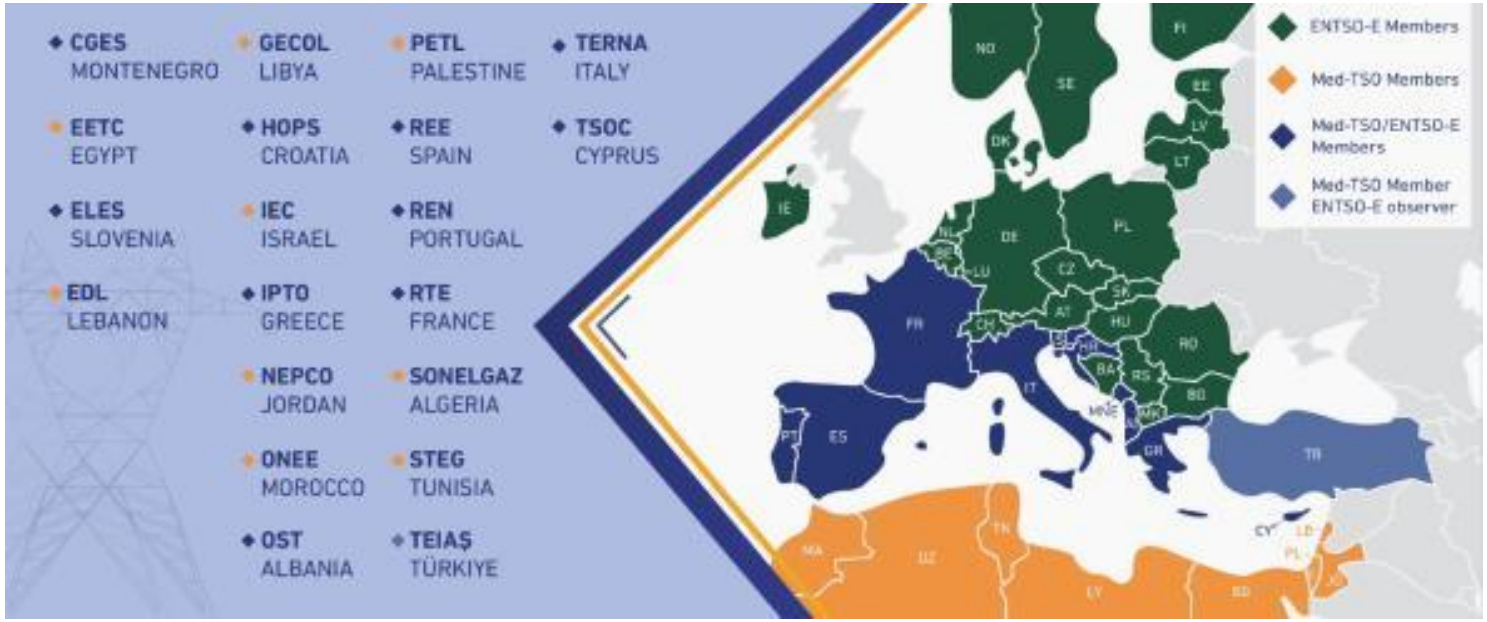
Med-TSO and its role to support energy transition and PS integration in the Mediterranean region

Cairo, 27 February 2023

Med-TSO
MEDITERRANEAN TRANSMISSION SYSTEM OPERATORS

Co-funded by
the European Union

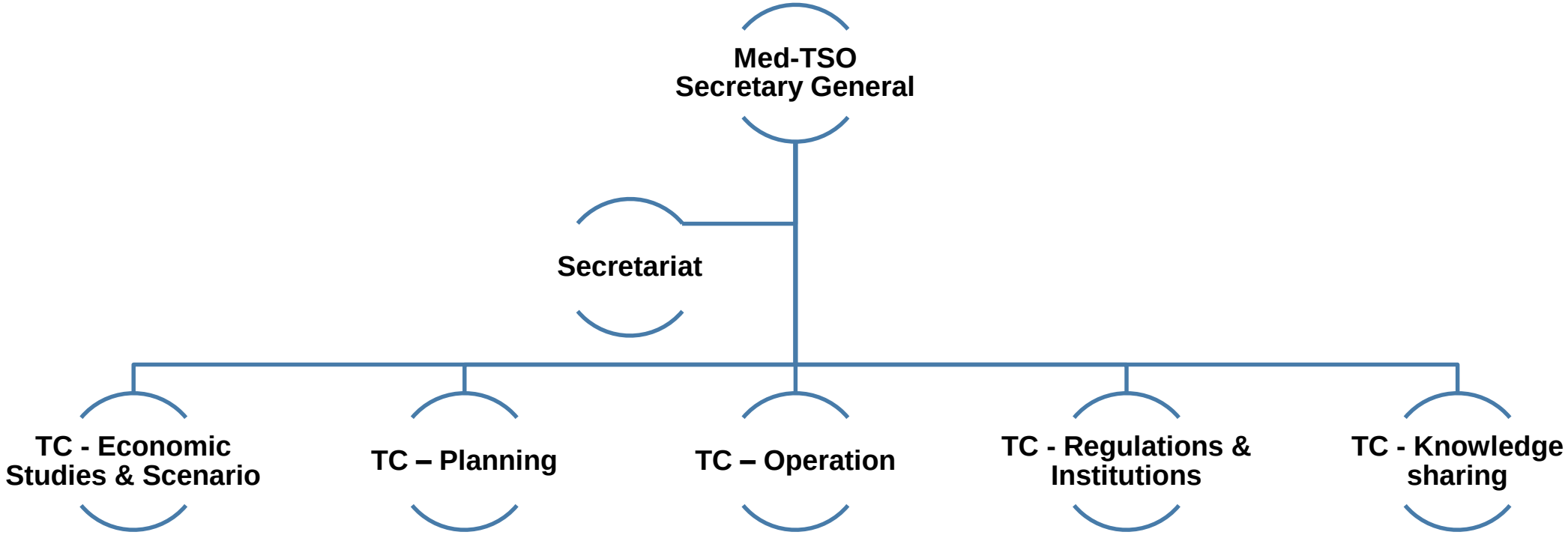
Med-TSO: multilateral cooperation in the Mediterranean



