MEDITERRANEAN PROJECT

First year of activities

Assessment of regional cross border exchanges potential development in Mediterranean Region

Barcelona, 8 March 2015

supported by the EU

Med-TSO
MEDITERRANEAN TRANSMISSION SYSTEM OPERATORS

hosted by the UfM

Scope of the study

The activity is a part of **Task 3** (**International Electricity Exchanges**) of the **Mediterranean project** which aims at **collecting the relevant data** to perform an **assessment of the cross border exchanges between Mediterranean electricity systems**.

The objective is to **analyse the actual electricity cross border exchanges** and their **potential development** in the **Mediterranean region**.

The activity consists in **3 deliverables** and **this presentation is about the first one** which **analyses the following issues**:

- Assessment of regional cross border exchanges potential development
- Schemes and methodologies for Operation of interconnected systems
- Procedures of management of power and energy deviations and compensation of mutual exchanges

Methodology (1/5)

- The methodology is based on a cooperative approch between TSO involveded in MedTSO Association
- The members of technical committe 'TC3' worked on a shared questionnaire
- Participation to 4 meetings and 2 internal workshops (with TC2 ''rules'')

1st meeting: Algiers – March 25, 2015 **Main subject:** Discussion of the ToRs and establishment of two task force to prepare the questionnaire related to the 1st deliverable
2nd meeting: Casablanca – May 29, 2015 **Main subject:** Discussion of the issues included in the questionnaire
1st TC2 – TC3 joint Workshop: Rome – November 4, 2015 **Main subject:** Analysis and discussion of the answers provided by TC2 and TC3 members for the common issues
3rd meeting: Rome – November 5, 2015 **Main subject:** Analysis and discussion of TSO answers
2nd TC2 – TC3 joint Workshop: Rome – February 10, 2016 **Main subject:** Last check of the answers provided by TC2 and TC3 members for the common issues
4th meeting: Rome – February 11, 2016 **Main subject:** Approval of the 1st deliverable

Methodology (2/5)

- To prepare the 1er deliverable of the activity of technical committee ‘’International Electricity Exchanges’’ of MedTSo, the questionnaire gathered more than 100 questions organized in the following topics was prepared

General	Data of existing and planned interconnections between MedTSO countries
System markets	Transfer capacity (criteria and process for evaluation of NTC)
	Methods of capacity allocation
	Publication of data-information and transparency
	Real time balancing activities of TSOs
	Procedures and rules to guarantee exchange programs and balancing services
	Market
	Legal
	Nomination of exchanges in the interconnections
	Network services providing
	Settlement and metering

Methodology (3/5)

System Operation	Experiences in AC operation and HVDC technology
	Voltage management with neighbours
	Procedures for outage coordination with neighbours
	Limitation of the power flow through the interconnection in case of emergency
	Defence plan coordination
	Restoration plans
	Selectivity protection on interconnection lines to avoid propagation of incidents
	Description of the system states
	Parameters that are monitored in real time
	Frequency requirements
	Voltage ranges in internal networks and on interconnections

Methodology (4/5)

System Operation	Reactive management
	Limit criteria for short-circuit
	System protection coordination
	Data exchanges between TSO
	Contingency analysis and stability studies
	Unintended deviations management
	Load-frequency control
	Reserve management
	Training and certification of employees in charge of real time operation
	Power generation dispatching priority

Methodology (5/5)

- Examples of questions asked in the questionnaire

Data of existing and planned interconnections between MedTSO countries

INTERNATIONAL ELECTRICITY EXCHANGES								
QUESTIONNAIRE ABOUT CURRENT STATUS OF RULES AND PROCEDURES OF MANAGEMENT OF INTERCONNECTIONS								
INTERNATIONAL CONNECTIONS								
Definition: A transmission link (e.g. tie line or transformer which connects two control areas)								
1. Please fill in the table for existing interconnections. Notice that Thermal Capacity and Net Transfer Capacity (NTC) are required (Indications are given in comments. Please take note by pointing the mouse over the cell with a red mark on the upper right corner).	Neighbouring country	Substation in your country	Substation in neighbouring country	Nominal Voltage of the Interconnector (kV)	Operating Voltage of the Interconnector (kV)	Connection type	Interconnector Thermal Capacity (MW)	Interconnection NTC (MW)

