ENTSO-E's Workshop with Stakeholders on Ten-Year Network Development Plan 2014

Claire Fourment
ENTSO-E
RG Continental Central South

TYNDP 2014 workshop
4 September 2014, ENTSO-E premises, Brussels

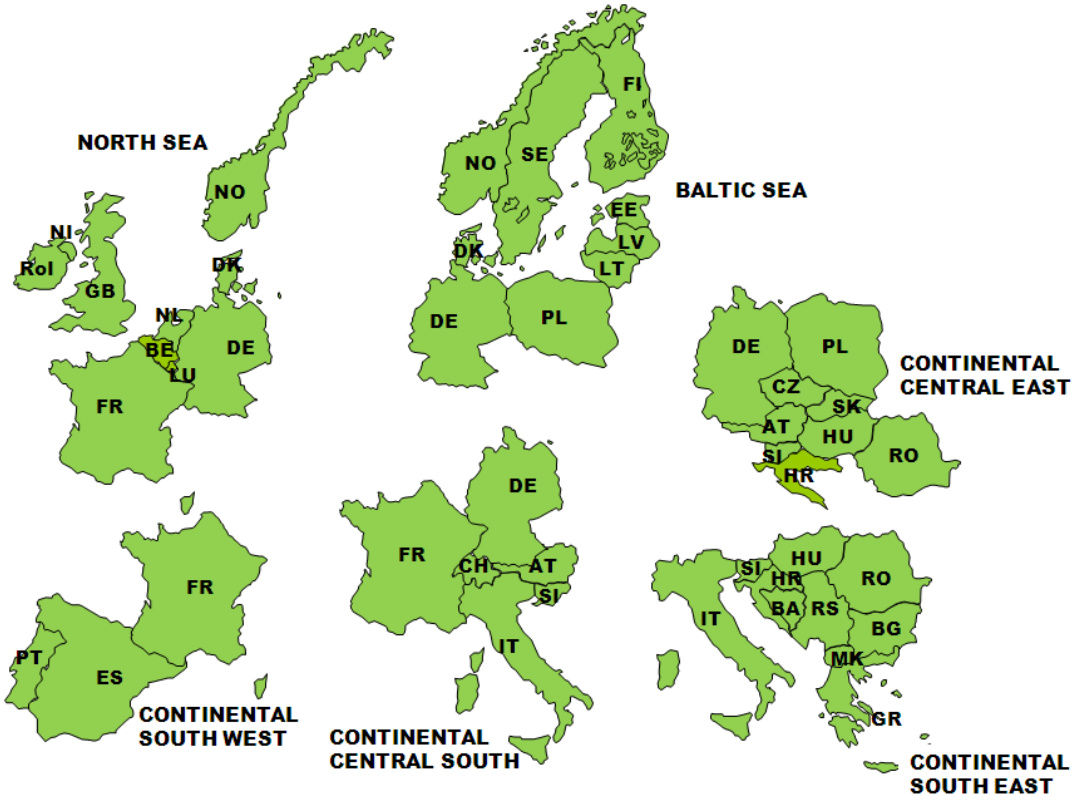
entsoe
Reliable Sustainable Connected

Content

1. Who is RG CCS and what are the specificities
2. Investment needs
4. Project portfolio
5. Project status/monitoring and public acceptance
6. CCS main messages

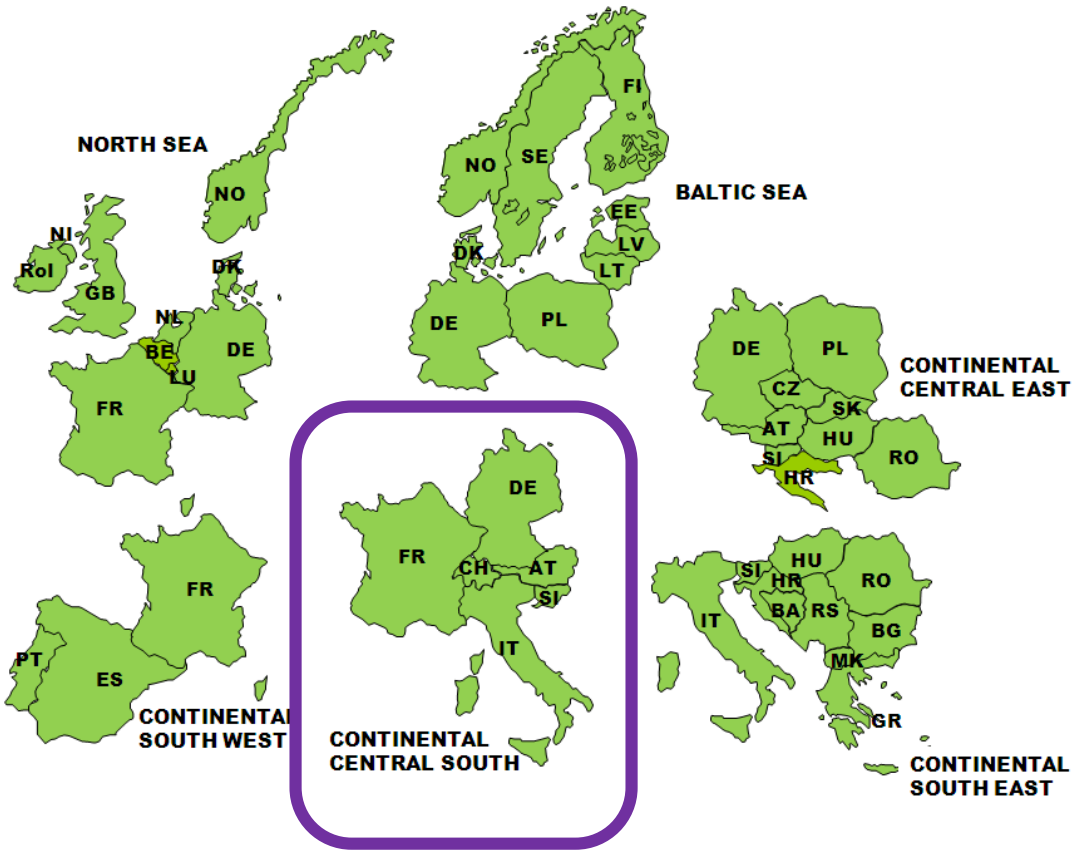
Specifics of the Region
Continental Central South

What/Where is the RG Continental Central South?