- **22** members from **20** Med countries
- **> 500 million** people served
- **~ 544.000 MW** installed capacity
- **~ 400.000 km** transmission lines
- **> 1600 TWh** electricity consumption

- **A bridge between Europe and the MENA Region,** acting as THE reference regional stakeholder for electricity
- Playing a regional reference role for creating a favorable climate for the **development of North-South and South-South interconnections**
- **Launching pilot projects** to strengthen the integration of the MENA Power Systems
- **Support the EC** in its Euro-Mediterranean initiatives
- **Bottom-up approach**

Med-TSO Organization



Energy transition in the Mediterranean context

1 All countries involved in the energy transition

- COP27 marks the growing commitment of MENA countries to global climate actions
- Need of investments in gas (medium term) & RES

2 TSOs called to adapt to this new context

- Grid expansion
- System operation more complex (fast and massive RES growth)
- Need for more system flexibility

3 Challenges

- Limited or non efficient use of grids & interconnections
- Unstable environment for investors: market fragmentation, lack of long-term price signals
- balance climate engagements with fossil fuels overdependence

4 Integration is a key driver

- Reduced mkt fragmentation
- Share balancing resources
- Complementarities:

i. seasonal
ii. hourly
iii. generation mix

Mediterranean is warming 20% faster than the average

Integration is no longer an option

Inadequate interconnection level is a heavy barrier

Reinforced cooperation is essential

Integration of the Mediterranean Power Systems

What is needed

- **develop the electricity infrastructure** (effective integration only when both North–South and South-South interconnections exist to connect regions – subregions and not only countries)
- **use the existing grid in an efficient way**
- **develop common rules** for guaranteeing the system interoperability

Role of Med-TSO

- promotes the HW, i.e. developing the grid: common planning methodologies, tools and criteria to assess commercial and technical viability of projects through a shared Cost-Benefit Analysis for evaluating their regional impact and ensuring Technical
- develop the SW, i.e. the common ground rules for achieving system interoperability and basic elements of a Mediterranean Grid Code

The Mediterranean is for the first time after decades at the heart of the discussions on energy

