (except in BG and ME, where priority of connection is applied)
- As a general characteristic of the region, RES generating units have priority in dispatch
  - TSOs in the region have the right to send re-dispatch orders in case of congestion, but so far, this was rarely applied
  - No compensation for RES curtailment,

RES balancing responsibility



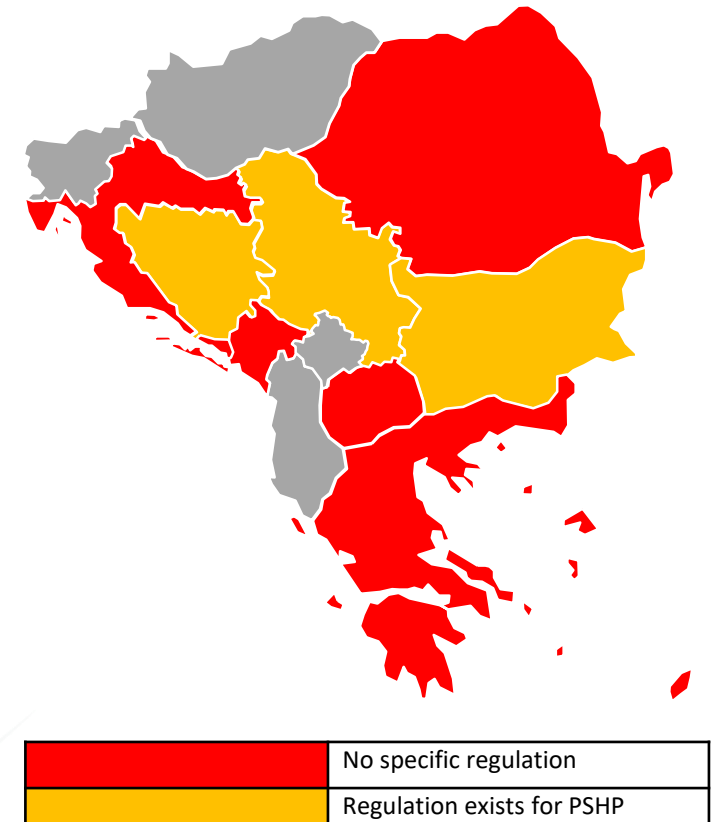
	Balancing responsible
	Balancing responsibility transferred to other entity

# STORAGE



- The region lacks regulation related to energy storage
  - Connection rules related to storage are to be changed in near future in Bulgaria and Romania
  - HR, RS: storage units can participate in the market
  - BG: TSO/DSOs are not allowed to own storage
- Future developments
  - RO: regulation on storage to be adopted, along with energy storage

Energy storage regulation

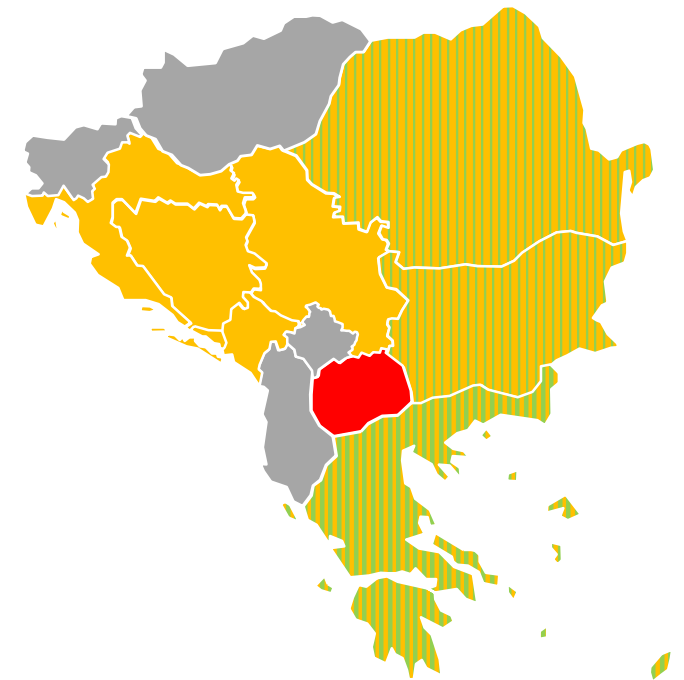


# DEMAND RESPONSE



- Although in some countries there is no specific regulation on DR, also, no specific regulatory limitations to its use are observed
- In the region, in general, there are no existing consumer groups engaged in providing DR.
  - ME: large consumers (aluminum industry) can provide up to 50 MW DR service
  - BG: In future, DSOs shall act as DR aggregators
  - HR: pilot project on aggregation of various consumers
  - BH: experience in use of large consumers for frequency restoration reserve in the past

