

Formula for calculating the CO₂ avoidance factors by the Federal Environment Agency¹ >

Umwelt
Bundesamt 

The calculation method is identical for PV, for offshore wind and for 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)¹.

Calculation method

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

¹ Source: Umweltbundesamt (Federal Environment Agency): Emissionsbilanz erneuerbarer Energieträger 2017 (Emission Balance of Renewable Energy Sources), data as of October 2018; gCO₂eq/kWh: grams of CO₂-equivalent per kilowatt-hour.