



Continental South East Regional Investment Plan 2014 Main results and messages

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Continental South East Region



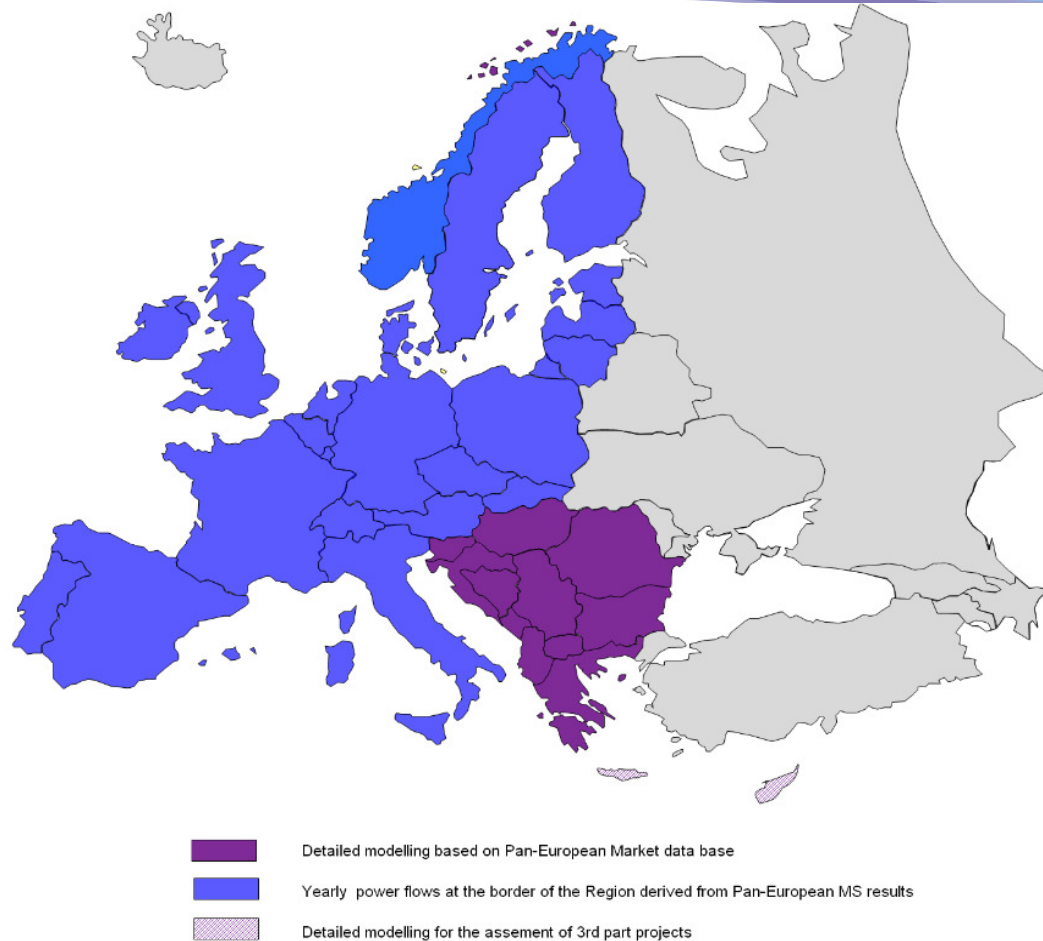
11 TSOs

+ CY (corresponding member)

+ AL (collaboration in data provision and modeling)

