

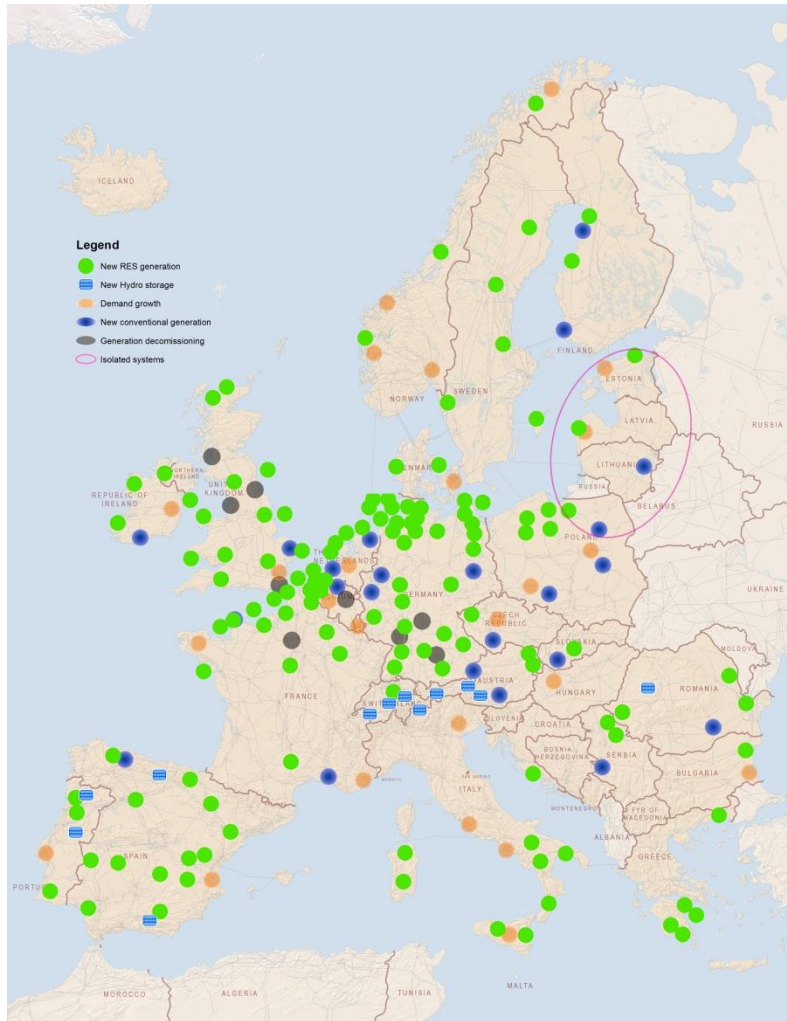
Challenges in grid development in the CCE Region

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ENTSO-E RG CCE stakeholder external workshop
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- **Looking back:
Drivers for grid development across Europe**
- **The way forward:
Where are we heading to?**
- **Challenges for the grid development in the RG CCE**
- **Conclusions**

Generation and Load Evolution



Approximately 1/3 of present generation capacity to be replaced due to end of lifetime

Peak load growth +1.7% per year

RES increase in the next decades for the entire Europe

Looking back: Results from the TYNDP 2012



- **Permitting:** Comparing to the projects identified in ENTSO-E's pilot TYNDP 2010, the report finds that **one in three planned investments are experiencing delays in implementation due to long permitting processes**. This is why ENTSO-E considers the Commission's proposals on fast-tracking of transmission infrastructure projects in its draft Energy Infrastructure Package and in particular the proposal on a one-stop-shop and defined time lines for permit granting procedures as a most positive step forward.
- **RES:** The TYNDP 2012 identifies the need to invest €104 bn in the refurbishment or construction of roughly 52 300 km of extra high voltage power lines clustered into 100 investment projects across Europe. **80% of the identified 100 bottlenecks are related to the direct or indirect integration of renewable energy sources (RES)** such as wind and solar power. Such massive development of RES is the main driver behind **larger, more volatile power flows, over longer distances across Europe**.
- **Market Integration:** The commissioning of projects of pan-European significance could result in **CO2 savings of 170 MtCO₂**, of which 150 MtCO₂ results from the connection of renewable generation technology and 20 MtCO₂ which stem from savings due to further market integration.
- **Grid Extension:** Extending the grid **by only 1.3% a year enables adding 3% generation capacity** and the reliable integration of 125 GW of renewable energy sources.



