Study Committee 3

Power system environmental performance

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The TSOs contribution to the decarbonisation of the European economy

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European Union is committed to achieving carbon neutrality by 2050:

- energy production and use accounts for 75% of EU GHG emissions
- the main 2 questions of the article:
  - How do and will the TSOs contribute to this ambitious target ?
  - What are the limitations of general methodologies frequently used for assessing "low-carbon" trajectories ?

TSOs support the low carbon transition in 2 main ways:

- acting to reduce their carbon footprint including direct emissions (scope 1), electricity indirect emission (scope 2), and others indirect emissions (scope 3)

Figure 1 : the 3 scopes of the GHG protocol [3] or the ISO 14064-1:0 and 14069 [6]

- contributing, as en essential actor of the energy system to the decarbonisation of the economy

=> important to be distinguished to avoid mixing the different perimeter of quantification

Carbon footprint of TSO activities: RTE example (1.1 million tons CO_2 eq. / year 2018)

- > 50% of the carbon footprint emissions are due to grid losses (scope 2)
- >12% are due to SF_6 leaks (scope 1)
- >18% are du to network infrastructure upstream emissions

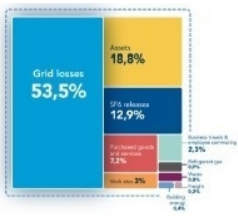

Figure 2: RTE GHG emission inventory (year 2018) [7]

How can TSOs reduce their carbon footprint?

- direct emission (scope 1)
  - reducing SF_6 leaks & installed mass, replacing SF_6 gas
  - replacing the thermic vehicle fleet
  - reducing the fossil energy consumptions
- indirect emissions linked to electricity consumption (scope 2)
  - optimal dispatching and operation of the grid to reduce losses
  - purchasing more energy efficient transformers
  - contributing to the decreasing of the carbon electricity mix (=> see the energy system perimeter)
- other indirect emissions (scope 3)
  - sustainable grid developement
  - green procurement
  - optimized TSO asset maintenance policy

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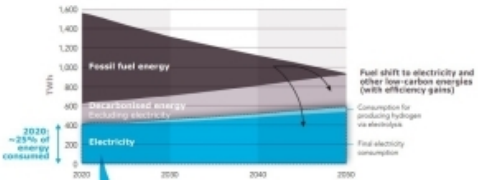
French case: how does RTE contribute to the decarbonisation of the European energy system?

The French carbon neutrality target in 2050 involves:

- reducing by 40% the energy consumption between 2020 and 2050
- decarbonising the generation mix by 2050 (by a factor of 10)
- decarbonising the energy fossil fuel in all the sectors

The RTE report "Energy Pathways to 2050" gives consumption trajectories and 6 scenarios to reach both neutrality and the security of supply:

- electricity consumption will increase (+35%) when energy consumption will decrease (+40%)
- significant development of renewable energies
- the electricity network must be rapidly resized



=>RTE activities will grow with the electrification of usages and the connection to new Renewable Energy Source (RES). Some activities – source of GHG emissions – will increase in particular : grid losses and infrastructures.

Finally, developing the network to integrate low carbon generation and electrify fossil usages contributes to reduction of GHG emissions at the global scale.

Italian case: how does Terna contribute to the decarbonisation of the European energy system?

National strategy involves the electrification of energy consumption and the integration of huge amounts of electrical renewables:

- electrification is already the most rapid decarbonisation instrument
- electricity network represents the backbone of this electrified and decarbonized energy system

2 examples of TSOs contribution to system level CO_2 emission reduction :

- The Tyrrhenian link :
  - 2 submarine bipolar HVDC VSC links connecting Sardinia with Sicily and Sicily with the Italian mainland
  - will allow 600 GWh/year of added renewable energy in 2030 as well as an important enhancement of the reliability of the power system
  - will avoid a substantial amount of GHG emissions
- Equigy, owned by leading European transmission system operators :
  - creates a trusted data exchange to enable aggregators to participate with smaller flexibility devices, such as home batteries and electric vehicles, in electricity balancing markets, turning consumers into prosumers
  - aims to set cross-industry standards throughout Europe, to support a future-proof, reliable and cost-effective power system that is independent of fossil fuel-based flexibility sources

- **By enabling the integration of RES and the electrification of fossil fuel consumptions, both grid developments and operative improvements will directly contribute to the decarbonisation of the whole energy system.**
- **While building new infrastructure could potentially increase TSOs carbon footprint, the massive benefits that the integration of RES and electrification of consumptions can bring at energy system level are essential to achieve the neutrality.**

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What are the limitations of general methodologies frequently used by companies to assess "low-carbon" trajectories?

2 main methods are used:

- "ACT" method for assessing low carbon transition with carbon target
- SBTi method for setting objectives

Both methods are based on carbon trajectories by sector for each scope of the GHG protocol:

- for TSOs, the sector to be referred is "Electric Utilities" but only the effort on the 3 scopes will be taken account
- the TSO system-level contribution in all sectors thanks to the support in connecting RES capacities and electrifying the fossil fuel usages is not considered

The concept of neutrality, developed by the UNFCCC for countries, is confusing for companies:

- neutrality means first reduce the GHG emissions and compensate the ones incompressible
- the identification of emissions to be reduced and the ones to be compensated require common and verified practices to evaluate if reductions are compatible with the global neutrality target and the compensation compatible with the limit of the global GHG emission credit available

Conclusions

- TSOs act to reduce their emissions thanks to regular assessment of their carbon footprint
- TSOs contribute to the decarbonisation of the whole economy beyond their 3 scopes of carbon footprint
- a TSO GHG emission reduction strategy requires a system –wide approach that considerate the perimeter of company inventory and the perimeter of national inventories or carbon footprint
- as emission sources of those 2 perimeters can overlap, it is important to assess the different sources of emissions without mixing them
- to set up an optimal climate strategy it is fundamental to assess GHG emission reduction and avoidance from a system-wide perspective, i.e according to the 2 perimeters. In the case of TSOs, the increase of their activities has in fact a very positive leverage effect on the decarbonisation of the global energy system
- for measuring GHG emission reduction and avoidance and for setting low carbon trajectories, there is a need to share the methodologies used
- practices need to be shared with national and local public authorities engaged in the 2°C target to benefit from additional synergies and ensure compliance with the national or/and global target.