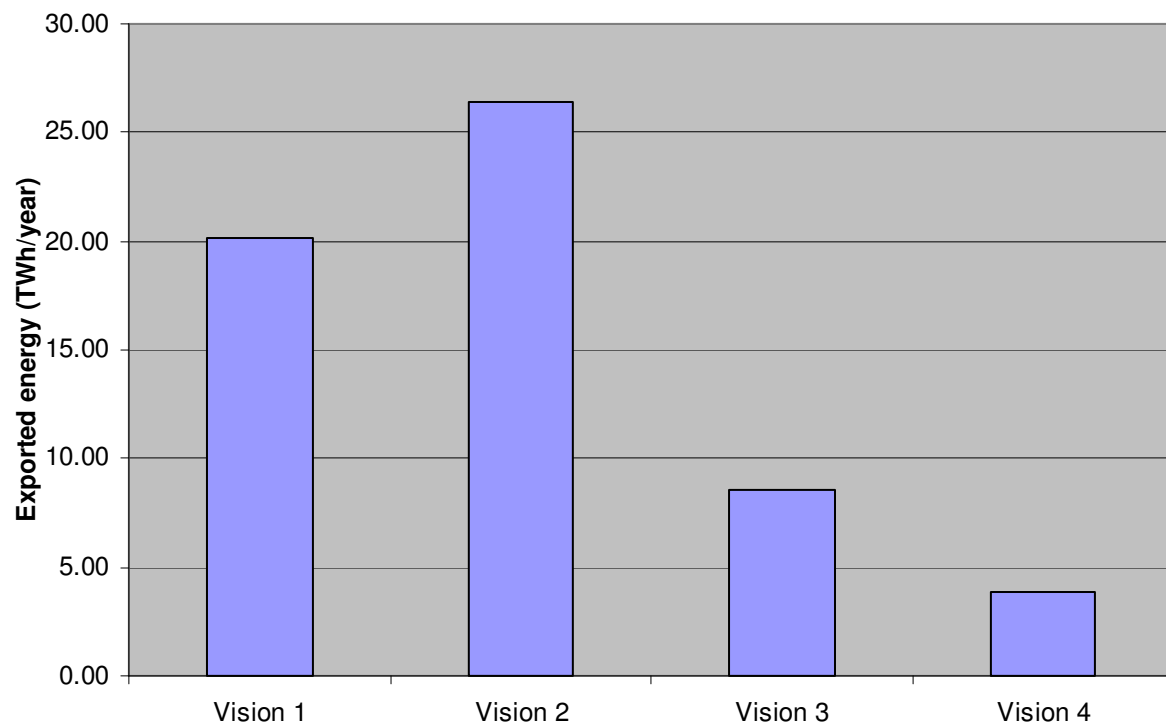
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TERNA	IT
ESO	BG
MEPSO	MK
EPCG	ME
NOsBiH	BA
HOPS	HR
EMS	RS
TRANSELECTRICA	RO
ELES	SI
MAVIR	HU

The studies perimeter



- All the countries of the Region including Albania and excluding Italy have been modeled in detail for both market and network studies.
- Yearly power flows at the border of the modeled area have been derived from Pan-European market studies results.
- For the assessment of 3rd party projects detailed modeling have been extended in order to include also Cyprus.

