

Calculation of CO₂ avoidance factors for Germany and France >

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Calculation for Germany¹ >

The calculation method is identical for PV, offshore wind and onshore wind. However, different emission- and substitution factors are utilized. The emission gases CO₂, CH₄ and N₂O are taken into account. This way, not only CO₂ emissions are being calculated but the respective CO₂ equivalents (CO₂eq).

Calculation Germany

$$\begin{array}{l} \text{CO}_2\text{eq emissions} \\ \text{avoided by} \\ \text{RE generation,} \\ \text{gross} \end{array} - \begin{array}{l} \text{CO}_2\text{eq emissions from} \\ \text{RE generation} \\ \text{(indirect emissions from} \\ \text{manufacture of generating} \\ \text{equipment, auxiliary energy, etc.)} \end{array} = \begin{array}{l} \text{CO}_2\text{eq emissions} \\ \text{avoided by} \\ \text{RE generation,} \\ \text{net} \end{array}$$

$$\begin{array}{l} \text{CO}_2\text{eq emissions} \\ \text{avoided by} \\ \text{RE generation,} \\ \text{net} \end{array} \div \begin{array}{l} \text{RE energy} \\ \text{generation} \end{array} = \begin{array}{l} \text{CO}_2 \text{ avoidance} \\ \text{factor (CO}_2\text{eq)} \end{array}$$

¹ Source: Umweltbundesamt (Federal Environment Agency): Emissionsbilanz erneuerbarer Energieträger, Bestimmung der vermiedenen Emissionen im Jahr 2018 (Emission balance of Renewable Energy sources, determining emissions avoided), data as of November 2019

Calculation for France¹ >

It is assumed that renewable generation in France substitutes conventional generation. Therefore, the specific CO₂ equivalent (CO₂eq) of electricity generation in France is calculated from the generation data of conventional generation with the corresponding CO₂ emission factors.

The CO₂ avoidance factor from renewables is calculated for each generation type by subtracting the specific CO₂eq from the life cycle of the respective renewable generation type from the calculated specific CO₂eq from electricity generation.

Calculation France

$$\begin{array}{l} \text{Specific} \\ \text{CO}_2\text{eq emissions} \\ \text{from conventional} \\ \text{generation} \\ \text{in France} \end{array} - \begin{array}{l} \text{Lifecycle CO}_2\text{eq} \\ \text{of specific} \\ \text{renewable} \\ \text{energy type} \end{array} = \begin{array}{l} \text{CO}_2 \text{ avoidance} \\ \text{factor (CO}_2\text{eq)} \end{array}$$

¹ Sources: Electricity generation of France: RTE-Electricity-Report 2019 CO₂ 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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