

Emissions Factors database

Frequently Asked Questions

International
Energy Agency

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INTERNATIONAL ENERGY AGENCY

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Product description

1. What is the IEA Emission factors database?

The *IEA Emission factors* database contains emission factors from electricity and electricity/heat generation of national grids, for a set of three different gases (CO₂, CH₄, N₂O), for all countries globally, starting in 1971. The power generation emission factors are included per energy source, as well as average emission factors across all sources; also including a set of additional information, such as trade and losses' adjustments. Additionally, the database includes a set of life cycle upstream emission factors corresponding to electricity grids and factors for direct combustion of different energy sources. The database has the format of an excel file. For any questions on the product content, please refer to emissions@iea.org.

2. Why should I use this product?

The *IEA Emission factors* database is comprehensive and regularly updated. The database is an essential tool for policy makers to get a better representation of the current trends, or for research and academic applications (e.g. assess decarbonisation of the power sector globally and by country). Depending on the type of licensing (see section on [Purchase and Licensing](#)), the database can also be used by companies and other entities to support the assessment of their energy-related carbon footprint, both for direct combustion and indirect use of electricity; or to prepare their own products and services.

3. How does the IEA derive its emissions factors?

The indicators are based on state-of-the-art energy statistics collected each year by the IEA across all countries globally, and harmonised to fit standard methodologies, such as those presented in the International Recommendations on Energy Statistics (IRES), for the development of energy balances. The IEA validates its basic energy statistics through

iteration with counterpart statisticians in countries. The emissions factors make use of the granularity of information on electricity and heat generation by energy source presented within the *IEA World Energy Balances* – the detailed methodology, coherent with the *IPCC Guidelines for GHG Inventories* for emissions estimation, is well described in the documentation [here](#).

The life cycle emission factors included in this product have been developed by merging data from multiple sources, namely: IEA statistics, IEA modelling work, IEA-performed life cycle harmonization, alongside a life cycle assessment project carried out by the US National Renewable Energy Laboratory (NREL). For additional information please refer to the respective [database documentation](#).

4. How often is the database updated?

The *IEA Emissions Factors* database is updated once a year, typically in September, and includes time series up to two years before, with information for selected countries available up to the previous year. Emission factors previously computed using provisional data are updated to take into account newly available historical data. Please note that all time series may be updated in each edition, based on improvements in the underlying data availability. For this reason, the IEA recommends to download each year the full time series and not only the data for the most recent year.

Purchase and licensing

1. How can I purchase the database?

The database is available for online purchase under different predefined licences and its use is governed by the IEA's Terms and Conditions [here](#). For uses that are not permitted in the IEA's Terms and Conditions, including for re-dissemination of raw or derived data, please contact datasales@iea.org to discuss additional licensing.

2. Does the IEA provide customised selections of the data (e.g. extractions for a set of countries)?

The database is an all-in-one package and the system does not allow users to purchase extractions of individual data points.

3. Upon purchase, is the access to the product permanent?

After purchase, users get access to the latest available annual edition of the dataset product, via a downloadable Excel file. This dataset can be used indefinitely provided it is not used in breach of the IEA's Terms and Conditions. When the product is updated by the IEA (typically each September), users need to proceed to a new purchase to access the latest release. Where a Licence Agreement has been implemented to enable broader usage of the data (see Questions 5 and 10), the broader usage is permitted for the duration of the Licence Agreement only.

4. Are the data available for preview or sampling for potential buyers?

The database documentation, available for download [here](#), provides extensive information on the content of the database and the methodologies used. You can also download an empty data version of the dataset, to familiarize yourself with the structure and availability of the database.

5. How to choose among the different licences (e.g. single-user, multi-user, global corporate, etc.)?

All available licences give access to the same database. The difference is in the number of users allowed to access or view the data (or derived data), their employer and location. Note that a **single-user** licence is valid as long as only **one** person access or views the data. A **multi-user** licence is required if other individuals working at the location of the purchasing entity also need to access or view the data (or the derived data created by the single user), including in a shared internal tool like Excel, intranet or a data warehouse. A **global corporate** licence is required if individuals working for affiliates of the purchasing entity also need to access or view the data. More information is available on the product's page. For information on the licences, please contact datasales@iea.org.

