

### Environmental directives with best LCA facilitate Net Zero

Answer to question : To what degree are the new environmental directives impacting on the industry’s ability to respond and deliver the substation infrastructure necessary to facilitate Net Zero?

#### Net zero: Net Zero by 2050

Net zero by 2050 is a cross-sector initiative to accelerate the transition to a net zero global economy no later than 2050 zero emissions by 2050 or sooner.

According to the leading GHG Protocol corporate standard, a company’s greenhouse gas emissions are classified into three scopes. Scope 1 and 2 are mandatory to report, whereas scope 3 is voluntary. **Scope 1 emissions** are direct emissions from company-owned and controlled resources. In other words, emissions are released into the atmosphere as a direct result of a set of activities, at a firm level.

**Scope 2 emissions** are indirect emissions from the generation of purchased energy, from a utility provider. In other words, all GHG emissions released in the atmosphere, from the consumption of purchased electricity, steam, heat and cooling.

**Scope 3 emissions** are all indirect emissions – not included in scope 2 – that occur in the value chain of the reporting company, including both upstream and downstream emissions. In other words, emissions are linked to the company’s operations.

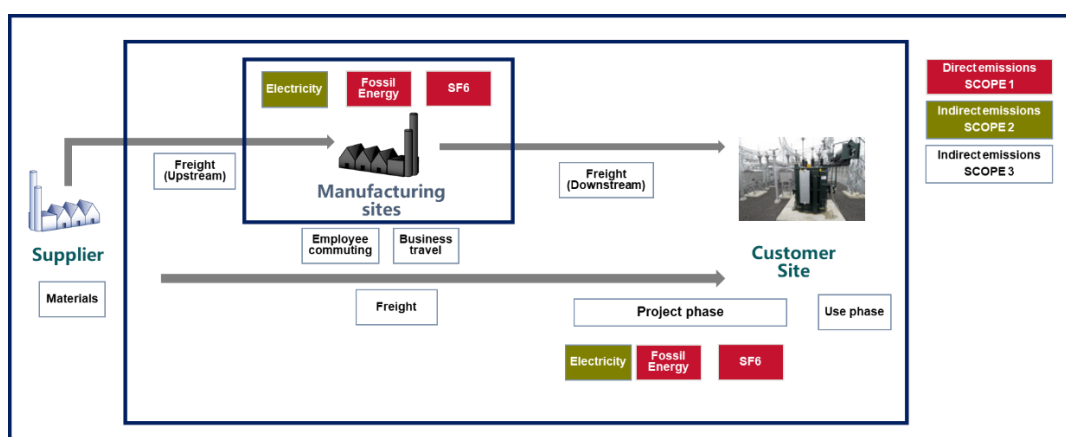


Fig. 1 :

#### Carbon neutrality:

Carbon neutrality measures carbon footprint and achieve a net zero impact by balancing emissions with an equal amount of reductions and offsets, see Figure 2.

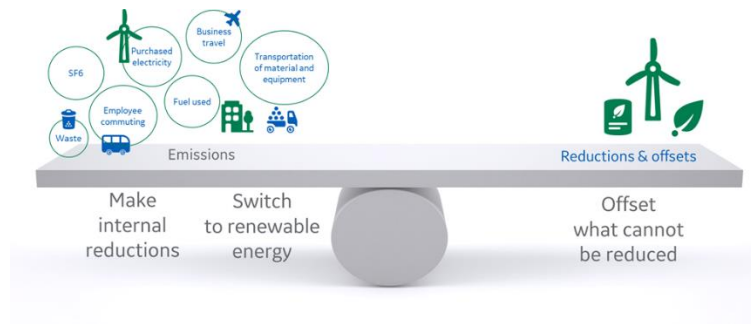


Fig. 2

### Existing directives:

- The RoHS Directive aims to prevent the risks posed to human health and the environment related to the management of electronic and electrical waste. It does this by restricting the use of certain hazardous substances in EEE that can be substituted by safer alternatives. These restricted substances include heavy metals, flame retardants or plasticizers.
- Waste electrical and electronic equipment (WEEE) Directive 2012/19/EU. The objective of the Directive is to promote re-use, recycling and other forms of recovery of waste electrical and electronic equipment (WEEE) in order to reduce the quantity of such waste to be disposed and to improve the environmental performance of the economic operators involved in the treatment of WEEE. The WEEE Directive sets criteria for the collection, treatment and recovery of waste electrical and electronic equipment.
- REACH is a regulation of the European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry. It also promotes alternative methods for the hazard assessment of substances in order to reduce the number of tests on animals.
- Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products.

### Life Cycle Assessment

Life cycle assessment or LCA (also known as life cycle analysis) is a methodology for assessing environmental impacts associated with all the stages of the life cycle of a commercial product, process, or service. For instance, in the case of a manufactured product, environmental impacts are assessed from raw material extraction and processing (cradle), through the product's manufacture, distribution and use, to the recycling or final disposal of the materials composing it (grave). LCA also clearly evidences pollution transfer. The LCA is done according to ISO 14040 and 14044.

