

DATABASE ON GREENHOUSE GAS EMISSION FACTORS (IPCC-EFDB)

User Guide for Local Application (Version 2020)

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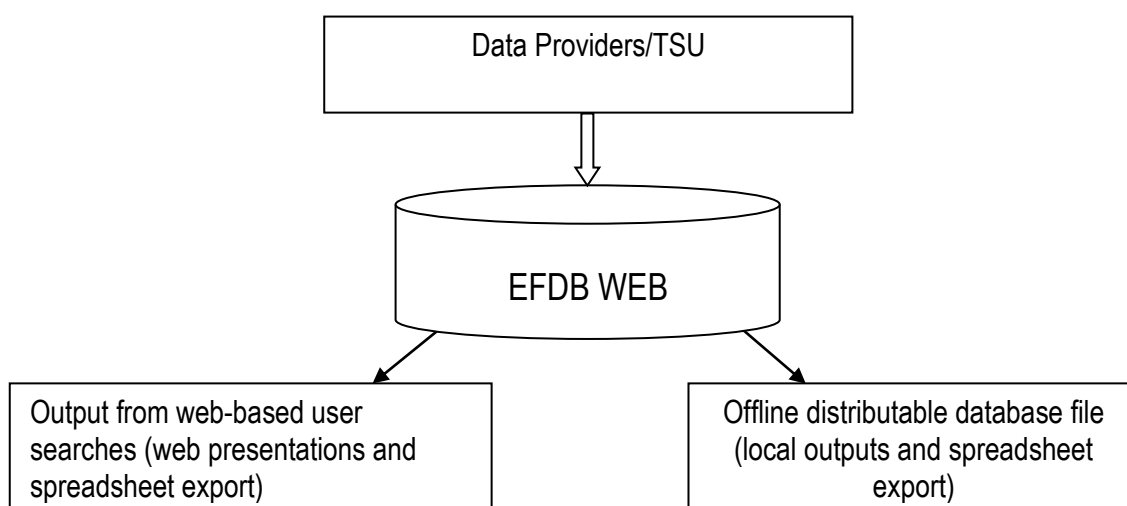
1 Introduction

1.1 Scope of this document

This User Manual covers the information on how to use the Emission Factor Database (EFDB) Local application in order to search the database for emission factors or other parameters¹ **off-line**. It is based and updated from the **web application**², which is the core of the EFDB system (*for more details, see the Figure 1-1 and the EFDB User Manual for the web application*³).

The local application is intended for general users, who have difficulty with Internet connection. It enables you to query the database for emission factors off-line. This application works with local database, which contains the copy of the on-line web database. The application is capable of checking for and downloading updated database from EFDB web server in case updated (newer) database exists and Internet connection is available.

Figure 1-1 EFDB data flow diagram



1.2 Objective of the EFDB

The overall objective of the EFDB is to be an always up-to-date companion for the IPCC Guidelines for National Greenhouse Gas Inventory that is seen as a worldwide resource for greenhouse gas inventory developers.

The EFDB has the objective to provide a variety of users, in particular the inventory compilers of the Parties to the UNFCCC, with current and well-documented emission factors and other parameters, as

¹ The EFDB is a database on various parameters to be used in calculation of anthropogenic emissions by sources and removals by sinks of greenhouse gases. It covers not only the so-called “emission factors” but also the other relevant parameters. For convenience sake, however, the term “Emission Factor” or its abbreviation “EF” is sometimes used to represent parameters in this database generally.

² <http://www.ipcc-nggip.iges.or.jp/EFDB/main.php>

³ <https://www.ipcc-nggip.iges.or.jp/EFDB/documents.php>

well as to establish a communication platform for distributing and commenting on new research and measurement data. Such a platform can provide an efficient means for experts and researchers to disseminate new emission factors or other parameters in a timely manner to a worldwide audience of potential end users. The EFDB is meant to be a recognised data repository where users can find emission factors and other parameters with background documentation or technical references.

While the EFDB Editorial Board has examined each entry, and associated background technical documentation where made available by the data provider, following the evaluation criteria that include robustness and applicability of the data, the ultimate responsibility of using this information appropriately resides with the users themselves. The members of the EFDB Editorial Board are not responsible for errors in the data as shown in the database, such as those that may be due to transcription errors from the data provider or other errors due to the inaccurate presentation of the data on submission from the data provider. The database users are highly encouraged to consult the background technical reference for the entry to better evaluate the application of the data for their own situation.

