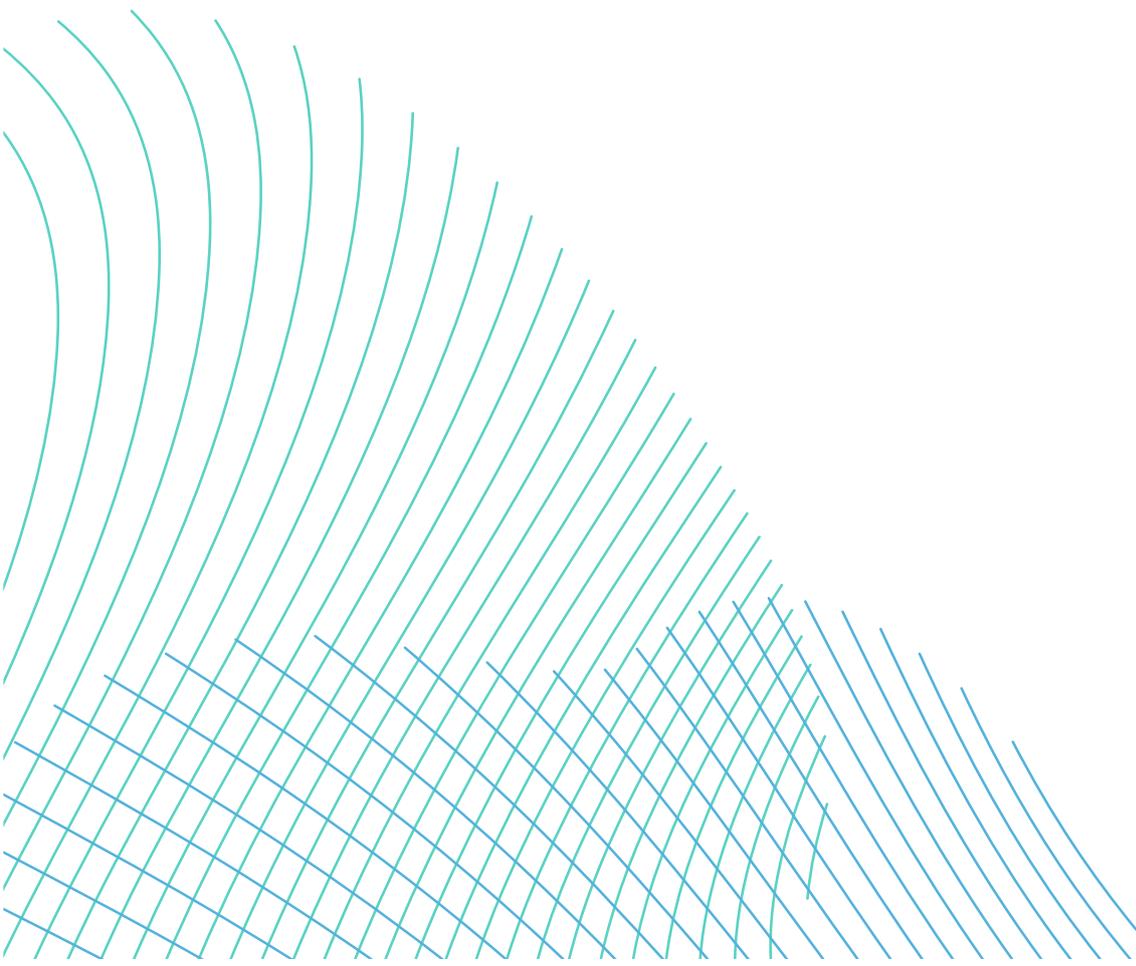


**RWE**

# **Greenhouse Gas Emission Inventory & Calculation Methodology**

**Quantification and reporting of greenhouse gas  
emissions in accordance with the Corporate Green-  
house Gas Protocol**

December 2021



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## Executive Summary

Greenhouse gases (GHG) trap heat and make the planet warmer. The resulting change of our climate is one of the defining issues of our times. RWE is acting – we reduced our emissions from power generation year on year, halving the emissions from our power plants from 2012 to 2019. RWE is committed to the targets of the 2015 Paris Agreement: Limiting global temperature increase to well below 2 degrees Celsius above pre-industrial levels, while pursuing efforts to limit the increase to 1.5 degrees.

