

Continental South West Regional Group Investment Plan

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RG Continental South West

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Content



1. RG CSW membership and specificities
2. Network and market studies
3. Main network and market results
4. RG CSW bottlenecks and project portfolio
5. Target capacities and transmission adequacy
6. Main findings in RG CSW for 2030

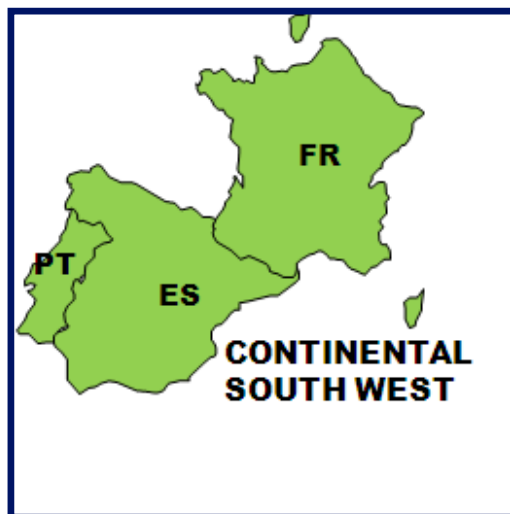
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RG CSW Membership and main tasks

Membership



Main tasks within TYNDP 2014

- ✓ Identify the needs and necessary network reinforcements considering the four scenarios in analysis
- ✓ Assess the TYNDP projects (within the region) from:
 - TSOs
 - Third party projects (BRITIB project)
- ✓ Adapt the Pan-EU studies according the regional specificities (e.g: temperature sensitivity, hydro conditions, wind and solar profiles, pumping modeling, etc)
- ✓ Perform regional market and network studies
- ✓ Ensure a proper cooperation with the main stakeholders and Third Party promoters

RG CSW main characteristics

Renewable integration

- Wind and solar in the whole CSW Region (Iberian Peninsula has a huge potential of Solar generation, namely in the South)
- New hydro generation including pumping storage (north of Portugal, and different areas in Spain)
- More flexible conventional generation is needed

Market Integration

- Increase of cross border capacity to accommodate predominant power flows
- Integration of MIBEL with continental Europe is one of the main keys for the region
- It also avoids RES Spillage in the Iberia Peninsula and, as a consequence, to reduce CO2 emissions across Europe

Security of Supply

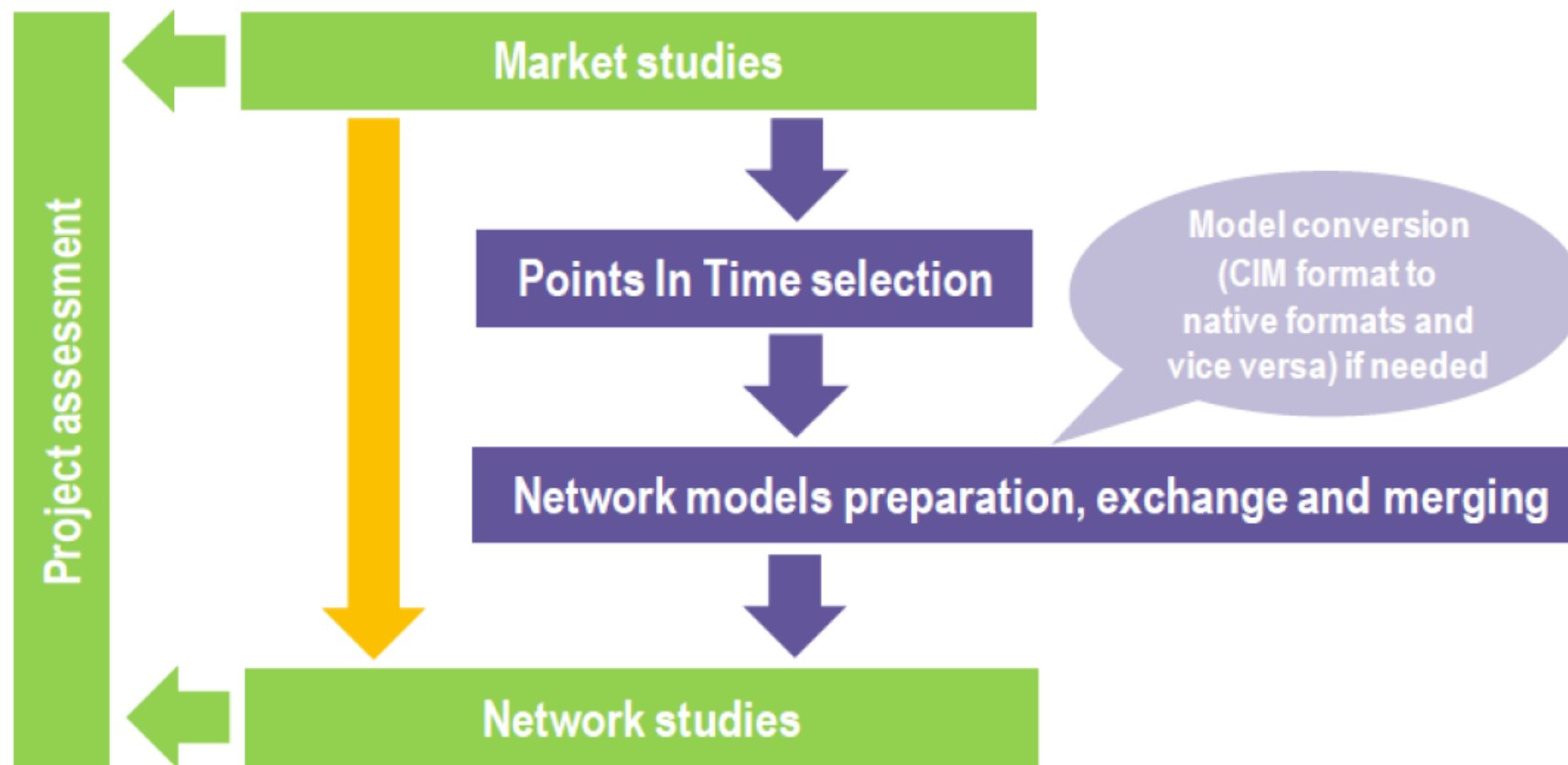
- Increasing of cross-border capacity enhances national security of supply while it increases mutual support possibilities
- Some reinforcements are needed to face some SoS local issues (areas with high demand growth; areas supplied by an obsolete transmission system, etc)