The responsibility of using this information appropriately will always remain with the users themselves.

2 Recommended client configuration

2.1 Hardware requirements

To use EFDB Local application, a PC with supported operating system, a minimum of 2GB of RAM and 60MB of free disk space is required. Connection to Internet is recommended for application to check for and eventually download the latest database.

2.2 Supported operating systems

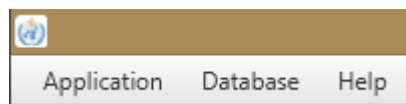
EFDB Local application is a modern cross-platform application which can run on multiple different Operating system platforms as listed below:

- **Microsoft Windows** – minimum required version of operating system is Windows 7 SP1. Supports 32bit and 64bit x86 CPU architectures.
- **Apple macOS** – minimum required version is macOS 10.10 Yosemite. Supports 64bit x86 CPU architecture only.
- **Linux** – all Desktop Linux distributions with graphical desktop available (e.g. Ubuntu). Supports 64bit x86 CPU architecture only.

3 Main menu

Main menu contains the following menu items:

Figure 3-1 Main Menu



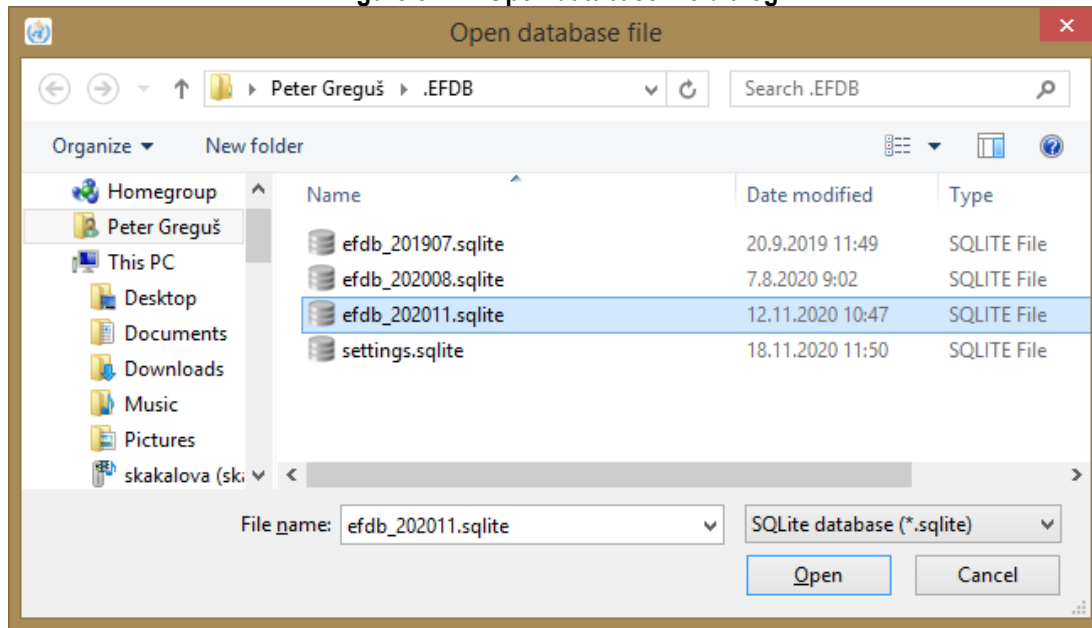
3.1 Application

- **Open web version** – this menu item allows you to directly open online EFDB WEB application in a web browser
- **Exit** – this menu item allows you to close currently running EFDB Local application

3.2 Database

- **Use built-in** – this menu item allows you to switch to default database that the EFDB Local application was originally distributed with. This database does not exist as a physical file since it is directly built into the application.
- **Use external...** - this menu item allows you to open external database file. External database file is typically available after newer (updated) database was downloaded from EFDB WEB application server. User is presented with an Open File dialog to choose the external database file of interest (Figure 3-2).

Figure 3-2 Open database file dialog



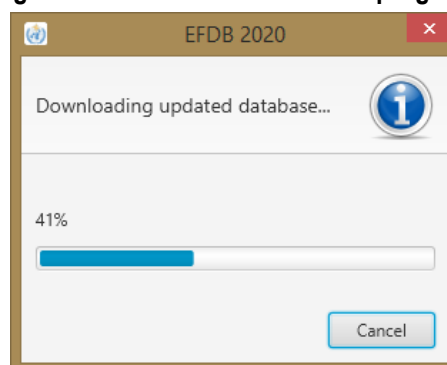
- **Check for update** – this menu item triggers check for updated database. In case Internet connection is available, application will contact EFDB WEB application server to check if newer version of database is available for download. In case newer version of database is available, application will prompt a user to download the database (Figure 3-3).