Methods of capacity allocation

INTERNATIONAL ELECTRICITY EXCHANGES	
QUESTIONNAIRE ABOUT CURRENT STATUS OF RULES AND PROCEDURES OF MANAGEMENT OF INTERCONNECTIONS	
ALLOCATIONS	
Definition: The procedure of determining the owner – who can exercise import/export on the allocated facility – of Net Transfer Capacity for a particular interconnection facility for a limited time period.	
Specific issue	Related description or information
11. Please answer the following questions for yearly allocations	
a. What is the applied transmission capacity allocation method? Please indicate (Indications are given in comments. Please take note by pointing the mouse over the cell with a red mark on the upper right corner)	
b. If there is a yearly allocation, is the capacity given together with the energy (e.g. market coupling) or capacity is allocated without energy (explicit allocation)? (Yes or No).	
c. Direction. Please indicate.	

Main conclusions about Current situation on Mediterranean electricity systems (1/2)

The interconnections between **Spain and Morocco and between Turkey, Bulgaria and Greece are currently the only interconnections in service between both shores of the Mediterranean Sea.**

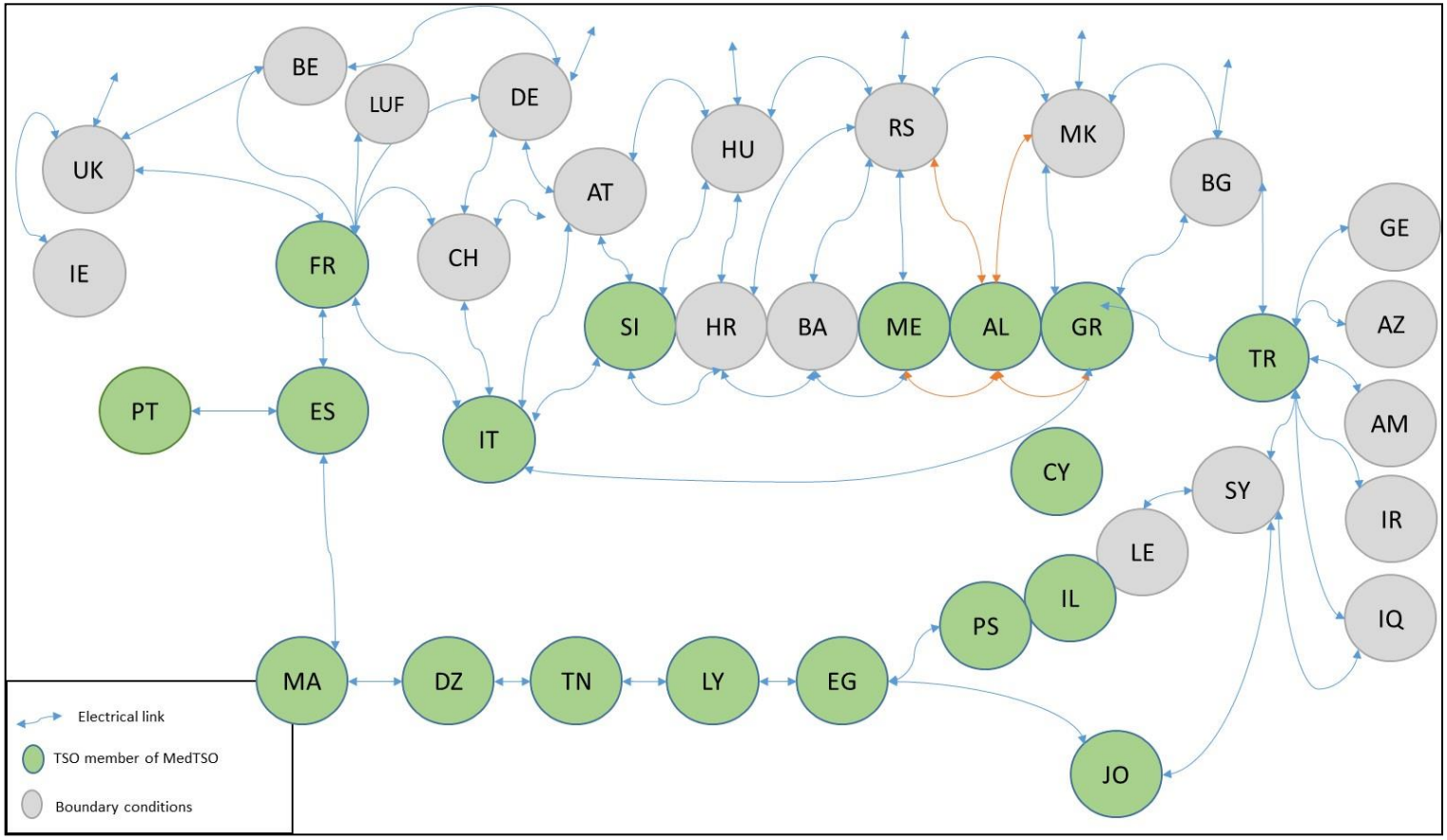
Libya – Tunisia interconnection is open because of some stability constraints and Egypt – Libya interconnection is used to supply a partial region of the Libyan network while Turkey – Syria interconnection is open due to the war in the region.

