IEA Emissions Factors databases

Frequently Asked Questions

International Energy Agency

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Product description

1. What are the IEA Emission factors products?

The IEA publishes 3 different emission factors products all in excel format as detailed below:

a) The IEA Emission Factors database contains emission factors from electricity and electricity/heat generation of national grids, for a set of three different gases (CO_2, CH_4, N_2O), for countries globally. 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 direct combustion factors corresponding to various energy products.

b) The IEA Life Cycle Upstream Emission Factor database includes a set of life cycle upstream emission factors and emission intensities associated with the transmission and distribution (T&D) losses of electricity in the grid developed from a life cycle perspective.

c) The IEA Emission Factors Package includes both the IEA Emission Factors and IEA Life Cycle Upstream Emission Factors annual editions and complements these data sets with monthly and quarterly emission factors from electricity generation.

2. Why should I use these products?

The IEA emission factors databases are comprehensive and regularly updated. The data may be used as 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 data can also be used by companies and other entities to support the assessment of their energy-related carbon footprint as detailed below:

a) The provided grid electricity factors in the IEA Emission Factors database may be used for tracking Scope 2 emissions associated with consumption of purchased electricity under the GHG Protocol. Additionally, the direct combustion factors may be used for tracking Scope 1 emissions under the GHG Protocol.

b) The provided factors in IEA Life Cycle Upstream Emission Factors database may be used for tracking Scope 3 – Category 3 emissions corresponding to the consumption of purchased electricity under the GHG Protocol.

The monthly and quarterly emission factors included in the IEA Emission Factors Package may be used for monitoring and analysing the influence of periodical activities, seasonal patterns and disruptions on the grid, and the corresponding climate impact.

3. How does the IEA derive its emissions factors?

The indicators included in the in the IEA Emission Factors 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 IEA emission estimations are coherent with the *2006 IPCC Guidelines for GHG Inventories* as described in the database documentation.

The life cycle emission factors included in IEA Life Cycle Upstream Emission Factors database are 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 documentation.

The monthly and quarterly emission factors included in the IEA Emission Factors Package are developed by leveraging the monthly statistics from the IEA Monthly Electricity Statistics. For additional information please refer to the corresponding documentation.

4. How often is the database updated?

The IEA Emission Factors and IEA Life Cycle Upstream Emission Factors databases are updated once a year, typically in September, and include 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 downloading the full time series each year and not just the data for the most recent year.

The monthly and quarterly emission factors included in the IEA Emission Factors Package are released on a quarterly basis starting in 2015. Similar to the yearly data, all time series may be updated in each edition, based on improvements in the underlying data availability. The monthly/quarterly data corresponding to the most recent years may be subjected to larger revisions.

Purchase and licensing

1. How can I purchase the databases?

The databases are available for purchase online from the IEA website here under different predefined licences and their use is governed by the IEA's Terms and Conditions. For uses that are not permitted under IEA's standard Terms and Conditions, including but not limited to, 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 databases are all-in-one packages and the system does not allow users to purchase extractions of individual data points.

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

After purchase of any of the three emissions factors products (Emissions Factors annual edition, Life Cycle Upstream Emissions Factors annual edition, Emissions Factors Package), users get access to a dataset, via a downloadable Excel file. Once the dataset has been downloaded by the user, it can be used indefinitely provided it is not used in breach of the IEA's Terms and Conditions. The annual editions are released by the IEA once a year (typically in September), and users need to purchase the new edition(s) to access the latest release. However, if the user has purchased the Emissions Factors Package they get 12 months access which includes any updates released during the term of their subscription. 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 corresponding documentation files listed below, provide extensive information on the content of each database and the methodologies used. You may also obtain an empty data version of each dataset, to familiarize yourself with the structure and availability of the database.

IEA Emission Factors - Database documentation

IEA Life Cycle Upstream Emission Factors - Database documentation

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

All available licences for a given product give access to the same database. The difference is in the number of users allowed to access or view the data (or derived data), and the location of the users. Note that a **single-user** licence is valid if only ***one*** person can access or view the data (or derived 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 (unlimited users/multiple locations) licence is required if the employees are working in different locations. If the user wishes to include the results in their Annual Report, then a global (unlimited users/multiple locations) licence is required. More information is available on the product page. For further information on licensing, please contact datasales@iea.org.