Energy balance in the 4 Visions

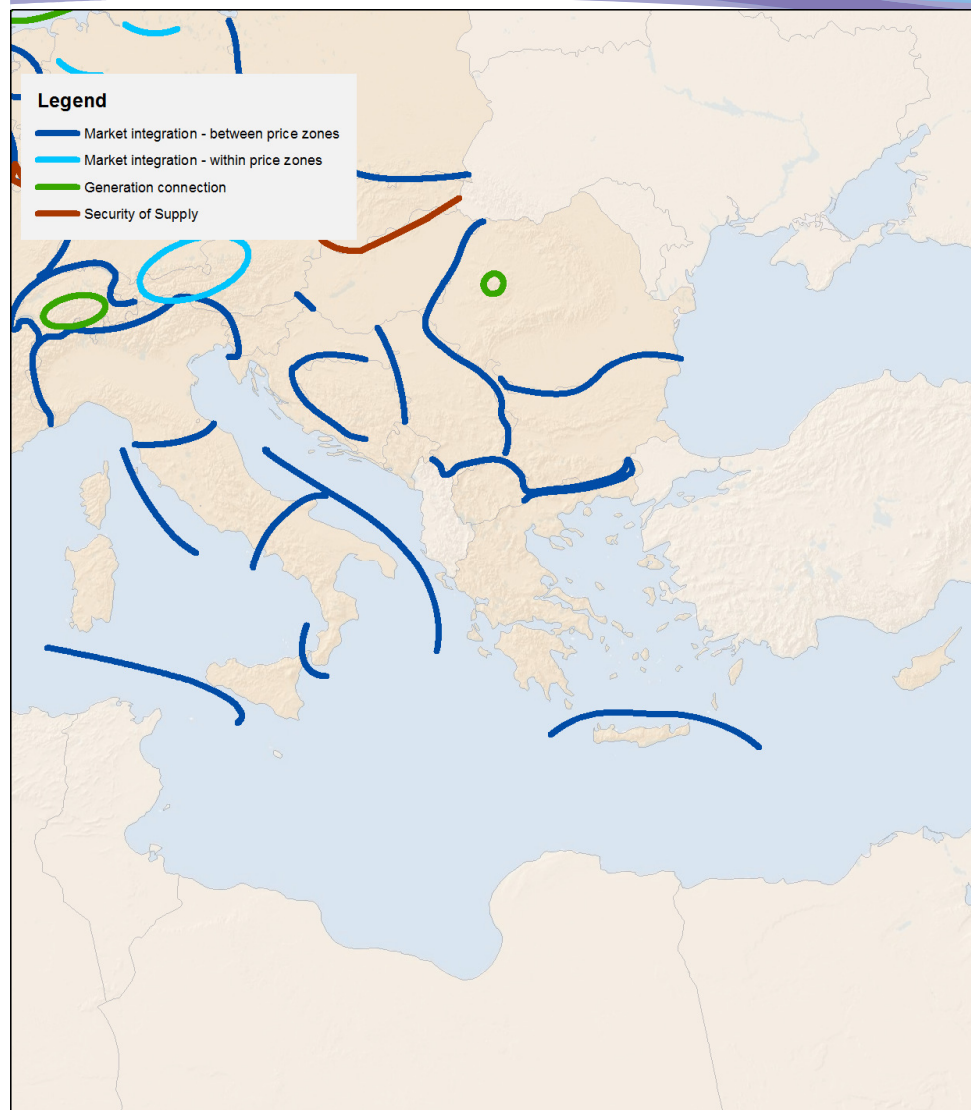


- The modeled area of CSE Region is an exporter in all 4 visions.
- Higher exports appear in Visions 1&2 and lower exports in Visions 3&4.
- This is because of the hypothesis constituting the framework of each scenario and especially the higher CO2 prices and RES penetration assumed in Visions 3&4.

Regional drivers for grid development

- Market integration: Increase of cross-border and internal transfer capacities in order to assist market integration in the Region.
- Massive RES penetration: The anticipated large RES penetration (mainly wind, PV and hydro) in the Region in order to achieve EU and National targets requires extensive grid developments.
- Evacuation of future conventional generation mostly in the West part of the Region.

Regional bottlenecks



- The orientation of identified areas with potential bottlenecks defines the main power flow directions (N->S and E->W).
- Increase of transfer capacity in these areas assists the market integration of the Region
- More than 1000MW of wind generation is expected to be connected in RO and RS close to their borders .
- The exploitation of windy areas at the Bulgarian and Romanian coastal areas of Black sea is expected to trigger significant power flows. With the planned network development about 5000MW will be realized.
- The Greek island of Crete has an enormous wind and solar potential. Its interconnection will allow the transfer of renewable energy towards the load center of Continental Greece.

