

Study Committee C-3

Power system environmental performance

11037_2022

Science based targets, emission reduction and carbon neutrality strategies for TSO companies. Experience in Spain

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Motivation

- Climate change is a global challenge. Limiting the increase of global temperature requires urgent action.
- The transition to a decarbonised energy model is imperative to compatibilize economic well-being & emission reduction.
- Companies in the power sector have the responsibility to make energy transition possible (which requires an increase in their activities, including the development of new infrastructures) while they are asked to reduce their own emissions.
- The paper summarises the methodology and the steps followed to set ambitious but achievable emission reduction targets for 2030.

Method/Approach

- To define targets, it is necessary to combine top-down and bottom-up calculations, following these steps
- ✓ 1. **Top-down design**: identify the minimum reduction requirements in accordance with the ambition of the company.
- ✓ 2. **Bottom-up approach**: calculate the evolution of emissions considering different scenarios. By taking BAU as a reference, different reduction pathways can be studied.
- ✓ 3. **Analysis of the gap** between desired and expected emissions: identify the possibility to reach the targets and the best options to do it (considering emission reduction plans). If there is a significant gap, either the ambition must be reduced, or further measures must be identified.

Conclusion

- **Scope 1&2**: SBTi requirements to be aligned with 1.5° target has been considered as a reference for ambition (46.2% of emissions between 2019 and 2030). As a result of the bottom-up analysis, a goal of 55% reduction by 2030 has been proposed. This proposal is more ambitious than the requirement established by SBTi and is also attainable and affordable by the company.
- **Scope 3**: despite the lack of information to make reliable projections, the company has decided to define reduction objectives aligned with the SBTi criteria, considering the establishment of a work path aimed at promoting the development of suppliers and the prioritization of “sustainable” procurement.
- Setting ambitious targets involves the **commitment to develop the required emission reduction plans**. Besides, the goals set reflect the strong commitment of the company to make possible the energy transition in Spain, which is completely linked with the achievement of scope 2 emission reduction.

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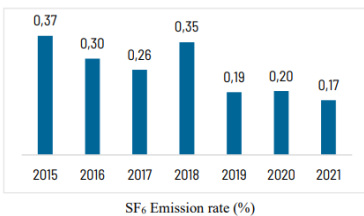
Bottom-up approach (emission projections)

• SF₆ Emissions (scope 1)

Defining SF₆ reduction pathways is a huge challenge because many improvement actions have already been developed, leading to a very low baseline leakage rate. The lack of alternatives for higher voltages makes it also difficult to provide solutions for a medium-term period.

To calculate the emissions projections the following issues have been studied:

i. Historic data (from 2008): leakage rate & detailed analysis of leakages considering characteristic of the equipment (age, voltage, manufacturer...), environment conditions, maintenance issues and other causes related to leakages or incidents (*80% of SF₆ emissions in Red Eléctrica are caused by only 6 GIS substations*)



ii. Expected increase of installed gas needed to meet the electrification and renewable integration goals (*installed gas for 2030 in Spain is expected to exceed 720,000 kg*).

iii. Age of equipment, as main factor related to SF₆ leakages (*almost all the substations responsible for the majority of emissions were built between 1980-1995*).

iv. Measures to reduce emissions:

- Progressive renewal of old equipment and equipment with very high leakage.
- Leakage control: training and raising awareness, improvements in leak detection and alarm systems, reduction of intervention times & development of effective reparation methodologies helps to minimize emissions.
- Designing criteria to reduce the risk of materials degradation.
- Reduction of installed gas, mainly by using SF₆ alternatives.

Two different scenarios have been considered to estimate SF₆ emissions by 2030. Finally, BAU + additional measures (further action to improve leakage control, renovation works for AIS equipment and renovation of GIS substation with higher leakage rate and no more GIL with SF₆ installed) has been considered. According to this, an increase of emissions is expected by 2026 and a final reduction in 2030 will be achieved.

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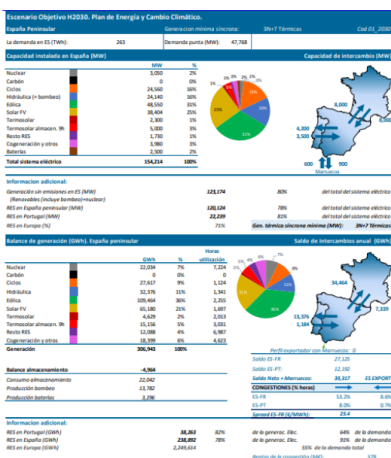
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Bottom-up approach (emission projections) – continuation.

• Transmission losses (scope 2)

The Spanish Climate and Energy Plan (PNIEC) have been taken as a reference, in line with Red Eléctrica's commitment to contribute to the achievement of the national/European climate & energy goals.

Emissions have been projected considering the evolution of three main variables: electricity demand, expected emission factor of the electricity mix (78% renewable energy) and % of losses in the transmission network.



Source: Spanish PNIEC 2030. Target scenario

• Other scope 1 +2 emissions

Estimation of future emissions for the rest of emission sources, as they aren't quantitative relevant, has been based on simple approaches that consider the evolution of the technology and the reduction levers to be pulled by the company.

Top-down approach (ambition)

SBTi recommendations has been considered to define minimum reduction targets:

- Establish a base year as recent as possible. (2019 has been taken)
- The minimum forward-looking ambition of targets (2030) must be consistent with reaching net-zero by 2050, assuming a linear reduction between base year and 2050 (not increasing absolute emissions or intensity).
- In addition to 1&2 targets, the proposal must include targets for scope 3 emissions.
- Scope 1+2: Targets must cover at least 95% of the emissions and must be aligned with the 1.5° ambition, which implies that annual reductions proposed must be greater than 4,2%.
- Scope 3: SBTi proposes different options. The most suitable ones for the company have been considered:
 - Absolute reduction of 28% by 2030. This target is aligned to a WB2C ambition (the alignment with 1.5 ° is not considered feasible by now)
 - Supplier engagement: driving the adoption of SBTi targets by suppliers in 5 years (2/3 of total emissions must be covered)