Deliverable 3.1.3

Procedures of management of power and energy deviations and compensation of mutual exchanges

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"Mediterranean Project"

Task 3 "International Electricity Exchanges "

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1. Short Summary:

The present report concludes the activity of sub-Task 3.1 and provides an outlook of state of art of the cross border exchanges potential development in the Mediterranean Region.

The potential power transits on the interconnectors among the Mediterranean region are analyzed for the actual interconnections planned between TSO's.

The report makes great use of the data collected and of the results of questionnaire completed by MedTSO members (see questionnaire attached in Annex 1). The analysis of the questionnaire shows that:

- The situation of the Mediterranean power systems is not homogeneous with a wide variety of advances regarding the integration of national electric systems and markets. In the North, the European countries belong to an integrated area which is nowadays advancing towards a real internal energy market. In the Southern and Eastern parts, the exchanges are very low.

- In general the Southern and Eastern interconnections in the Mediterranean region are used to improve the security of supply and not for market purpose. A large part of transfer capacity is available for further market development. So given the complementarity of supply and demand (growth and profile), increasing exchanges even without using an integrated market would help to develop more technical coordination in terms of network operations and sharing information which are essential for the development of the electricity market at the sub regional and regional level.
- Regarding interconnection capacity allocation, the information collected make appear that MedTSO countries can be divided in two groups:
    - one group of TSO where the capacity allocation considerations are not applicable today which are mainly located in the southern and Eastern Mediterranean basin,
    - and one group of TSO that apply all or some of the allocation methods which are located in Europe (France, Greece, Italy, Portugal, Spain and Turkey).
- For the data publishing and transparency, it appears that most of the electrical data are not published in the countries located in the South and East of the Mediterranean region. The situation is completely different for European countries that most of TSO's publish almost all the data.
- For the exchange limitations in case of emergency, all the TSOs said the exchanges are limited except Portugal and Spain. Regarding the settlement and metering, the main conclusion is that the TSO is responsible for settlement and metering in international interconnection in all countries.

2. Scope of the Study and this report

The activity 3.1 about assessment of cross border electricity exchanges is a part of task 3 ''International electricity exchanges'' of the "Mediterranean project''. This activity aims at collecting the relevant data of the networks and interconnections to perform the assessment of the cross border exchanges between Mediterranean electricity systems.

The overall objective of this document is to present and analyse the situation in terms of electricity cross border exchanges and their potential development in the different electric power systems around the Mediterranean region, considering not only the current exchanges but also the expected development in the future.

This 1st deliverable concerns the analysis of the following fields:

- 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

This document gives response to subtask 3.1 which is the first deliverable to be performed within Task 3 of the Mediterranean Project signed between MedTSO (Association of Mediterranean TSO´s) and the European Commission, which final objective is to develop a common draft set of basic Mediterranean network rules. It has been developed by MedTSO Technical Committee 3 (TC3) International Electricity Exchanges.

The structure of Task3 of the Mediterranean project is as follows:

A**ctivity 3.1: Assessment of regional cross border exchanges:** Assessment of cross border exchanges potential development and definition of procedures for coordinated dispatching and operation in presence of international interconnections.

Activity 3.2: Schemes of sharing services and RES integration: Identification and proposal schemes of sharing systems services, auxiliary applications, services of regulation and RES integration

Activity 3.3: Application and analysis of CBA methodology: Analysis and application of CBA methodology, defined by the Economic Studies and Scenarios working Group, and complete the criteria and assessment for interconnections cases studies

The document subject of this report concerns the sub task 3.1 '**Assessment of regional cross border exchanges'**

This work is established in the framework of the Mediterranean project signed in 2015 with the European Commission and MedTSO named ''the Mediterranean Project - MedTSO´s Action Plan 2015-2017'', which will be developed according to the following axes:

1. Common Set of Rules for a Mediterranean Power System.
2. Planning and Development of the Euro-Mediterranean Grid.
3. International Electricity Exchange.
4. Knowledge network.
5. MedTSO´s Database.

3. Methodology

MedTSO TC3, on International electricity exchanges has been working during 2015 in order to analyse the Assessment of regional cross border exchanges in Mediterranean Region. The methodology used has been a cooperative approach between all TSO involved in the

association with several meetings and questionnaire shared by the members. In particular three meetings were organised:

- 1st meeting held in Algiers on the 25 th March 2015.
- 2nd meeting held in Casablanca on the 29th May 2015.
- 3rd meeting held in Rome on the 5th November 2015.
- Internal workshop between TC02 and TC03 held in Rome on the 4th November 2015.

The main activity was to collect all the informations regarding the exchange capacities of all interconnections around the Mediterranean region. For this purpose a questionnaire was elaborated to collect informations about:

- Operational procedures of interconnections between neighbouring countries
- Procedures of management of power and energy deviations and compensation of mutual power exchanges

As a first step two task forces was created and TC3 members were designed in order to take the leadership on design a set of questionnaires to be completed by each TSO in the Mediterranean region.

To start with the work, it was proposed during the first meeting of TC03 (25th march 2015 in Algiers) a "List of issues with a cross border exchanges and interconnections" that was approved by all TC3 members and that has been the basis for the elaboration of the questionnaires. In the basis of this list of issues, a questionnaire was prepared. This questionnaire was sent as a survey to all MedTSO members in order to have a picture of the cross border exchanges and the potential development around the Mediterranean region.

After the questionnaire collection, a detailed analysis with the following structure was performed:

- Transfer capacity and NTC between electrical systems
- Capacity Allocations and transparency
- Balancing and Market of electricity
- Legal issues of electricity Exchanges
- Network services and Operation
- Dispatching and balancing
- Settlement + Metering

4. Current situation on Mediterranean electricity systems

In coherence with the high growth of the electricity demand and of the consequent planned new generation facilities, the Mediterranean countries have defined plans for a series of reinforcements of their internal transmission networks.

More uncertain is the realization of new interconnection links in the south region (although several projects are actively investigated) probably due to the low amount of the present electricity exchanges, motivated in the absence of a true electricity market more by mutual help rather than by economic advantages.

In terms of electricity demand in the 2015 Mediterranean Energy Perspectives from OME (Observatoire Méditerranéen de l'énergie), it is mentioned that the "Economic growth in the Mediterranean region is expected to sustain an average annual growth of 2.3% to 2040:

- 3.7% annual growth from 1990 to 2040 for the South Est
- 3.4% for the South West
- 1.5% for the North.

Thus in the chapter "electricity demand", they precise "This implies a considerable increase in electricity demand in particular in the South. OME's outlook in its conservative scenario projects an increase in the total electricity final consumption of 88 million tons of oil equivalent by 2040." (ie 1.230 TWh).

The electricity demand will increase in the South from 546 TWh to 1583 TWh by 2040. The total demand in the area is 3.105 TWh.

For North side of Mediterranean région, electricity production is expected to progress at very low yearly rate (0,9%) and reach around 1700 TWh in 2040 (from 1347 TWh in 2013).
The Mediterranean networks analysed are composed of all MedTSO countries: from Portugal to Turkey in the north and from Morocco to Jordan in the south.

In the following figure the current situation regarding the interconnections between the East/South and north of Mediterranean and with the "outside" is shown. The interconnections between Spain-Morocco and Turkey – Bulgaria – Greece are nowadays the only interconnections in service between both shores of the Mediterranean. The interconnection Libya – Tunisia is open because of stability constraints. The interconnection Egypt – Libya is used to supply a portion of the eastern Libyan network

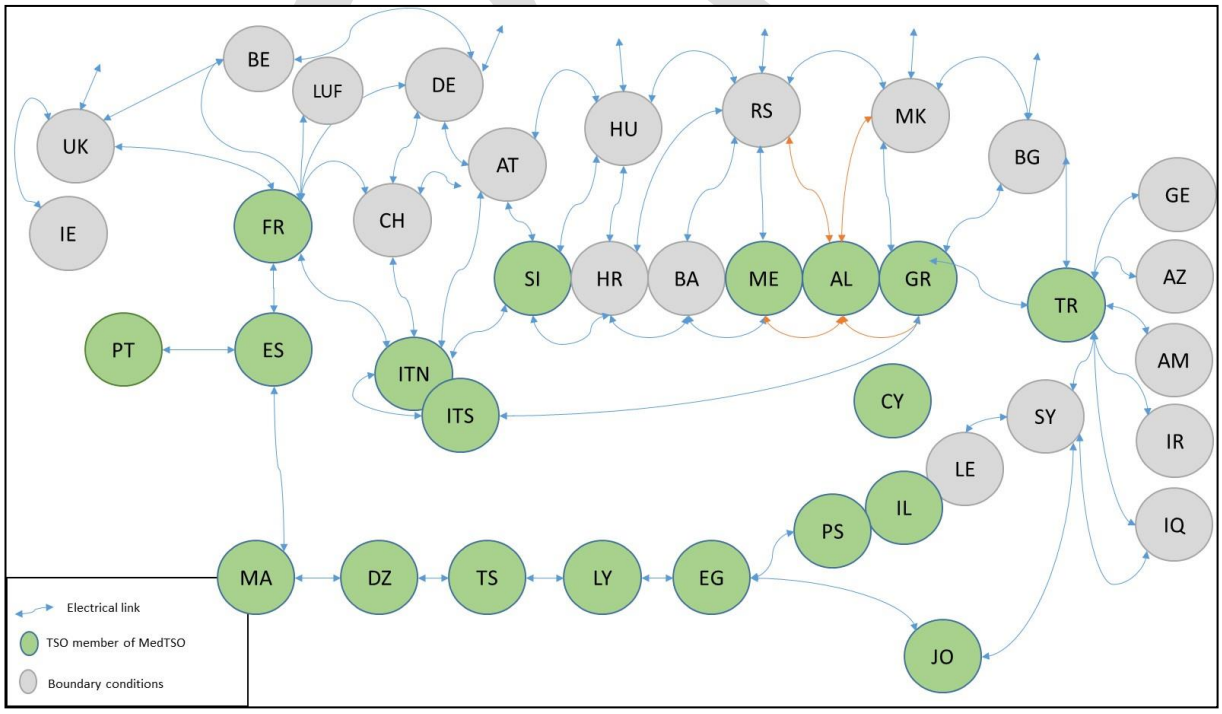


Fig. 1. Existing interconnections in Mediterranean Region

Anyway, the situation of the Mediterranean power systems is not homogeneous with a wide variety of advances regarding the integration of national electric systems and markets. In the north the European countries, belong to an integrated area which is nowadays advancing towards a real internal energy market.

5. Rules and usage of existing and planned interconnections around the Mediterranean

Partner country	Name of the electricity company	Situation of rules and usage
Algeria	SONELGAZ Holding Company (the transmission operator is the subsidiary of Sonelgaz)	A decree set the technical rules for connection to the transmission network, the rules for operation on the network and the management of the interconnections. The Interconnections are used mainly for rescue, with a zero balance for the no programmed exchanges at the end of the year with Morocco and Tunisia.
Cyprus		No interconnections, so no rules
Egypt	Egyptian Electricity Holding Company (EEHC) – single buyer	The focus is primarily targeting bilateral coordination. This bilateral coordination includes: defence plans, transit energy compensation among different TSOs, Information provision on interconnection capacities, Transit charges Currently issues such as congestion management access fees are not considered since there is no electricity market.
Israel	IEC	No interconnections, so no rules
Jordan	NEPCO Single buyer	The focus is primarily targeting bilateral coordination. It is planned to apply in the future the rules and requirements issued from the 8 interconnections countries.There is no electricity market for the moment
Lebanon	EDL	No interconnections, so no rules
Libya	GECOL	The interconnection Libya – Tunisia is used to supply a portion of western Libyan network. interconnection Egypt – Libya is used to supply a portion of the eastern Libyan network
Morocco	ONEE	The interconnection Morocco-Spain is used today by Morocco to import and export a part of its energy. In the future, this interconnection will permit to export its renewable energy to a country of the EU (through Spain) and is therefore eligible to the European directive. A project of access tariff is being negotiated by Spain.
Palestine	PETL	No interconnections, so no rules
Syria	PEEGT single buyer	The focus is bilateral coordination. It is planned to apply in the future the rules and requirements issued from the 8 interconnections countries.There is no electricity market for the moment
Tunisia	STEG	A protocol governing the exchange of power between Tunisia and Algeria and Libya was signed. Operating agreements for interconnections have been established at the national dispatching
Turkey	TEAIS	Coordinated with the neighboring TSO is provided in compliance with the ENTSO-E rules Policy 3 for the ENTSO-E connections.
European Countries	All TSO's	Coordinated with the neighboring TSO is provided in compliance with the ENTSO-E rules Policy 3 for the ENTSO-E connections.

6. Transfer capability and transfer capacity of existing and planned Interconnections

6.1 Grid transfer capacity

The following table, shows the existing and the planned Net transfer capacity of each interconnection system.