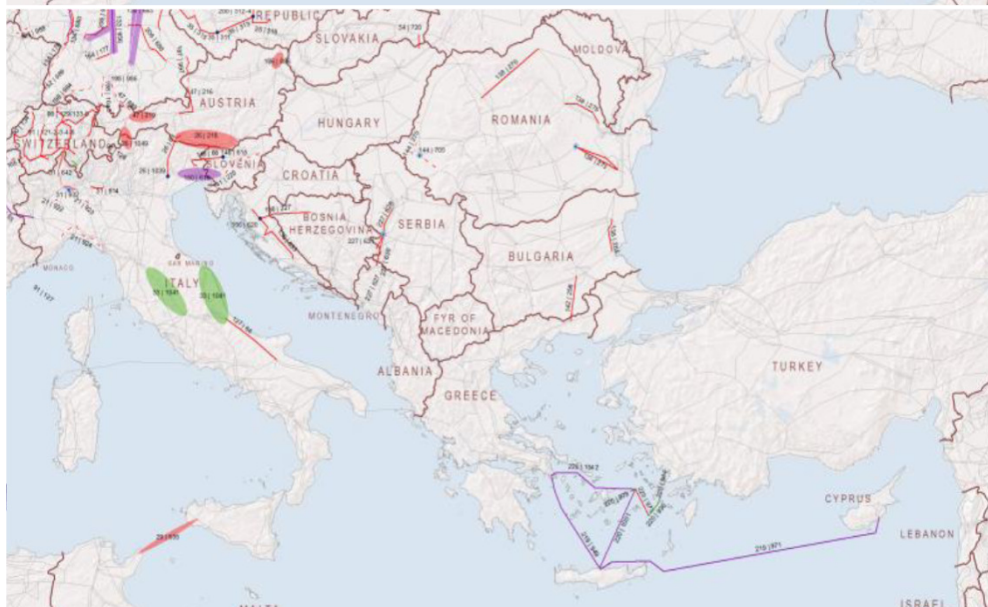
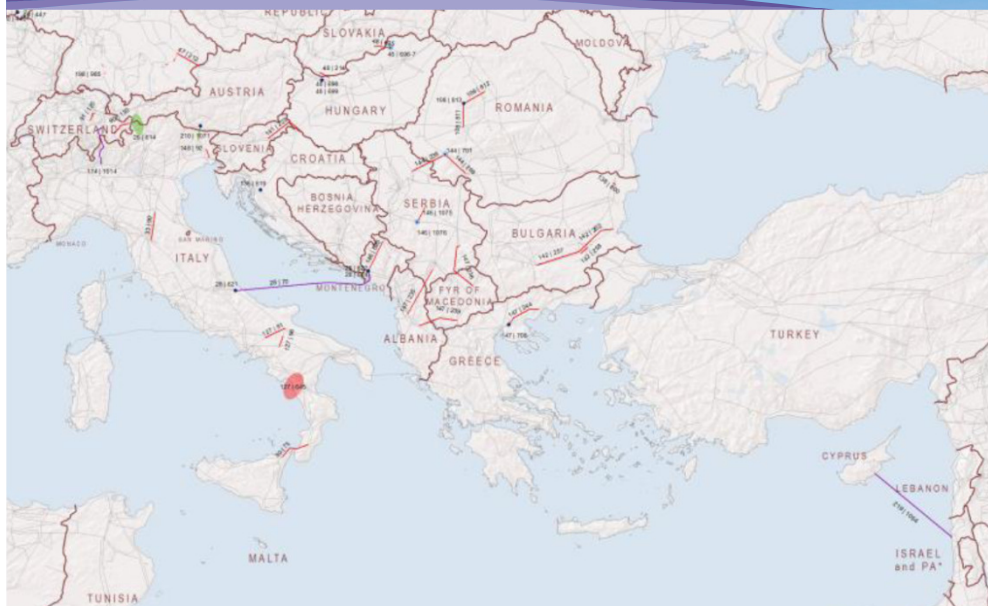
Bulk power flows in Vision 1



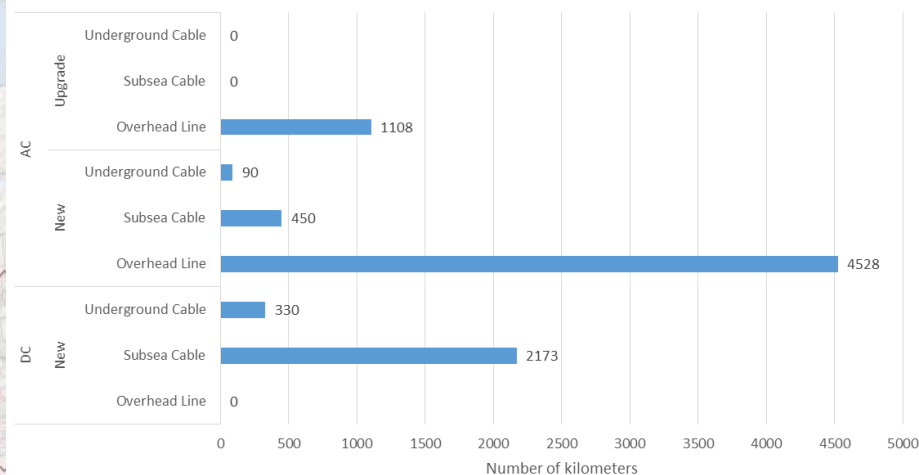
Bulk power flows in Vision 4



Regional project portfolio, mid-term and long-term



- Mid-term projects are before 2019 and long term projects after 2019
- Information shown concerns projects of pan-European relevance, however it should be kept in mind that this portfolio is complemented by the projects of regional investment necessary for increasing SoS in many areas of the Region or assisting market integration of areas like the Greek islands.