For RWE it all starts with transparency on our emissions. This document outlines our key rationales in accounting our greenhouse gas emissions. The inventory is based on the results of a Group-wide assessment in 2020 and will be reviewed on a regular basis. This process is steered by the Sustainability team at RWE AG and conducted in close collaboration with relevant functions within RWE Group. Emissions have been part of our external reporting for years: The first reporting using the internationally renowned Greenhouse Gas Protocol Standard has been in 2009. Based on this methodology we publish GHG figures on an annual basis.

## Introduction

In the past century the concentration of greenhouse gases in the atmosphere has grown. As such increasing greenhouse gas emissions pose a threat to the wellbeing and welfare of humankind. Global warming has diverse negative impacts such as rising sea levels, increased risks of flooding, drought and other extreme weather events.

Thus, at the 2015 Climate Summit in Paris the international community agreed to limit global temperature increase to well below 2 degrees Celsius, while pursuing efforts to limit the increase to 1.5 degrees. This can only be achieved if global greenhouse gas emissions are rapidly reduced. As a power generating company it is RWE's purpose to provide energy for a sustainable life. We recognize the responsibility of our sector to enable the transition to a low-emissions future. Part of this responsibility is transparency on our corporate emissions footprint.. Understanding our own footprint is crucial to steer our way into a sustainable future, to engage with internal and external partners and stakeholders and take appropriate steps to keep cutting emissions.

This document outlines RWE's approach in accounting greenhouse gas emissions. It describes the calculation boundaries, methodologies, assumptions and key references used in the preparation of our RWE emission inventory. We are using the internationally renowned Greenhouse Gas Protocol Corporate Standard and its additional guidance documents. The Greenhouse Gas (GHG) Protocol is a multi-stakeholder partnership of businesses, nongovernmental organizations (NGOs), governments, and others convened by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). Launched in 1998, the GHG Protocol seeks to develop internationally



accepted GHG accounting and reporting standards and tools to promote their adoption worldwide.

The inventory presented in this document is the outcome of a recent assessment that helped us to identify the most relevant sources and categories of emissions within our corporate value chain.

## About RWE and its value chain

RWE is one of the world's leading renewable energy companies. We are an all-rounder in electricity generation at the forefront of creating a sustainable energy system. In addition, we will ensure security of supply with our flexible power plants. To this end, we will invest billions in wind energy, photovoltaics and storage technologies, enter the green hydrogen production business, and phase out electricity generation from coal.

RWE is currently structured in five segments: (1) Offshore Wind, (2) Onshore Wind/Solar, (3) Hydro/Biomass/Gas, (4) Supply & Trading and (5) Coal/Nuclear. Segments (1) to (4) represent our core business. This is where we want to grow. In (5), we have pooled our German electricity generation from lignite, hard coal and nuclear fuel, which will lose importance due to exit roadmaps established by the state.

Caring about climate has been part of our strategy for years with ambitious emission reduction targets in our industry. Compared to 2012 we have reduced our power plant emissions by more than 60% by closing down 12 GW of coal-fired power generation capacity. We will continue that transition journey. For the next years we brought forward targets for both our direct and indirect emissions. Compared to 2019 levels we plan to reduce our emissions intensity from Scope 1 and 2 50% by 2030. Within our Scope 3 we intend to reduce our emission by 30% compared to 2019 levels. We are glad that these 2030 targets have been approved by the Science Based Targets initiative in December 2020. For 2040 we plan to be net zero – this encompasses all three Scopes. On the way there, our ambition is to reduce our emissions in line with a 1.5°C compliant pathway.