6. Can the data or any result of their processing be shared with third parties?

If you are using the data to calculate or verify carbon emissions for third parties like clients, provide a tool that contains or relies on the data to third parties, or create other derived data which you intend to sell, disseminate or otherwise use externally, you need to purchase an appropriate licence and enter into a Licence Agreement - such usage is not covered by our standard terms and conditions which you can find at the following link: <https://www.iea.org/terms>. If this is your case, please contact datasales@iea.org for more information.

Data content

1. Are the data provided in terms of GHG emissions (CO₂eq)?

The database provides emission factors expressed in gCO₂eq/kWh for the set of three gases (CO₂, N₂O, CH₄). Conversions between gCH₄ and gN₂O to gCO₂eq are performed using the 100-year Global Warming Potential (GWP), as described on **page 10** of the database documentation available for download [here](#).

For the purpose of converting the non-CO₂ GHG emissions to units of CO₂eq, the 100-year GWP from the 4th Assessment of the IPCC report (AR4) was selected. The logic behind this selection was to ensure comparability with international data submission guidelines to UNFCCC. Note that based on Decision 24/CP.19 from UNFCCC's Measurement, Reporting and Verification (MRV) framework, until year 2024 the factors from the 4th Assessment of the IPCC are used for the purpose of reporting the national GHG emission inventories to the Convention. Our statistical emission outputs follow the same guideline.

2. What factors are included in the database?

A detailed list of all indicators included in the *IEA Emission factors* database can be found on **page 2** in the database documentation [here](#).

3. What years does the database cover?

For most of the included emission factors, the time series start in 1971 and cover the years up to Year-2 at the time of release, with information for selected countries available for Year-1.

For the life cycle emission factors included in the database, the time series starts from year 2021 and cover the years up to Year-2 at the time of release, with information for selected countries available for Year-1.

4. Do the country-level emissions factors account for upstream emissions (scope 3), including transportation and distribution losses?

The IEA emissions factors database historically included the emission factors at the electricity generation point (combustion only, including energy used by the plant).

The product also provides adjustment factors for emissions associated to transmission and distribution losses of electricity in the grid, as well as electricity trade between countries (data available for selected countries). These adjustments can be added to the default factors, as required, to obtain a closer figure at the final user point.

Starting 2023, the database has been expanded to include a set of upstream life cycle emission factors which may be used for Scope 3 reporting under the GHG protocol. Moreover, adjustment factors to account for the emission intensity associated with the T&D losses from a life cycle perspective have also been added to the database allowing a complete Scope 3 reporting corresponding to consumption of purchased electricity. Please note that these life cycle factors are also published as part of a new free plot database which can be accessed [here](#).

5. Do the emissions factors correspond to market-based or location-based factors?

The factors can be applied for location-based scope 2 emissions reporting under the GHG protocol. Due to the unavailability of the required contractual information, the IEA does not currently publish the residual mix emission factors required for market-based reporting.

6. Why emissions factors change year to year for a given country?

There could be revisions to published historical emission factors as better data in terms of quality is made available to IEA. Factors for the provisional year may be more often subject to revisions as they are estimated based on electricity output assuming that no changes occur in the efficiency of plants. This is explained on **page 41** of our documentation available [here](#).

7. What is the emissions factor uncertainty?

The IEA strives to maintain the highest possible quality in its data products. Some uncertainties in the IEA emissions factors may come from uncertainties in underlying energy data, as energy data quality may vary across countries globally. Additionally, information on CH₄ and N₂O, based on the IPCC 2006 Guidelines GWPs, results in higher uncertainty than that for CO₂.

The IEA does not quantify uncertainties on the emission factors themselves. Please feel free to send notifications to emissions@iea.org if you have feedback on data quality for any specific data point.

Geographical coverage

1. What is the geographical coverage of IEA Emission factors database?

The list of countries and regions included in IEA's database figures in the database documentation, **page 11**, available for download [here](#).

2. Why are some countries marked with a star (*)?

Stars label the set of over fifty countries not covered explicitly by the *IEA World energy balances*. For those countries, emissions factors are derived based on more aggregated energy data from the United Nations Statistics Division (UNSD) Energy balances publication.

Additionally, the label marks a handful of countries, for which the factors are derived based on a comparably more limited energy data from the *IEA World energy balances*. For more detailed information, please refer to the database documentation, **page 11**, available for download [here](#).