Figure 3-3 Database download prompt

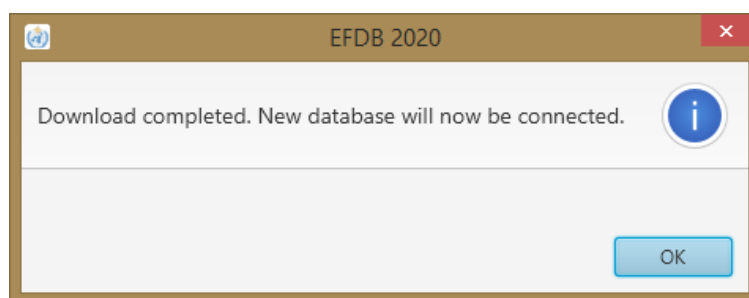


Download process will start as soon as user confirms the prompt by clicking the **Yes** button (Figure 3-4).

Figure 3-4 Database download progress



After database file is successfully downloaded, application will automatically connect to the new database (Figure 3-5).

Figure 3-5 Connecting to updated database

Information about currently connected database is always visible in the bottom status bar of the application (Figure 3-6).

Figure 3-6 Information about current database

Database: C:\Users\gregus\EFDB\efdb_202011.sqlite | November 2020 | EF count: 17931

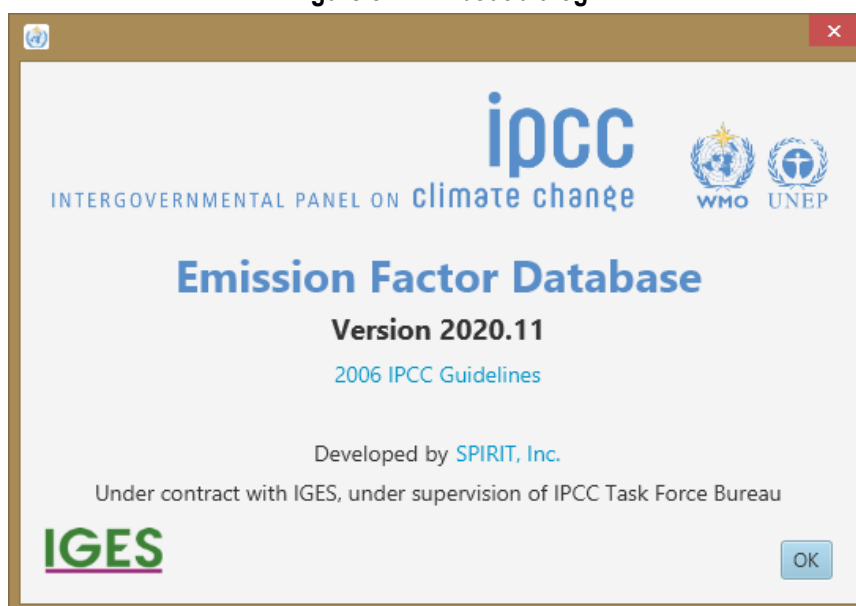
The first segment contains the full path of currently connected external database file (or “Built-in” in case built-in database is currently connected).

The second segment contains information about date when the database was last updated with new data.

The third segment contains information about how many emission factor or other parameter records database contains.