Take the momentum to overcome the non technical barriers

Main pillars of Med-TSO's action plan

a — Coordinated planning

- Coordinated development of HV grid
- Med Masterplan

b — Common rules

- Power System interoperability
- Mediterranean Grid Code

c — Capacity building

- Training
- Knowledge Sharing programs

d — Interconnected Electricity Exchange Zones

- Coordinated Adequacy assessments
- Enhance coordination in operations

2015 — 2018 — 2020 — 2023 — 2025

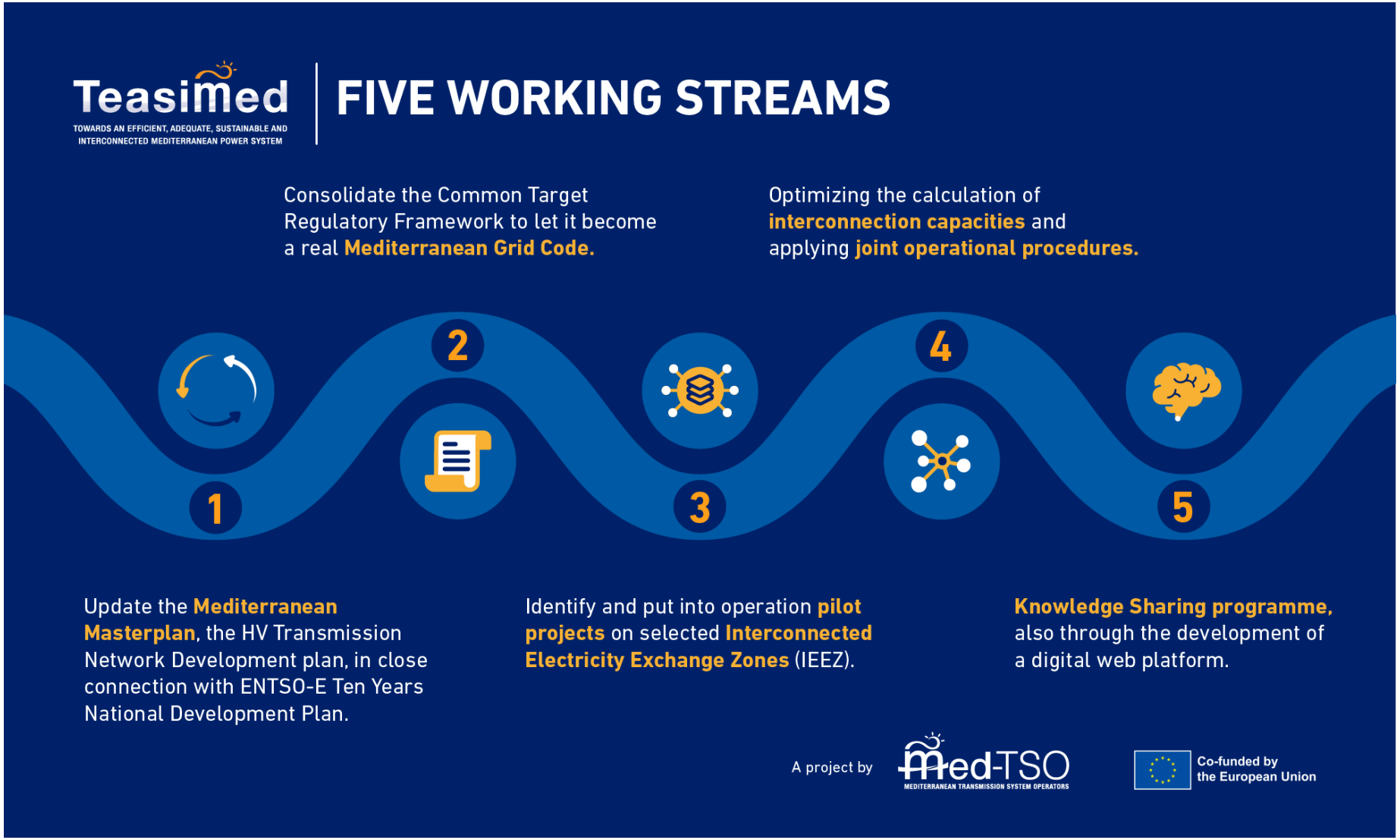
Teasimed

TOWARDS AN EFFICIENT, ADEQUATE, SUSTAINABLE AND INTERCONNECTED MEDITERRANEAN POWER SYSTEM

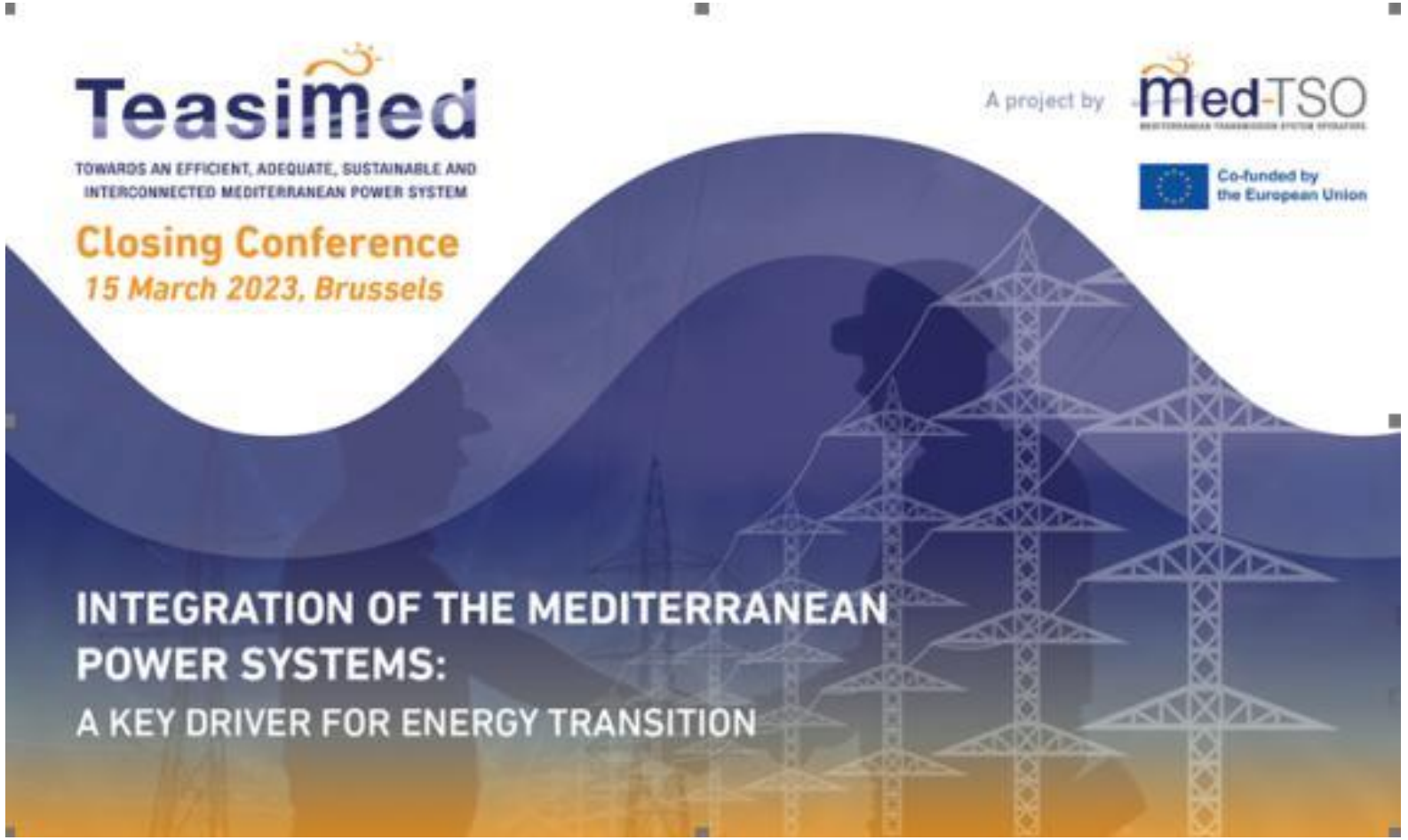
Teasimed 2

TOWARDS AN EFFICIENT, ADEQUATE, SUSTAINABLE AND INTERCONNECTED MEDITERRANEAN POWER SYSTEM

TEASIMED Project



TEASIMED Closing Conference



Final event in Brussels on 15 March 2023

Twofold objective:

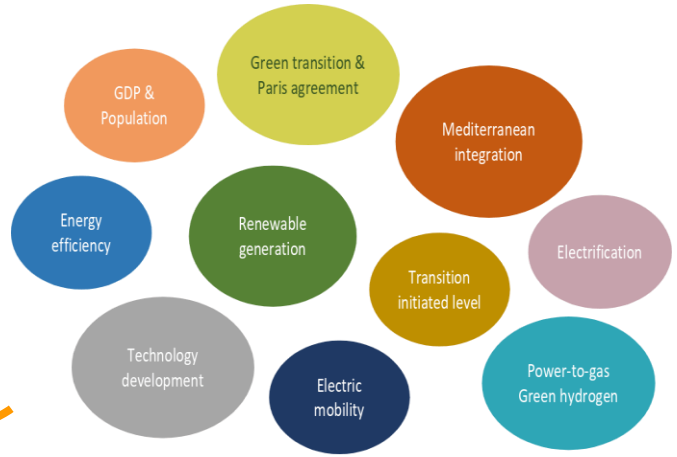
- briefly present the outcomes of TEASIMED project
- discuss on how to accelerate the integration of the Mediterranean Power Systems, both in terms of infrastructure and policy developments