Main drivers for the transmission system evolution

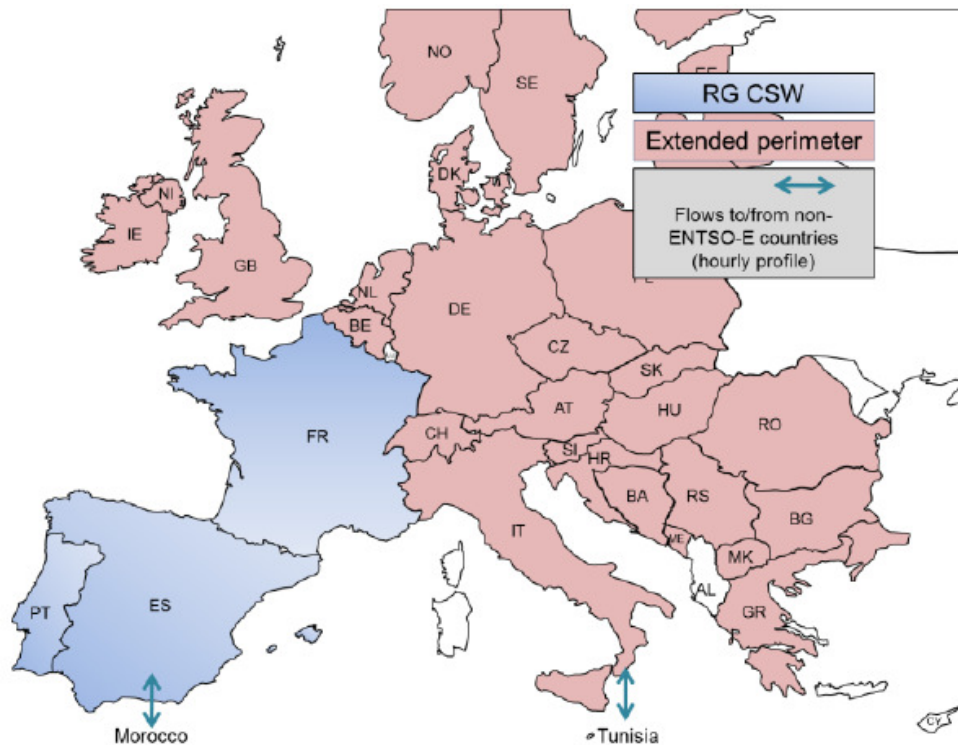
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Market and Network Studies



Market and Network Studies



For the Market Studies RG CSW used two tools for the entire year simulations:

- ANTARES: Sequential Monte-Carlo multi-area adequacy and market simulator
- UPLAN: Commercial SCUC (security constrained commitment)

For Network studies, the RG CSW used three tools:

