Calculation of CO_2 avoidance factors for Germany and France

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Calculation for Germany[1]

The calculation method is identical for PV, offshore wind and onshore wind. However, different emission- and substitution factors are utilized. The emission gases CO_2, CH_4 and N_2O are taken into account. This way, not only CO_2 emissions are being calculated but the respective CO_2 equivalents (CO_2eq).

Calculation Germany

CO_2eq emissions avoided by RE generation, gross	−	CO_2eq emissions from RE generation (indirect emissions from manufacture of generating equipment, auxiliary energy, etc.)	=	**CO_2eq emissions avoided by RE generation, net**
CO_2eq emissions avoided by RE generation, net	÷	RE energy generation	=	CO_2 avoidance factor (CO_2eq)

[1] Source: Umweltbundesamt (Federal Environment Agency): Emissionsbilanz erneuerbarer Energieträger 2020 (Emission Balance of Renewable Energy sources), November 2021; gCO_2eq/kWh: grams of CO_2-equivalent per kilowatt-hour.

Calculation for France[1] ›

It is assumed that renewable generation in France substitutes conventional generation. Therefore, the specific CO_2 equivalent (CO_2eq) of electricity generation in France is calculated from the generation data of conventional generation with the corresponding CO_2 emission factors.

The CO_2 avoidance factor from renewables is calculated for each generation type by subtracting the specific CO_2eq from the life cycle of the respective renewable generation type from the calculated specific CO_2eq from electricity generation.

Calculation France

Specific CO_2eq emissions from conventional generation in France **–** Lifecycle CO_2eq of specific renewable energy type **=** **CO_2 avoidance factor (CO_2eq)**

[1] Sources:
Electricity generation of France: RTE-Electricity-Report 2020
CO_2-emission factors:
1) IPCC WGIII Contribution AR5 2014, Climate Change 2014 Mitigation of Climate Change.
2) IPCC 2011 Special Report on renewable energy sources and climate change mitigation (SRREN).

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