Mediterranean power systems are not homogeneous regarding the integration of national electric systems and electricity markets (European countries belong to an integrated area with a real internal energy market while exchanges are very low in the Southern and Eastern parts).

Generally **interconnections in the Southern and Eastern parts of the Mediterranean region are not used for market purpose but to improve the security of supply,**

A large part of transfer capacity is available for further market development. Consequently, **increasing exchanges even without using an integrated market would help to develop more technical coordination** in terms of network operations and sharing information.

Current situation on Mediterranean electricity systems (2/2)

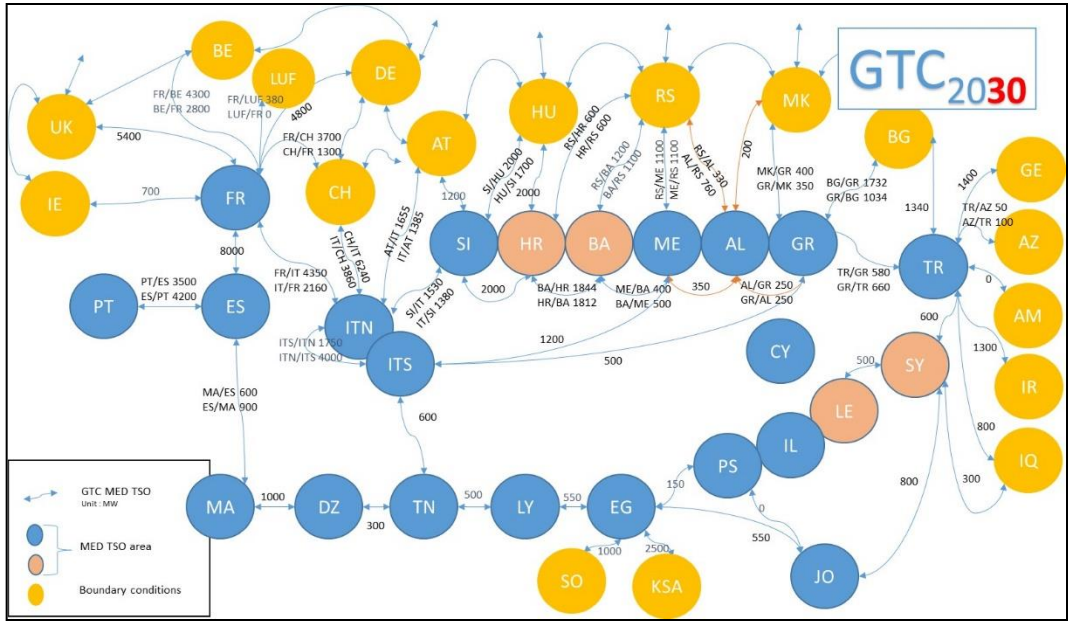


Existing interconnections in the Mediterranean region

MedTSO interconnections in 2030

This map shows **a picture of the Mediterranean interconnections in 2030 in accordance with TYNDP 2016 and GTC 2030 of MedTSO**.

Other interconnection projects are listed in the study report.



These projects, even if they are already under consideration or under study by some countries, **are not represented in the map because not considered in TYNDP 2016** which was the agreed reference to elaborate the base case of the study. However, **these projects will be considered within the Mediterranean Project** under the **CBA** (Cost Benefit Analysis) which is **still in progress**.

Analysis of the submitted questionnaires (1/3)

System markets

Issues Highly harmonized where applicable	Issues moderately harmonized where applicable	Issues poorly or not harmonized where applicable
Transfer capacity evaluation	Methods of capacity allocation	Publication of data-information and transparency
Real time balancing activities of TSOs	Nomination of exchanges in the interconnections	Market
Procedures and rules to guarantee exchange programs and balancing services		Legal
Network services providing		
Settlement and metering		

Analysis of the submitted questionnaires (2/3)

System operation

Issues Highly harmonized where applicable	Issues moderately harmonized where applicable	Issues poorly or not harmonized where applicable
Voltage management with neighbours	Selectivity protection on interconnection lines to avoid propagation of incidents	Reserve management
Procedures for outage coordination with neighbours	Parameters that are monitored in real time	
Limitation of the power flow through the interconnection in case of emergency	Frequency requirements	