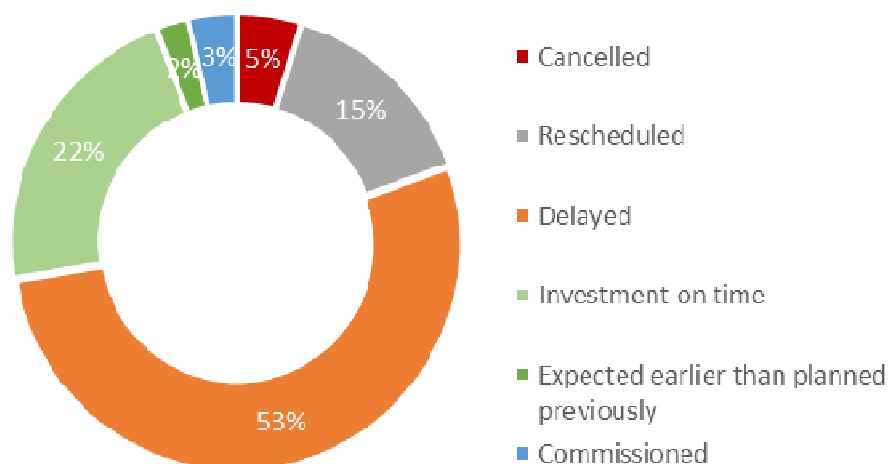
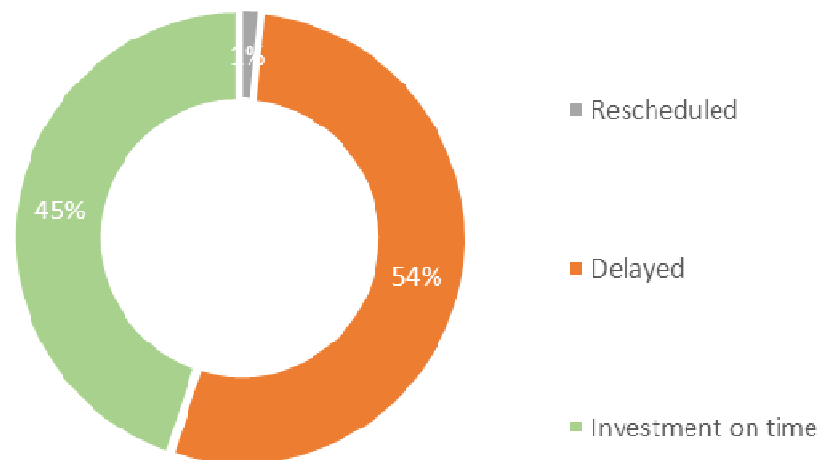