4th EC grant (2023-2025): TEASIMED 2

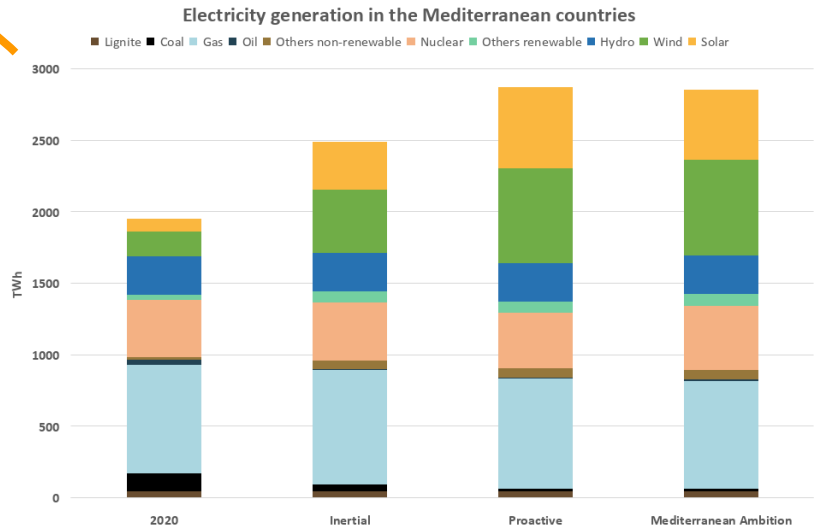
- Main outcomes confirmed (Masterplan, Grid Code, Pilot Projects, Knowledge Sharing, Adequacy)
- Wider perimeter of activities:
  - Long term scenarios (2040-50)
  - Cybersecurity issues and resilience of integrated power systems
  - Offshore potential assessment
  - Storage and other flexibility means
  - Possible cooperation in Research, Development & Innovation

Med-TSO Mediterranean Master Plan 2022

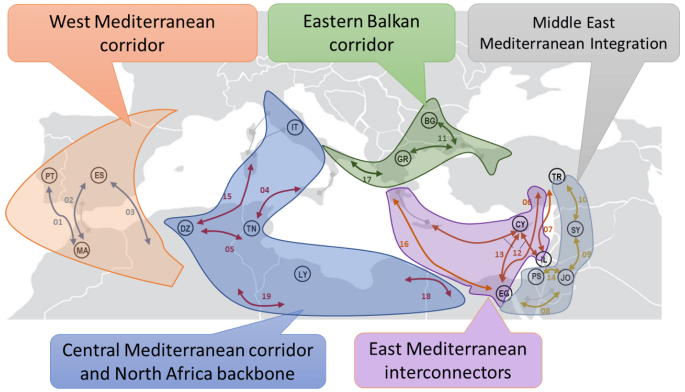
1 - Identify main trends, drivers & uncertainties



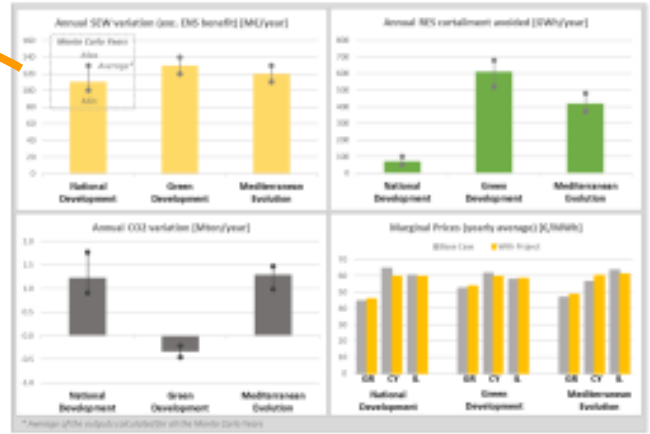
2 - Development of exploratory scenarios



3 - Collect list of projects after having defined common eligibility criteria



4 - Cost-Benefit assessments Market & Network Analysis



Mediterranean Masterplan 2022 – list of projects

- Project 1 – Morocco (MA00) – Portugal (PT00)
- Project 2 – Morocco (MA00) – Spain (ES00)
- Project 3 – Algeria (DZ00) – Spain (ES00)
- Project 4 – Italy (ITSI) – Tunisia (TN00)
- Project 5 – Algeria (DZ00) – Tunisia (TN00)
- Project 6 – Egypt (EG00) – Turkey (TR00)
- Project 7 – Israel (IL00) – Turkey (TR00)
- Project 8 – Egypt (EG00) – Jordan (JO00)
- Project 9 – Jordan (JO00) – Syria (SY00)
- Project 10 – Syria (SY00) – Turkey (TR00)
- Project 11 – Bulgaria (BG00) – Greece (GR00) – Turkey (TR00)
- Project 12 – Greece (GR03) – Cyprus (CY00) – Israel (IL00)
- Project 13 – Cyprus (CY00) – Egypt (EG00) – with 12
- Project 14 – Jordan (JO00) – Palestine (PS00)
- Project 15 – Algeria (DZ00) – Italy Sardinia (ITSA)
- Project 16 – Egypt – Greece
- Project 17 – Italy – Greece
- Project 18 – Egypt – Libya
- Project 19 – Algeria – Libya