Specifics of the Region
Continental Central South

Where is Continental Central South?



Specifics of the Region Continental Central South

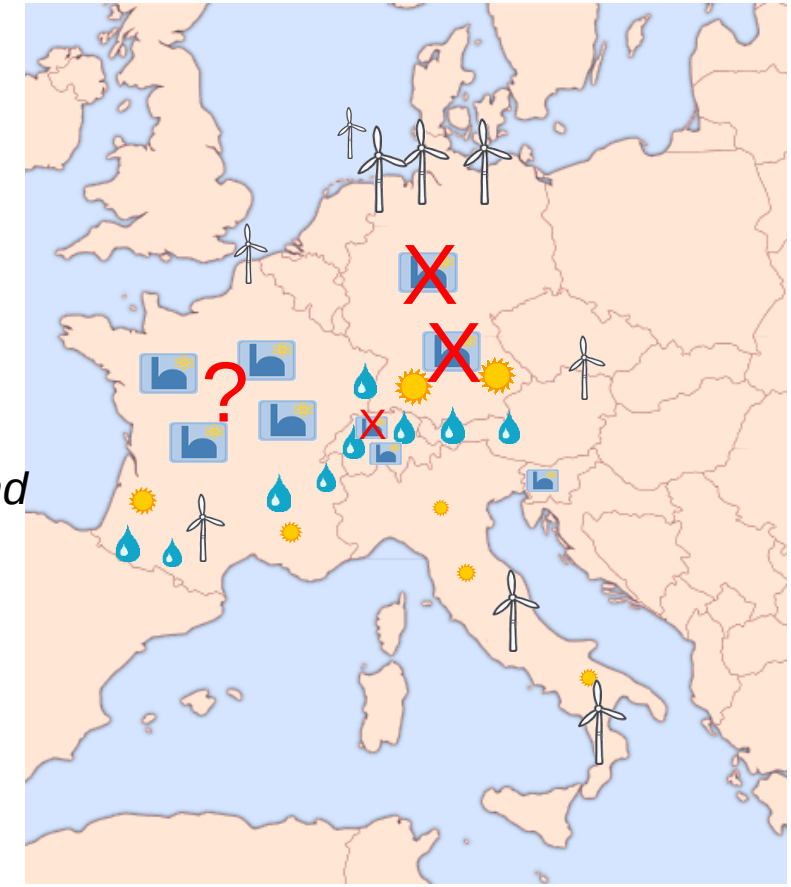
Who is the RG Continental Central South?

- *9 TSOs out of 6 Countries*
  - ✓ *AT: APG, VÜN*
  - ✓ *CH: Swissgrid*
  - ✓ *DE: Amprion, TenneT TSO, TransnetBW*
  - ✓ *FR: RTE*
  - ✓ *IT: Terna*
  - ✓ *SI: ELES*

Specifics of the Region Continental Central South

TODAY: What is currently at Stake in the Region?

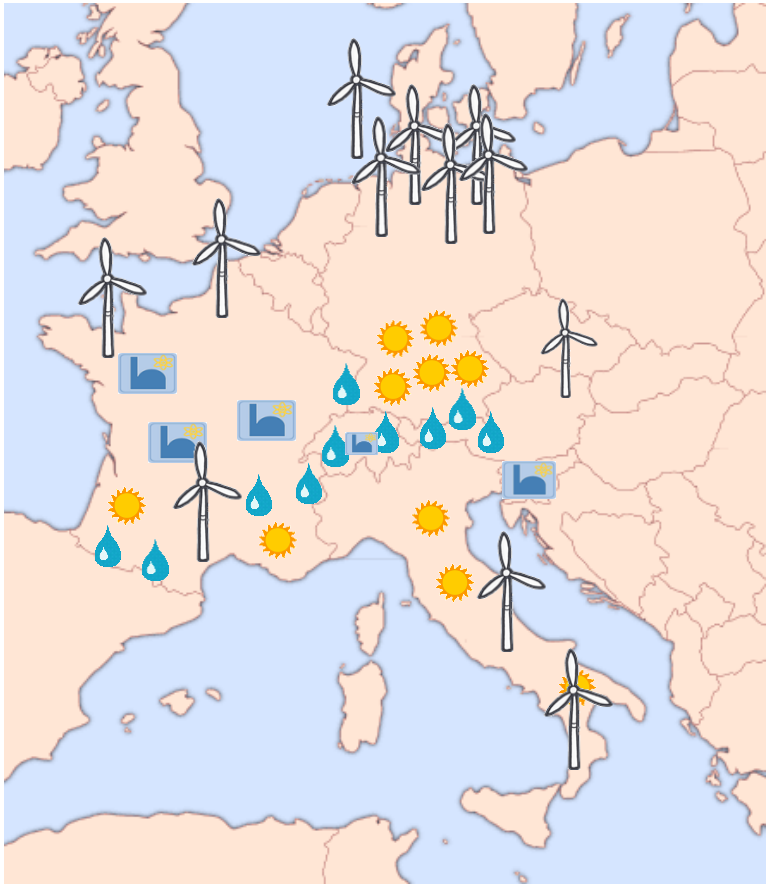
- *Central position in Europe*
- *Strong interaction/interrelation within the region and with neighbours*
- *"Energiewende" is already on-going*
- *RES development concentrated at the corners of the region (DE, FR and IT)*
- *Alpine hydro pump storage generation in the centre*
- *Nuclear phase out in Germany and Switzerland decided; discussions in FR*



What is at Stake in the Region in the 2030 Scenarios?