Order Number	Interconnection link	MAX transfer capacity (MW) NTC	
		Existing	Future
1	Syria -Lebanon	0	500
	Lebanon-Syria	n.a	500
2	Syria- Iraq	n.a	300
	Iraq-Syria	n.a	300
3	Jordan- Palestine (West bank)	20	100
4	Egypt – Gaza (Palestine)	17	100
5	Egypt-Libya	180	550
	Libya -Egypt	180	550
6	Algeria-Italy	-	1000
	Italy-Algeria	-	1000
	Algeria-Morocco	300	1000
	Morocco-Algeria	300	1000
	Algeria-Spain	-	2000
	Spain-Algeria	-	2000
	Algeria-Tunisia	300	300
	Tunisia-Algeria	300	300
7	France-Belgium	3600	4300[1]
	Belgium-France	1800	2800[1]
	France-Germany	2600	4800[1]
	Germany-France	3600	4800[1]
	France-Ireland	-	700[1]
	Ireland-France	-	700[1]
	France-Italy	3200	4350[1]
	Italy-France	1200	2160[1]
	France - Spain	2700	8000[1]
	Spain- France	1900	8000[1]
	France - Switzeland	3200	3700[1]
	Switzeland -France	2100	1300[1]
	France - United Kingdom	2000	5400[1]
	United Kingdom- France	2000	5400[1]
8	Greece- Albania	250	250
	Albania-Greece	250	250
	Greece- Bulgaria	400	1034
	Bulgaria -Greece	600	1732
	Greece-Italy	500	500
	Italy -Greece	500	500
	Greece- FYROM	350	350
	FYROM-Greece	400	400
	Greece-Turkey (DC)	216	660
	Turkey –Greece (DC)	166	580

[1] TYNDP 2030 GTC

Order Number	Interconnection link	MAX transfer capacity (MW) NTC	
		Existing	Future
9	Italy-Austria	145	1385[1]
	Austria-Italy	315	1655[1]
	Italy-France	1160	2160[1]
	France-Italy	3150	4350[1]
	Italy-Greece	500	500[1]
	Greece-Italy	500	500[1]
	Italy-Montenegro	-	1200[1]
	Montenegro-Italy	-	1200[1]
	Italy-Slovenia	680	1380[1]
	Slovenia-Italy	730	1530[1]
	Italy-Switzeland	1910	3860[1]
	Switzeland-Italy	4240	6240[1]
10	Jordan-Egypt	400	550
	Egypt -Jordan	400	550
	Jordan-Iraq	-	-
	Iraq-Jordan	-	-
	Jordan-Palestine	-	-
	Palestine -Jordan	-	-
	Jordan-Saudi Arabia	-	-
	Saudi Arabia -Jordan	-	-
	Jordan-Syria	450	800
	Syria-Jordan	450	800
11	Morocco-Algeria	300	1000
	Algeria-Morocco	300	1000
	Morocco-Spain	600	600
	Spain-Morocco	900	900
	Morocco-Mauritania	-	300
	Mauritania-Morocco	-	300
12	Portugal- Spain	2300	3500
	Spain-Portugal	2000	4200
13	Spain-France	1900	8000
	France- Spain	2700	8000
	Spain-Morocco	900	900
	Morocco-Spain	600	600
	Spain-Portugal	2300	4200
	Portugal- Spain	2000	3500
14	Tunisia-Algeria	300	300
	Algeria-Tunisia	300	300
	Tunisia-Italy	-	600
	Italy -Tunisia	-	600
	Tunisia-Libya	500	500
	Libya-Tunisia	500	500
15	Turkey-Armenia	0	0
	Armenia-Turkey	0	0
	Turkey-Azerbaijan (Nakhichevan)	50	50
	Azerbaijan (Nakhichevan)-Turkey	100	100
	Turkey-Bulgaria	334	1340
	Bulgaria-Turkey	434	1340

[1] TYNDP 2030 GTC

Order Number	Interconnection link	MAX transfer capacity (MW) NTC	
		Existing	Future
	Turkey-Georgia	850	1400
	Georgia-Turkey	850	1400
	Turkey-Greece	166	580
	Greece-Turkey	216	660
	Turkey-Iran	0	1300
	Iran-Turkey	490	1300
	Turkey-Iraq	300	750
	Iraq-Turkey	0	500
	Turkey-Syria	500	600
	Syria-Turkey	0	600

It shoud be said that the 2nd Bulgaria-Greece interconnector, as well as a number of projects aiming to strengthen the 400kV Bulgarian network (at the South-East) will help to increase the NTC with Turkey in both directions in the future. Nevertheless, there are no confirmed results from network studies about future NTC in the TR-GR border.

6.2 Cross border transactions mechanism

A cross-border transaction (import or export) takes place following two main steps: **Allocation and Nomination.**

The allocation phase: consists of acquiring interconnection capacity for a given period and in a given direction. Physical Transmission Rights (PTRs) are calculated and allocated by the TSOs for various timeframes:

- "long term" (annual, monthly, six-monthly, quarterly or by weekend, in some cases),
- daily and intraday.

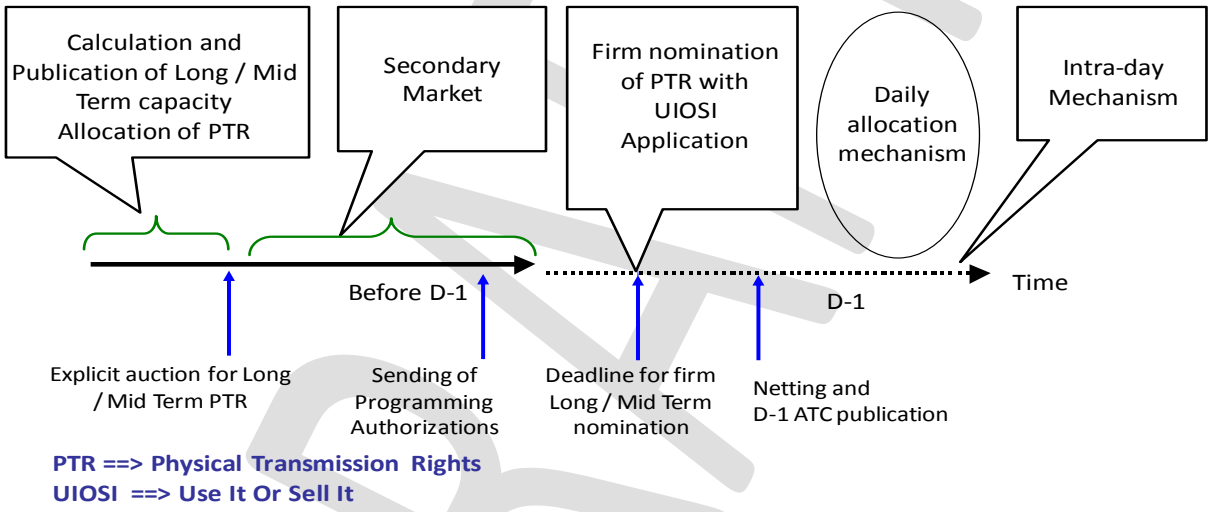
The nomination phase: consists of declaring to the TSO the cross-border exchange program, in the limit of the previously acquired PTRs.

- Long Term physical transmission rights are nominated at the start of day D-1,
- Rights acquired at daily auctions are nominated during the afternoon of day D-1,
- Rights acquired through intraday mechanisms maybe nominated at a range of gates scheduled Throughout the D day, depending on the interconnection concerned.
- Rights acquired through long Term allocations that have not been nominated are automatically made available for sale again via daily allocations.
- The holder of non-nominated long term rights receives financial compensation (Use It or Sell It, or UIOSI) equivalent to:
  - The marginal price of the sale auction when the daily allocation mechanism is an explicit auction,
  - The market price spread when the daily allocation mechanism is an implicit auction.
  - Non nominated rights acquired at daily allocations, are made available for sale again at intraday allocations, on condition that the safety of the electricity system allows it. The holder of non-nominated daily rights does not receive any compensation (Use It or Lose It, or UIOLI).

Cross border capacity allocation

The volume of cross-border exchanges is limited by the physical interconnection capacities of each national transmission grid involved. Working in coordination with their neighbours, the TSO evaluates the exchange capacities available (NTCs) across their various interconnections, for the multiannual, annual, monthly, weekly, D-2and day-ahead timeframes. The physical capacities of lines depend solely on the infrastructure's technical characteristics and the period of the year (capacities tend to be higher in winter).

However, due to the complex functioning of a meshed power grid, there is no straight forward correlation between commercial capacities and physical capacities. Indeed, the physical flows on a AC grid depend only on generation and consumption at the interconnected network various nodes and are not determined by the exports and imports declared by market participants. The method used to determine commercial import and export capacities follows these steps, for each timeframe.



7. Analysis of the state of the art on procedures of management of Mediterranean interconnections

The analysis of rules and procedures of management of interconnections in the Mediterranean region concerns the following twelve (12) parts:

- Data of existing and planned interconnections between MedTSO countries
- Transfer capacity (criteria and process for evaluation of NTC)
- Methods of capacity allocation
- Publication of data-information and transparency
- Balancing and volume-price of involuntary exchanges
- Procedures and rules to guarantee exchange programs and balancing services
- Market
- Legal

- Nomination of exchanges in the interconnections
- Network services providing
- System operation
- Settlement and metering

The analysis is based on more than 100 questions, that was sent to MedTSO members, but only ten (10) of twenty (20) TSO's submitted their related answers (Algeria, France, Greece, Italy, Jordan, Morocco, Portugal, Spain, Tunisia and Turkey). The following analysis constitutes a synthesis of these answers. Cyprus too submitted a questionnaire but only a few answers related to Market and Legal issues were provided, due to the fact that Cyprus is currently operating as an autonomous system.

The figure below shows the TSOs that submitted their filled questionnaires and the TSOs that did not.

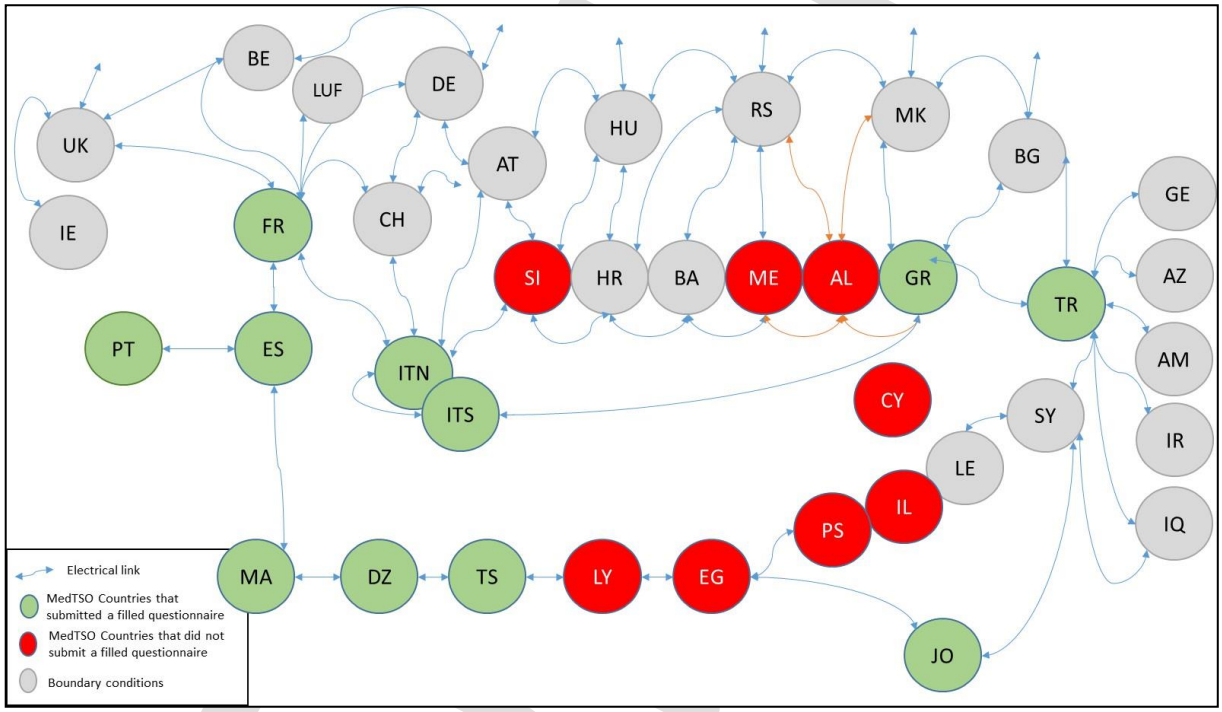


Fig 2–TSO that submitted a filled questionnaire

7.1 Data of existing and planned interconnections between MedTSO countries

a- Data on existing interconnections

The 10 TSO which submitted their filled questionnaire provided data on NTCs of existing and future interconnections. The table below shows this information:

TSOs	Neighbouring country	Current interconnection NTC (MW)	
		From country to neighbours	From neighbours to country
ALGERIA	Morocco	300	300
	Tunisia	300	300
FRANCE	Belgium	3600	1800
	Germany	2600	3600
	Italy	3200	1200

TSOs	Neighbouring country	Current interconnection NTC (MW)	
		From country to neighbours	From neighbours to country
	Spain	2700	1900
	Switzerland	3200	2100
	United Kingdom	2000	2000
GREECE	Albania	250	250
	Bulgaria	400	600
	Italy	500	500
	FYROM	350	400
	Turkey	216	166
ITALY	Austria	145	315
	France	1160	3150
	Greece	500	500
	Slovenia	680	730
	Switzerland	1910	4240
JORDAN	Egypt	400	400
	Syria	450	450
MOROCCO	Algeria	300	300
	Spain	600	900
PORTUGAL	Spain	2300	2000
SPAIN	France	1900	2700
	Morocco	900	600
	Portugal	2000	2300
TUNISIA	Algeria	300	300
	Libya	500	500
TURKEY	Armenia	0	0
	Azerbaijan	50	100
	Bulgaria	334	434
	Georgia	850	850
	Greece	166	216
	Iran	0	490
	Iraq	300	0
	Syria	500	0

The figure below show the existing interconnections with the NTCs according to the data collected from MedTSO having submitted their questionnaires.

