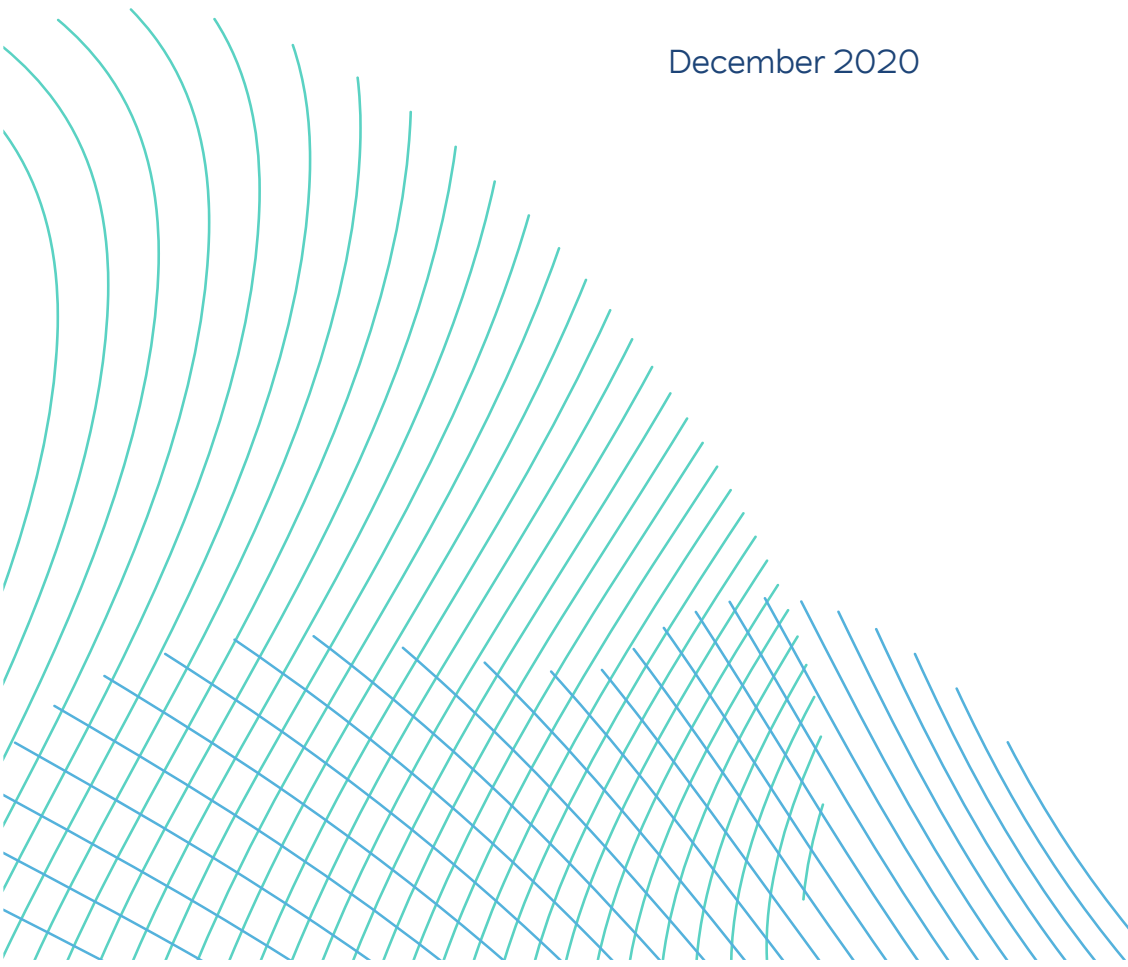


RWE

Greenhouse Gas Emission Inventory & Calculation Methodology 2019

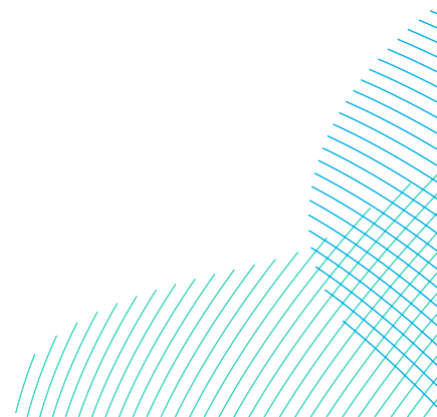
**Quantification and reporting of greenhouse gas
emissions in accordance with the Corporate Green-
house Gas Protocol**

December 2020



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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. Our inventory has been updated in a Group-wide project in the course of 2019 and will be reviewed on a regular basis. Reason for the project and update has been the transformation of RWE into a global renewables player. The strategic decision brought major changes in our Group structure that had to be reflected in the way we account for our emissions. 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. With this methodology we publish reassessed figures for financial year 2019, starting 1 January 2019 and ending 31 December 2019. These figures have been calculated under the theoretical assumption that the new RWE has already been put in place during the whole year of 2019.

Our revised carbon footprint of RWE Group for financial year 2019:

Emission Scope	t CO₂e in 2019
Scope 1	89.836.098
Scope 2	622.728
Scope 3	22.329.870

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. As RWE we have first published our emissions according to the Greenhouse Gas Protocol Corporate Standard in 2009 and have released annual data ever since.