Vision 1: Regional issues/specifics

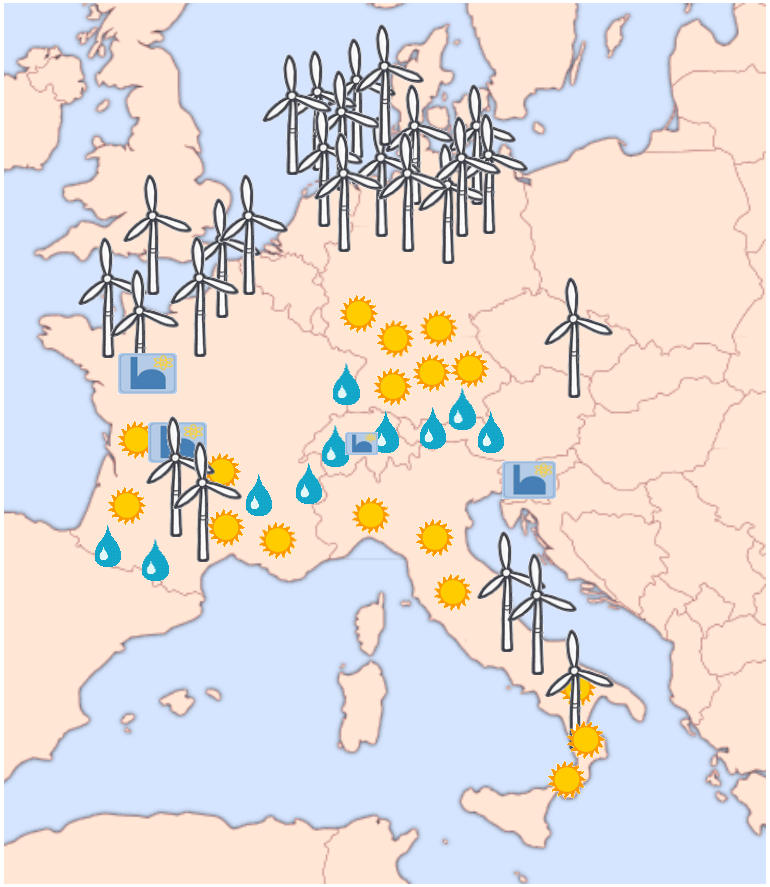
- *Central position in Europe*
- *Strong interaction/interrelation within the region and with neighbours*
- *"Energiewende"* ***proceeds – but "rel. slow"***
- *RES development* ***keeps*** *concentrated at the corners of the region (DE, FR and IT)*
- *Alpine hydro pump storage generation in the centre* ***is increased***
- *Nuclear phase out in Germany* ***realized***
- ***Some decrease of nuclear generation in France and Switzerland***
- ***FR and DE have less energy available for export to IT***
- ***Low load growth***



What is at Stake in the Region in this 2030 Scenario?

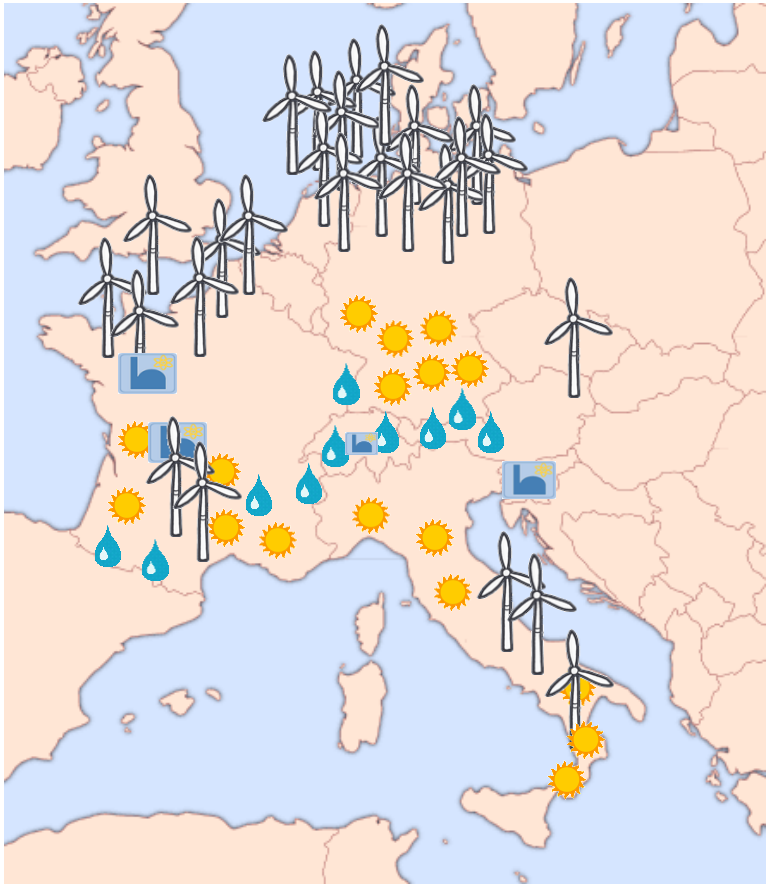
Vision 4: Regional issues/specifics

- *Central position in Europe*
- *Strong interaction/interrelation within the region and with neighbours*
- *"Energiewende" **in full progress***
- ***Massive** RES development concentrated at the corners of the region (DE, FR and IT) **- on trajectory to EU 2050 targets***
- *Alpine hydro pump storage generation in the centre **is further increased***
- *Nuclear phase out in Germany **realized***
- ***Stronger** **decrease of nuclear generation in France (and Switzerland)***
- ***FR and DE have less energy available for export to IT***
- ***Higher** **load growth***



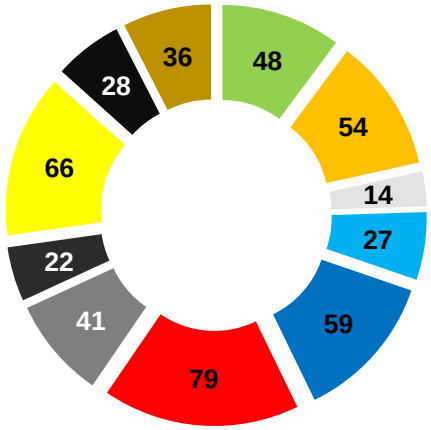
Consequences of installed RES capacity

- **Regional divergence**
  of generation and demand
  - Wide area energy flows necessary
  - New “renewables“ are more large scale power plants
- **Divergence in time**
  of generation and demand
  - Necessity of additional transport capacity and storages!
  - Challenge for the overall system!
- **Divergence Power vs. Energy**
  - **Grid development is triggered by power not by energy!**