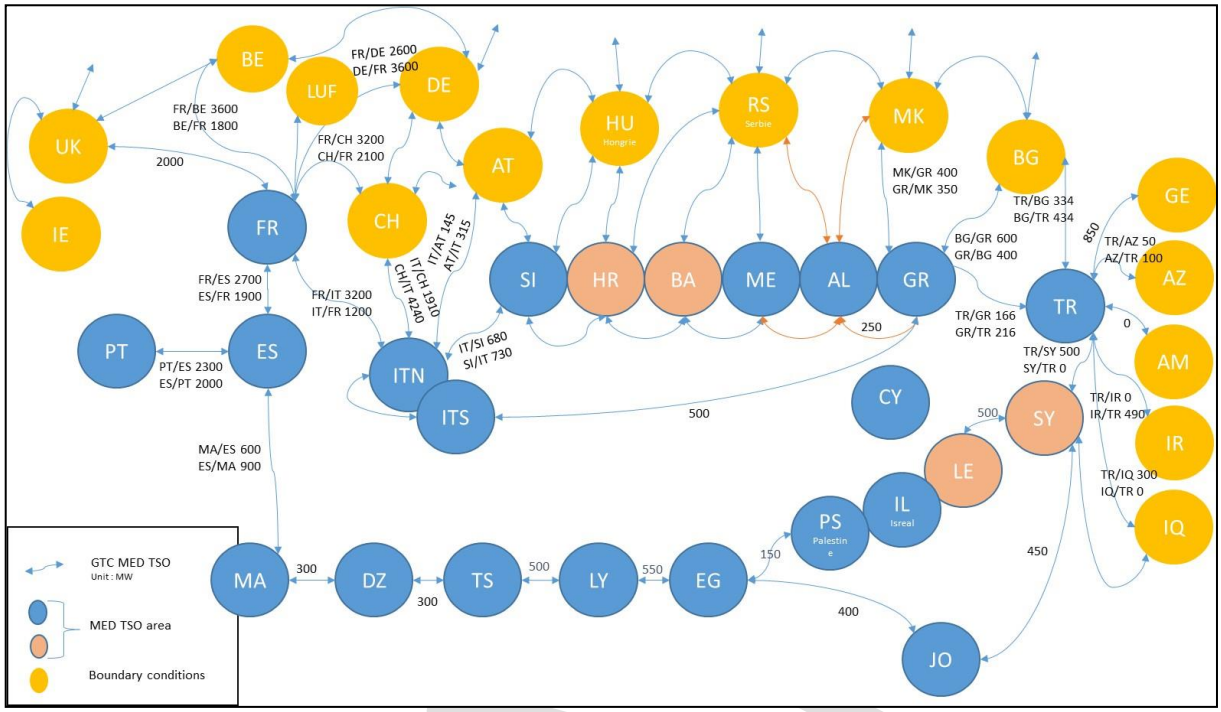


Fig. 3: NTC (MW) of existing interconnections in Mediterranean Region

7.2. Data on interconnections in 2030

The table below shows the future values of NTC by 2030 (new projects are given in comments). This information is given according to the collected data.

TSOs	Neighbouring country	Interconnection NTC in 2030 (MW)		Comments
		From country to neighbours	From neighbours to country	
ALGERIA	Italy	1000	1000	New 1000 MW HVDC link under consideration by 2025
	Morocco	1000	1000	
	Spain	1000	1000	New 1000 MW HVDC link under consideration by 2025
	Tunisia	300	300	
FRANCE	Belgium	4300[1]	2800[1]	New AC 400 kV line (600 to 1300 MW) under consideration between 2021 and 2023
	Germany	4800[1]	4800[1]	Two new AC 400 kV lines (300 MW and 1500 MW) under consideration
	Ireland	700[1]	700[1]	New 700 MW HVDC link under consideration by 2025
	Italy	4350[1]	2160[1]	New HVDC link under construction expected in 2019
	Spain	8000[1]	8000[1]	New HVDC link under consideration by 2023

[1] ENTSO-E reference GTC 2030 TYNDP 2016

TSOs	Neighbouring country	Interconnection NTC in 2030 (MW)		Comments
		From country to neighbours	From neighbours to country	
	Switzerland	3700[1]	1300[1]	Two new AC lines under consideration by 2020 and 2026
	United Kingdom	5400[1]	5400[1]	3rd party of Eleclink Mandarins project (1000 MW) expected in 2017 and two other HVDC links (1000 MW, 1400 MW) under consideration by 2020 and 2022
GREECE	Albania	250	250	
	Bulgaria	1034	1732	New AC 400 kV line (2000 MW) planned for 2021
	Italy	500	500	
	FYROM	350	400	
	Turkey	660	580	
ITALY	Austria	1385[1]	1655[1]	
	France	2160[1]	4350[1]	New 400 kV HVDC link under construction expected in 2019
	Greece	500[1]	500[1]	
	Montenegro	1200[1]	1200[1]	New 400 kV HVDC link under construction expected in 2018
	Slovenia	1380[1]	1530[1]	
	Switzerland	3860[1]	6240[1]	
JORDAN	Egypt	550	550	
	Iraq	—	—	New 400 kV HVDC submarine link (1000 MW) under consideration by 2025
	Palestine	—	—	New 400 kV HVDC submarine link (2000 MW) under consideration by 2025
	Saudi Arabia	—	—	New 400 kV AC link (1200 MW) under study by 2020
	Syria	800	800	
MOROCCO	Algeria	1000	1000	
	Mauritania	300	300	New 225 kV AC link (350 MW) planned by 2025
	Spain	600	900	New 400 kV AC submarine link (750 MW) under study by 2022
PORTUGAL	Spain	3500	4200	New 400 kV AC link (1720 MW) planned and under construction expected in 2018
SPAIN	France	8000[1]	8000[1]	New HVDC link at the stage of government agreement by 2022 and two other links at the stage of government agreement by 2023 whose technology (AC or DC) is not yet decided
	Morocco	900	600	

[1] ENTSO-E reference GTC 2030 TYNDP 2016

TSOs	Neighbouring country	Interconnection NTC in 2030 (MW)		Comments
		From country to neighbours	From neighbours to country	
	Portugal	4200	3500	New AC 400 kV line planned for 2018
TUNISIA	Algeria	300	300	
	Italy	600	600	New 400 kV HVDC link (1200 MW) under consideration by 2021
	Libya	500	500	
TURKEY	Armenia	0	0	
	Azerbaijan	50	100	
	Bulgaria	1340	1340	New AC 400 kV link (1510 MW) under study by 2020
	Georgia	1400	1400	Two new 400 kV HVDC links (700 MW each) planned for 2020
	Greece	580	660	New AC 400 kV link (1510 MW) under study by 2020
	Iran	1300	1300	New 400 kV HVDC link (600 MW) at the bidding stage expected in 2019 and two other HVDC links one of them (154 kV – 100 MVA) under construction expected in 2017 and the other (400 kV – 600 MW) planned for 2025
	Iraq	750	500	New 400 kV HVDC link (600 MW) planned for 2020
	Syria	600	600	New 400 kV HVDC link (600 MW) planned but no indication about the horizon can be given due to the war

It should be noted that Jordan provided in its filled questionnaire three new projects which will connect Jordan with Iraq, Palestine and Saudi Arabia. However, the NTC of these new projects did not be provided.

Also, future NTC of the interconnection between Greece and Turkey by 2030 remains to be confirmed by appropriate network studies. The 2nd Bulgaria – Greece interconnector, as well as a number of projects aiming to strengthen the 400 kV Bulgarian network (at the South-East), will help to increase the NTC between Bulgaria and Turkey and between Greece and Turkey.

The figure below shows the future NTCs expected in 2030 according to TYNDP 2016.

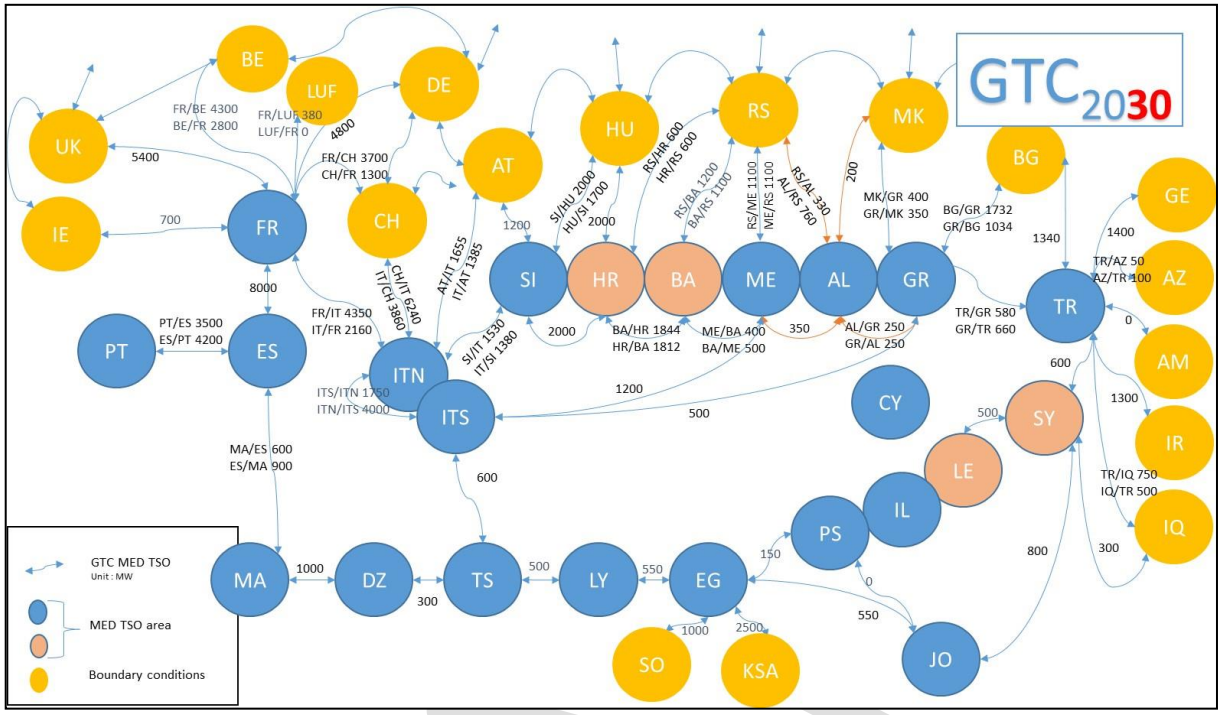


Fig. 4: Future NTC (MW) expected in 2030 (TYNDP 2016)

7.3. Energy exchanged between 2010 - 2014 in the Mediterranean interconnections

The volume of exchanges during the period 2010 – 2014 in the MedTSO region is shown in the table below (energy exchanged in TWh).

TSOs	TWh	Neighbouring Country	2010	2011	2012	2013	2014
ALGERIA	Import	Morocco	0,61	0,51	0,76	0,14	0,13
		Tunisia	0,12	0,15	0,17	0,16	0,56
	Export	Morocco	0.66	0.67	0.81	0.22	0.34
		Tunisia	0.14	0.13	0.18	0.16	0.54
FRANCE	Import	Belgium	4,80	2,10	1,90	2,30	0,80
		Germany	16,10	8,40	13,90	15,10	13,20
		Italy	1,20	0,80	0,60	1,50	0,50
		Spain	3,50	3,10	4,00	4,10	2,90
		Switzerland	6,00	2,40	7,00	7,40	9,10
		United Kingdom	5,50	2,90	1,90	1,80	0,80
	Export	Belgium	3.90	7.90	13.90	15.20	17.40
		Germany	9.40	10.80	5.20	5.30	7.30
		Italy	17.40	16.90	15.70	16.90	19.80
		Spain	1.90	4.50	5.80	5.80	6.50
		Switzerland	25.50	27.60	24.50	23.90	25.50
		United Kingdom	8.50	7.70	8.40	12.30	15.90
GREECE	Import	Albania	0,40	0,00	1,01	1,35	1,85
		Bulgaria	3,45	2,82	2,77	2,87	3,85
		Italy	0,07	0,27	0,89	0,29	1,42
		FYROM	3,86	1,49	1,39	1,07	2,09

TSOs	TWh	Neighbouring Country	2010	2011	2012	2013	2014
		Turkey	0,74	2,59	0,22	0,05	0,43
	Export	Albania	0.49	2.12	0.36	0.12	0.06
		Bulgaria	0.00	0.00	0.09	0.18	0.00
		Italy	2.31	1.71	3.11	2.09	0.21
		FYROM	0.01	0.11	0.20	0.21	0.04
		Turkey	0.00	0.00	0.89	1.30	0.74
ITALY	Imports	Austria	1,30	1,10	1,10	1,50	1,50
		France	11,70	14,30	12,60	12,50	15,50
		Greece	2,30	1,70	2,50	1,60	0,10
		Slovenia	7,50	4,80	3,80	5,30	5,20
		Switzerland	23,20	25,60	25,30	23,30	24,40
	Exports	Austria	0.00	0.01	0.02	0.02	0.03
		France	1.10	1.00	1.20	0.80	0.70
		Greece	0.07	0.30	0.30	0.10	1.30
		Slovenia	0.10	0.10	0.10	0.10	0.10
		Switzerland	0.50	0.40	0.60	1.00	0.80
JORDAN	Imports	Egypt	0,45	1,46	0,78	0,38	0,43
		Syria	0,22	0,28	0,00	0,00	0,00
	Exports	Egypt	0.00	0.00	0.01	0.01	0.02
		Syria	0.00	0.00	0.00	0.00	0.00
MOROCCO	Imports	Algeria	0,65	0,62	0,76	0,18	0,30
		Spain	3,94	4,51	4,90	5,37	5,84
	Exports	Algeria	0.61	0.51	0.81	0.15	0.13
		Spain	0.03	0.02	0.01	0.00	0.00
PORTUGAL	Imports	Spain	4,35	4,44	8,30	5,23	4,08
	Exports	Spain	1.71	1.64	0.40	2.45	3.18

These values indicate that exchanges in the southern and Eastern part of the considered area are very low. This situation is due to the fact that no market mechanisms are set in this area yet. However, a valuable exchange is shown from Spain to Morocco (nearly 6 TWh in 2014) due to the long term contract between both countries.

7.4 Exchanges potential development in the Mediterranean region

Regarding the capacity available, it appears that in general Southern and Eastern interconnections on Mediterranean area are not used enough in relation to their capacity due to lack of market. So the potential development of exchanges is particularly important in southern and Eastern Mediterranean region.

So, given the complementarity of supply and demand (growth and profile), increasing exchanges even without using an integrated market would help to develop more technical coordination in terms of network operations, information sharing which are essential for the development of the electricity market at sub regional and regional levels.

In the Northern part of Mediterranean region, exchanges are significant due to the existence of an integrated market for trading of both sides and considering the availability of important interconnections capacity.