### SF<sub>6</sub> regulations update in EU (F-gas 2022)

The new F-gas proposal introduces restriction of use in switchgear for SF<sub>6</sub> depending on voltage and with different GWP thresholds.

In some extent, the regulation proposal goes against the net zero emission target as does not consider at first the LCA of the product manufactured and based on the gas, knowing that the gas is only a component of the electrical switchgear among others.

Indeed, the GWP of the gas is not the main factor to assess the environmental impact of GIS. Total CO<sub>2</sub> emission must be via the LCA. SF<sub>6</sub>-free alternatives must be assessed using LCA for

climate change impact but also resource depletion to avoid pollution transfer (see on Figure 1 an example of comparative LCA for SF<sub>6</sub> and SF<sub>6</sub>-free based switchgears extracted from Cigre 2020 A3-102).

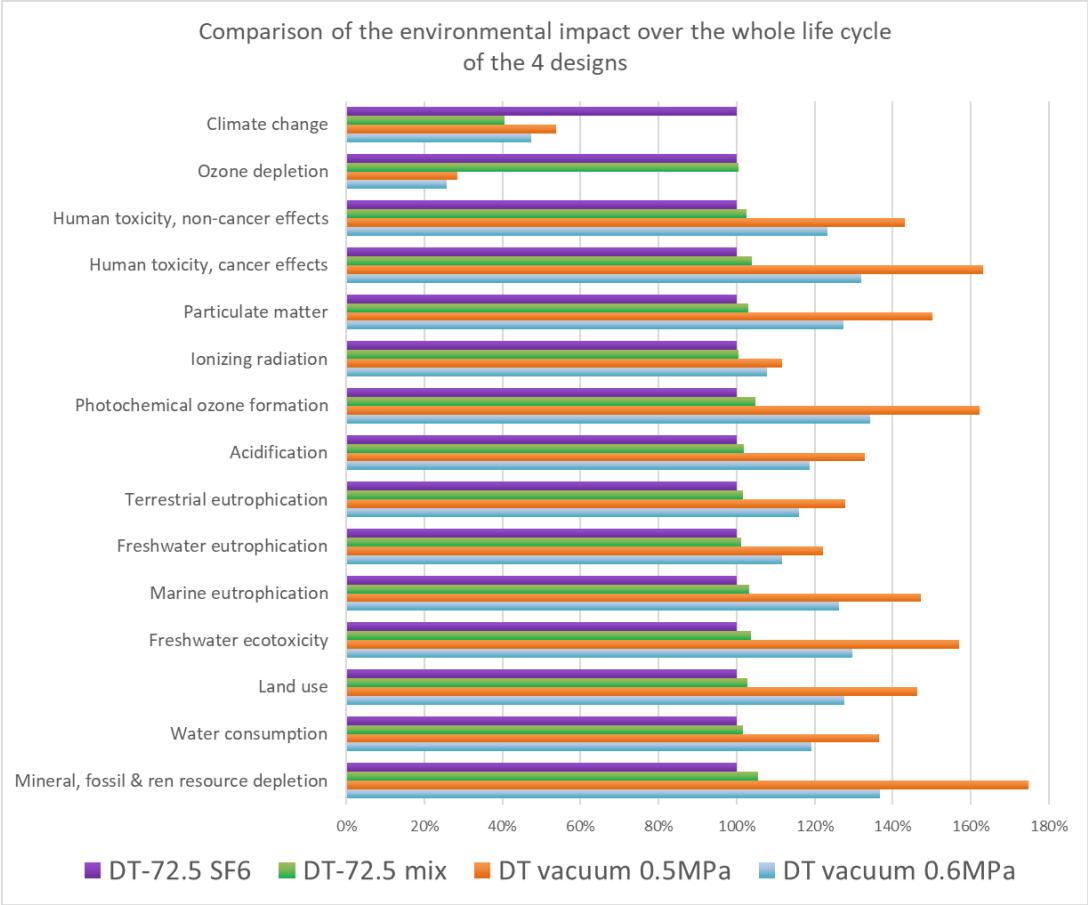


Figure 1: Example of comparative LCA for SF<sub>6</sub> and SF<sub>6</sub>-free alternative based switchgears

**To focus only on GWP may negatively impact on the overall carbon footprint of the switchgear and delay the CO<sub>2</sub> emission reduction target.**

**Conclusion:**

RoHS, Reach, WEEE, ErP are already exiting directive that give a clear framework to the industry to develop more sustainable products. In order to facilitate Net Zero, the new directives must consider the reduction of the CO<sub>2</sub> emissions all along the life of the product via LCA. The last F-gas regulation proposal is an example where the LCA of the product must be considered to better draft the regulation to reach the ultimate goal, that is to reach Net zero, and not focusing only on a single parameter, GWP.