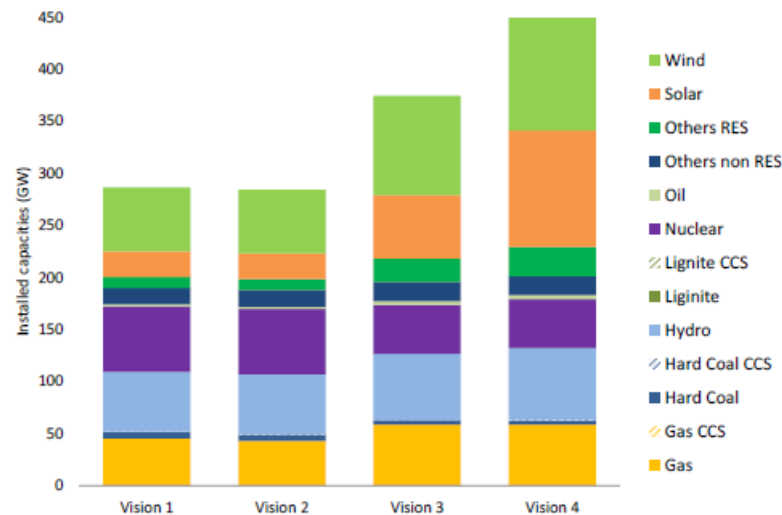
- PSS/E
- UPLAN
- Convergence

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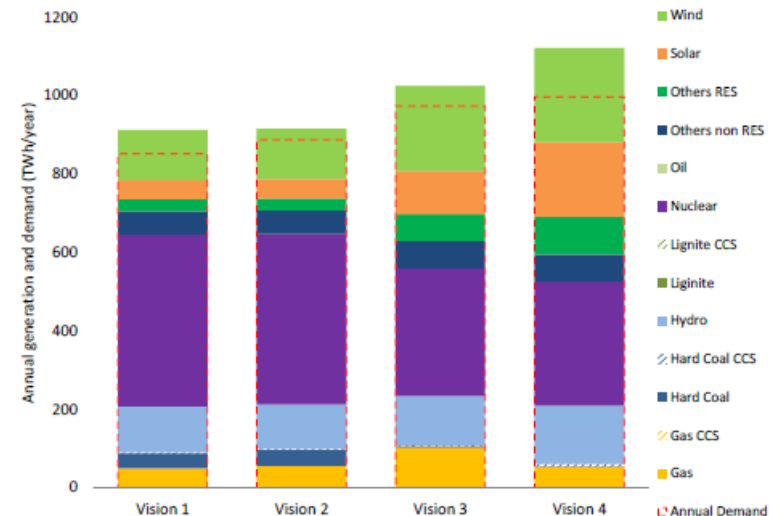
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RG CSW installed capacity and main market results

Installed Capacity



Main Market Results



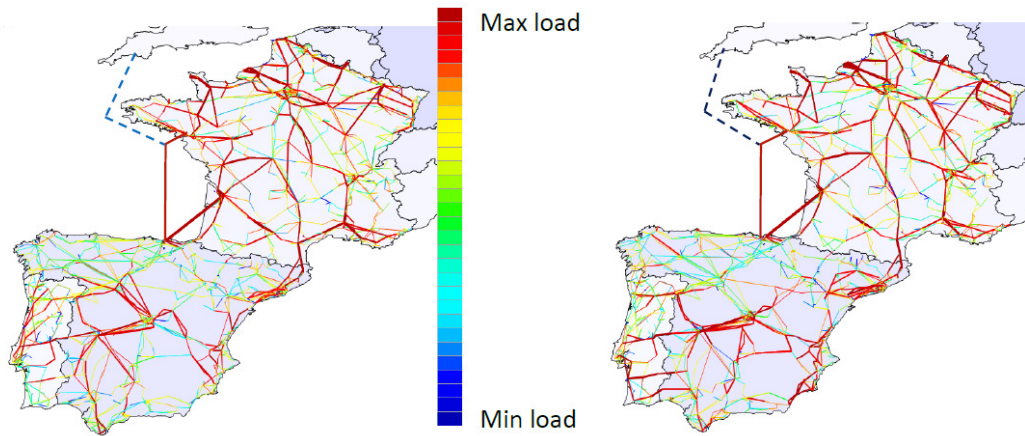
1. RES installed capacity and expected generation increases significantly in Visions 3 and 4

2. As a consequence of the expected economic conditions improvement in the EU and of the increase of the electricity usage (e.g. electrical vehicle) and heating/cooling the demand is higher in Visions 3 and 4, comparing with Visions 1 and 2. Comparing with Vision 1, the demand grows 14% in Vision 3 and 17% in Vision 4.