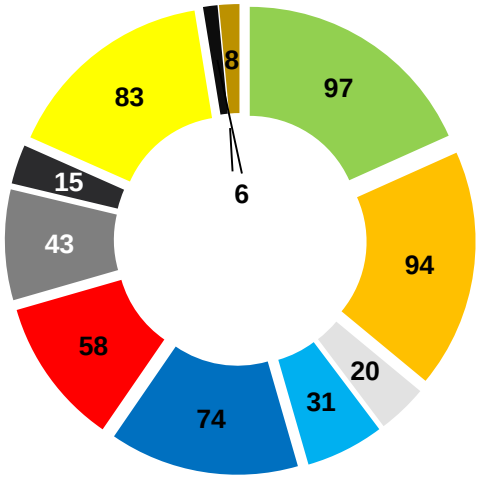
RG CCS Installed Capacities in Vision 1 and Vision 4

2012 [GW]



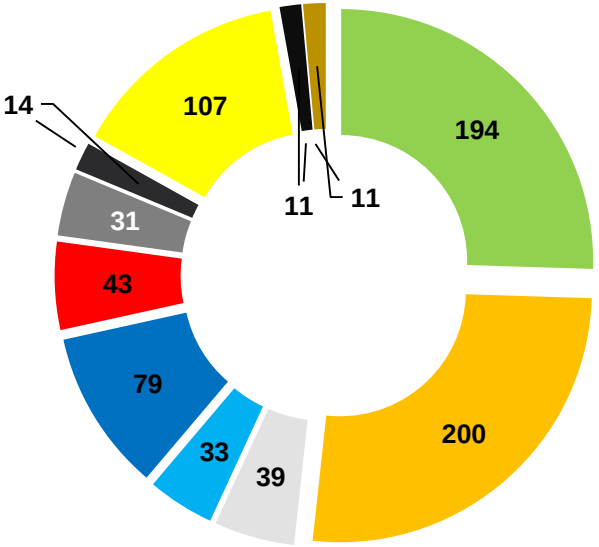
Total 472 GW

Vision 1 2030 [GW]



Total 528 GW

Vision 4 2030 [GW]



Total 769 GW

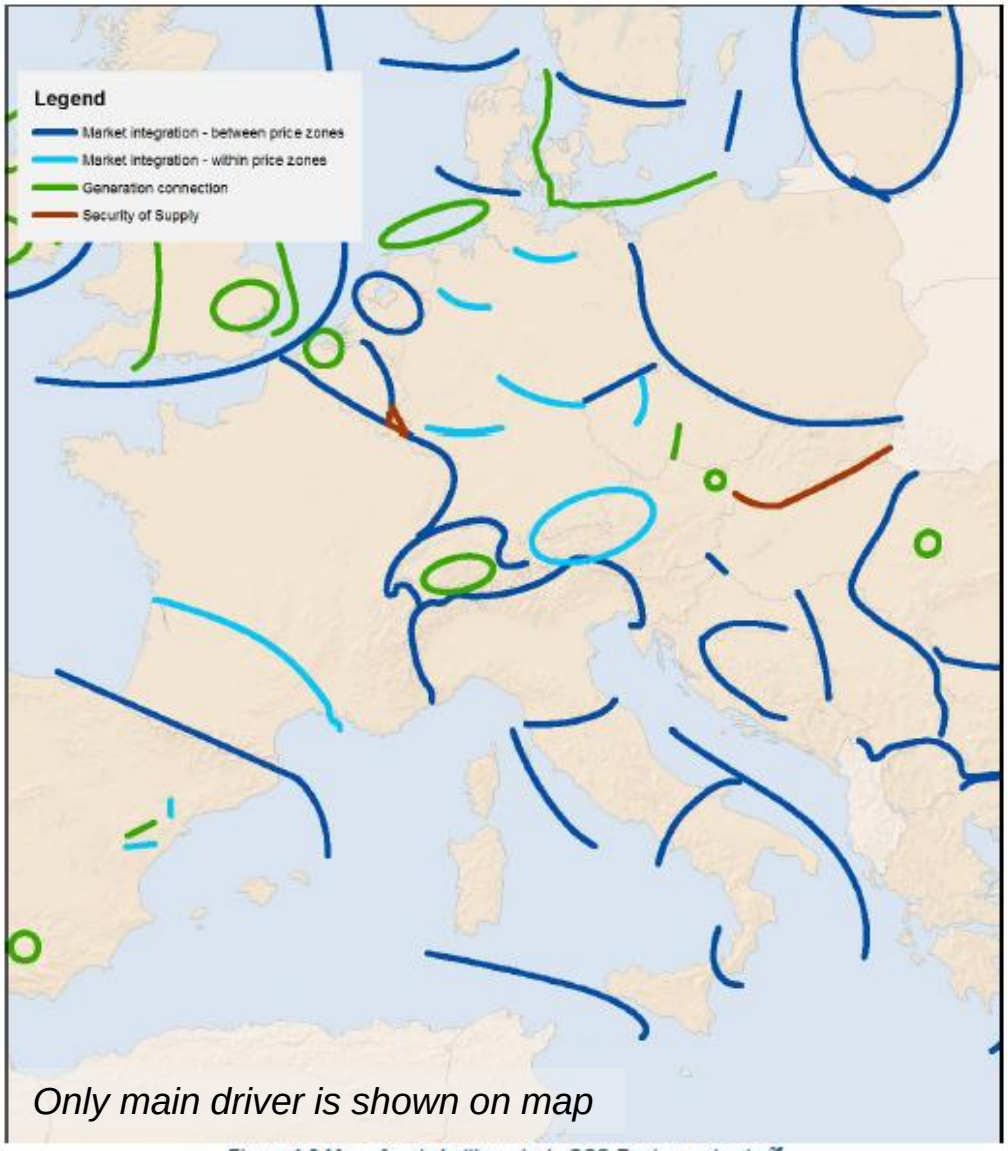
- Wind
- Solar
- Others renewable
- Run of river
- (Pump) Storage
- Nuclear
- Hard Coal
- Lignite
- Gas
- Oil
- Others non-renewable