Energy policy goals, Structural changes, Load development

Security of supply

- Load development
- More optimal resources sharing
- Generation structural change

Competitiveness/market integration:

- More long-distance flows
- Change of load flow patterns

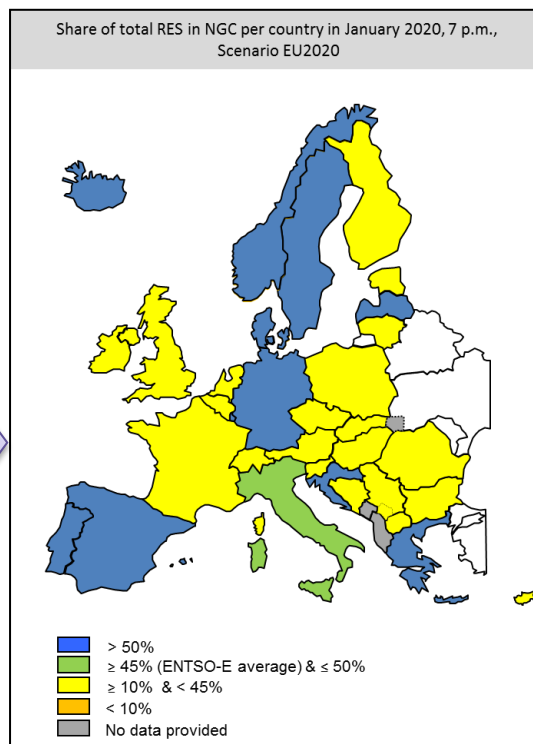
Sustainability/GHG:

- More renewables, further from the loads
- More heating and mobility with electricity



**all require Grid
capacity !**

ENTSO-E - Where are we heading to?



2012

**320 GW of RES
538 GW of peak load
3300 TWh demand**



**2014 TYNDP
2030 visions**



2050

**80-95% reduction in
greenhouse gases
with higher
reduction for the
electricity sector**



2020 – TYNDP 2012

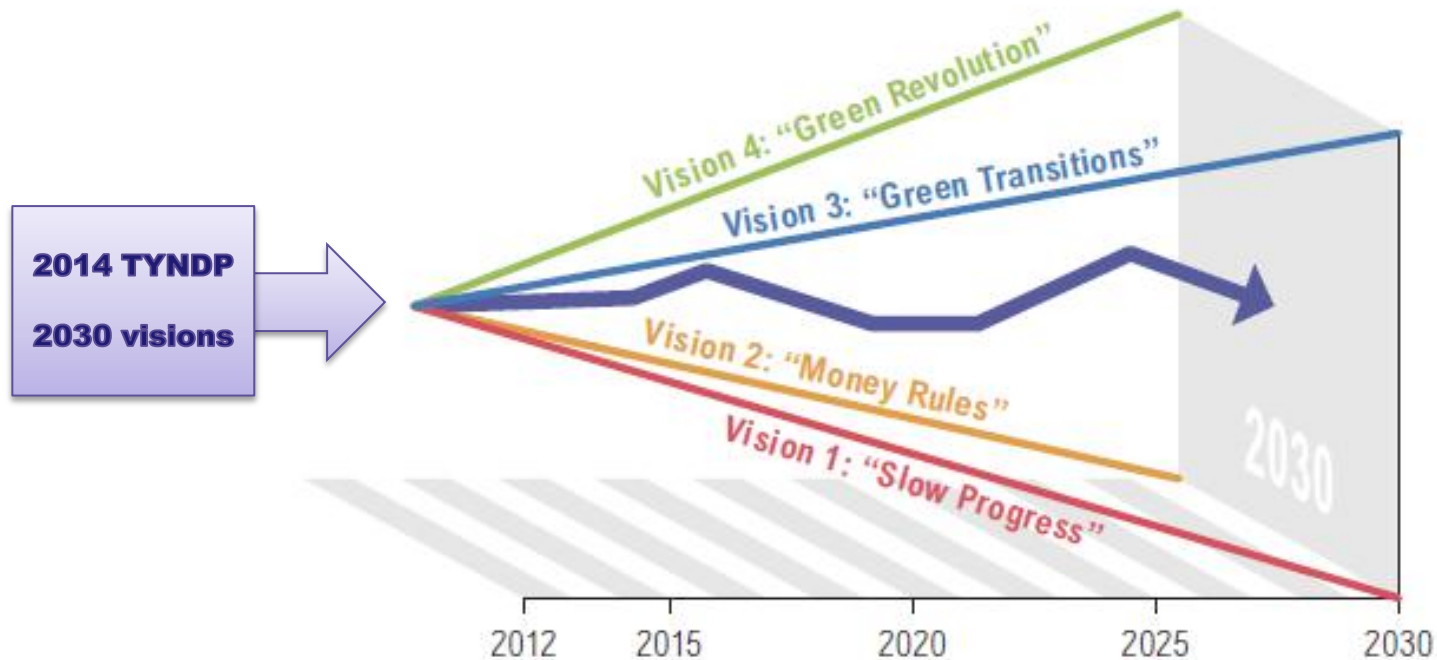
**536 GW of RES
567 GW of peak load
3600 TWh demand**