The 2022 Mediterranean Master Plan

19 Interconnections assessed

16 Countries involved

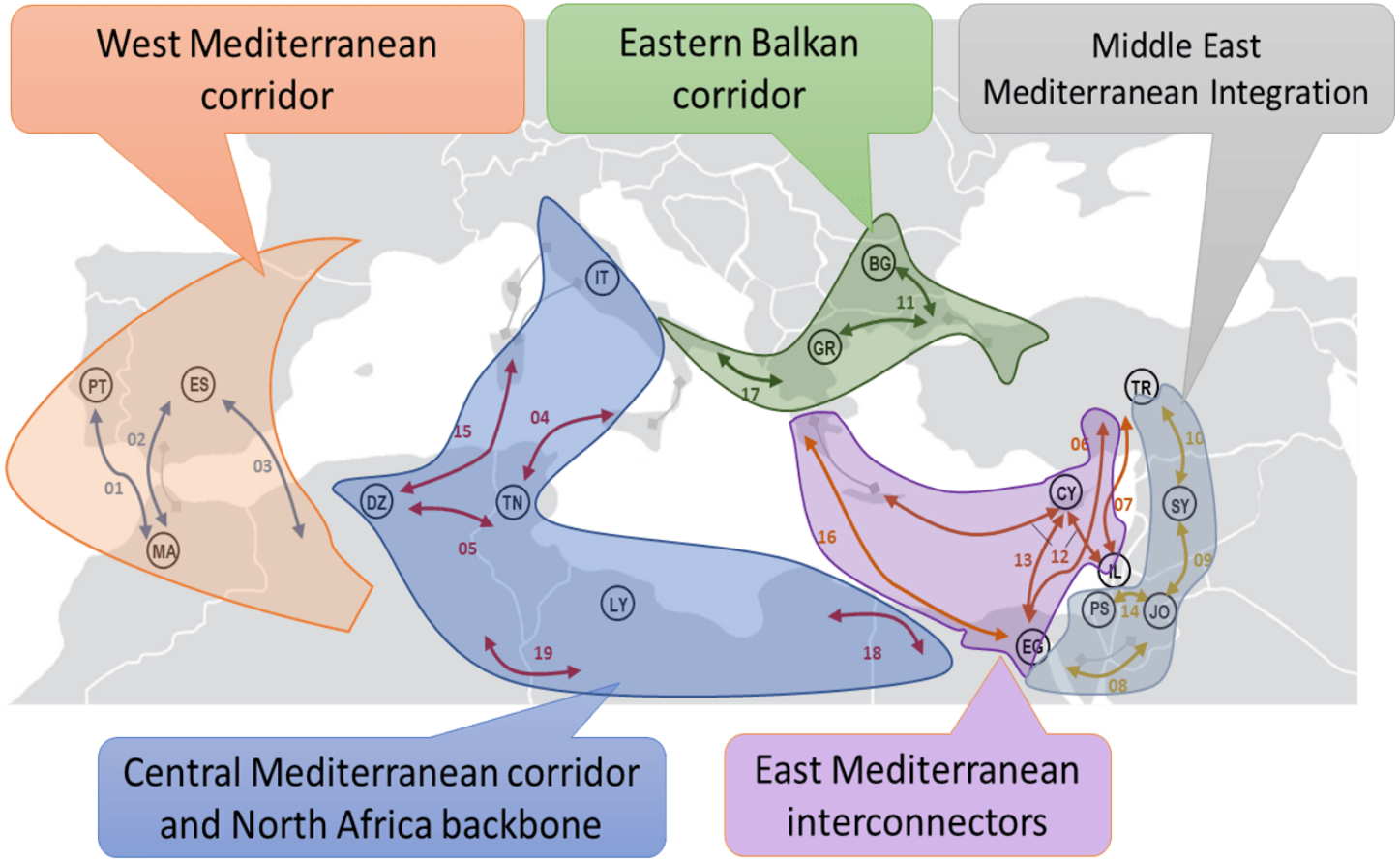
16 BEUR Investments

9.600 km new lines

19 GW new interconnection capacity

Up to 15 TWh of integrated RES

Up to 24 Mt avoided CO2



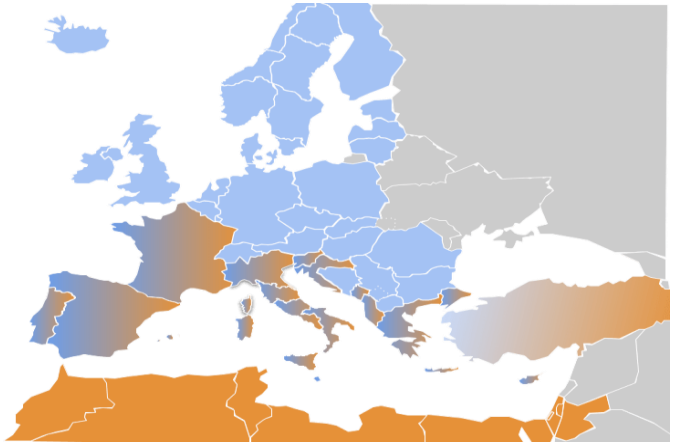
https://masterplan.med-tso.org/
https://data.med-tso.org/

TEASIMED – Towards a Mediterranean Grid Code

From a **Common Technical Regulatory Framework (CTRF)** to **a Mediterranean Network Code**

Operation

- Emergency & Restoration
- Operations
- Cybersecurity



Connection

- Demand Connection Code
- Requirements for Generators
- HVDC Connections

Market

- Forward Capacity Allocation
- CACM
- Electricity Balancing

Institutional Support

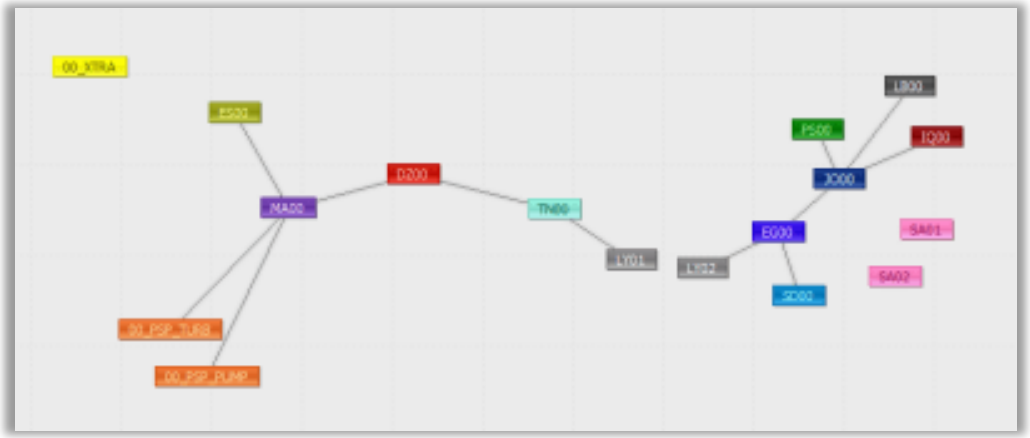
Role of TSOs

Grid Codes

- NRAs
- Regional Organizations
- National Institutions
- Public Acceptance

TEASIMED – Adequacy assessment

- European TSOs regularly assess and control system adequacy
- Similar investigations carried out for the first time ever to non-EU Med-TSO members
- Provided reports:
  - Summer Outlook 2022 Report provides information about potential adequacy issues during summer 2022 in the 5 MED-TSO members (Morocco, Algeria, Tunisia, Egypt and Jordan)
  - Winter Outlook (plus Lebanon and Libya)
  - Mid-term Adequacy Forecast
  - KSA already included in the analysis as a couple of nodes