3.3 Help

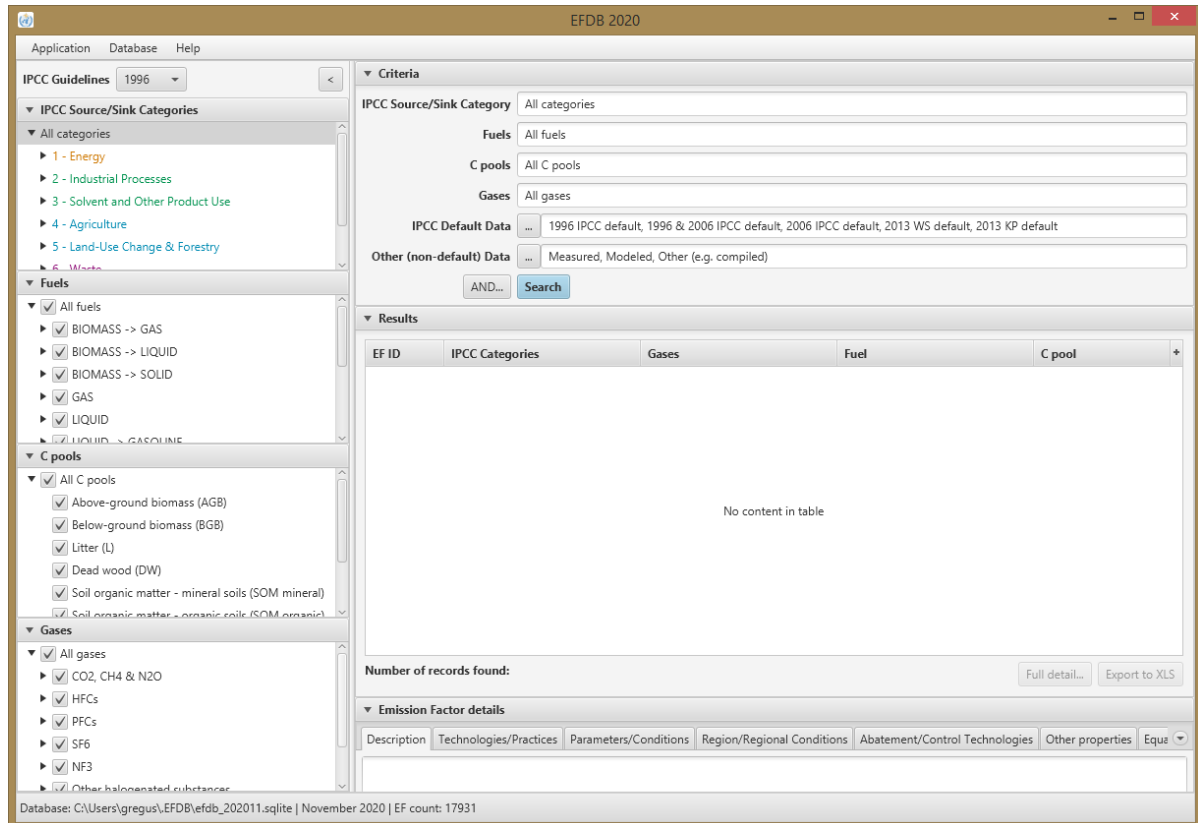
- **User guide** – opens PDF version of the user guide. Requires external PDF viewer.
- **About** – shows dialog with additional information about application (Figure 3-7)

Figure 3-7 About dialog

4 Searching the EFDB for emission factors or other parameters

Screen designed to search the database for emission factors is always automatically open after database is connected. The recently used database will open automatically (Figure 4-1).

Figure 4-1 Search screen



The screen consists of the following sections:

- **IPCC Guidelines** – dropdown box that allows to choose either 1996 or 2006 version of the IPCC Guidelines. This will automatically adjust relevant data in IPCC Source/Sink Categories section as well as Fuels section.
- **IPCC Source/Sink Categories** – contains the hierarchical list of all IPCC Source/Sink Categories corresponding to the selected IPCC Guidelines version.
- **Fuels** – contains the hierarchical list of Fuels corresponding to the selected IPCC Guidelines version. Note, that this list is available only for Fuel Combustion Activities of the Energy sector.
- **C pools** – contains the list of C pools. Note, that this list is available only for Land Use Change and Forestry as well as Harvested Wood Products categories.
- **Gases** – contains the hierarchical list of Gases
- **Criteria** – contains information about currently chosen IPCC Source/Sink Category, Fuels (if applicable), C pools (if applicable), Gases, Type of parameter. Allows to specify additional search criteria. Contains **Search** button designed to initiate the search process taking into account currently specified criteria.
- **Results** – table containing the results of a search process
- **Emission Factor details** – dynamic overview of emission factor details that is currently selected in the Results table.

4.1 Specifying criteria

This stage consists of defining selection criteria and results in a table of all emission factors or other parameters complying with the criteria.