3. Nuclear installed capacity and the associated generation is reduced in Visions 3 and 4 and is compensated by RES generation, namely by solar in Vision 4

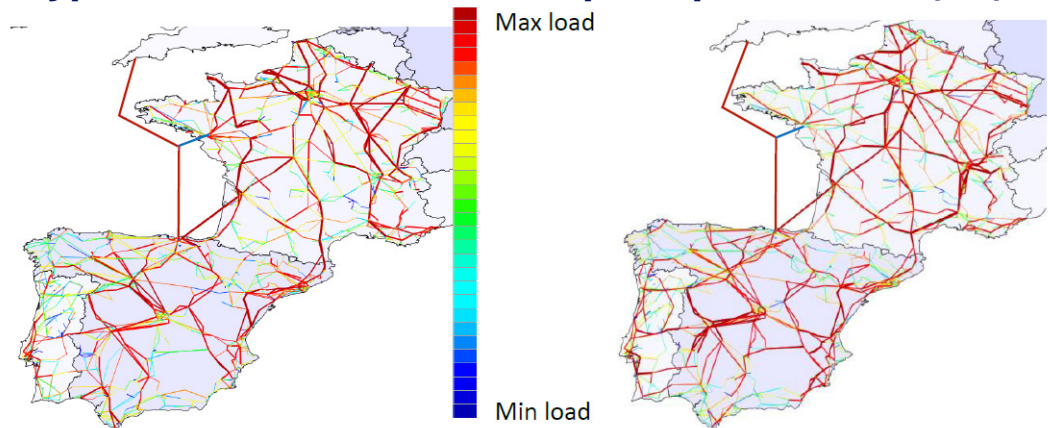
Main network results for the extreme Visions (1 and 4)

Typical winter and summer peak power flow (V1)



High usage of interconnectors in Vision1 and in Vision 4

Typical winter and summer peak power flow (V4)



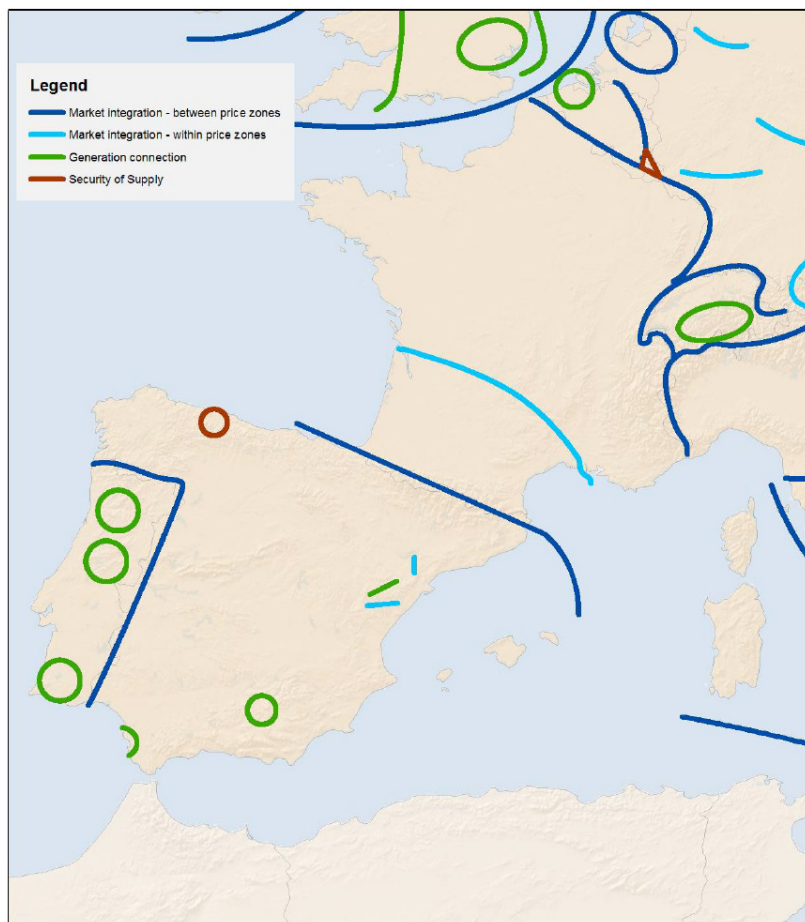
Vision 4 is much more demanding than Vision 1 due to the huge amount of RES in the region, stressing the electrical system not only at interconnection level but also at internal level

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Main bottlenecks in the CSW Region