DR regulation



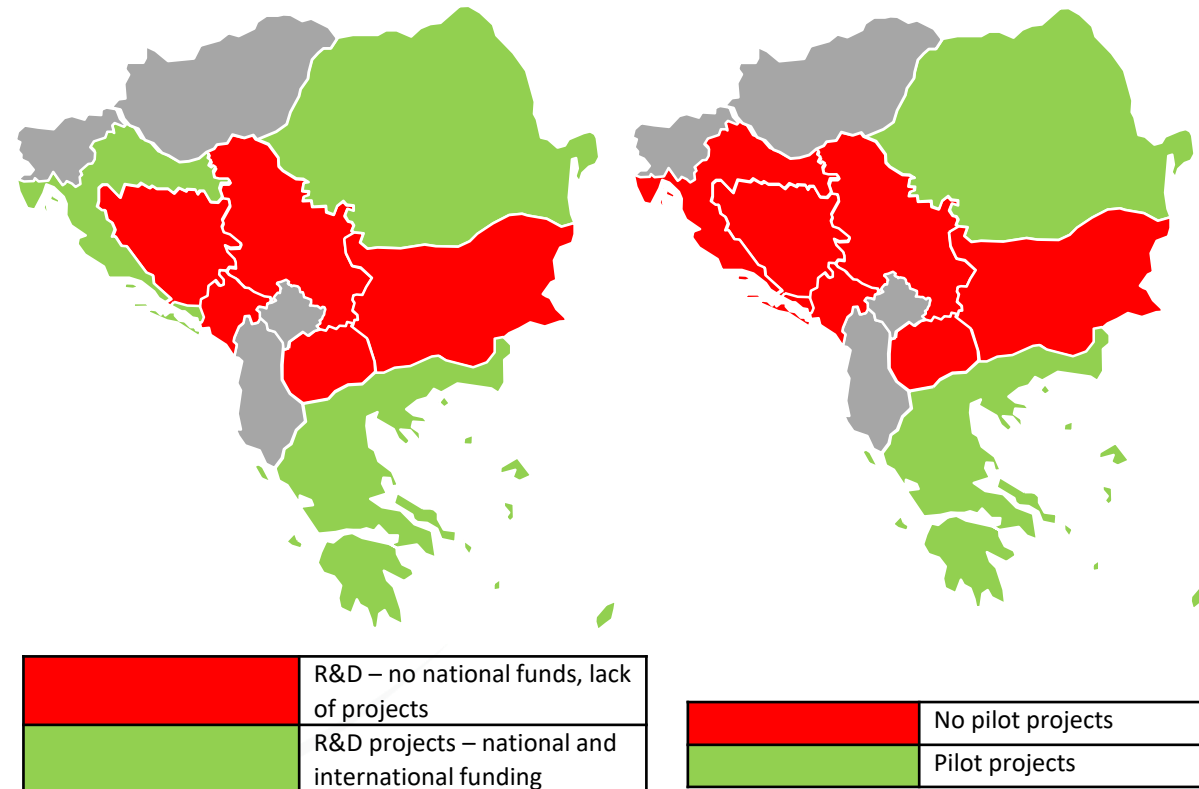
	No specific regulation
	Regulation exists – contracts between TSO & DR provider

# SMART GRIDS



- Lack of funding of R&D Smart Grids projects
  - HR & RO: national funding, GR: mostly EU funded projects
  - GR: may serve as an example for research, development and deployment of Smart Grids for the region.
  - The continuous work of the universities, research centers and utilities in Greece under various EC funded projects has been a key to gain substantial experience in Smart Grids and contribute to the global progress of new smart

Smart Grids: R&D funding and pilot projects





# CONCLUSION -1



## ○ **Implementation of TPEGM**

- Dominant market share of incumbent suppliers in the whole region is a limit to further development
- Limitations - deficiencies in secondary legislation, political influence in the sector, especially in WB countries, existence of price regulation
- Vulnerable customers are introduced, although with various level of customer protection
- Unbundling and certification process in EU MS is mostly completed and the unbundling of the DSOs is also largely finished, while WB countries are lagging in the process
- NRA – BiH, MK are the only countries in

## ○ **Electricity markets**

- Markets are supposed to be fully opened; but there is no competition and the prices are mostly regulated
- Ancillary services are procured by the TSOs for a regulated price usually only one provider is available
- Flexibility assets are available and used in most of the countries, GR is an exception

## ○ **Market trading codes**

- RS as an good example with day-ahead spot market already in operation (No other non-EU Balkan country has such market)
- RO, HR, BG have day-ahead markets
- MK, ME, BiH in preparations/talks

## ○ **Cross border balancing**

- Market-based balancing model is mostly in the dry run phase. BiH and BG have already implemented it. RS



# CONCLUSION - 2



## ○ **Forward capacity allocation**

- Most countries are members of SEE CAO. RS is not present in SEE CAO from WB countries. BG and RO are in favour of JAO.
- Countries have calculations from regional operational centre but (except BG) do not use them. We suspect that lack of cooperation and some other political challenges arise.

## ○ **System operation**

- Membership in ENTSO-E has been an essential advantage for the whole region, driving the technical advances in system operation

## ○ **Storage**

## ○ **Demand response**

- No specific regulation on DR, also, no specific regulatory limitations to its use are observed. Low implementation of DR possibilities

## ○ **RES support and operation**

- Countries of the region promote and support RES. Mostly FiTs are in place, except in RO, where CGs are used.
- Competitive procedures are generally not in place, except in some form in RO, GR and HR.
- Costs for support are based on non-tax levies included in the electricity bills

## ○ **Smart Grids**

- Low penetration of SG low number of R&D



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# THANK YOU

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