- a) Choosing the IPCC Source/Sink Category of interest
- b) Choosing the Fuel(s) or C pool(s) of interest (if applicable)
- c) Choosing the Gas(es) of interest
- d) Specifying additional criteria

4.1.1 Choosing the IPCC Source/Sink Category

Select the **IPCC Source/Sink Category** (Figure 4-2) by a hierarchical procedure using the **IPCC Source/Sink Categories** section on the left. Starting at the top level, you will be presented with a series of subcategories within the already expanded category. The complete list of the IPCC Source/Sink Categories can be found in Appendix B of the User Manual for WEB application. It should be noted that 18 new categories were temporarily added under “5 Land-Use Change & Forestry” for *Revised 1996 Guidelines* version. (See “Processing Data from GPG-LULUCF” in Appendix)

Only the emission factors and other parameters defined within the selected IPCC Source/Sink Category (including the underlying levels) will be included in the search criteria. Choosing **All categories** allows including all of the IPCC Source/Sink Categories at once.

The full name of the currently selected IPCC Source/Sink Category is displayed in the **Criteria** section.

If selected IPCC Source/Sink Category is one of the Fuel Combustion Activities of the Energy sector, the **Fuels** section becomes enabled to choose one or more Fuels of interest from the list of all available Fuels.

If selected IPCC Source/Sink Category is one of the Land Use Change and Forestry or Harvested Wood Products categories, the **C pools** section becomes enabled to choose one or more C pools of interest from the list of all available C pools.

After choosing the desired IPCC Source/Sink Category, you can proceed to select the Fuel(s) (if applicable), C pool(s) (if applicable) and Gas(es).

Figure 4-2 Choosing the IPCC Source/Sink Category



4.1.2 Choosing the Fuel(s) or C pool(s)

a) Fuels (Energy – Fuel Combustion Activities)

This step allows to choose one or more **Fuels** (Figure 4-3a). The fuels are split into several fuel types. Use checkbox located next to Fuel name to include/exclude given Fuel in/from the search criteria. Clicking a checkbox located next to fuel type includes/excludes all the Fuels belonging to that fuel type. Choosing **All fuels** allows including all of the Fuels at once.

The list of all included Fuels is displayed in the **Criteria** section.

Figure 4-3a Choosing the Fuel(s)

The screenshot shows a window titled 'Fuels'. Inside, there is a tree view. The root node is 'All fuels', which is selected. Below it, there are three main categories: 'BIOMASS -> GAS', 'BIOMASS -> LIQUID', and 'BIOMASS -> SOLID'. Each category has a checkbox next to it. The 'LIQUID' category is expanded, and its checkbox is checked. Under 'LIQUID', there are several sub-items, each with a checked checkbox: 'Crude Oil', 'Orimulsion', 'Natural Gas Liquids', 'Jet Kerosene', 'Other Kerosene', 'Shale Oil', 'Diesel Oil', 'Gas Oil', and 'Residual Fuel Oil'.

b) C pools (Land Use Change and Forestry and Harvested Wood Products)

This step allows to choose one or more **C pools** (Figure 4-3b). Use checkbox located next to C pool name to include/exclude given C pool in/from the search criteria. Choosing **All C pools** allows including all of the C pools at once.

The list of all included C pools is displayed in the **Criteria** section.

Figure 4-3b Choosing the C pool(s)

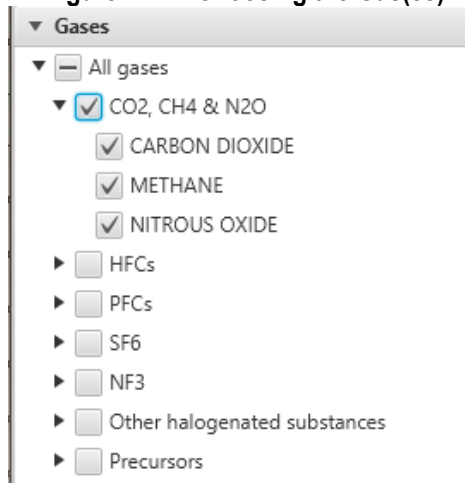
The screenshot shows a window titled 'C pools'. Inside, there is a list of checkboxes, all of which are checked. The first checkbox is 'All C pools'. Below it, there are several sub-items, each with a checked checkbox: 'Above-ground biomass (AGB)', 'Below-ground biomass (BGB)', 'Litter (L)', 'Dead wood (DW)', 'Soil organic matter - mineral soils (SOM mineral)', 'Soil organic matter - organic soils (SOM organic)', 'Harvested wood products (HWP)', and 'Classified otherwise'.

4.1.3 Choosing the Gas(es)

This step allows to choose one or more **Gases** (Figure 4-4). The gases are split into several gas groups. Use checkbox located next to Gas name to include/exclude given Gas in/from the search criteria. Clicking a checkbox located next to gas group includes/excludes all the Gases belonging to that gas group. Choosing **All gases** allows including all of the Gases at once.