The challenge of financing the necessary grid development



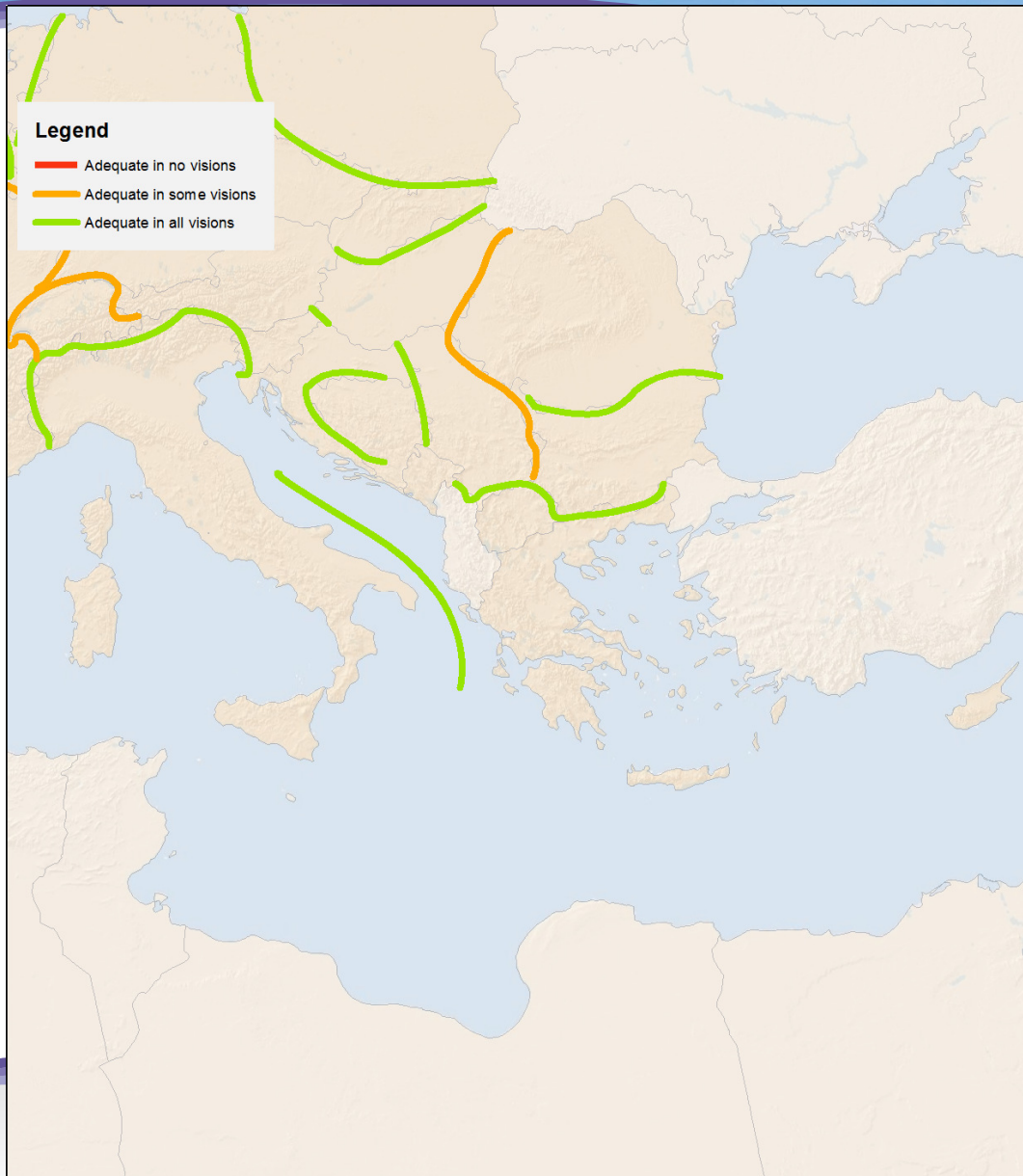
- Taking into account the rather sparse transmission network of the Balkan peninsula, the transmission investments needed to achieve the targets of 2030-2050 are high compared to the “normal rate” of transmission investments in the Region.
- Financing of this plan faces difficulties taking also into account the current fiscal conditions as well as the fact that there are numerous non-EU countries in the Region with differences in the legislation and the available financing tools/sources.
- Potential solutions have been identified in the ENTSO-E public position paper “Incentivizing European investments in transmission network”

Evolution of transmission investments



- Planned transmission infrastructure sums up to about 13000km (>220kV) while existing one has a total length of about 30000km.
- For both Pan-European and Regional significance projects in the area, about 50% are delayed compared to TYNDP 2012
- Difficulties in financing these investments constitutes a major reason for these delays.