7.5 Transfer capacity (criteria and process to evaluate the NTC)

For the transfer capacity, the most important conclusion is that mainly, all the TSO that contributed to the questionnaire consider the security criterion known by 'N-1', which consists mainly in load flow calculations considering the tripping of any line or transformer of the grid with respect to technical requirements (avoiding loading rates of lines and transformers over previously defined limits).

However, some TSO consider other criteria like Jordan and Tunisia which has adopted the N criterion and Portugal which consider the 'N-1' criterion and also some N-2 situations (tripping of two equipment's simultaneously). The figure below shows the criteria used by each MedTSO members.

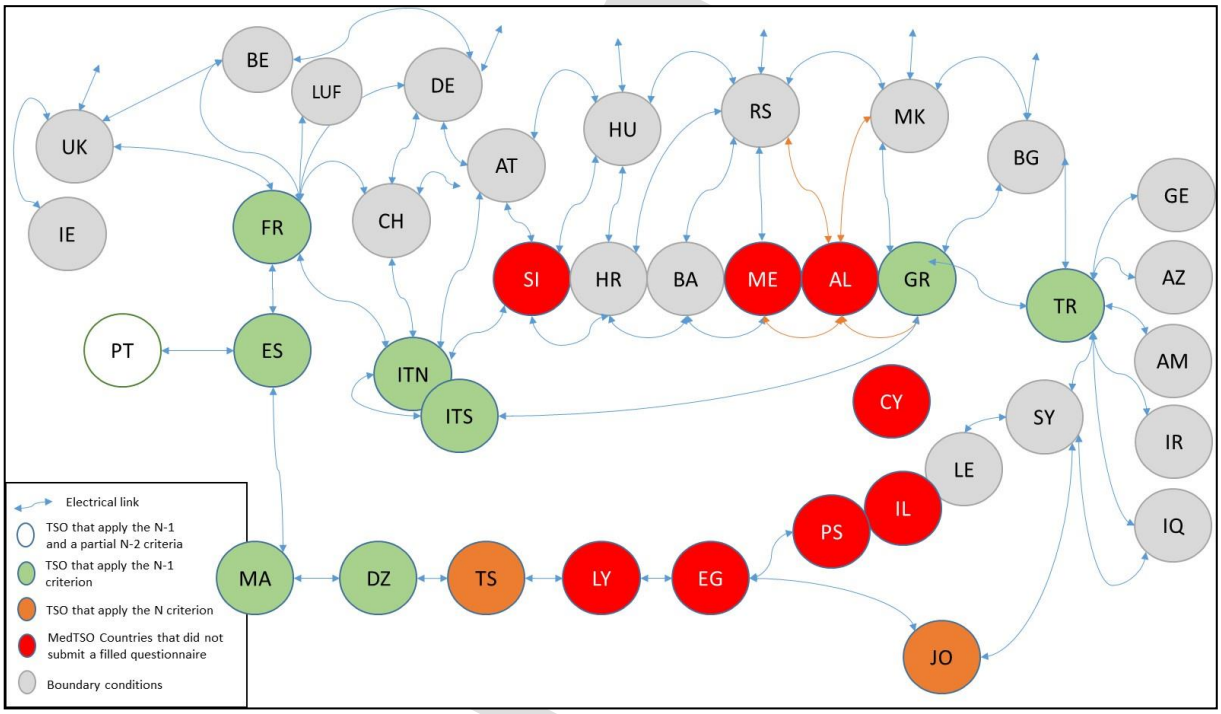


Fig. 5–Security criteria used in NTC calculation within MedTSO countries

7.6 Methods of capacity allocation

In terms of capacity allocation, the analysis of related answers makes appear that MedTSO countries can be divided in two groups: one group of TSO where the capacity allocation considerations are not applicable which are mainly located in the south of the Mediterranean basin (Algeria, Morocco, Tunisia and Jordan) and one group of TSO that apply all or some of the allocation methods which are located in Europe (France, Greece, Italy, Portugal, Spain and Turkey).

According to the answers provided by TSO of France, Italy, Portugal and Spain, it appears that all the allocation methods (yearly, monthly, daily and intraday allocation) are applied while intraday allocation is not applied in Greece and Turkey (see the figure below).

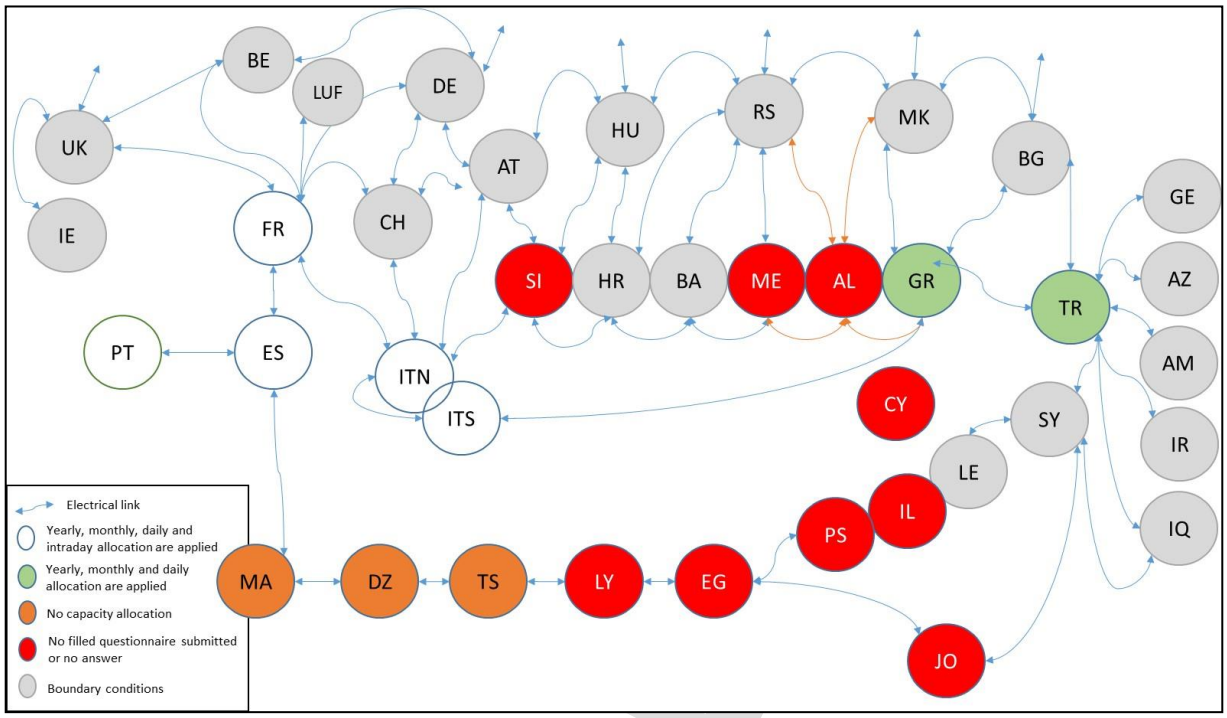


Fig. 6–Method of capacity allocation applied through the MedTSO countries

7.7 Data publishing and transparency

Regarding the data publishing and transparency, according to the answers provided, it appears that most of the electrical data are not published in the countries located in the south of the Mediterranean region (Algeria, Morocco, Tunisia and Jordan) except few data like actual loads in Morocco and Jordan, grid development plan in Algeria and installed generation capacity in Jordan.

The situation is completely different for ENTSO-E countries that publish almost all the data (France, Greece, Italy, Portugal and Spain) while Turkey takes an intermediate place because some data are published (capacity and some data about transmission grid) and some other are not (loads and generation).

The figure below gives a picture of MedTSO countries where electrical data are published and those where they are not.

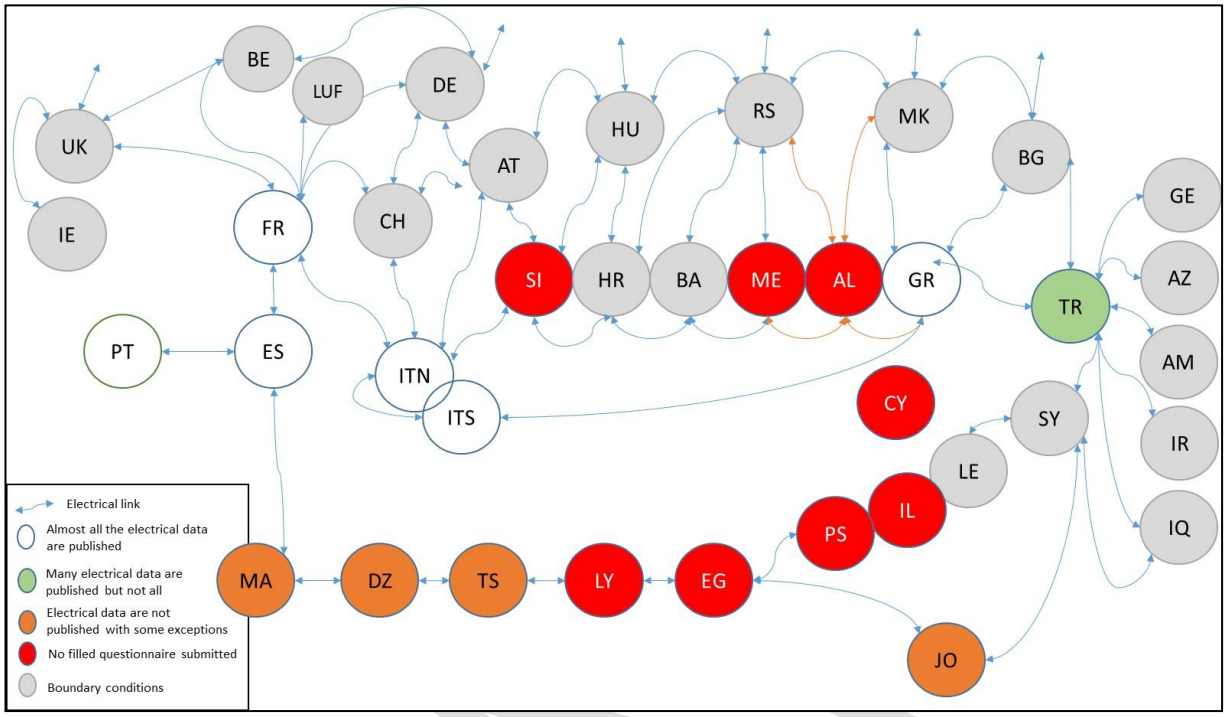


Fig. 7–Transparency within MedTSO countries

7.8 Balancing and volume-price of involuntary exchanges

Regarding the balancing and management of involuntary exchanges, TSO's were asked to provide volumes of balancing power, average and marginal prices of bids and offers, imbalance prices and prices and volumes of OTC standard contracts for the last five years. These data were provided except for Algeria which provided only volumes of balancing power and said that other data concerning market transactions are not applicable now. Also, Jordan, Morocco and Tunisia did not give answers to these questions.

The European countries (France, Greece, Italy, Portugal, Spain and Turkey) provided all or most of the requested data, except prices and volumes of OTC standard contracts that were mainly considered by all countries (even the European ones) in relation with a not applicable situation.

Regarding the commercial and technical treatment of involuntary exchanges, most of the TSOs answered these exchanges are not treated commercially but through compensation mechanisms such as energy consumed by a neighbour is returned in kind so that a zero balance is achieved at the end of the year. However, France mentioned there is a balance responsible entity that is in charge of treating this issue.

The figure below illustrates the repartition of MedTSO countries according to this matter.

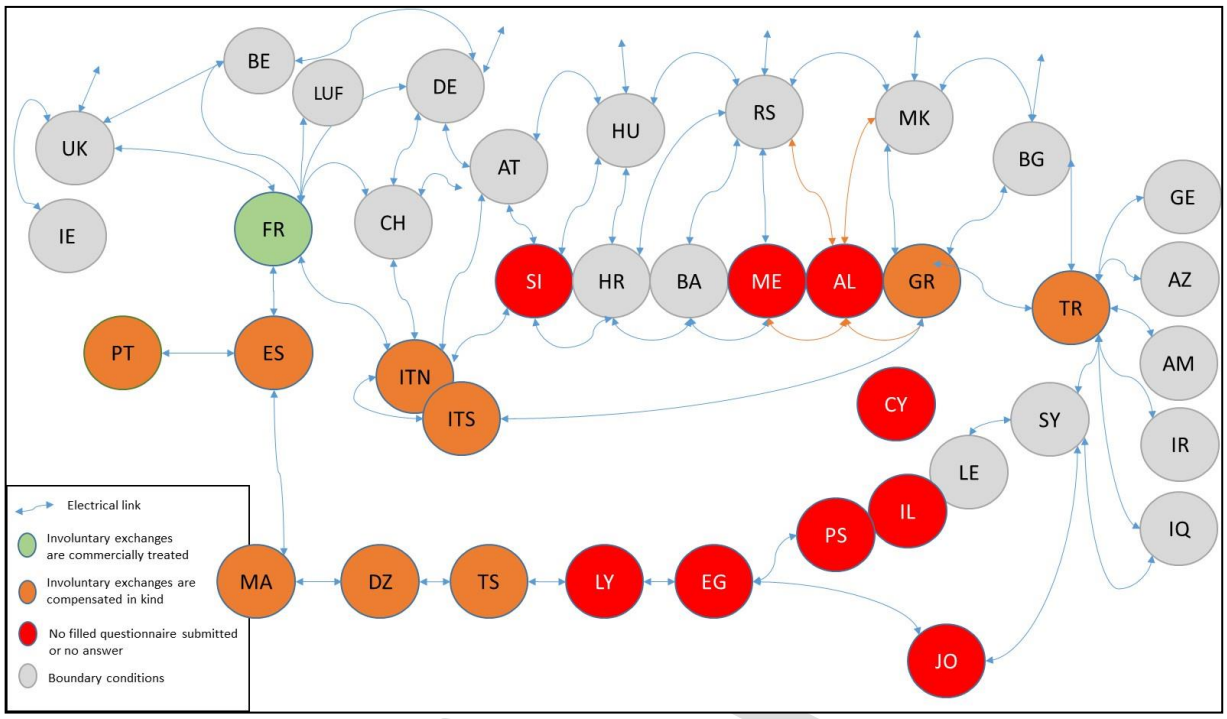


Fig. 8–Treatment of involuntary exchanges within MedTSO countries

7.9 Procedures and rules to guarantee exchange programs and balancing services

Regarding the procedures and rules to guarantee exchange programs and balancing services, the main conclusion is that coordination between TSOs is ensured in order to guarantee the exchange programs (Algeria, France, Greece, Italy, Portugal, Spain, Tunisia and Turkey) while Morocco did not answer and Jordan said there is no rules for this (see the figure 9. below).