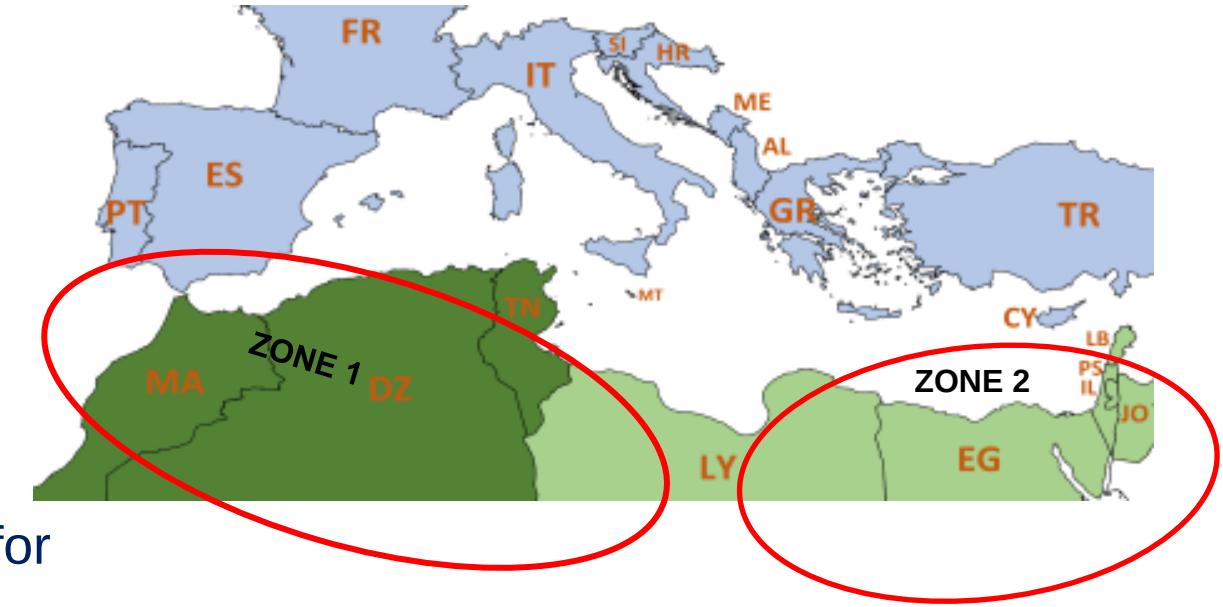


antaressimulator

https://med-tso.org/en/teasimed-in-progress-2020-2022-2/

Launching pilot projects

- Roadmaps set up by Med-TSO with the final goal to promote the efficient operation of interconnected electrical systems, through the use of trading web platforms
- Implement a coherent and harmonized set of technical rules for the management of existing interconnections
- Start the preparation of coordinated national plans for the development of HV networks



- Joint Cooperation Agreement signed in Algiers on 22.11.2022 among COMELEC, MEDENER, Med-TSO and OME, envisaged extension to MedReg
- **A win-win integration with the EU energy market**

Maghreb Interconnected Electricity Exchange Zone
Market design proposal

TeasiMed

TOWARDS AN EFFICIENT, ADEQUATE, SUSTAINABLE AND INTERCONNECTED MEDITERRANEAN POWER SYSTEM

A project by

Med-TSO
MEDITERRANEAN TRANSMISSION SYSTEM OPERATORS

Co-funded by
the European Union

Maghreb IEEZ: the objective

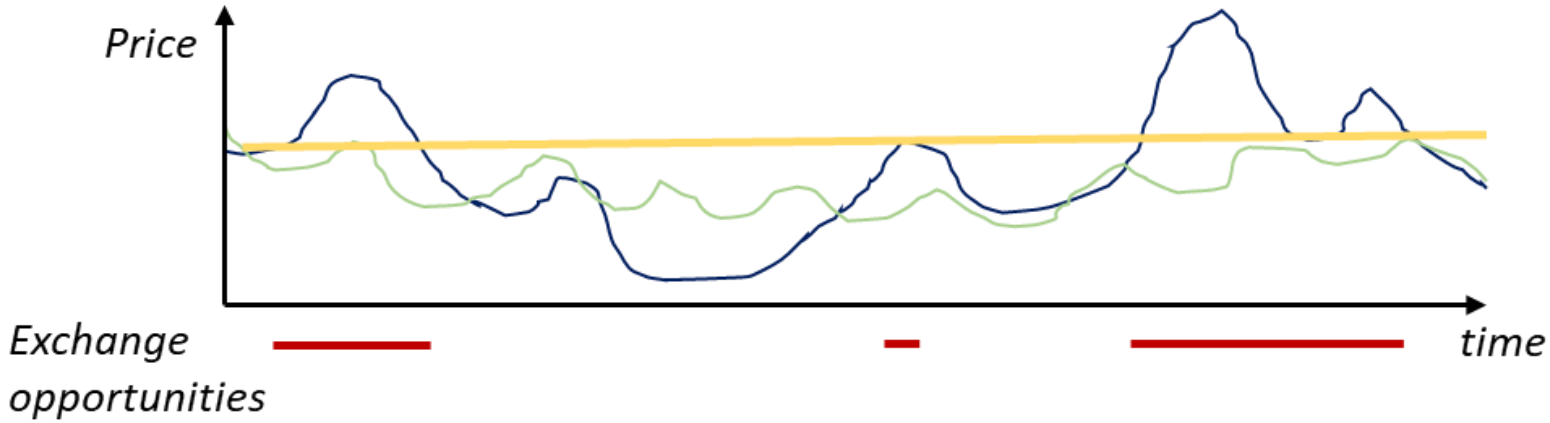
The objectives are:

1- Use the existing interconnection capacity in an efficient way,

2- Build a cross-border market in the region coping with the principles of the Internal European Energy Market to make easier the exchanges with the EU Markets.