Wind and PV:	**+ 89 GW, + ~100%**	**+ 292 GW, RES nearly triples**
Nuclear phase out:	**- 20 GW, -19 %**	**- 36 GW, - 45 %**
Storage capacity:	**+15 GW, + 25 %**	**+ 20 GW, +34 %**

entsoe

Total 769 GW

Investment needs

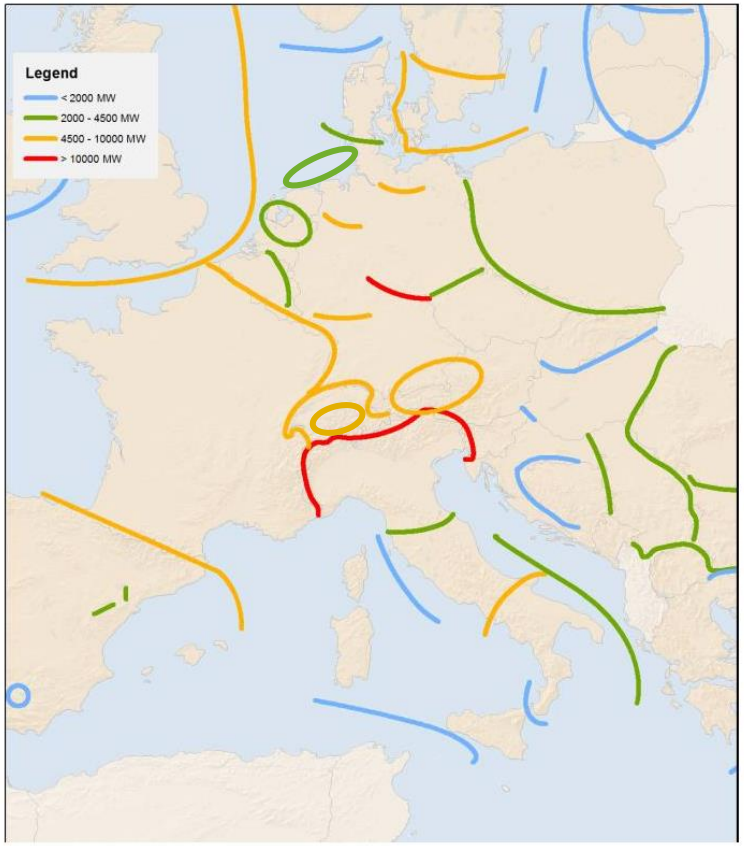


Only main driver is shown on map

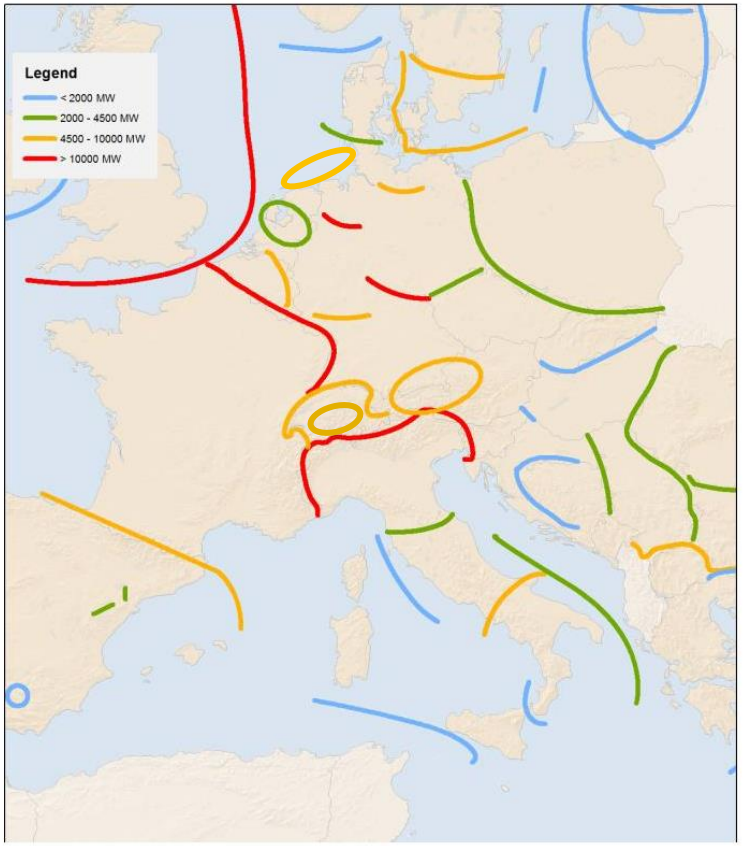
Figure 4-2 Map of main bottlenecks in CCS Region perimeter[26]

- Generation integration, mainly wind in northern Germany and hydro in the Alps
- Internal and cross border grid development needed to accommodate north to south power flows from Germany to Italy
- French north-eastern border
- Need for grid development within Italy
- Connection of Sardinia and Sicily to Italy
- Connection of CCS with NS, CCE and CSW
- Connection of Italy to Greece, Balkan area and northern Africa