Transmission adequacy

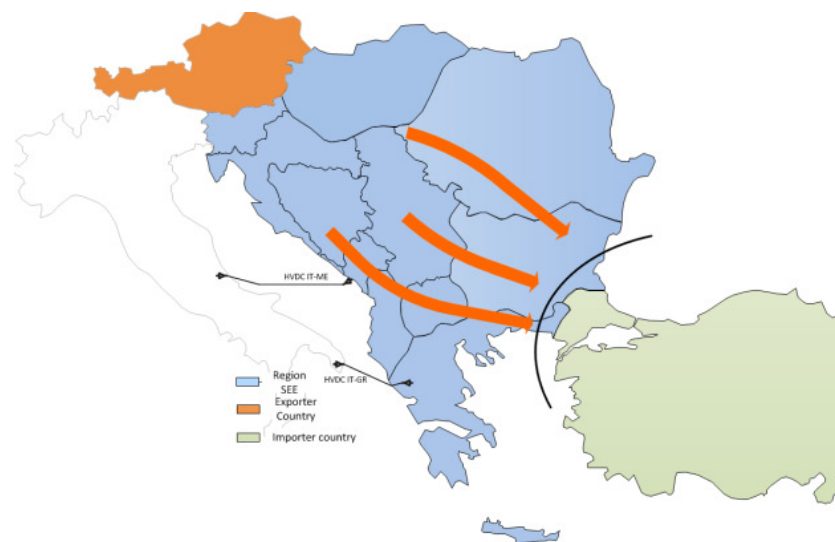


- For most of the boundaries in the Region, the proposed project portfolio is expected to be adequate in order to achieve the necessary target capacities.
- The only exception concerns the West borders of Romania and Bulgaria where some additional grid reinforcements might be required in order to cope with ambitious RES development projects as well as uncertainties related to the impact of non-ENTSO-E countries such as Turkey that is already in parallel operation with CESA.

Sensitivity analysis with respect to the exchanges with Turkey (1/2)



Base case: TR import 500 MW
TR is balanced 0 MW
TR export 500 MW
TR export 1000 MW



Base case: TR import 500 MW
TR import 1000 MW
TR import 1500 MW
TR import 2000 MW

Sensitivity analysis with respect to the exchanges with Turkey (2/2)

2 selected snapshots from market results in Vision 1:

- 1st week / 36 h for export, where exports of Bulgaria and Romania are on high level and
- 30th week / 14 h for import where Greece imports are high and totals of Romania and Bulgaria are at a lower level

Conclusions:

- Some OHLs in the region of CSE are significantly sensitive on Turkey's total
- Turkey's export has higher impact on overloading then Turkey's import
- Lines which show significant sensitivity
 - 1) OHL 400 kV Nis 2 (RS) – Sofia West (BG)
 - 2) OHL 400 kV Mladost (RS) – S. Mitrovica 2 (RS)
 - 3) OHL 400 kV Melina (HR) - Brinje (HR)
- N-1-1 analyses
 - Outage of OHL 400 kV Blagoevgrad (BG) - Thessaloniki(GR) due to maintenance is not possible because of high level of loading of the OHL 400 kV Bitola 2 (MK) – Florina (GR)

Conclusions-Main messages (1/2)

- The transmission system of the CSE Region of ENTSO-E (especially the Balkan Region) is a rather sparse network with predominant power flows from East to West (E→W) and North to South (N→S).
- The volume of electricity market exchanges is rather moderate
- Concerning the generation mix, thermal production has the largest share with a significant portion of lignite units as well as significant hydro capacity. Development of RES today is limited with the exception of Greece, Romania and Bulgaria.
- The Region is expected to be an exporter on 2030 in all four Visions
- Predominant power flow directions (E→W and N→S) still exist in 2030 in visions 1 and 2. In Vision 3 power flow predominant direction changes in the border between Bulgaria and Romania while in Vision 4 power flow predominant direction changes in the West borders of Serbia and the border between Croatia and Bosnia-Herzegovina

Conclusions-Main messages (2/2)

- The major drivers for the transmission system development in the area are **Integration of RES** and **market integration** with Western Europe (especially Italy)
- Under the precondition of implementing all planned investments, transmission capacity will be adequate to cope with the expected power flows. Some additional reinforcements might be needed in order to cope with the ambitious RES penetration targets for 2030 in the West borders of Bulgaria and Romania
- Foreseen installed generation up to year 2030 is sufficient to reliably meet the anticipated demand in all Visions
- CSE Region will be influenced by the extension of the synchronous area of Continental Europe to the East (connection of the Turkish power system and possible connection of Ukraine and Moldova in the future)



**Thank you very much for your
attention !**

Questions ?