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

If you intend to use the data to benchmark or to calculate or verify carbon emissions for third parties or clients, provide a tool that contains derived data or relies on the data to third parties, or create any 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 as such usage is not covered by our standard terms and conditions. If this is your case, please contact datasales@iea.org for more information.

Data content

1. Are the data provided include all GHG emissions (CO2eq) and what global warming potential (GWP) is used for the conversions?

The emission factors from electricity and electricity/heat generation of national grids included in the IEA Emission Factors database are expressed in gCO_2eq/kWh for the set of three gases (CO_2, N_2O, CH_4). Conversions between gCH_4 and gN_2O to gCO_2eq are performed using the 100-year Global Warming Potential (GWP), as described in a table called *GHG* within the database documentation.

The life cycle factors included in the IEA Life Cycle Upstream Emission Factors database, are expressed in gCO_2eq/kWh and include all three greenhouse gases (CO_2, N_2O, CH_4) combined. Similar to above, conversions between gCH_4 and gN_2O to gCO_2eq are performed using the 100-year Global Warming Potential (GWP).

To ensure alignment with the latest requirements from European Sustainability Reporting (ESRS) and other major disclosure standards, the factors from the **6th Assessment of the IPCC (AR6)** are used.

On the other hand, the monthly and quarterly emission factors included in the IEA Emission Factors Package are currently only available for CO2 (gCO_2/kWh).

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** of the database documentation.

A detailed list of all indicators included in the IEA Life Cycle Upstream Emission Factors database can be found on **page 6** of the database documentation.

A detailed list of the monthly and quarterly emission factors which complement the above data and are included in the IEA Emission Factors Package can be found on **page 4** of the database documentation.

3. What is the time series covered by the databases?

For most of the included emission factors in the IEA Emission Factors database, the time series start in 1990 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 IEA Life Cycle Upstream Emission Factors database , the time series starts from year 2015 and cover the years up to Year-2 at the time of release, with information for selected countries available for Year-1.

The Year-1 data are not available for the transmission and distribution loss adjustment factors included in either of the two databases.

The monthly and quarterly emission factors included in the IEA Emission Factors Package, start from year 2015 to the latest available monthly data in the current year.

4. Where can I find emissions factors projected for future years?

The IEA Energy Projections of IEA Countries – National Data database includes emissions factors for electricity and heat generation for the years 2030, 2040, 2050. The emissions factors are part of the indicators dataset and are based on national scenario modelling submitted to the IEA. The database covers IEA member countries and accession countries where data is available.

5. Does the IEA emission factors include emission factors required for Scope 3 – Category tracking?

The IEA Life Cycle Upstream Emission Factors database include a set of upstream life cycle emission factors which may be used for Scope 3 - Category tracking under the GHG protocol.

Moreover, adjustment factors to account for the emission intensity associated with the T&D losses from a life cycle perspective, also required for Scope 3 – Category 3 tracking are included. For additional details please refer to the database documentation.

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

The IEA Emission Factors database, includes grid emission factors which may be applied for location-based Scope 2 emissions tracking under the GHG protocol.

Due to not having access to the required contractual information, the IEA does not currently publish the residual mix emission factors required for market-based reporting.

7. 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 there is no change in the efficiency of generation plants and the quality (calorific value) of the fuel inputs to plants. This is explained in section called *Provisional carbon emission factors* of the database documentation.

For similar reasons monthly/quarterly data corresponding to the most recent years are also subject to notable revisions.

8. What are the emissions factors uncertainties?

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 CH_4 and N_2O, based on the IPCC 2006 Guidelines GWPs, results in higher uncertainty than that for CO_2.

The life cycle emission factors included in the IEA Life Cycle Upstream Emission Factors database, have been modelled by merging data from multiple data sources. For details regarding the uncertainties and limitations corresponding to this data please refer to section called *Limitations* of the database documentation.

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 Emission Factors database is available in the section called *Geographical Coverage and Country Notes* in the database documentation.

The list of countries and regions included in IEA Life Cycle Upstream Emission Factors database is available in the section called *Geographical Coverage and Country Notes* in the database documentation.

The list of countries included in IEA Emission Factors Package is available in the section called *Geographical Coverage and Country Notes* in the database documentation.

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

Within the IEA Emission Factors database , 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 table called Supplementary countries, in the database documentation.