Bottlenecks in the CSW region

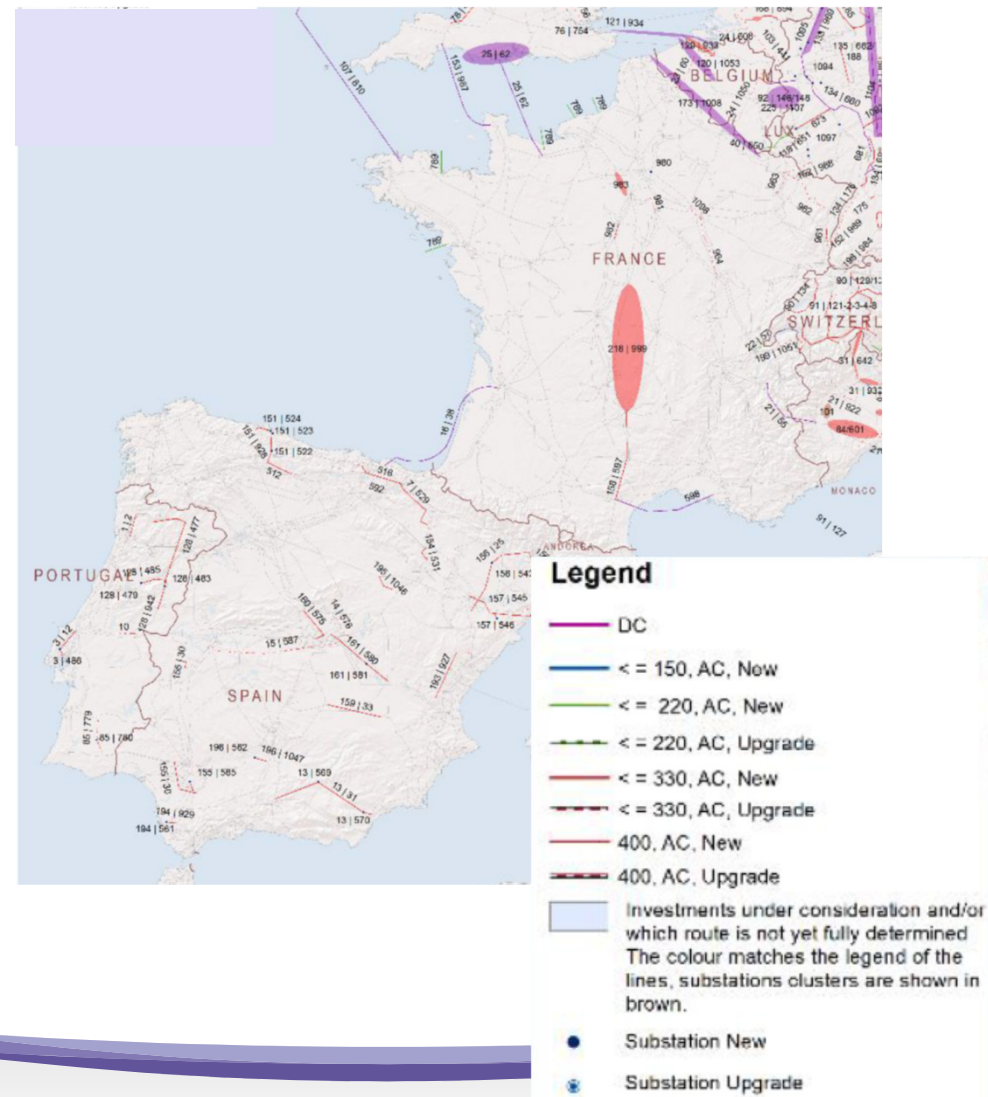
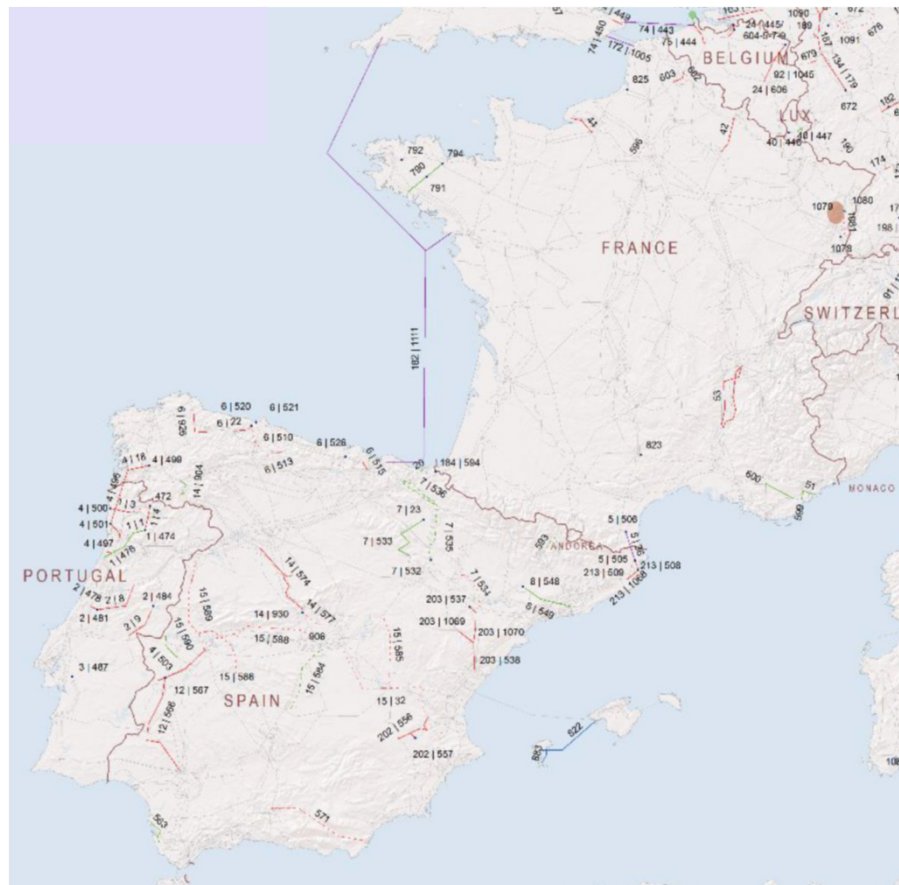