To this end, we will rapidly expand renewable energy, make more use of storage technologies and use CO<sub>2</sub>-neutral fuel to produce electricity. With our strategy 'Growing Green', RWE is massively stepping up the pace and is investing €50 billion gross in its core business until 2030. That means an average of €5 billion gross each year for offshore and onshore wind, solar, batteries, flexible generation and hydrogen. The company is thus expanding its portfolio by 25 gigawatts net to 50 gigawatts (GW) in the attractive markets of Europe, North America, and the Asia-Pacific Region. Net capacity additions are aimed to be on average 2.5 GW per year. This also includes green hydrogen: By the end of the decade, RWE aims to build up its own net 2 GW of electrolyser capacity. RWE is involved in over 30 projects in the promising field of hydrogen: The company is one of the few to be involved in projects along the entire hydrogen value chain.

## Organisational boundary

Defining the organisational boundary is a key step in corporate GHG accounting. This step determines which operations are included in the company's organisational boundary and how emissions from each operation are consolidated by the reporting company. As detailed in the GHG Protocol Corporate Standard, a company has three options for defining its organisational boundaries: Equity share, financial control and operational control. In line with its approach for financial accounting, RWE has opted for the operational control approach for its emission inventory.

Under the operational control approach, a company accounts for 100 percent of the GHG emissions over which it has operational control.

## Emissions Accounting and Reporting Methodology

This report encompasses the following greenhouse gases:

- **Carbon Dioxide (CO<sub>2</sub>),**
- **Methane (CH<sub>4</sub>),**
- **Nitrous oxide (N<sub>2</sub>O),**
- **Hydrofluorocarbons (HFCs),**
- **Perfluorinated compounds (PFCs),**
- **Sulfur hexafluoride (SF<sub>6</sub>),**
- **Nitrogen trifluoride (NF<sub>3</sub>).**

In accordance with the RWE inventory management plan the organization is regularly reviewing its GHG emission sources and organisational and operational boundaries used to account for emissions. In this process RWE is applying the principles of the Greenhouse Gas Protocol Corporate Standard:

- **Relevance:** The boundaries of GHG emissions accounting and reporting should appropriately reflect the company's emissions and serve the business goals and decision-making needs of the company both internally and externally.
- **Completeness:** The emissions sources within the specified organisational and operational boundaries should be reported.
- **Consistency:** To ensure that emission data can be tracked and compared within the reporting company over time, consistent application of accounting practices and quantification methodologies is essential.

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- **Transparency:** All information regarding the processes, assumptions and limitations of the inventory should be transparent and disclosed.
- **Accuracy:** Data collection should be as accurate as possible, and uncertainties should be avoided as far as practical.

We have excluded Scope 3 categories 12 (End-of-life treatment of sold products), 13 (Downstream leased assets), 14 (Franchises) from our corporate inventory since we found no activity in our value chain that could be sufficiently linked to these. At the end of our inventory calculation process we decided to exclude Scope 3 category 15 (Investments) from our final emission methodology since external data availability has proven insufficient to calculate emissions from equity investments of RWE. Since most of our contracts for larger office locations are long-term and give us control over power purchase agreements, we have allocated consumption to Scope 2. Therefore, we no longer report category 8 (Upstream leased assets).

## Scope 1

Scope 1 encompasses GHG emissions from operations that are owned or controlled by the reporting company. Scope 1 sources differ from company to company depending on its business model and sector. The same holds for Scope 2 and 3. For a long time the main source of emission in the utilities sector came from power generation assets that burn fossil fuels. With the ongoing transition to a low-carbon future these emissions will decrease.

According to the methodology Scope 1 emission encompass GHG emissions from the following activities:

- **Power generation from combustion of fossil fuels:** For CO<sub>2</sub> emissions from the combustion of fossil fuels in our power plants we use the official data that are required under the EU Emissions Trading Scheme. Additional emissions from assets outside the EU ETS are accounted separately and added to the figure. Other GHG emissions from these materials have been calculated separately.
- **Fuels used in company vehicles:** These emissions originate in the combustion of fuels in vehicles that the company owns or operates. We include vehicles such as crew and maintenance ships for our wind farms, ocean cruisers that are operating on our behalf and cars that are possessed or leased by RWE.
- **Fugitive emissions from mining and gas storage activities:** As we operate lignite mines there is a small amount of outgassing methane that we account for. Moreover, we include fugitive emissions from our gas storage facilities.