**Challenges for the
grid development in
RG CCE**

- Implementation of market mechanisms and integration of renewable in-feed on a large scale and nuclear phase-out in some MSs → change in system operation conditions.
- The today's transmission networks structure must be further reinforced to accommodate forecasted huge power evacuation done on a large scale.
- With the expansion of wind generation in northern Europe one of the main concerns of the interconnected power systems are transit flows already identified.

→ These developments are expected to continue and assessed in the TYNDP2014 using the ENTSO-E Visions.

Scenarios for assessing the investment needs TYNDP2014



Further details will be presented during this workshop.

- The ENTSO-E scenarios allow to assess long-term investment needs in the framework set by European policy in the TYNDP process.
- The investment needs and the drivers for grid development in the RG CCE show a stable development: to cope with the expected transmission needs, further optimisations, reinforcements and extensions of the network are necessary.

Thank you for your attention!

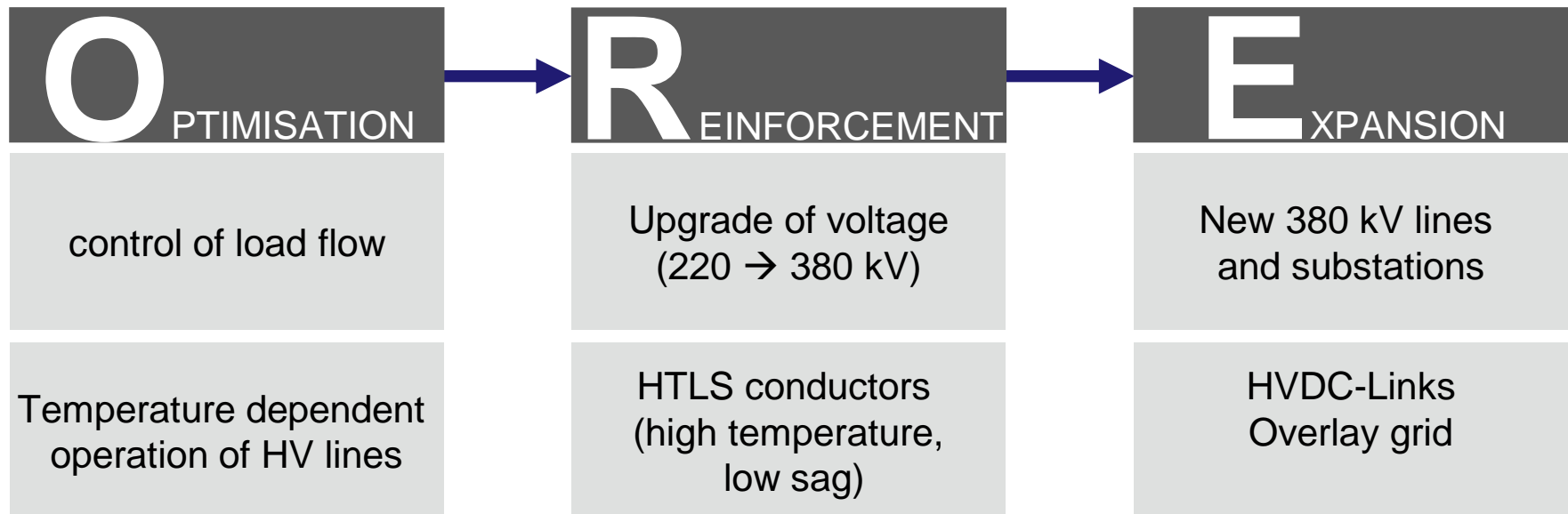


Back-up

Network analysis / selection of measurements



380/220-kV-Transmission-**N**ETWORK



THANK YOU FOR YOUR ATTENTION!

Questions?

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