RWE

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

Our business is separated in five segments. The segments Offshore Wind, Onshore Wind/Solar, Hydro/Biomass/Gas and Supply & Trading represent our core business. In the segment Coal & Nuclear we have pooled our electricity generation from lignite, hard coal and nuclear fuel. These technologies will follow exit paths established by the government, as a result of which plant dismantling and opencast mine recultivation will gain importance relative to power production. At the end of 2019, we had a total installed power generation capacity of 42.9 GW, giving us a leading market position in Europe. Gas is our major source of energy. At the end of 2019, it accounted for 33 % of our capacity. Lignite was in second place with 24 %, followed by renewables with 21 %. Disregarding the five lignite units we placed in security stand-by, renewables, consisting of wind, hydro, biomass and photovoltaics, are already in second place in the RWE Group.

Our renewable energy operations from the Americas to Asia Pacific make us a world leading producer of electricity from renewable sources. At the end of 2019, we had a renewable energy portfolio with a total capacity of 9.9 GW. This is the generation capacity allocable to us on a prorated basis, i. e. in accordance with the stakes that we hold. Onshore and offshore wind farms account for the largest share of this: 8.6 GW. In addition to existing assets, we have acquired a large number of growth projects in various stages of development. Here again, the focus is on wind, followed by photovoltaics.

Caring about emissions has been part of our strategy for years: As an example, RWE reduced its absolute annual carbon dioxide emissions from power generation by 51 % from 2012 to 2019. For the next years we brought forward ambitious 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 carbon neutral. To this end, we will rapidly expand renewable energy, make more use of storage technologies and use CO₂-neutral fuel to produce electricity. 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. In addition to constructing facilities that supply power from renewables for green hydrogen, RWE also has the expertise to produce it using large-scale electrolyzers, store it in its own gas storage systems, and supply it to industrial customers to meet their requirements. The company's own gas-fired power stations are also potential customers in the longer term.

Organisational boundary

Defining the organizational boundary is a key step in corporate GHG accounting. This step determines which operations are included in the company's organizational 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 (CO₂),**
- **Methane (CH₄),**
- **Nitrous oxide (N₂O),**
- **Hydrofluorocarbons (HFCs),**
- **Perfluorinated compounds (PFCs),**
- **Sulfur hexafluoride (SF₆),**
- **Nitrogen trifluoride (NF₃).**

In accordance with the RWE inventory management plan the organization is regularly reviewing its GHG emission sources and organizational and operational boundaries used to

RWE

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 organizational 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.
- **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.

Based on a screening in 2020 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.

Emission Scope	t CO₂e in 2019
Scope 1	89.836.098
Scope 2	622.728
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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.

Emission Scope	t CO₂e in 2019
Scope 1	89.836.098

RWE

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

- **Power generation from combustion of fossil fuels:** For CO₂ 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 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”).

Emission Scope	t CO ₂ e in 2019
Scope 2	622.728

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.
- **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

Scope 3 Category	t CO ₂ e in 2019
Purchased goods and services	1.025.167

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 procurement spent data for 2019 using the EEIO Model of Carnegie Mellon University (2002).

Category 2: Capital goods

Scope 3 Category	t CO ₂ e in 2019
Capital goods	429.362

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 EEIO Model. An internal assessment has been made to distinguish capital goods from further goods and services.

Category 3: Fuel and energy-related activities

Scope 3 Category	t CO ₂ e in 2019
Fuel and energy-related activities	5.451.770

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

Scope 3 Category	t CO ₂ e in 2019
Upstream transportation and distribution	697.183

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**

Category 5: Waste generated in operations

Scope 3 Category	t CO ₂ e in 2019
Waste generated in operations	64.387

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

Scope 3 Category	t CO ₂ e in 2019
Business travel	10.375

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

Scope 3 Category	t CO ₂ e in 2019
Employee commuting	18.633

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

Scope 3 Category	t CO ₂ e in 2019
Upstream leased assets	14.313

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

- **Purchased electricity from UK and Germany in leased buildings**

Category 9: Downstream transportation and distribution

Scope 3 Category	t CO ₂ e in 2019
Downstream transportation and distribution	6.368

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

Scope 3 Category	t CO ₂ e in 2019
Processing of sold products	199.754

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

- **Mineral products**
- **Gypsum production**

Category 11: Use of sold products

Scope 3 Category	t CO ₂ e in 2019
Use of sold products	14.412.558

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

- **Lignite Refinement Products**
- **Gas Trading to end-customers:** Volumes by end-customers' business unit of RWE Supply & Trading have been used based on an internal assessment
- **Hard coal trading to end-customers**

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.

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 team Corporate Responsibility 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. The figures in this report have not been audited by an external party. From financial year 2020 data onwards we aim to conduct an annual external assurance of our emissions.

Glossary

- **Carbon Dioxide Equivalent (CO₂e):** Carbon dioxide equivalent (CO₂e) is the standard unit used to compare and account for emissions from various GHGs based on their global warming potential. For example, CO₂ has a GWP of 1 and CH₄ (methane) has a GWP of approximately 28 (on a 100-year time horizon). Therefore, for every ton of CH₄ emitted, an equivalent of 28 tons of CO₂ 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 CO₂.
- **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 CO₂ 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 CO₂ having an index value of 1. The GWP for all other GHGs refers to the amount of warming they cause compared to CO₂.
- **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 CO₂e.

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

In case of feedback and questions please reach out to

RWE AG

Corporate Responsibility

RWE Platz 1

45141 Essen, Germany

responsibility@rwe.com