## Scope 2

Scope 2 emissions are considered indirect emissions from the generation of acquired and consumed electricity, steam, heat or cooling (collectively referred to as “electricity”). According to the methodology Scope 2 emission encompass GHG emissions from the following activities:

- **Purchased electricity for own use:** This includes electricity consumed in administrative buildings and electricity consumed by our power plants in the case of maintenance works or other situations when external supply is necessary. Certain offices are not yet covered due to the ongoing integration of our Renewables business in our corporate systems. We use the location-based approach. This refers to a method to quantify Scope 2 GHG emissions based on average energy generation emission factors for defined locations, including local, subnational, or national boundaries. From financial year 2020 onwards we have included purchased electricity in buildings leased by RWE in our Scope 2 reporting since most of our contracts for larger office locations are long-term.
- **Purchased heat for own use**

## Scope 3

Scope 3 emissions are by definition all indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. Examples are emissions from production of purchased products, transportation of purchased products, or use of sold products. The GHG Protocol categorizes Scope 3 emissions into 15 categories that are intended to provide companies with a systematic framework to organise, understand, and report on the diversity of scope 3 activities within a corporate value chain. The categories are designed to be mutually exclusive, such that, for any one reporting company, there is no double counting of emissions between categories. Each Scope 3 category can be comprised of multiple activities that individually result in emissions.

### Category 1: Purchased goods and services

According to the methodology this category encompasses GHG emissions from the following activities:

- **Emissions from the production or execution of purchased goods and services:** Emissions have been calculated on the basis of annual procurement spent data using a model of Carnegie Mellon University (2002)<sup>1</sup>. The Economic Input-Output Life

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<sup>1</sup> For more information on the model and access to the tool, see [giolca.net - Free Life Cycle Assessment on the Internet](http://giolca.net) (last accessed 17 December 2021)

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Cycle Assessment (EIO-LCA) method estimates the materials and energy resources required for, and the environmental emissions resulting from, activities in our economy. It is one technique for performing a life cycle assessment, an evaluation of the environmental impacts of a product or process over its entire life cycle.

## Category 2: Capital goods

According to the methodology this category encompasses GHG emissions from the following activities:

- **Emissions from the production of capital goods that the company procures:** Similar to approach in Category 1 spent data have been used to calculate emissions based on the EIO-LCA Model. An internal assessment has been made to distinguish capital goods from further goods and services.

## Category 3: Fuel and energy-related activities

According to the methodology this category encompasses GHG emissions from the following activities:

- **Emissions from extraction, production, and (in part) transportation of fuels and energy purchased or acquired:** Fuel data from internal systems and cradle to gate emission factors have been used. These factors include all relevant parts of the fuel supply chain, including pipeline grid losses.

## Category 4: Upstream transportation and distribution

According to the methodology this category encompasses GHG emissions from the following activities:

- **Transportation and distribution of products purchased between a supplier and our own operations:** We source hard coal from partners around the world. We calculate emissions from transport by calculating the distances in kilometres per means of transport, e.g. by ship. These distances are based on the country of origin and are approximations. We also include emissions from the transport of some of our products where RWE is responsible for delivery and payment.

## Category 5: Waste generated in operations

According to the methodology this category encompasses GHG emissions from the following activities:

- **Disposal and treatment of waste generated in RWE operations:** Waste volume separated in different categories as collected in our internal ESG data system. Each category is sub-divided into recycled material and different disposal routes. Emission factors from literature are then applied for the volumes of each channel.

## Category 6: Business travel

According to the methodology this category encompasses GHG emissions from the following activities:

- **Travel activities of our workforce including train, air, rental car, hotel stays:** We used internal data on the activities and used various emissions factors. Certain assumptions had to be made, e.g. on booking class for intercontinental flights. Due to lacking data from our Renewables business these emissions have not been included yet. We aim to include them as soon as the different systems are integrated.

## Category 7: Employee commuting

According to the methodology this category encompasses GHG emissions from the following activities:

- **Employee commuting:** To assess emissions we used global employee figures by country and average emission factors per country taking into account general distances and modes of transports per country.