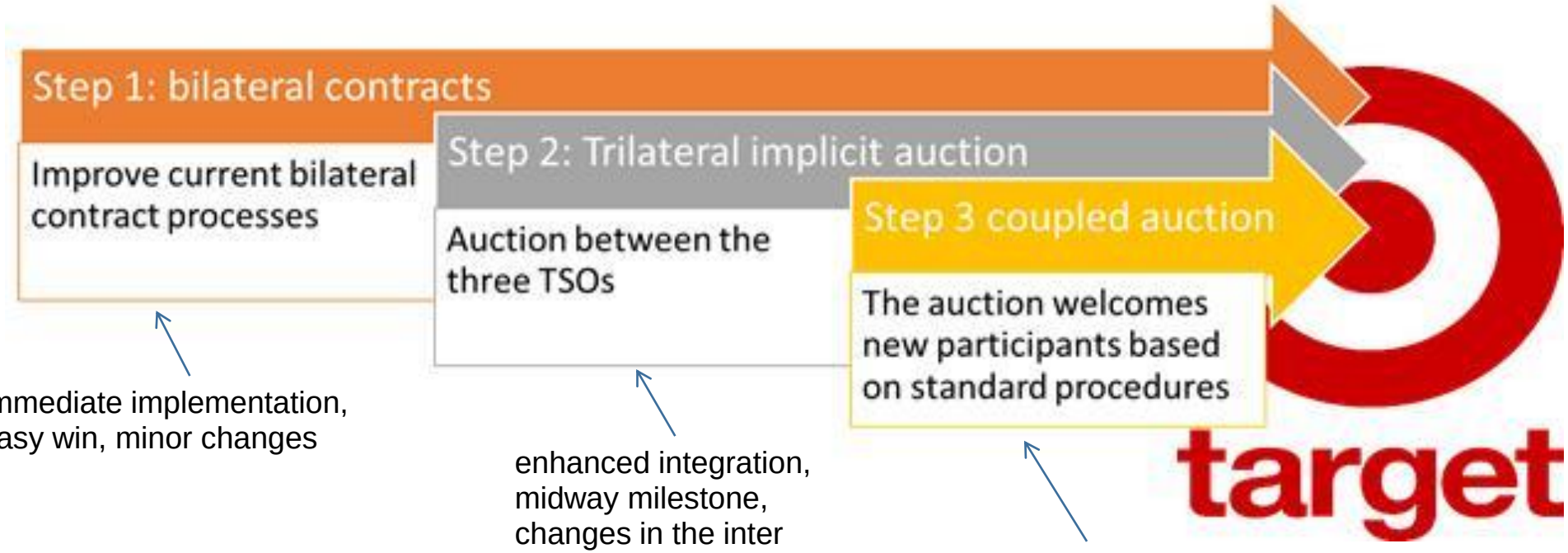
3- Adopt multi-phase approach to build progressively and pragmatically on current commercial arrangements considering each country specificities.

Actual Situation : Bilateral Contracts with fixed prices for the commercial exchange



Legend:
- Buyer price
- Seller price
- Fixed price
- Time windows when some exchanges are possible if the price is fixed

The Proposal: multi-phase approach



Immediate implementation, easy win, minor changes

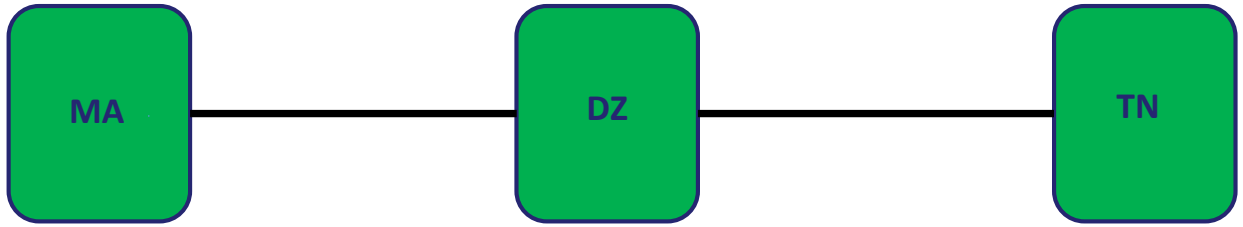
enhanced integration, midway milestone, changes in the inter TSO arrangements, depends mostly on the TSO willingness

Final Target, full integration, open to private sector, significant regulatory framework changes, implicit and explicit auctions

The Proposal : HOW?

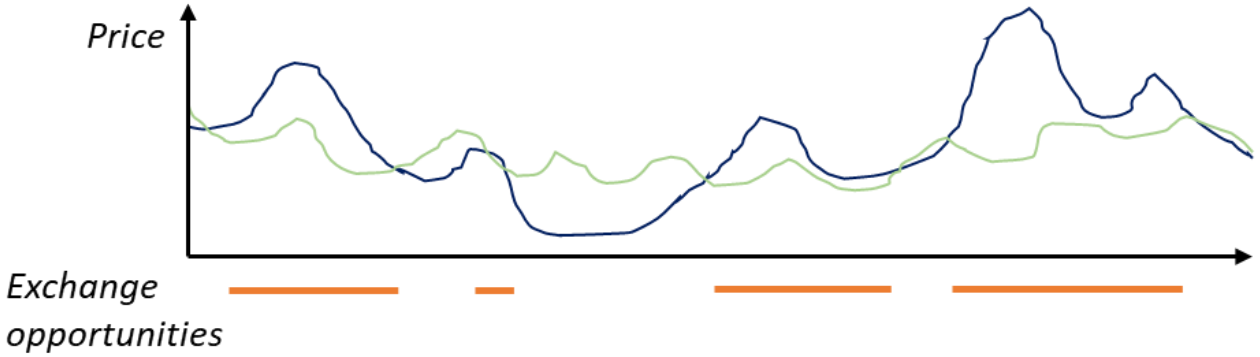
STEP 1 :

- Bilateral **Contracts** should evolve, including common **pre-defined price range instead of one fixed price for the next months**
- Prices could be different **per hour of the day**, and a different price could be proposed for the deals done in the day-ahead and intraday timeframe.
- The framework contracts would keep on fixing the maximum volume of each transaction.
- Each TSO would set up internal **rules** to be followed by the operators when offering or accepting a price depending on the technical and economic conditions
- Other current contractual dispositions such as operational processes, payment schemes and management of metering can remain unchanged, unless decided by both parties.