Defence plan coordination	Voltage ranges in internal networks and on interconnections	
Restoration plans	Limit criteria for short-circuit	

Analysis of the submitted questionnaires (3/3)

System operation

Issues Highly harmonized where applicable	Issues moderately harmonized where applicable	Issues poorly or not harmonized where applicable
Description of the system states	System protection coordination	
Reactive management	Data exchanges between TSO	
Unintended deviations management	Contingency analysis and stability studies	
Training and certification of employees in charge of real time operation	Load-frequency control	
Power generation dispatching priority		

Conclusion (1/2)

The situation of the Mediterranean power systems is **not homogeneous with a wide variety of advances regarding the integration of national electric systems and electricity markets**. European countries (Northern part) belong to an integrated area with a real internal energy market, while the exchanges are very low for the Southern and Eastern countries because no electricity market mechanisms are set in this area yet.

The analysis of the submitted questionnaires shows that **system market aspects are moderately or poorly harmonized where applicable for some issues** (methods of capacity allocation, nomination of exchanges in the interconnections, publication of data-information and transparency, market, legal) **and highly harmonized for other issues** (transfer capacity evaluation, real time balancing activities of TSOs, procedures and rules to guarantee exchange programs and balancing services, network services providing, settlement and metering) **especially when we compare Northern countries including Turkey to Southern and Eastern countries**. On the other hand, **a high or at least a moderate harmonization is generally observed with regard to operation issues**.

Conclusion (2/2)

Interconnections in the Southern and Eastern parts of the Mediterranean region are generally to improve the security of supply not for market purpose. So that a large part of transfer capacity is available for further market development. Consequently, **increasing exchanges even without using an integrated market would help to develop more technical coordination** in terms of network operation and sharing information **which are essential for the development of the electricity market** at the sub regional and regional levels.

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