## Category 8: Upstream leased assets

Since most of our contracts for larger office locations are long-term and give us control over power purchase agreements, we have allocated consumption to Scope 2. Therefore, we no longer report category 8 "Upstream leased assets". This assessment will be periodically reviewed.

## Category 9: Downstream transportation and distribution

According to the methodology this category encompasses GHG emissions from the following activities:

- **Shipped distances for delivery of refinement products in ship, train and lorry:** Data have been taken from internal systems. For emission calculation we used Life cycle assessment emission factors of the GaBi database.

## Category 10: Processing of sold products

According to the methodology this category encompasses GHG emissions from the following activities:

- **Mineral products and Gypsum production:** Through one of our Group companies, we supply customers with various mineral products that can be used for different

purposes. Since emissions may be generated in further processing, we also collect these emissions through the quantity of products delivered to end customers.

## Category 11: Use of sold products

According to the methodology this category encompasses GHG emissions at customers site using our products from the following activities:

- **Lignite Refinement Products:** In various plants in the Rhenish mining area, we produce so-called refinement products from the lignite mined there. These are briquettes, for example. We sell these to traders and intermediaries for further distribution. We classify the emissions from these products as indirect emissions, as they are produced by the end customer.
- **Gas Trading to end-customers:** Our trading company RWE Supply & Trading supplies gas to end customers of all kinds, especially large customers. RWE itself is not the producer, but only a trader. We calculate the emissions from the combustion of the gas at end customers within our inventory. We refer here to the gas sales of a unit that is responsible for sales to end customers.
- **Hard coal trading to end-customers:** In small quantities, a unit within RWE Power trades hard coal to end customers alongside RWE Supply & Trading. We also report emissions from these trading volumes as indirect emissions in our inventory.

## Category 12: End-of-life treatment of sold products

According to the Greenhouse Gas Protocol Corporate Standard in this category emissions from waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life have to be accounted. This category has been identified as not material to the Scope 3 inventory for our business and an emissions figure is not calculated. This assessment will be periodically reviewed.

## Category 13: Downstream leased assets

According to the Greenhouse Gas Protocol Corporate Standard in this category emissions from operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year have to be accounted. This category has been identified as not material to the scope 3 inventory for our business and an emissions figure is not calculated. This assessment will be periodically reviewed.

## Category 14: Franchises

In this category emissions from the operation of franchises in the reporting year, not included in scope 1 and scope 2 have to be accounted. This category has been identified as not material to the scope 3 inventory for our business and an emissions figure is not calculated. This assessment will be periodically reviewed.

## Category 15: Investments

In this category emissions from investments (including equity and debt investments and project finance) in the reporting year have to be accounted. During our inventory design we have investigated reported emission from our equity investments. However due to the lack of reliable external data we have decided to exclude any emissions for the time being. This assessment will be periodically reviewed.

## Emission Factors

In most cases we do not measure an activities' greenhouse gases directly. By using relevant activity data in different units (e.g. liters diesel or gasoline, kilogram or passenger kilometers) and emission factors we arrive at an approximation of the greenhouse gas emissions emitted. We obtain the emission factors from various public and non-public sources. We try to check these factors regularly and - if necessary - update them. In a few cases, we obtain emissions data directly from third-party suppliers, who determine them with their own calculations for customers or partners. In these cases, we generally refrain from calculating on the basis of the activity data and emission factors.

## Responsibilities and processes

A Greenhouse Gas inventory provides a high-level perspective of a company's total emissions. Establishing high inventory quality is paramount for accounting emissions. For this reason, RWE strives to have sound processes and clear roles to manage emissions. Within the RWE Group the Sustainability team within the Strategy & Sustainability department ensures that the inventory is up to data and adapted whenever needed due to larger corporate changes. In collaboration with other departments the team ensures accounting processes and works to improve data accuracy and completeness. The GHG emissions are reported to various departments in the Group to ensure management of the carbon footprint and the achievement of corporate climate targets. Currently emissions are reported once a year to the Executive Board during the annual reporting process.

