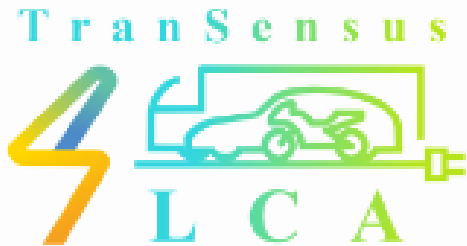


Mix électriques géographiques vs mix électriques marché

Quelles recommandations en ACV ?



ISO 14067
ISO 14064-1



Coordinating the harmonization of a transport-specific Life Cycle Assessment (LCA)



Funded by the European Union

GA # 101056715



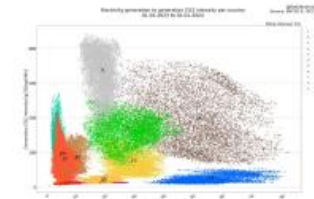
Electricity modelling for attributional LCA: location-based or market-based approach?

CONTEXT

Most of nowadays products and organizations have various electricity consumption processes embedded in their value chains, therefore the importance of electricity modelling choices when conducting an environmental LCA of products or organizations. The main approach for electricity modelling in attributional LCA is the location-based approach, based on territorial electricity mixes. But recently, different guidances include the possibility to use a market-based approach, taking into account electricity market instruments such as Energy Attribute Certificate and using residual mixes for all processes that do not benefit from any EAC. These two approaches cannot be used simultaneously in one attributional LCA if there is to be a coherence between the emissions reported in the GHG inventories and the emissions to the atmosphere.

ELECTRICITY BASICS

The electricity supply from the grid is the result of a complex collaboration between various actors to ensure an equilibrium between production and consumption, at all times. The physical reality of the electricity grid means that consumed electrons cannot be traced back to a given production plant: it is impossible to differentiate the consumption of two actors in the same bidding zone.



DEFINITIONS

An Energy Attribute Certificate (EAC) is the official documentation to prove that 1 MWh of renewable energy has been produced and added to the grid. Global EAC standards are primarily Guarantees of Origin (GO) in Europe, Renewable Energy Certificates (RECs) in North America and International RECs (IRECs) in a growing number of countries in Asia, Africa, the Middle East and Latin America. A residual electricity mix is defined as a mix which is not documented via an Energy Attribute Certificate (EAC) tracking system. The Association of Issuing Bodies (AIB - Home | AIB (aib-net.org)) develops, uses and promotes a European, harmonised and standardised system of energy certification for all energy carriers and is issuing residual mixes for European countries.



LOCATION-BASED APPROACH

Location based mixes are available in most databases. The location-based approach is accused of not helping to decarbonize the national or regional electricity grid mixes because it does not incentivize investments in renewables, but whose job is it?



Electricity Maps | Emissions CO2 de la consommation électrique en temps réel

MARKET-BASED APPROACH

There is a need to overcome potential "greenwashing" accusations when using a market-based approach, such as:

- Double counting (as explained by Peter Holzappel, Vanessa Bach and Matthias Frickbeiner (Technische Universität Berlin, Institute of Environmental Technology, Chair of Sustainable Engineering) in "Electricity accounting in life cycle assessment: the challenge of double counting", published in April 2023 in The International Journal of Life Cycle Assessment,
- Resource shuffling (i.e. showing decarbonization for given products while attributing all the "bad" emissions to other products for which there is little or no reporting that is done),
- Decoupling reported emissions from real emissions,
- Desensitizing the implementation of energy savings measures,
- Approximations due to in-house modelization of contractual and residual electricity mixes...

Some of these accusations can be tackled through a careful selection of the contractual instruments that are used, considering, in particular, strict spatial, temporal and additionality criteria.

Country	Year	Renewable	Coal	Gas	Nuclear	Hydro	Wind	Solar	Other	CO2 emissions (tCO2e/MWh)
Denmark	2021	100%	0%	0%	0%	0%	0%	0%	0%	0.0
France	2021	0%	0%	0%	70%	0%	0%	0%	0%	0.0
Germany	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Spain	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
UK	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Italy	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Poland	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Sweden	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Netherlands	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Austria	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Belgium	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Portugal	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Greece	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Czechia	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Slovakia	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Slovenia	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Finland	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Estonia	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Lithuania	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Latvia	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Malta	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
Cyprus	2021	0%	0%	0%	0%	0%	0%	0%	0%	0.0
EU average	2021	22%	28%	35%	15%	0%	0%	0%	0%	0.0

Table 1. Some national and residual European electricity mixes LCA impacts

GLOBAL DECARBONIZATION

There is no clear evidence of a tangible impact of market-based approaches as a driver of decarbonization of the electric grid. Multiple studies have shown that contractual instruments used in the context of the Scope 2 market-based method have proved inefficient in that they are very unlikely to lead to additional renewable electricity generation, whose price is currently too low to provide additionality.

CONCLUSION

As stated by Matthew Brander and Anders Eijern in "Principles for accurate GHG inventories and options for market-based accounting" published in April 2023 in The International Journal of Life Cycle Assessment: "We emphasise that inventories are only one form of accounting method, and their accuracy should not be undermined by attempting to fulfil functions that are best served by other methods."

EDF is part of the SCORELCA network
ACV France (scorelca.org)