1. Integration of RES generation, mainly in Portugal and Spain (Wind, Hydro and Solar)
2. Reinforcement of the interconnection between Spain and France
3. Reinforcement of the interconnection between Portugal and Spain to achieve the political goals in order to reach a complete operational Iberian Electricity Market (MIBEL)
4. Internal reinforcements in Spain and France to accommodate power flows triggered by RES development combined with higher cross border exchanges
5. Solving SoS local issues identified in Spain

Regional project portfolio for the mid and the long term

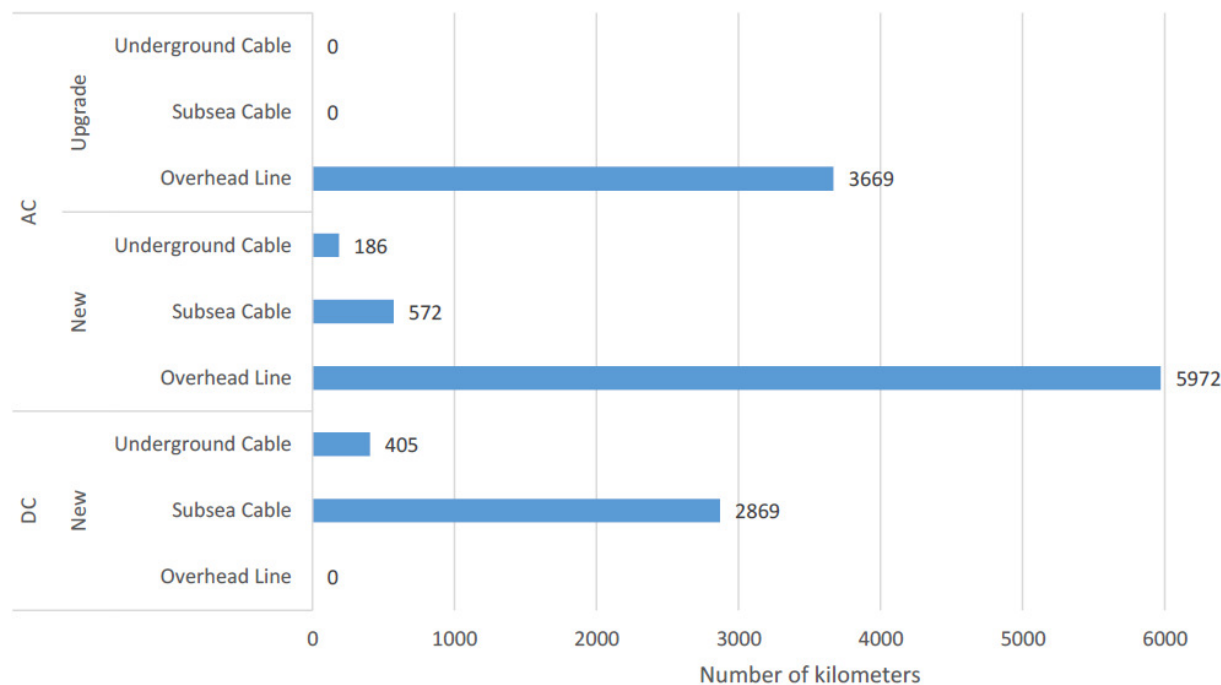
Mid term portfolio

Long term portfolio



Pan-EU projects – Breakdown per technology

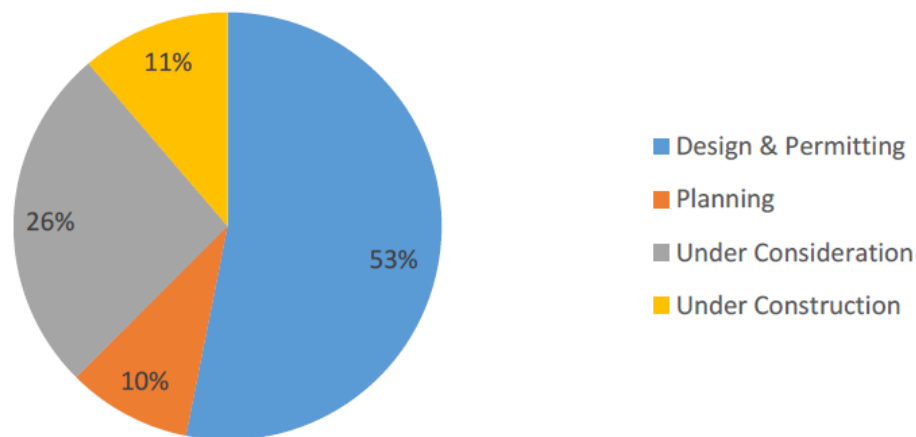
Breakdown per technology



- The RG investment Plan sums up almost 14000 km of new lines, 71% of them overhead
- It includes 3 interconnections within the region and one interconnection between RG CSW and RG NS. It also includes the interconnections between France and the rest of Europe
- 27% of the AC projects are upgrades, upgrades or change of conductors
- Most of the DC routes are subsea cables (88%)

Status of the projects and total costs

Status of the projects



Most of the projects (53%) are in design and permitting process

The investment cost in the CSW region is around €13,4 billion

Investment costs