## Next steps

With the new inventory we started the implementation of accounting processes in our overall ESG (Environmental, Social, Governance) data tool. In the next years we aim to automatize certain steps of the process. In many cases we are relying on emission factors from reliable sources and literature. This is common practice and these factors are

regularly updated. However, we aim to incorporate more detailed and accurate emission data whenever possible and reasonable. From financial year 2020 data onwards we aim to conduct an annual external assurance of our emissions

## Glossary

- **Carbon Dioxide Equivalent (CO<sub>2</sub>e):** Carbon dioxide equivalent (CO<sub>2</sub>e) is the standard unit used to compare and account for emissions from various GHGs based on their global warming potential. For example, CO<sub>2</sub> has a GWP of 1 and CH<sub>4</sub> (methane) has a GWP of approximately 28 (on a 100-year time horizon). Therefore, for every ton of CH<sub>4</sub> emitted, an equivalent of 28 tons of CO<sub>2</sub> would be emitted. Since one ton of a particular GHG is not the same GWP as one ton of another, this standard unit is a simple way to normalize and express GHGs as an equivalent of CO<sub>2</sub>.
- **Global Warming Potential:** GHGs released into the atmosphere have different radiative effects depending on the unique qualities of the gas. The factor describing the radiative forcing impact of one unit of a given GHG relative to one unit of CO<sub>2</sub> is known as the Global Warming Potential (GWP). Since the amount of warming a gas causes over a given period (normally 100 years) varies, GHG emission calculations must account for the GWP of each gas. GWP is an index with CO<sub>2</sub> having an index value of 1. The GWP for all other GHGs refers to the amount of warming they cause compared to CO<sub>2</sub>.
- **Emission Factor:** An emission factor is used to calculate the GHG emissions for a given source, relative to units of activity. Emission factors reflect average values by sector, technology type, and/or fuel type.
- **Activity Data:** Activity data is a key input for the calculation of GHG emissions and refers to the data associated with an activity that generates GHG emissions, such as liters of gasoline consumed from company cars. This activity data is collected in physical units (gallons) or energy units (therms) and then combined with an emissions factor and the relevant greenhouse gas GWP value to calculate CO<sub>2</sub>e.

## References

- GHG Protocol Corporate Accounting and Reporting Standard; WRI/WBCSD; 2004; <http://ghgprotocol.org/>
- GHG Protocol Scope 2 Guidance. An amendment to the GHG Protocol Corporate Standard; WRI/WBCSD; 2011; <http://ghgprotocol.org/>
- GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard; WRI/WBCSD; 2011; <http://ghgprotocol.org/>



- GHG Protocol Technical Guidance for Calculating Scope 3 Emissions (v1): Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard; WRI/WBCSD; 2013; <http://ghgprotocol.org/>

## Contact

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## Annex

**Table 1: RWE Annual Greenhouse Gas Emissions**

GHG Scopes and Categories	2020	2019 <sup>1</sup>
	in million mt CO <sub>2</sub> e	in million mt CO <sub>2</sub> e
<b>Scope 1</b>	<b>70.4</b>	<b>91.7</b>
<b>Scope 2</b>	<b>2.6</b>	<b>4.7</b>
<b>Scope 3</b>	<b>18.9</b>	<b>22.3</b>
Cat. 1 Purchased Goods and Services	0.7	1.03
Cat. 2 Capital Goods	0.6	0.43
Cat. 3 Fuel and energy-related activities	5.5	5.45
Cat. 4 Upstream transportation and distribution	0.3	0.7
Cat. 5 Waste generated in operations	0.1	< 0.1
Cat. 6 Business travel	< 0.1	< 0.1
Cat. 7 Employee commuting	< 0.1	0.19
Cat. 8 Upstream leased assets <sup>2</sup>	n. a.	0.14
Cat. 9 Downstream transportation and distribution	< 0.1	< 0.1
Cat. 10 Processing of sold products	0.1	0.2
Cat. 11 Use of sold products	11.7	14.4

<sup>1</sup> Due to the asset swap with E.ON we restated 2019 GHG figures based on this methodology

<sup>2</sup> Accounting for this category discontinued