



Validating environmental reporting of carbon emissions

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ESG (Environmental, Social, Governance) reporting is essential for industry as it helps secure investment for companies' development. While Scope 1 are direct emissions and Scope 2 are indirect emissions, most of the industrial players report Scope 2 emissions from the use of energy (electricity and gas): these are carbon emissions that are emitted in the power station that uses fossil fuels (oil, coal, gas, biomass, etc.), see [1].

Conventional way to report company's carbon emissions of Scope 2 is to obtain electrical meter readings and multiply them by the average carbon intensity of the electric grid that supplies electricity. In the UK, such carbon factors were previously published (annually) by the Department for Environment, Food, and Rural Affairs (Defra), then more recently by the Department for Energy Security and Net Zero (DESNZ). These average annual factors are approximate, and actual fuel mix of the electrical grid varies within a few minutes, depending on the operating power generators.

In some cases, the annual carbon intensity may underestimate the actual intensity of the grid. This usually happens in Europe in winter, when a large number of gas-fuelled generators are active to provide sufficient heating, and at the same time wind conditions are placid, providing little of renewable energy. In other cases, when there is lots of wind-generated energy and less gas-generated energy (for example, on a windy summer day), the average carbon factor may overestimate actual carbon intensity of the grid.

In several case studies, we demonstrate that such discrepancies may reach 10-15% of the total carbon emissions, as they are presented in quarterly or annual ESG reports. The results suggest that the current way of reporting carbon emissions should be revised, so that actual state of the dynamical energy grid would be taken into account for improvement of ESG reporting. Subsequently, this will impact their ESG standing and potential investment, which is crucial for European business as well as for the correct accounting of the impact of European carbon emissions [2].

References

[1] Livina et al, International Journal of Metrology and Quality Engineering, in revision.

[2] Livina et al, in preparation.