Bulk Power Flows

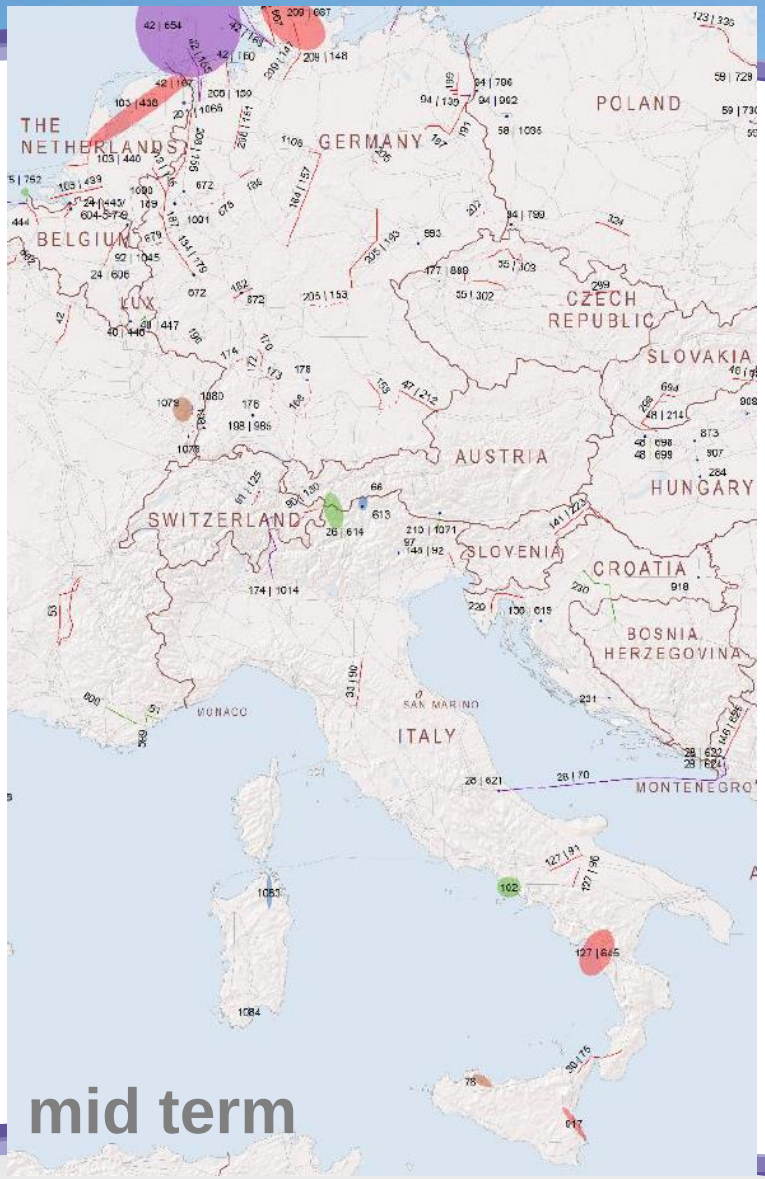


Vision 1

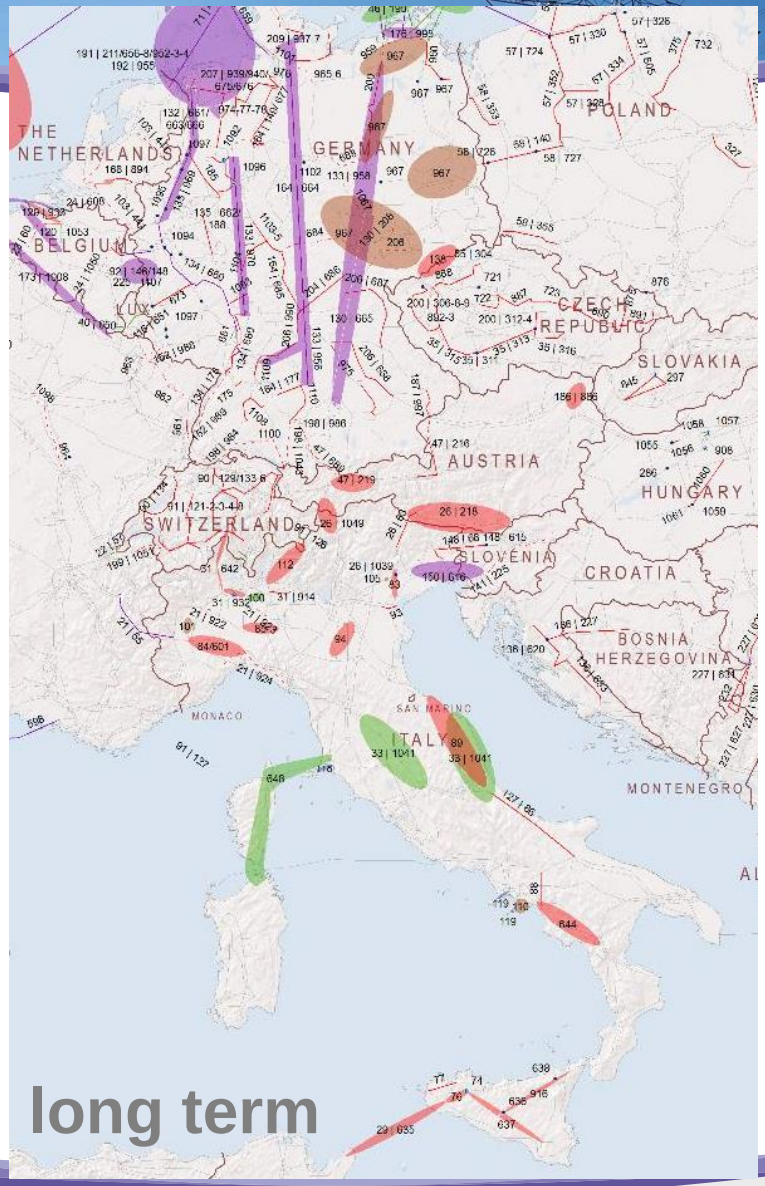


Vision 4

Project Porfolio



mid term



long term

Planned Infrastructure in the RG CCS

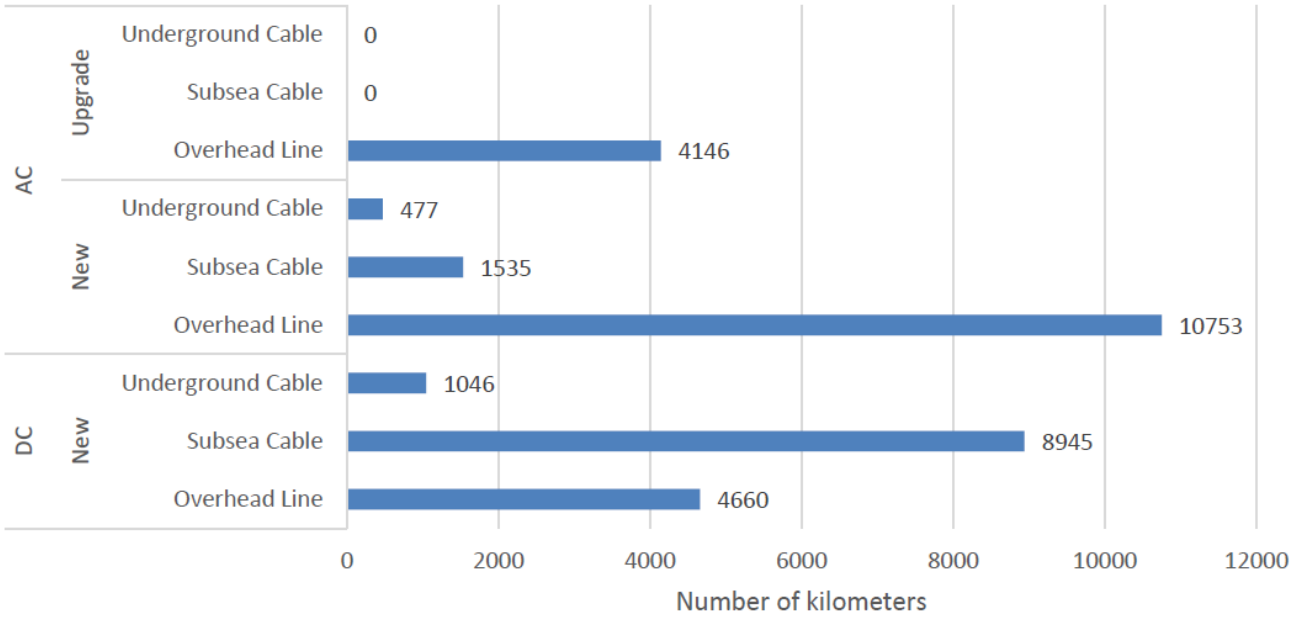


Figure 5-7 Projects in the RgIP - breakdown per technology

More than 32000 km of new or upgraded lines in the RgIP, of which

- 33% are underground or subsea cables
- 30% are based on HVDC technology
- 13% are upgrades of existing routes

More than 24000 km are projects of pan-EU significance (53 projects)

Total Investment Costs*

Country	Cost (bnEuros)
AT	1.9
CH	1.6
DE	34.8 - 54.2
FR	8.4
IT	5.9
SI	0.6
Total	53.2 - 72.6

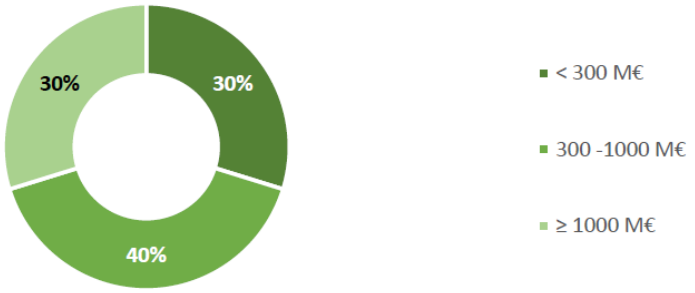