Countrys	Total cost (bn Euros)
ES (Spain)	4.3
FR (France)	8.4
PT (Portugal)	0.7
Total	13,4

Bridging the Finance gap

In CSW region it is critical to increase the NTC between the Iberia Peninsula and the rest of the Europe

- A competitive Internal European Energy Market → The Benefits
- A high performing electricity transmission backbone → The Precondition
- Increased Capital Cost & Lack of incentives → The challenge of the finance gap
- Regulatory frameworks → Stability and attractiveness required for investors
- Priority Premiums → Possibility for bridging the gap



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Target interconnection capacities within RG CSW

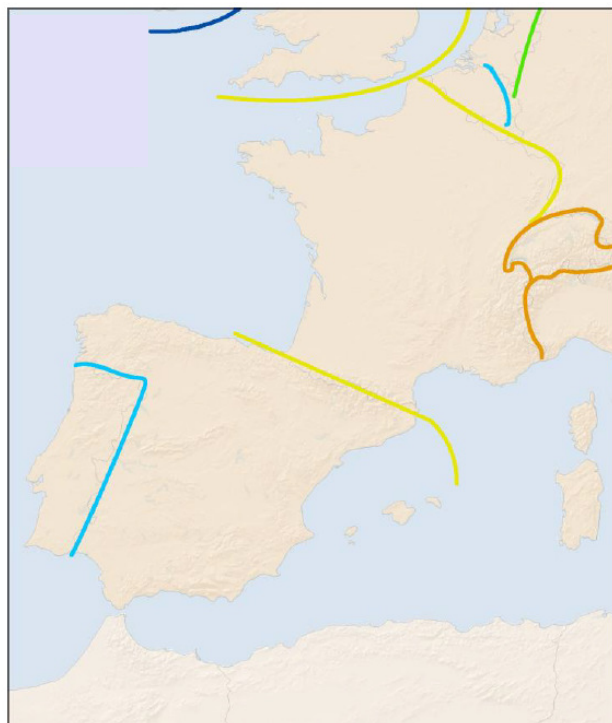
Computation framework

- ✓ They take into account (or consider) the “EU 10% objective” which was defined in the EU Parliament conclusions of 20 and 21 March 2014
- ✓ According to current studies, additional capacity above the target capacity would not be profitable, i.e. the economic value derived from additional capacity quantum cannot outweigh the corresponding cost. Profitability depends on the final characteristics of the specific projects which contribute to increase the capacity.

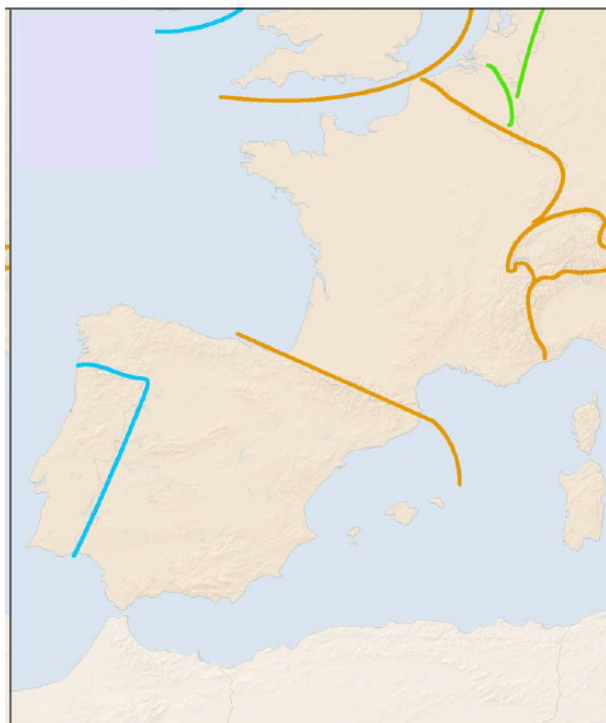
Target capacities confront the investment needs with the project assessments to derive the targets for every boundary for 2030