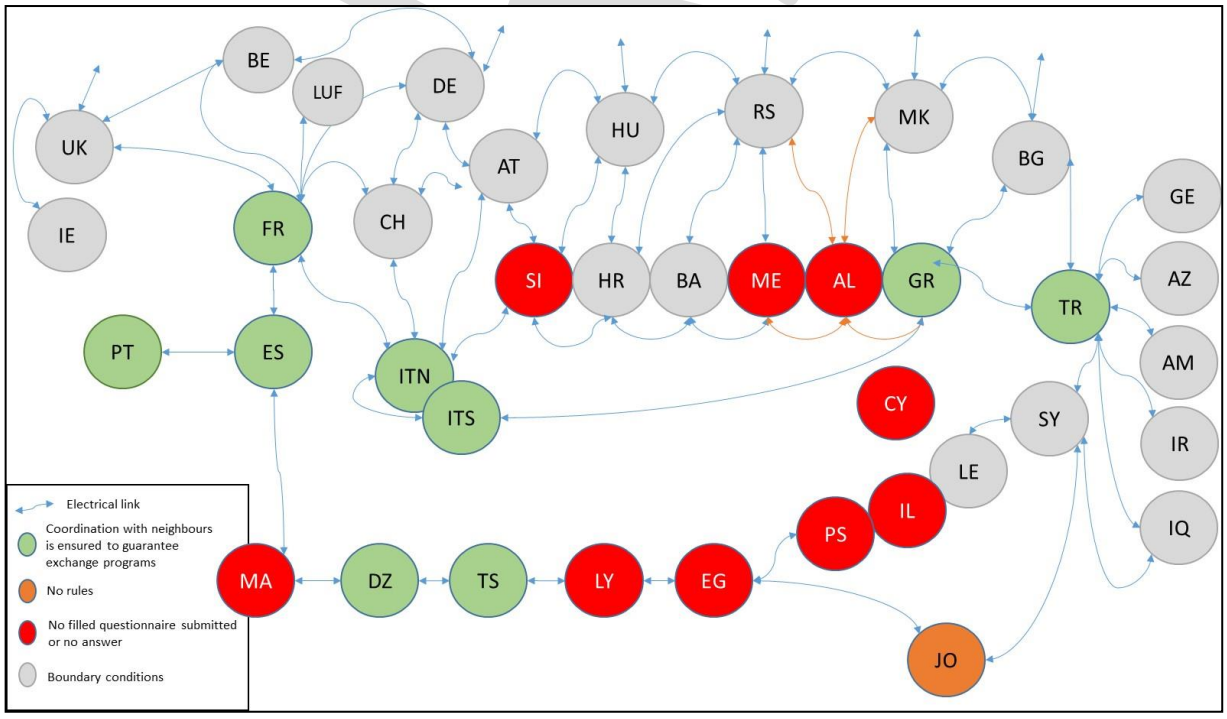


Fig. 9–Actions to guarantee exchanges programs

7.10 Market aspects

In terms of Market, the main questions were about providing information on submission of the generation schedules deadline, market share of the largest actors, existing data on market price, definition of peak hours, number of market players that can bid in national market or that can do cross border trade, programming period of trade on international interconnections, reactive power exchange treatment, etc..

TSO answered and provided the information which are different from one TSO to the other and it is difficult to classify the countries according typical answers for most of the questions (questions are about dates, times, prices, number of players etc.). Jordan and Morocco did not answer to these questions.

Regarding the reactive power exchanges treatment, the answers can be classified in two parts according to the understanding of each TSO. Some TSOs mentionned that reactive exchanges are regulated by controlling voltage profiles at neighbouring substations to minimize these exchanges (Algeria, Greece and Turkey). Tunisia said there is no treatment of reactive exchange and care is taken of maintaining an acceptable voltage profile on the transmission network even if reactive flow occurs.

Other TSOs gave a commercial answer and said that reactive exchanges are not remunerated (Italy) and not compensated (Spain) while France talked about a payment system established in order to remunerate the voltage regulation.

7.11 Legal aspects

For this aspects the questionnaire asked about legal issues related to electricity market, such as the requirements for participating on the market and the cross border trade, the requirements for using the interconnections, the organization form of the players relevant for the cross border trade, risk management, legal pre-requisites and technical studies that have to be carried out before building a new interconnection project, etc..

Each TSO gave the information that describes the situation in its country, most of the TSOs having said there is a market operator responsible of electricity transactions (France, Greece, Italy, Portugal, Spain and Turkey). Algeria too said there is a project of a market operator but it is not operating yet while Jordan and Tunisia said this responsibility is attributed to the TSO. The situation is illustrated in the figure below.

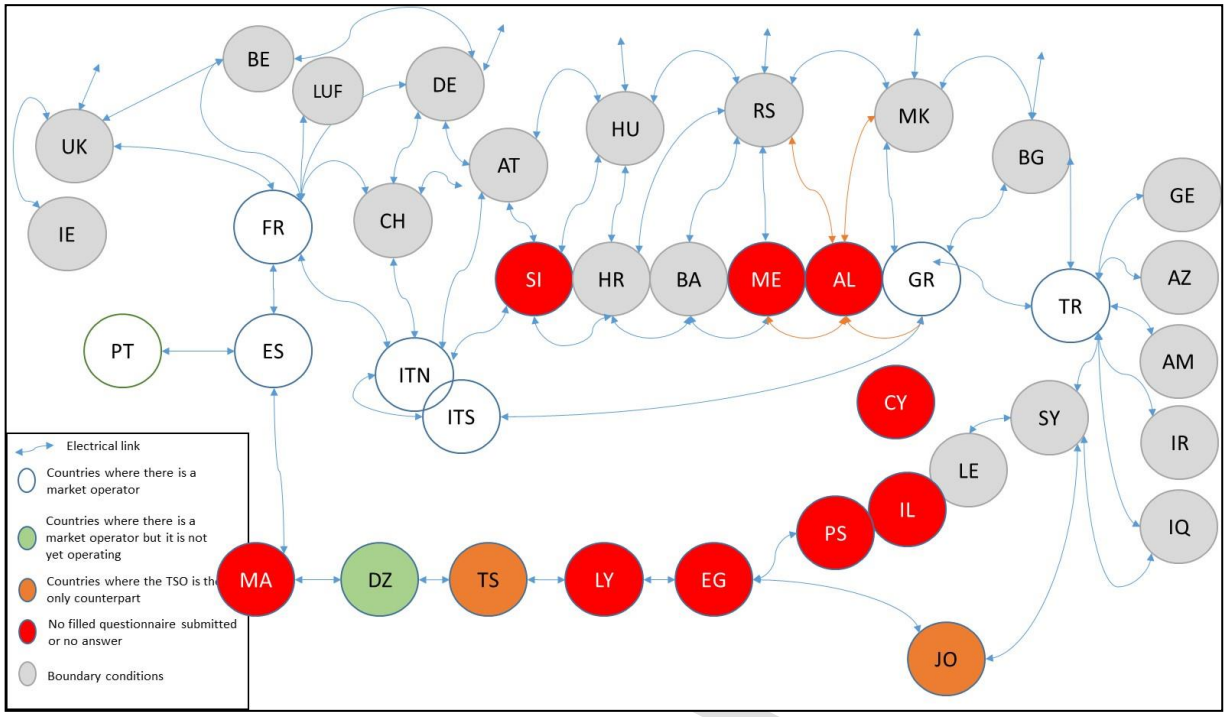


Fig. 10–Presence of a market operator in MedTSO countries

7.12 Nomination of exchanges in the interconnections

For the nomination of exchanges in the interconnections, the MedTSO members were asked to provide information about nomination of exchanges in the interconnections (eg. deadline for nominating yearly capacities, the matching procedure, how losses are handled, how are imbalances between the programmed flows and the effective flows settled).

The answers can be classified in two categories. For the limitation of exchanges in case of emergency, all the TSOs said the exchanges are limited except Portugal and Spain (see the figure 11 below). For the accuracy of the meter installed on the interconnectors, all the TSOs answered they are class 0,2 except Italy which gave the accuracy in terms of metering frequency (every 15 minutes).
Also, all the TSOs said a yearly check of the meters and sensors installed on the interconnectors are performed and access is given to neighbouring TSOs to contribute to this check.

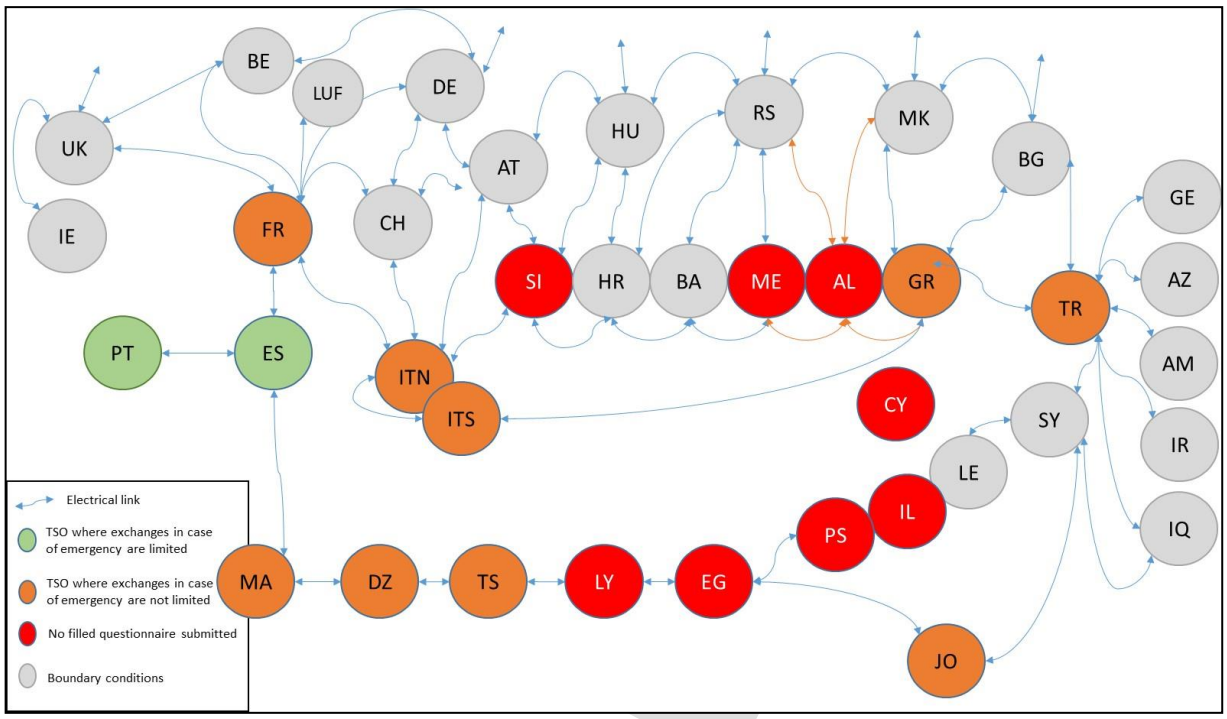


Fig. 11–Limitation of exchanges in case of emergency

7.13 Network services providing

In terms of network services, MedTSO members were asked about the kinds of network services provided by the market players and whether receiving and providing these services are allowed. Almost all the TSOs said that network services which are needed to be provided are all power reserves (FCR, FRR and RR), reactive power control and voltage control (France, Greece, Morocco, Portugal, Tunisia and Turkey). Greece, Portugal and Turkey added the black start units and Portugal added also synchronous compensation and power factor at current RES while Spain said FCR is provided and other reserves depending on the features of the generation units.

Providing and receiving these services are allowed in France, Greece, Italy, Portugal, Spain and Turkey but with some restrictions in Italy (only tertiary reserve and only in case of emergency), in Portugal and Spain (only RR and up to 50 MW in Portugal) and in Turkey (flow through the interconnection limited to 200 MW in case of emergency).

7.14 System operation

Regarding System operation, questions started with experiences in AC operation systems caused by faults in AC interconnection lines and experiences in HVDC technology based on LCC or VSC especially when such lines operate in parallel with AC interconnection ones. Only France and Spain said they have got interconnection lines based on one or both of the HVDC technologies LCC or VSC while Algeria, Greece, Morocco, Portugal, Tunisia and Turkey said they have not got and no answer to this question was provided by Italy (see the figure 12 below).