Figure 5-25 Total project expenditures V1

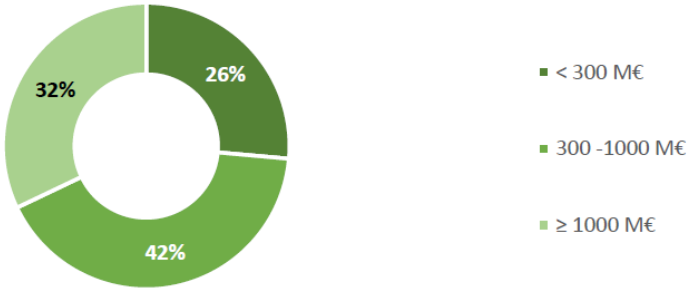


Figure 5-26 Total project expenditures V4

*On- and offshore summarized

Transmission Adequacy

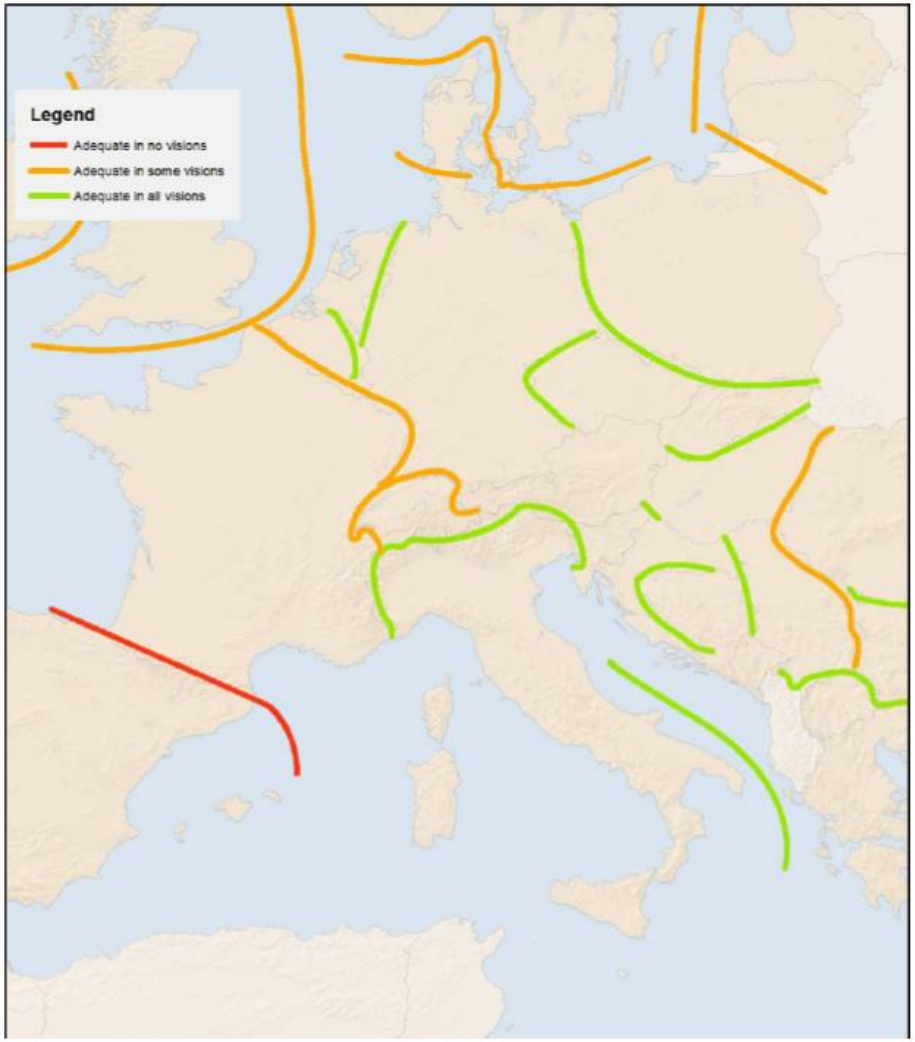


Figure 6-2 Transmission adequacy by 2030

- Project portfolio allows to meet future needs in most of the cases.
- Nevertheless ambitious scenarios regarding RES development may rise additional needs for some borders
- Additional investigations needed for possible further grid development in the Swiss roof and the French north-eastern border
- NB: Vision 4 is very challenging, not only in terms of grid development but also regarding technical and operational aspects (e.g. frequency control, voltage control, short circuit power)