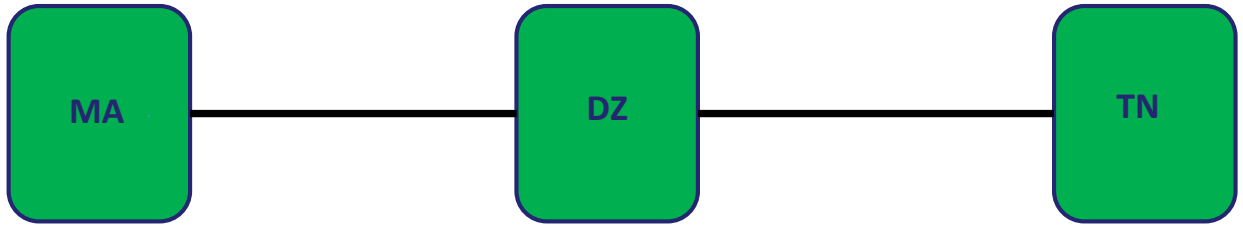


The Proposal : HOW?

STEP 1 :



Day-ahead price in Eur/MWh	Monday 09/01/2023	Tuesday 10/01/2023	Wednesday 11/01/2023	Thursday 12/01/2023	Friday 13/01/2023	Saturday 14/01/2023	Sunday 15/01/2023
Hour 1	40	40	50	50	40	40	40
Hour 2	40	40	50	50	40	40	40
Hour 3	40	40	50	50	40	40	40
Hour 4	40	40	50	50	40	40	40
Hour 5	40	40	50	50	40	40	40
Hour 6	60	60	70	70	40	40	60
Hour 7	60	60	70	70	40	40	60
Hour 8	60	60	70	70	40	40	60
Hour 9	60	60	70	70	40	40	60
Hour 10	60	60	70	70	40	40	60
Hour 11	60	60	70	70	40	40	60
Hour 12	60	60	70	70	40	40	60
Hour 13	60	60	70	70	40	40	60
Hour 14	60	60	70	70	40	40	60
Hour 15	60	60	70	70	40	40	60
Hour 16	60	60	70	70	40	40	60
Hour 17	60	60	70	70	40	40	60
Hour 18	60	60	70	70	40	40	60
Hour 19	60	60	70	60	40	40	60
Hour 20	60	60	70	60	40	40	60
Hour 21	60	60	70	60	40	40	60
Hour 22	40	40	50	40	40	40	40
Hour 23	40	40	50	40	40	40	40
Hour 24	40	40	50	40	40	40	40

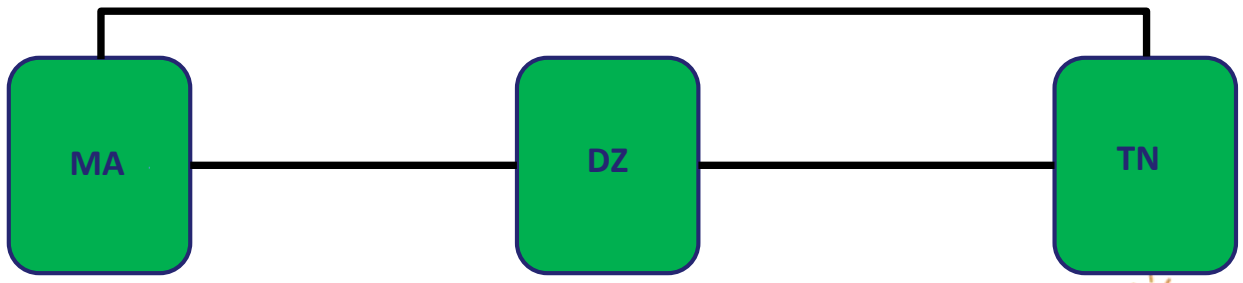


The Proposal : HOW?

STEP 2 :

- Introduction of an auction between the three TSOs following the same rules
- the product traded is a day-ahead product for delivery the next day (or even intra-day if there is a will)
- It means that the TSOs shall elaborate bids to participate to this auction.
- The order book of each participant includes some prices and volumes which can be different for each hour.
- The organization of the auction could be performed by a **neutral counterpart**
- This new set up requires the elaboration of **wheeling agreements, market rules, new way to submit orders.**

BENEFIT COMPARED to PHASE 1:
some exchanges can take place directly between A-C, if the welfare created by those exchanges is higher than other exchanges between A-B or B-C

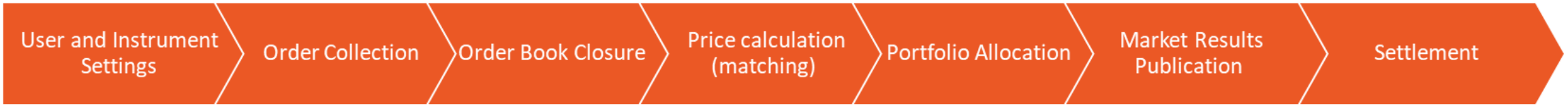


The Proposal : HOW?

STEP 3 :

- Third party access to the market : additional participants such as IPPs, consumers, suppliers, or any other market party depending on the market opening status in each country.
- Trade information is automatically transmitted from the trading platform to the central counterpart, for settlement of the contracts.
- Nomination by the central counterpart and by the relevant Balance Responsible Parties to the TSO depending on TSOs balancing rules.

Regular tasks performed by the Independent Market operator



The Proposal: multi-phase approach

	Step 1	Step 2	Step 3
Participants	TSOs		TSOs and other market participants
Contracts counterparties	Bilateral	Trilateral	Multilateral
Products	Hourly and block daily and intraday products		
Price determination	Pre-determined price range with internal guidelines	Auction clearing price	
Type of cross border capacity allocation	No allocation necessary in a bilateral environment	Implicit allocation of cross border capacity	
Market organization and market rules	Bilateral agreements	Trilateral market rules	Market rules
Payment and nominations	Unchanged, with no central counterparty	Trilateral settlement	Central counterparty
TSOs related concepts			

THANK YOU!

med-TSO
MEDITERRANEAN TRANSMISSION SYSTEM OPERATORS

Co-funded by
the European Union