Target interconnection capacities within RG CSW

Vision 1



Vision 4



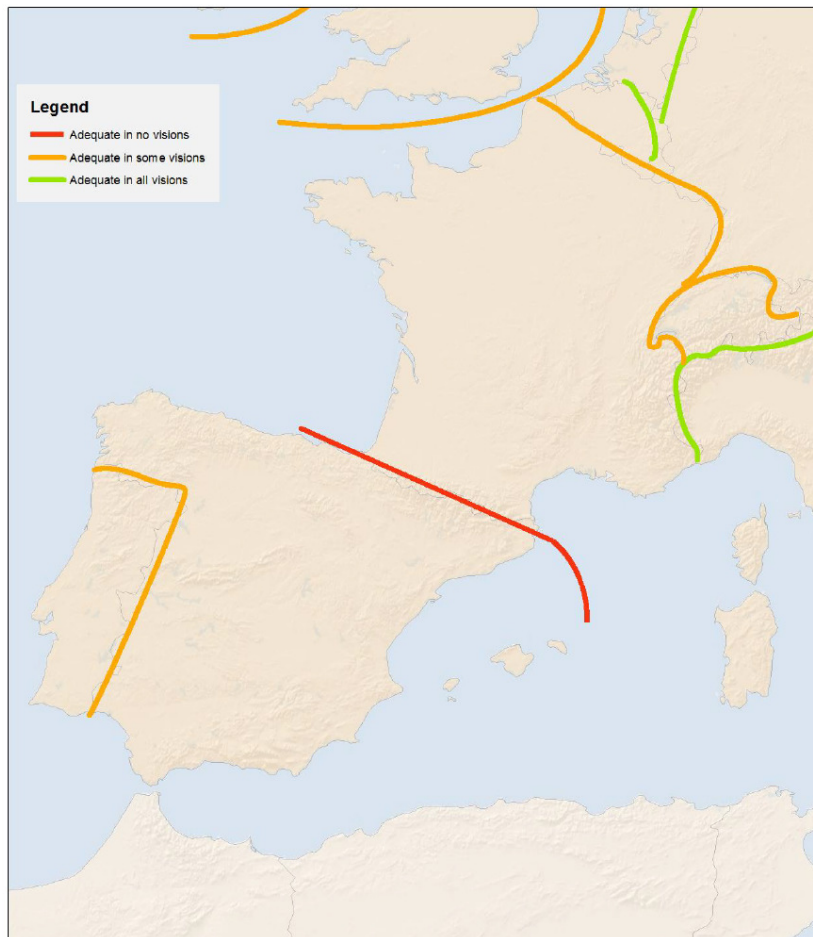
Legend



- ✓ Target capacity between Portugal and Spain is in the range of 2.500-4.500MW
- ✓ Target capacity between France and Spain depends on the Vision and on RES development. For Vision 1 it is in the range of 7.000-10.000MW and for Vision 4 it is greater than 10.000MW

RG CSW transmission adequacy for 2030

Transmission adequacy



- Even considering the increase of the interconnection capacity between France and Spain from the current 1GW to 6GW (considering TSO projects and BRITIB), the project portfolio seems not to be adequate to the market needs for 2030
- Further analyses are needed in this respect on next TYNDP release

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Key findings in CSW Region

RES integration supports an Energy transition

- Increase of RES generation from a total of 90 GW in 2013 to around 150 – 320 GW by 2030, depending on the Vision.
- New Wind and Solar power plants within all the CSW region, and also new Hydro generation (in Portugal and Spain).
- Reduction of Nuclear generation from 71 GW in 2013 to 63 (Vision 1) - 47 GW (vision 4) by 2030.

IEM full implementation asks for adequate Cross-Border capacities

- Insufficient cross-border capacity between the Iberian Peninsula and the rest of the European Continent (the Iberian Peninsula is considered almost an electrical island).
- Studies show that the cross-border capacity between the Iberian Peninsula and the rest of the European Continent needs to be increased in all Visions.
- CSW project portfolio included in TYNDP 2014 already allows an ES-Europe NTC increase from 1 GW today to 6 GW in 2030.

Energy transition requires the grid and the grid requires everyone's support

- In the set of projects included in TYNDP 2012, a significant number has experienced delays.
- In order to achieve climate and energy objectives, it is of utmost importance to smooth the permitting processes and gain political support at all levels.
- A stable regulatory framework is essential to ensure that grid reinforcements can be completed in time.

RG CSW has identified 27 projects of pan-European relevance in the region which includes 14000 km of lines and estimates around Bn €13,4 of investment.



Thank you very much for you attention

Brussels

Pedro Carola | 4 September



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