Project Status

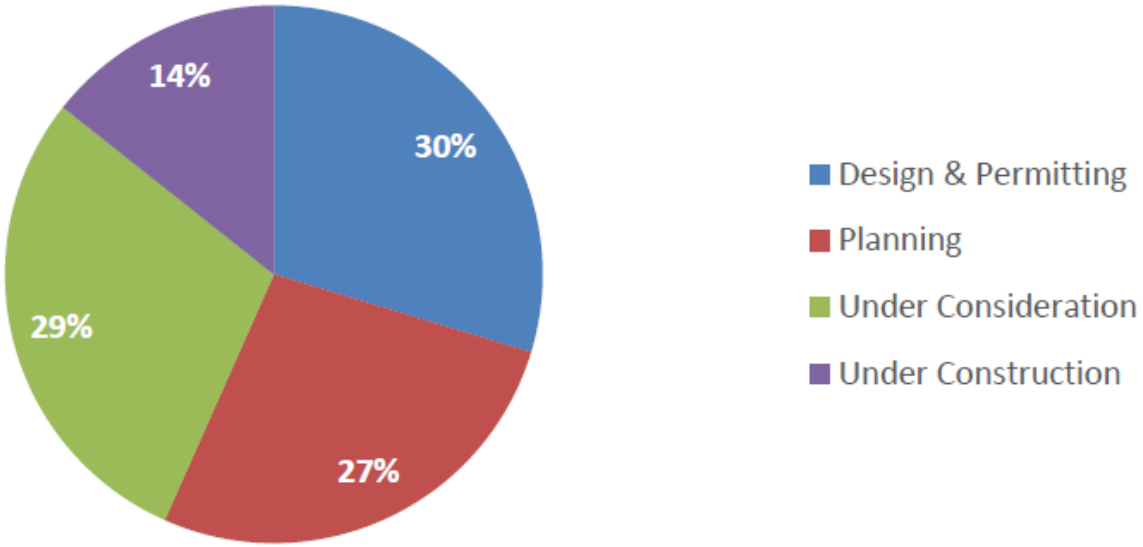


Figure 5-8 CCS RgIP investment portfolio in the RgIP - breakdown by status

CCS projects monitoring

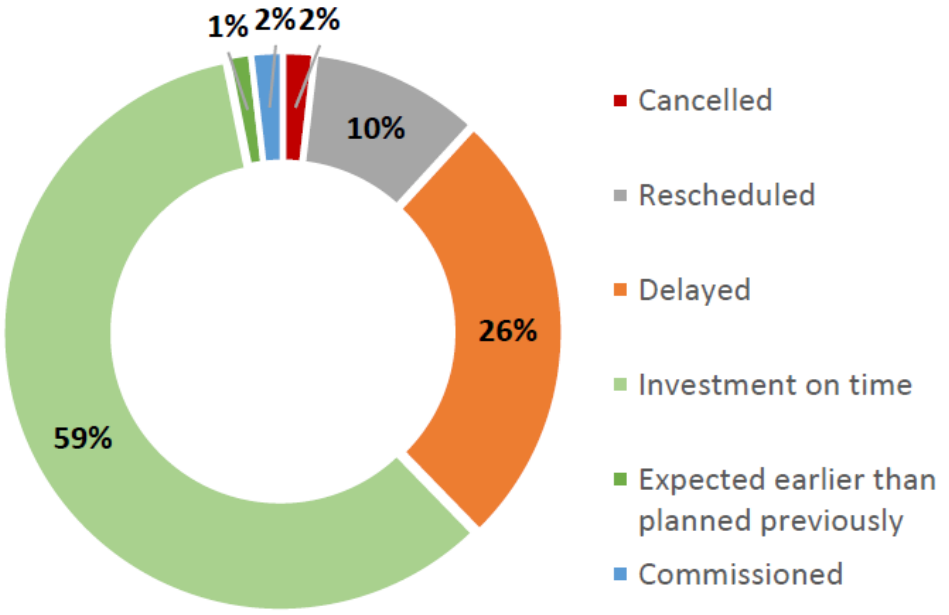


Figure 9-2 Evolution of the CCS region investments portfolio (including pan-EU and regional significance investments)

Delayed projects

- Longer permitting procedures than expected
- Technical issues

Rescheduled projects

- External driver delayed (e.g. postponed RES projects)
- Long term projects

Cancelled projects

- Lack of social acceptance / environmental feasibility not reached
- Technical difficulties
- More efficient solutions developed

Current challenges and transmission infrastructure development

EU climate targets

- Public Acceptance
- Authorisation Process
- Urban Planning
- Costs & Incentives for Investments

Grids

Urban Planning

Urban planning does not take lines into consideration, no legislative possibility to prevent corridor rededication.

Buildings under an existing 220kV Line

Building under a new 380kV Line

Present steps taken by TSOs to reduce the lengthy permitting process

- Environmental impact taken into account from incipient study phases
- Closer collaboration with the local administration in assessing the future urban planning and preliminary agreement on location of future assets
- Environmental compensation - “balance effect”
- Active participation in informing the public

➔ *EIP expected to help*

Main messages

- Massive RES-Development at the corners of the region is on-going and accompanied fundamental changes for the electricity system
- High, volatile and wide area power flows are the consequence in the Region
- Adequate and reliable transmission network is a crucial prerequisite for achieving the EU energy policy goals and to cope with the forthcoming challenges
- Time is a crucial factor:
  From Planning to "making projects happen" the support of all stakeholders is vital → public acceptance is a key factor
  → EIP is expected to help
- CCS Regional Investment Plan comes up to 32000 km of new or upgraded lines (24000 km of pan-EU significance), representing 53 to 73 bn€ of investment

Thank you for your attention!