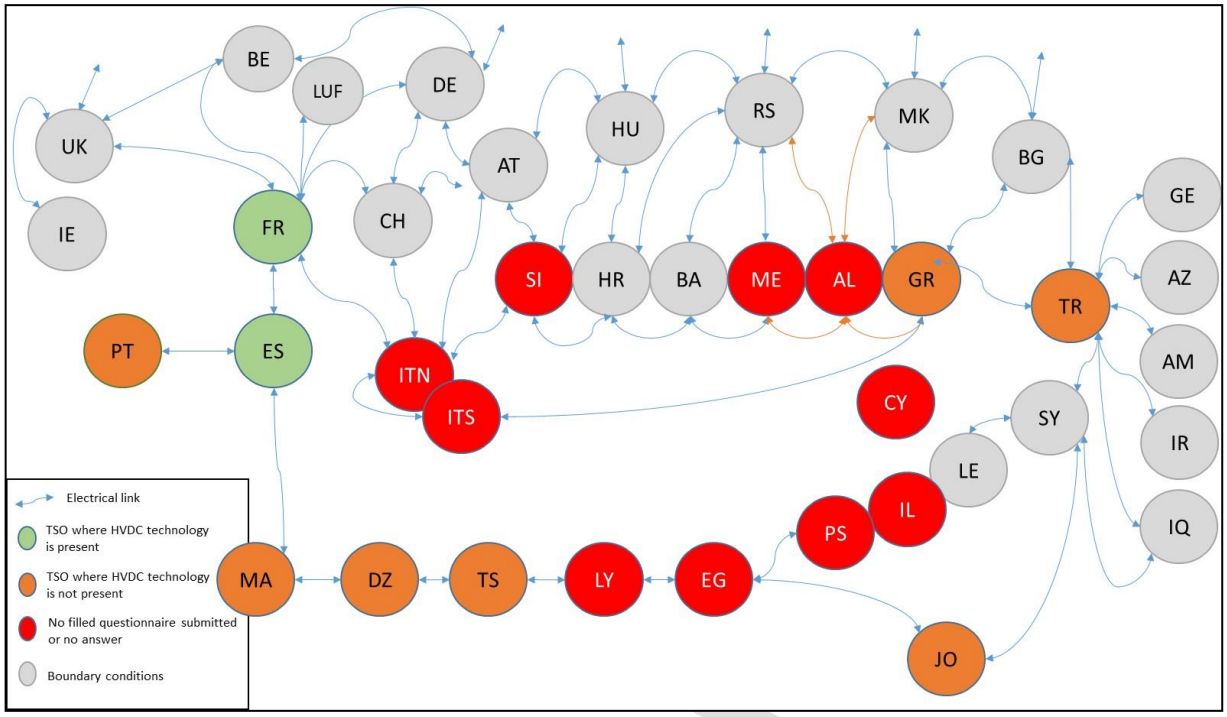


Fig. 12–HVDC technology based on LCC or VSC

Following this set of questions about experiences in system operation, other questions about technical issues were asked like:

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

An overview of the collected answers is given in the table below.

Technical issues	Related answers
Voltage management with neighbours	Controlling voltages at neighbouring substations such as they remain in specified limits in a coordinated way. HVDC can be used (France). No specific limits for interconnections (Spain).
Procedures for outage coordination with neighbours	Coordination with neighbours taking care of outage period planning for minimization of impacts on NTC. The criterion is to ensure the operation of the interconnected system in N-1 conditions.
Limitation of the power flow through the interconnection in case of emergency	Limited for some countries (Algeria, France, Spain, Tunisia and Turkey) and unlimited for other (Greece, Morocco and Portugal).
Defence plan coordination	There is defence plans coordination between TSO (All). These defence plans include frequency deviation management, automatic and manual demand disconnection, voltage deviation management, power flow management and assistance in emergency state. Detailed description is given and the main actions consist in setting frequency stages and corresponding amount of load to be cut, using primary, secondary and tertiary reserves to maintain and/or restore frequency, controlling voltages using reactive power resources like generation units, capacitors and reactors, acting on tap changer transformers, change of topology, asking users to reduce their power demand, re-dispatching power generations using optimal load flow calculations, etc..
Restoration plans	Both Top – Down and Bottom – Up strategies of restoration are mainly used based on the generation units equipped with the Black Start feature with assistance of neighbouring TSO through interconnections.
Selectivity protection on interconnection lines to avoid propagation of incidents	Yes (All except Portugal and Spain for its interconnections with Morocco and Portugal) and No Answer from Italy and Tunisia.
Description of the system states	System states are classified as Normal, Alert, Emergency, Blackout and Restoration states. Description of these system states are mainly the same for all TSOs, with the exception of Jordan that did not provide a description of each state and added another state, namely System Stress.
Parameters that are monitored on line	Each TSO has a list of parameters that are monitored in real time and that are generally frequency, bus bar voltages, active and reactive power flows, generation and load. Some TSOs include also active power reserve (Algeria, Greece, Morocco and Spain), reactive power reserve (Algeria, Greece and Morocco), frequency restoration control error (Morocco and Tunisia), Area control error (Greece) and intensity (France and Jordan).
Frequency requirements	The largest frequency range is from 47 Hz to 52.5 Hz (Spain) but frequency varies almost within the same range for other countries (the lower limit may be higher than 47 Hz or the higher limit may be lower than 52.5 Hz for some countries). Also, some TSO provided the time ranges corresponding to the

	frequency ranges and some other described the state of the system in each frequency range (Normal, Alert, Emergency, etc.).
Voltage ranges in internal networks and on interconnections	Voltage ranges are mainly according to prescribed limits which are set by each TSO for normal situation and in case of emergency or in N-1 conditions. These limits are generally applied either for internal networks or for interconnections but differences may be for some TSO (see details in annex).
Reactive management	The measures applied for reactive management are mainly the same for all TSO. These measures include the use of reactive resources like reactors, capacitors and generation units, the opening of some selected lines and change of the topology, acting on the excitation of the generation units and acting on the tap changer transformers.
Limit criteria for short-circuit	Equipment operated at 220 kV: mainly 31.5 kA (Algeria and Tunisia) or 40 kA (Morocco) and 40 kA or 50 kA (Portugal). Equipment operated at 400 kV: 40 kA (can be 40 kA or 50 kA for Portugal and 40 kA or 63 kA for Tunisia). However, France said it depends on the power line and its position in the grid and Spain said there is no limit associated with the voltage level but short-circuit are fixed taking into account the topology of the grid.
System protection coordination	General criteria (Greece, Spain and Tunisia), coordination of protection devices are set in the contracts between interconnected TSO (France), operation protocols with DSO and producers and agreements with neighbouring TSO (Portugal) and No Answer from Algeria, Italy and Turkey.
Data exchanges between TSO	A lot of data are exchanged between TSOs including contingency lists, Joint remedial actions agreed between TSOs after a contingency, Operational planning models, real time data, scheduled data and grid electrical parameters and grid topology. Details are given in annex.
Contingency analysis and stability studies	The contingency analysis consists mainly in performing load flow calculations taking into account a full N-1 criterion and the loss of the biggest generation unit (All except Turkey which do not consider the loss of generation). A partial N-2 criterion in also considered by some TSO (Greece, Spain and Tunisia) and a Full N-2 criterion too (Portugal and France). Stability studies are generally not performed neither ahead nor in real time (France, Morocco, Portugal, Spain, Tunisia and Turkey). Algeria and Italy perform such studies ahead and Greece performs them occasionally ahead and in real time. Generally, no overload is tolerated in normal condition and an overload of a defined percentage is tolerated in N-1 conditions during a certain period of time (10 min to 20 min). Voltage ranges are defined for either N or N-1 conditions.
Involuntary deviations management	Not commercially treated but treated through compensation mechanisms such as energy consumed by a neighbour is returned in kind such as a zero balance is achieved at the end of the year. However, France said there is a balance responsible

	entity that is in charge of treating this issue.
Load-frequency control	FCR is mandatory and the TSO is generally appointed to select providers which are generally selected from all the generation units whose power output is higher than a certain threshold. FRR is mandatory in Algeria, France, Morocco, Tunisia and Turkey and not mandatory in Greece, Italy, Portugal and Spain. The TSO is appointed to select the providers where applicable. All generation units whose power output is higher than a certain threshold can be providers. RR is mandatory in Algeria, France, Italy, Portugal and Tunisia and not mandatory in Greece, Spain and Turkey. The TSO is appointed to select the providers where applicable. All producers can be providers (with performances approved). In addition, France said all clients can be providers. That means that some industrial customers can contribute to the replacement reserve (RR) by decreasing their power demand. Other information and data are given for the three kinds of reserve (FCR, FRR and RR) in terms of technical requirements, remuneration, dimensioning criteria, compliance schemes and penalties when not provided. These data can be found in annex.
Reserve management	Only FCR exchange in Algeria, Morocco and Tunisia but in practice, this is not applied because of power exchange limitations through interconnections. FCR, FRR and RR exchange in France and Spain. Only FCR exchange in Greece. MEAS/RR sharing in Italy. Only RR exchange for Portugal with Spain. Exchange of FCR, FRR and RR is technically possible in Turkey but developing rules for providing and payment is needed.
Training and certification of employees in charge of real time operation	Yes with different criteria of duration and periodicity. Consistency of the training includes mainly technical skills and system operation. A good use of English is required (All) and also other languages like French (Algeria, Morocco, Spain and Tunisia) and Arabic (Algeria and Tunisia)
Power generation dispatching priority	Dispatching according to a merit order principle determined after an economic dispatch (Algeria, Morocco, Spain and Tunisia), according to market offers (Greece, Italy) and such as security of supply is ensured (France). RES has the first priority (All).

7.15 Settlement and Metering

Regarding the settlement and metering, the TSOs were asked to specify the entity responsible for these issues and how the energy injected or withdrawn is identified and attributed. The main conclusion is that the TSO is responsible for settlement and metering in international interconnection in all countries (distinction should be made in Algeria between the TSO as a system operator and the TSO as the owner of the electrical grid and the responsible for metering in Algeria is the owner of the grid).

The figure below shows the countries where the TSO is the entity responsible for settlement.

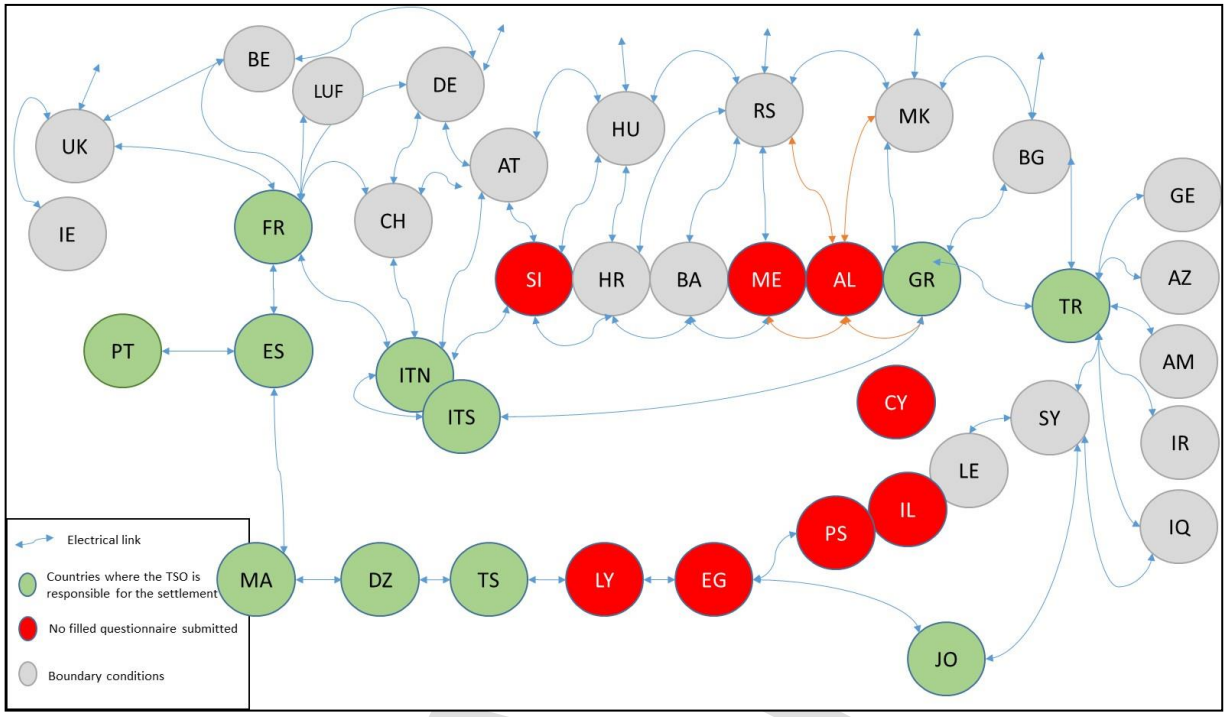


Fig. 13–Responsible of the settlement in MedTSO countries

8. Conclusion

Based on the analysis of replies to questionnaires (annex1) by members of MedTSO who responded, it appears that:

- The situation of the Mediterranean power systems is not homogeneous with a wide variety of advances regarding the integration of national electric systems and markets. In the North, the European countries belong to an integrated area which is nowadays advancing towards a real internal energy market. In the Southern and Eastern part, the area exchanges are very low. This situation is due to the fact that no market mechanisms are set in this area yet. Also, it appears that in general, the Southern and Eastern interconnections in the Mediterranean region are used to improve the security of supply and not for market purpose. A large part of transfer capacity is available for further market development. So given the complementarity of supply and demand (growth and profile), increasing exchanges even without using an integrated market would help to develop more technical coordination in terms of network operations and sharing information which are essential for the development of the electricity market at the sub regional and regional levels.
- In terms of transfer capacity, the most important conclusion is that mainly, all the TSOs that answered to the questionnaire consider the security criterion ‘N-1’, which consists mainly in load flow calculations considering the tripping of any line or transformer of the grid with respects to technical requirements (avoiding loading rates of lines and

transformers over previously defined limits). However, some TSO consider other criteria like Jordan and Tunisia which has adopted the N criteria and Portugal which consider the 'N-1' criteria and also some situations (tripping of two equipments simultaneously).

- Regarding capacity allocation, the analysis makes appear that MedTSO countries can be divided in two groups: one group of TSOs where the capacity allocation considerations are not applicable which are mainly located in the south Mediterranean region and one group of TSOs that apply all or some of the allocation methods which are located in Europe (France, Greece, Italy, Portugal, Spain and Turkey).

- For the data publishing and transparency, it appears that most of the electrical data are not published in the countries located in the south of the Mediterranean region (Algeria, Morocco, Tunisia and Jordan) except few data like actual loads in Morocco and Jordan, grid development plan in Algeria and installed generation capacity in Jordan. The situation is completely different for ENTSO-E countries that publish almost all the data (France, Greece, Italy, Portugal and Spain) while Turkey takes an intermediate place because some data are published (capacity and some data about transmission grid) and some other are not (loads and generation).
- In terms of commercial and technical treatment of involuntary exchanges, most of the TSOs answered that these exchanges are not treated commercially but through compensation mechanisms such as energy consumed by a neighbour is compensated in kind so that a zero balance is achieved at the end of the year. However, France mentioned there is a balance responsible entity that is in charge of treating this issue.
- For the exchange limitation in case of emergency, all the TSOs said the exchanges are limited except Portugal and Spain.

- Regarding the settlement and metering in international interconnections, the main conclusion is that the TSO is responsible for these issues in all countries.

ANNEX
QUESTIONNAIRE ON RULES AND PROCEDURES ON MANAGEMENT OF INTERCONNECTIONS

The following questionnaire was prepared by Technical Committee TC03 of MedTSO in accordance with the ToR TC3 ''International Electricity Exchanges''.

The main of this questionnaire is to find the answers to specific questions these are:

- Operational procedures of interconnections between neighbouring countries
- Procedures of management of power and energy deviations and compensation of mutual power exchanges
- Rules on voltage management in presence of renewable energy sources (RES) integration into the power system

Submission of members will be used in studies regarding methodologies, schemes and procedures and mechanisms for sharing resources through cross border exchanges

ABBREVIATIONS AND DEFINITIONS

Med-TSO: Mediterranean Transmission System Operators
TC3: Third Technical Committee in charge of International Electricity Exchanges
TSO: Transmission System Operator
ToR: Terms of reference
MoM: Minutes of the meeting
WG: Working Group
AC: Alternating Current
DC: Direct Current
HV: High Voltage
HVDC: High Voltage Direct Current
LCC: Line Committed Converter
VSC: Voltage Source Converter
RES: Renewable Energy Sources
PTR: Physical Transmission Rights
OTC: Over the counter
CA: Capacity Auction
TCA: Transfer Capacity Allocation.
FCR: Frequency Containment Reserves: the spinning and non-spinning reserves activated to contain system frequency after the occurrence of an imbalance. Times of activation depending on level of frequency deviation (at the limit, to be activated up to 30 seconds for Continental Europe). Primary regulation was the former name of this category of reserve.
FRR: Frequency Restoration Reserve: the active power reserves activated to restore system frequency to the nominal frequency and for synchronous area consisting of more than one Load Frequency Control (LFC) area power balance to the scheduled value. This category is divided in two parts: Automatic Frequency Restoration Reserve (aFRR) and Manual Frequency Restoration Reserve (mFRR).
aFRR: Automatic Frequency Restoration Reserve with activation delay not greater than 30 seconds. Secondary regulation was the former name of this category.

mFRR: Manual Frequency Restoration Reserve: this resource would correspond to part of the tertiary reserve with activation time of less than 15 minutes.
RR: Replacement Reserve: the reserves used to restore/support the required level of FRR to be prepared for additional system imbalances. This category includes operating reserves with activation time from time to restore frequency (TTRF) up to hours. Activation time of more than 15 minutes. This resource would correspond to the remaining tertiary reserve and other slower reserves.

Re-energization: Reconnecting generation and load to energise the system (or parts of the system) that have been disconnected.

Bottom-up re-energization strategy: Strategy where the system (or part of the system) of a TSO can be re-energised without the assistance from other TSOs.

Top-down re-energization strategy: Strategy that requires the assistance of other TSOs to re-energise the system (or part of the system) of a TSO.

I. Data of existing and planned interconnections between MedTSO Countries

1. Thermal capacity and Net Transfer Capacity for existing interconnections (MW) in the both directions

2. Thermal capacity and Net Transfer Capacity for the planned interconnections (MW) in the both directions

3. Total energy exchanged per each border network for the last 5 years (exportation and importation)

II. Transfer capacity (criteria and process to evaluate the NTC)

4. Which security criterion (criteria) is (are) used for calculating Net Transfer Capacity? Please indicate[1].
5. How do you define the term "Critical Branch" in order to obtain its common and transparent definition? Please indicate[2].
6. What is the process for finalization of Net Transfer Capacity? Please indicate.
7. Usage of a common regional network model for capacity calculation? (Yes or No).
8. Do you have long term (more than 1 year) capacity allocated on your border? (Yes or No).
a. If yes, please specify which border and the duration.
b. What type of contract is used (e.g. guaranteed power, etc.)? Please indicate.
9. How are loop flows treated if they exist (e.g. Opening subject interconnections to cut return flows). Please indicate.
10. What is the level of interconnection capacity of each control area according to peak load demand? Please indicate.

III. Methods of capacities Allocations

11. Please answer the following questions for yearly allocations.
a. What is the applied transmission capacity allocation method? Please indicate[1].

[1] The Net Transfer Capacity is the maximum total Exchange Program between two neighbouring Control Areas compatible with security standards applicable in both Control Areas, taking into account the technical uncertainties on future network conditions
[2] The term critical branch corresponds to a specific HV branch which in case it is overloaded due to an unexpected event it affects the cross border exchanges (imports or exports in a country)

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.
d. Is the capacity split or joint[2]? (Yes or no).
e. Obligation to use the allocated capacity (Yes or No).
f. Is the capacity free of charge? (Yes or No).
g. At which date is the auction performed? Please indicate.
h. What kind of capacity products are allocated? Please indicate.
i. Is the method approved by the regulator or between TSOs? (Yes or No).
j. Other type of allocation (arrangement between concerned TSOs). Please indicate.
12. Please answer the following questions for monthly allocations.
a. What is the applied transmission capacity allocation method? Please indicate[7].
b. If there is a monthly 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.
d. Is the capacity split or joint?[8] (Yes or No).
e. Obligation to use the allocated capacity. (Yes or No).
f. Is the capacity free of charge? (Yes or No).
g. At which date is the auction performed? Please indicate.
h. What kind of capacity products are allocated? Please indicate.
i. Is the method approved by the regulator or between TSOs? (Yes or No).
j. Other type of allocation (arrangement between concerned TSOs). Please indicate.
13. Please answer the following questions for daily allocations.
a. What is the applied transmission capacity allocation method? Please indicate[7].
b. If there is a daily 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.
d. Is the capacity split or joint?[8] (Yes or No).
e. Obligation to use the allocated capacity. (Yes or No).
f. Is the capacity free of charge? (Yes or No).
g. Is the method approved by the regulator or between TSOs? (Yes or No).
h. Other type of allocation (arrangement between concerned TSOs). Please indicate.
14. Please answer the following questions for intraday allocations.
a. What is the applied transmission capacity allocation method? Please indicate[7].
b. If there is an intraday 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.
d. Is the capacity split or joint?[8] (Yes or No).
e. Obligation to use the allocated capacity. (Yes or No).
f. Is the capacity free of charge? (Yes or No).
g. What is the deadline for submission of bids? Please indicate.
h. Are the capacities only allocated on an hourly basis? (Yes or No).
i. If no, please specify other products allocated in the daily auction.
j. Is the method approved by the regulator or between TSOs? (Yes or No).
15. How is the capacity fractioned between different time frames? Please indicate.
16. Use it or lose it (UILI) or use it or sell it (UISI) in long term? Please indicate[1].

[1] If the capacity is given through a market based mechanism (e.g. bidding) or non-market based mechanism (e.g. first come-first served)
[2] The Net Transfer Capacity is allocated separately by two neighbouring TSOs on a pre-agreed share (e.g. 50:50)

17. Is there a secondary market to transfer the PTR?[2] (Yes or No).
a. What is the timeline to transfer PTRs? Please indicate.
18. Possibility for re-selling the capacity (e.g. selling the yearly PTRs in monthly allocations). Please indicate.
19. Is the allocation procedure description published? (Yes or No).
a. If yes, please indicate where this description is published (website address).
20. Are the commercial and physical flows published? (Yes or No).
a. If yes, please indicate where these flows are published (website address).
21. Please provide the congestion Income for last 5 years in € for the auctions for different time frames (Yearly Monthly, Weekly, Daily, (Resale)).
22. What kind of procedures do you use or do you intend to use for the PTR allocation (e.g. public auction, tender procedures, etc.)?
a. How do you manage congestions in phase of PTR allocation?
b. Which rules do you have for the management of physical and commercial use of PTR? Which related time schedule?
c. Which system of liabilities, guarantees and penalties (technical and commercial) do you apply for each subject involved?
d. Who is the subject responsible for the management procedure?
23. Capacity calculation
a. Which are the time horizons used for capacity calculation?
b. What is the process for calculating capacity in the different time horizons?

IV. Publication of data- informations and Transparency

24. Please indicate which of the following data is published together with its link and availability in English.
a. Load
i. Actual load
ii. Day ahead load forecast
iii. Week ahead load forecast
iv. Month ahead load forecast
v. Year ahead load forecast
vi. Year ahead forecast margin
b. Transmission grid
i. Report on development on transmission grid
ii. Planned outages on the transmission grid
iii. Year ahead forecasts of available transmission capacity
iv. Month ahead forecasts of available transmission capacity
v. Week ahead forecasts of available transmission capacity
vi. Day ahead forecasts of available transmission capacity
vii. Intraday available transmission capacity
viii. Details on actual outages in transmission grid
c. Capacity
i. Capacity offered, requested and assigned
ii. Capacity reserved for balancing market
iii. Type of product available before running the auction
iv. Total capacity nominated

[1] If the owner of the capacity does not use this right, unused capacity is lost and the owner of the capacity cannot claim any compensation
[2] Physical Transmission Right: The Right to use Interconnection Capacity for electricity transfers, usually expressed in MW

v. Capacity allocated, capacity price, congestion income
vi. Reasons of the curtailments and effects of actions taken by TSOs
vii. Aggregated realized commercial and physical flows
viii. Publishing times for capacity offered, requested and assigned
d. Generation
i. Installed generation capacity
ii. Ex ante information on planned outages of generation units
iii. Ex ante information on planned outages of consumption unit
iv. Ex ante aggregated information on scheduled generation
v. Filling rate of water reservoirs
vi. Forecast of wind and solar power
vii. Actual generation of wind and solar power
viii. Ex post information on unplanned outages of consumption units
ix. Ex post information on unplanned outages of generation unit
x. Ex post data on the actual generation

V. Balancing and volume – price of involuntary exchanges

25. Please provide the volume of balancing power for the last five years.
26. Please provide the average and marginal prices of bids and offers for the last 5 years.
27. Please provide the imbalance prices for the last 5 years.
28. Please provide the prices and volumes of OTC standard contracts for the last 5 years.
29. Please indicate the technical and commercial treatment of involuntary exchanges on international interconnections.
30. Please indicate the levels of regulatory exchanges (involuntary exchanges)
31. How are involuntary exchanges between TSO's treated? Please indicate.

VI. Procedures and rules to guarantee exchanges programs and balancing services

32. Which set of actions (procedures, rules) do you apply in order to guarantee the exchange programs?
33. Which set of remedial actions (ancillary services, black start capability, etc.) do you apply in order to guarantee the exchange programs?
34. Which set of actions (procedures, rules) do you apply for the balancing services?
35. Which users can provide balancing services?
36. How is the congestion income distributed?

VII. Market

37. At which time of day D-1 do national generation schedules for day D have to be submitted? Please indicate.
38. If there is a power exchange in your country, at which time of day D-1 is the spot market clearing for day D performed? Please indicate.
39. In your national market, what is the market share (e.g. in percent of national supply) of the largest market actor and of the three largest market actors? Please indicate.
40. What is the ratio of private sector generation in national generation mix? Please indicate.
41. Is there any data available concerning current and/or historic market prices for the last 5 years? (Yes or No).
a. If yes, where are such data available (website, documents)?
b. If no, please specify typical price ranges (e.g. observed during last year) for:
i. Weekday peak hours, winter

ii. Weekday night hours, winter
iii. Weekend winter
iv. Weekday peak hours, summer
v. Weekday night hours, summer
vi. Weekend summer
42. Does a commonly agreed (or even "official") definition of peak hours exist in the national market? (Yes or No).
a. If yes, please specify these hours.
43. Please specify the number of the market players who can bid in national electricity market.
44. What is the eligible threshold/criteria in your national market? Please indicate.
45. Please specify the number of the market players who can do cross-border trade.
a. Are there any additional players which might be relevant for the cross border trade, which, however, do not fit into the typical trader role (e.g. any governmental/local authorities, associations, etc.)? (Yes or No).
b. If yes, please list those players.
46. Please specify the programming period of trade on international interconnections.
47. Please indicate how reactive power exchanges treated are.
48. Commercial energy exchange contracts (process power guaranteed).

VIII. Legal

49. What are the current requirements for participation on the electricity markets in your country? Please indicate.
50. What are the current requirements for participation on the cross border electricity trade in your country? Please indicate.
51. Is there a market operator in your legislation or the TSO is the only counterpart?
52. Which requirements you have to satisfy for using the interconnections (e.g. demand/offer equilibrium, congestion management at national, and if possible, at international level, balancing of the exchange program in real time, coordinated dispatching)?
53. What are the current rules for export / import of cross border electricity in your country? Please indicate.
54. Who imports / exports electricity in your country (single buyer, operator, customers, etc.)? Please indicate.
55. Please provide information and data concerning organization form (public ltd. company, private ltd. company), ownership structure (public entity, private entity) and capital structure of the players relevant for the cross border trade.
a. Are there any changes to be expected in the above mentioned structures? (Yes or No).
b. If yes, please provide the expected structures.
56. Is there a commercial register in your country? (Yes or No).
57. Which information has to be passed on to the commercial register? Please complete with the same answer than in TC2 Questionnaire - Starting Regulatory Framework.
58. Please provide information on the ability and necessity to enter into contracts with market players relevant for the cross border trade with other relevant market players in your country (i.e. contracts between TSO and grid operators, contracts between TSO and market operators and contracts between market operators and grid operators).
58.1. Contracts between TSO and grid operators:
a. Can they conclude contracts? (Yes or No).
b. Are there any obligations to conclude contracts? (Yes or No).
c. Do they need a special permission to do so? (Yes or No).
d. Are there any limitations to their contract making powers? (Yes or No).
e. Do any contracts already exist? (Yes or No).

f. If yes, what was the legal basis for setting up these contracts? Please indicate.
g. Please also give a short overview on their contents as far as these contracts might be of importance for cross border trade.
58.2. Contracts between TSO and market operators:
a. Can they conclude contracts? (Yes or No).
b. Are there any obligations to conclude contracts? (Yes or No).
c. Do they need a special permission to do so? (Yes or No).
d. Are there any limitations to their contract making powers? (Yes or No).
e. Do any contracts already exist? (Yes or No).
f. If yes, what was the legal basis for setting up these contracts? Please indicate.
g. Please also give a short overview on their contents as far as these contracts might be of importance for cross border trade.
58.3. Contracts between market operators and grid operators:
a. Can they conclude contracts? (Yes or No).
b. Are there any obligations to conclude contracts? (Yes or No).
c. Do they need a special permission to do so? (Yes or No).
d. Are there any limitations to their contract making powers? (Yes or No).
e. Do any contracts already exist? (Yes or No).
f. If yes, what was the legal basis for setting up these contracts? Please indicate.
g. Please also give a short overview on their contents as far as these contracts might be of importance for cross border trade.
59. Please provide an overview of international agreements on either bilateral or multilateral basis which your country has concluded with other countries concerning further development and liberalization of energy markets.
60. Risk management: the auction rules shall contain provisions concerning risk management, possibly with an obligation for the market participants to offer collateral securities to the auction office. One possibility would be bank guarantees.
a. Are there any provisions in national legislation which have to be taken into consideration? (Yes or No).
b. Does national legislation permit this tool of risk management? (Yes or No).
c. Are there any difficulties to be expected with possible different standards for bank guarantees in your country (e.g. concerning terms of duration or the right of the beneficiary to make use of the bank guarantee?) or any other limitations which have to be taken into consideration for the purpose of introducing bank guarantees as a tool for risk management? (Yes or No).
i. If yes, please indicate.
61. Are there any “national security” concerns in your country with respect to the information to be given to the Auction Office (or others? – e.g. grid structure and current system status) that have to be taken into account? (Yes or No).
62. Is there any legal definition or necessity for a legal definition of border capacity? (Yes or No).
63. Are there any customs duties / taxes which may arise in case of transmitting energy cross border from your country to any other countries participating in this project and vice versa? (Yes or No).
64. Will the right to buy transfer capacities under the Transfer Capacity Allocation (TCA) be taxed in your country? (Yes or No).
65. Are there any other fiscal restrictions which have to be taken into account? (Yes or No).
a. If yes, what are these restrictions? Please indicate.
66. Are there control areas with part of them under different jurisdiction? (Yes or No).
67. How is electricity trade made in your country: between market participants or between TSO’s?
68. Is there any pre-requisite to build a new interconnection project (e.g. it should be approved first by another authority etc.)? (Yes or No).
a. If yes, what are these pre-requisites? Please indicate.

69. For development of new interconnections, what are the preconditions (studies to be achieved, etc.) before launching an interconnection project? Please indicate.

IX. Nomination of exchanges in the interconnections

70. What is the deadline for nominating the yearly capacities? Please indicate.
71. Do you have a matching procedure on your borders to check if the nomination from market players are consistent? (Yes or No).
a. If yes, what is the deadline for matching process? Please indicate.
b. Which rule is applied when the matching fails for a particular market player (i.e. cancellation of the program, accepting the minimum value, etc.)? Please indicate.
72. In case of emergency, can you perform emergency exchanges with your neighbour? (Yes or No).
a. If yes, is there any limit for this exchange? (Yes or No).
73. How do you handle the "losses" on your interconnectors? Please indicate.
74. By law, is delivered energy assumed to be delivered on your border? (Yes or No).
a. If no, please provide information.
75. Please provide information on how the imbalances between the program and realized flows are settled.
76. Please provide information on the accuracy of the meters installed on your interconnectors.
77. Do you have yearly check for the meters / sensors on the interconnectors? (Yes or No).
a. If yes, can your neighbour join you in this check? (Yes or No).
78. Is it possible to access the meter data remotely? (Yes or No).
a. If yes, do you give access to your neighbour for the sake of transparency? (Yes or No).

X. Network services providing

79. Please provide what kind of network services the market players need to provide (i.e. primary frequency reserve, secondary/tertiary reserve, network losses, etc.).
80. Does your legislation allow you to receive those services from your neighbour? (Yes or No).
a. If yes, please provide more information about size and delivery of those services.
81. Does your legislation allow you to provide those services for your neighbour? (Yes or No).
a. If yes, please provide more information about size and delivery of those services.

XI. System Operation

82. Have you ever experienced problems in AC system operation caused by faults in AC interconnections lines? (Yes or No).
a. If yes, write a short description of what happened.
b. What problems were caused in neighbouring systems and interconnection lines? Please indicate.
83. Have you ever experienced problems in AC system operation caused by faults because they were not correctly eliminated? (Yes or No).
a. If yes, write a short description of what happened.
b. What problems were caused in the neighbouring systems and interconnection lines? Please indicate.
84. Do you have HVDC technology based on LCC or VSC in your system? (Yes or No).
a. If yes, write a brief description about the main characteristics.
b. What are the HVDC specific operation security limits (where applicable)? Please indicate.
85. Do you have HVDC interconnection lines based on LCC or VSC technology? (Yes or No).
a. If yes, write a brief description about the main characteristics.
b. Write a brief description about your experience in the operation of this HVDC technology.
c. How do you deal with a tripping of an HVDC interconnection if your interconnection line(s) is/are only HVDC? How is the system prepared? Please indicate
d. Are some special protection and control schemes considered? (Yes or No).

i. If yes, write a short description about this issue.
e. Are some special operational procedures considered in order to keep system security? (Yes or No).
i. If yes, write a short description about this issue.
86. Do you have interconnection lines based on HVDC technology (LCC or VSC) operated in parallel with AC interconnection lines? (Yes or No).
a. If yes, how do you operate all the interconnections together? Please indicate.
b. What problems can be unleashed in the operation of all interconnections? Please indicate.
c. How can you solve these problems? Please indicate.
d. Have you detected any unexpected behaviour related to power system in the interconnection areas? (Yes or No).
e. Are some special protection and control schemes considered? (Yes or No).
i. If yes, write a short description about this issue.
f. Are some special operational procedures considered in order to keep system security? (Yes or No).
i. If yes, write a short description about this issue.
87. Please answer the following questions about areas/countries/neighbours where there is an HVDC technology based on LCC or VSC, in case of critical conditions like a disturbance.
a. Have you observed presence of harmonics in AC network? (Yes or No).
b. Were all faults or commutation failures well cleared? (Yes or No).
i. If not, why? Please indicate.
c. How did system protection work (which ones worked and which ones did not)? Please indicate.
88. Have you experienced situations where the protection system has not operated properly during a fault due to the short circuit current contribution of the power electronic devices? (Yes or No).
a. Describe the type of power electronic devices, type of fault, trip time, type of protections that worked and those which that did not.
89. How do you manage the voltage with your neighbour (e.g. voltage limits of the border substations)? Please indicate.
90. Please answer these questions about criteria and procedure for outage coordination when NTC is affected.
a. How do you harmonize the maintenance of the interconnection lines including HVDC links (and neighbouring internal lines, if they effect the NTC) with your neighbour? Please indicate.
b. What are the criteria and procedure for outage coordination between TSOs (corrective or predictive maintenance) when NTC is affected? Please indicate.
c. What are the criteria and procedure for outage coordination between TSO and User (corrective or predictive maintenance) when NTC is affected? Please indicate.
91. In case of emergency, is there any pre-agreed limit (MW) to help your neighbour? (Yes or No).
a. If yes, what is this limit (MW)? Please indicate.
92. How do you handle the wheeling fee that occurs in your system that is originated by your neighbour? Please indicate.
93. How do you handle the wheeling fee that is originated by the import/export of your country and creates loop flows in your neighbour? Please indicate.
94. Is there any defence plans coordination and protection against propagation of incidents? (Yes or No).
a. If yes, please give some information that characterize these defence plans (consider the following issues). Please indicate.
i. What is the frequency deviation management procedure (Automatic Under/Over-Frequency control scheme)?
ii. Which are the setting of demand disconnection schemes (low frequency and/or low voltage) in your system?
iii. What is the voltage deviation management procedure?
iv. What is the power flow management procedure?
v. What is the manual demand disconnection procedure?

vi. Describe the inter-TSO assistance and coordination in emergency state.
95. Please answer the following questions about restoration plans (rules and types of restoration plans at local/national level and through interconnections).
a. What are the rules at local/national level and through interconnections if the bottom-up re-energization strategy restoration plan is used? Please indicate.
b. What are the rules at local/national level and through interconnections if the top-down re-energization strategy restoration plan with inter-TSO assistance and coordination is used? Please indicate.
96. Is there any appropriate selectivity protection on interconnection lines to avoid propagation of large incidents? (Yes or No).
97. Please answer the following questions about system states.
a. What is the classification of system states in your system? (Normal, Alert, Emergency, Blackout, Restoration, etc.). Please specify briefly the conditions of each one.
b. Which parameters are monitored in real time? Please indicate.
i. If there are differences between system states, please explain.
98. Please answer the following questions about technical requirements.
a. What are the frequency/time ranges in your system?
b. What are the voltage/time ranges in your system?
c. What are specific voltage ranges for international interconnections (where applicable)?
d. Which measures are applied in your system for reactive management? (Opening lines, reactors, distribution support, etc.)? Please indicate.
e. What are specific reactive power management measures for international interconnections (where applicable)? Please indicate.
f. What are the limit criteria for short-circuit management? Please indicate.
g. What are the system protection coordination criteria? Please indicate.
99. What types of information are exchanged between TSOs in the following topics? Please indicate.
a. Issues included in the contingency list (both for internal and external contingencies).
b. Joint remedial actions agreed between TSOs after a contingency in each operation time horizon.
c. Operational planning models in each operation time horizon .
d. Real time data (including criteria used for defining network limits shared between TSOs – observability area).
e. Scheduled data for different time horizons.
f. Structural data (grid electrical parameters, topology, etc.).
g. State estimation data exchange.
100. Please answer the following questions about contingency analysis.
a. What are operational security limits in different system states and what are the contingencies considered (full n-1, partial n-1, full n-2, partial n-2, loss of the biggest generation plant, etc.)? Please indicate.
b. Which studies are made for state estimation and what is the periodicity of these studies? Please indicate.
101. Please answer these questions about dynamic stability studies.
a. Are stability studies performed in day ahead? (Yes or No).
b. Are stability studies performed in real time? (Yes or No).
102. Please answer the following questions about principles of management of international exchange programs between TSOs.
a. Please provide information about scheduled exchanges programming and management.
b. Please provide information about unintentional deviations management (including compensation of unintentional deviations).
103. Please answer the following questions about Load Frequency Control.
a1. Please provide information (technical minimum requirements by Synchronous Area) about Primary regulation / Frequency Containment Reserve (FCR).

a2. Is providing FCR mandatory? (Yes or No).
i. If yes, who is appointed to select FCR providers? Please indicate.
a3. Are users paid for providing FCR? (Yes or No).
i. If yes, how are FCR providers paid? Please indicate.
a4. Which users can provide FCR? Please indicate.
a5. What are the criteria used for establishing the quantity of FCR needed? Please indicate.
a6. Is there any compliance scheme for FCR? (Yes or No).
a7. Are there any consequences (i.e. economic penalties) for not providing FCR? (Yes or No).
b1. Please provide information (technical minimum requirements by Synchronous Area) about Frequency Restoration Reserve (FRR).
b2. Is providing FRR mandatory? (Yes or No).
i. If yes, who is appointed to select FRR providers? Please indicate.
b3. Are users paid for providing FRR? (Yes or No).
i. If yes, how are FRR providers paid? Please indicate.
b4. Which users can provide FRR? Please indicate.
b5. What are the criteria used for establishing the quantity of FRR needed? Please indicate.
b6. Is there any compliance scheme for FRR? (Yes or No).
b7. Are there any consequences (i.e. economic penalties) for not providing FRR? (Yes or No).
c1. Please provide information (technical minimum requirements by Synchronous Area) about Replacement Reserve (RR).
c2. Is providing RR mandatory? (Yes or No).
i. If yes, who is appointed to select RR providers? Please indicate.
c3. Are users paid for providing RR? (Yes or No).
i. If yes, how are RR providers paid? Please indicate.
c4. Which users can provide RR? Please indicate.
c5. What are the criteria used for establishing the quantity of RR needed? Please indicate.
c6. Is there any compliance scheme for RR? (Yes or No).
c7. Are there any consequences (i.e. economic penalties) for not providing RR? (Yes or No).
104. Please answer the following questions about reserves management (exchange and sharing).
a. What are the possibilities of reserve exchange and share between TSOs and what are the implementation mechanisms of each type of reserves (FCR, FRR and RR)? Please indicate.
105. Please answer the following questions about training and certification of system operator employees in charge of real-time operation.
a. Is there any certification of the operators in charge of real time? (Yes or No).
b. Is the certification delivered by the TSO or by another entity? (Yes or No).
c. How long time the certificate is valid? Please indicate.
d. Does the TSO use a simulator for the training? (Yes or No).
e. How consistent is the training realised by the TSO for operators and what kind of topics are included in this training (including stress management)? Please indicate.
f. Please indicate the periodicity of the training of each operator and the duration of one session.
g. What are the different levels of the operators? Please indicate.
h. What are the criteria of the classification? Please indicate.
i. How long is the activity of the operator in real time? Please indicate.
j. Is there any language requirement for operators? (Yes or No).
j1. If yes, what are the languages the operator should know? Please indicate.
k. Is there any systematically established inter-TSO training scheme or practice? (Yes or No).
l. Do you have similar requirements for operators in other control centres (not operated by the TSO)? (Yes or No).
106. Please answer the following questions about dispatch priority and RES operation management.
a. What dispatch criteria (including priority) are applied in your system? Please indicate.

XII. Settlement + Metering

107. Who is responsible for the settlement in your system?
108. How do you identify and attribute the amount of energy injected or withdrawn?
109. Who is responsible for metering (settlement measures) in the international interconnections?

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