The list of all included Gases is displayed in the **Criteria** section.

Figure 4-4 Choosing the Gas(es)



4.1.4 Specifying additional criteria

The **Criteria** section contains the summary of currently defined search criteria regarding the IPCC Source/Sink categories, Fuel(s) and Gases and allows to specify additional criteria such as **Type of parameter** and also criteria for additional fields (Figure 4-5).

Figure 4-5 Criteria section

- **IPCC Default Data** – allows to filter out the list of emission factors and other parameters according to IPCC Default Data parameter types. (Figure 4-6a)

Figure 4-6a Choosing Type of parameter – IPCC Default Data

- **Other (non-default) Data** – allows to filter out the list of emission factors and other parameters according to non-default data parameter types. (Figure 4-6b)

Figure 4-6b Choosing Type of parameter – Other (non-default) Data

- **AND...** - this button allows to add additional criteria row which allows to filter emission factors or other parameters by value specified by the user.
- The first dropdown box allows to choose a field that specified value should be matched against. It is possible to choose **–All fields–** which means specified value will be matched against all the fields from the list (except for special EF ID field).
- The second dropdown allows to specify comparison operator. Two operators are available:
 - **Contains** – means any occurrence of the specified value within chosen field
 - **Equals to** – means field value must exactly match the specified value. (Note: **EF ID** field can use only **Equals to** operator)

Example that filters out only those emission factors or other parameters where Region/Regional Conditions field contains Japan is in the Figure 4-7.

Figure 4-7 Additional criteria row

- Checkbox next to the value field can be used to temporarily exclude given criteria row from the search process
- Button with red X can be used to remove given criteria row

4.2 Search and the results

After specifying all the criteria of interest search process can be initiated by pressing the **Search** button. Results table will show all the emission factors or other parameters that match the specified criteria (Figure 4-8). The bottom of the table shows how many records were found that matched the specified criteria.

Figure 4-8 The results table

▼ Results						
EF ID	IPCC Categories	Gases	Fuel	Type of parameter	Description	Value
17202	1A3c - Railways	METHANE	Other Oils	1996 IPCC default	CH4 Default (Uncontrolled) emission factors	5
17242	1A3c - Railways	NITROUS OXIDE	Other Oils	1996 IPCC default	N2O Default (Uncontrolled) emission factors	0.6
18127	1A3c - Railways	METHANE	Other Oils	1996 IPCC default	CH4 Default (Uncontrolled) emission factors	5
18167	1A3c - Railways	NITROUS OXIDE	Other Oils	1996 IPCC default	N2O Default (Uncontrolled) emission factors	0.6
118995	1A3c - Railways	METHANE	Diesel Oil	2006 IPCC default	Default Emission Factor for the Most Common Used Fuels for Rail Transport	4.15
118996	1A3c - Railways	NITROUS OXIDE	Diesel Oil	2006 IPCC default	Default Emission Factor for the Most Common Used Fuels for Rail Transport	28.6

Number of records found: 19

Full detail... Export to XLS

The results table contains predefined list of columns for each data record. It is possible to adjust the list of displayed columns by using the + button located at the end of the table header. The adjusted list of columns is saved to the user settings and is automatically applied next time application is launched.

The results table supports ordering and additional filtering.

To order the results by a specific column click on the header of a column of interest.

To apply additional filter to a column right-click on the header of a column of interest. Criteria dialog box will be displayed as shown in the Figure 4-9.

Figure 4-9 Column filter

Type of parameter	Description
1996 IPCC default	CH4 Default (Uncontrolled) emission factors
1996 IPCC default	N2O Default (Uncontrolled) emission factors
1996 IPCC default	CH4 Default (Uncontrolled) emission factors
1996 IPCC default	N2O Default (Uncontrolled) emission factors
2006 IPCC default	Default Emission Factor for the Most Common Used Fuels for Rail Transport
2006 IPCC default	Default Emission Factor for the Most Common Used Fuels for Rail Transport

☒ 1996 IPCC default
 ☒ 2006 IPCC default
 ☒ Other

APPLY NONE ALL RESET ALL

Clicking the **Export to XLS** button will export the whole results table to Excel format. Excel search facilities can then be used to perform more advanced searching within the exported list.

Clicking the **Full detail...** button opens new screen showing the complete information for an Emission Factor or other parameter that is highlighted in the results table. (Refer to Section 5)

Detail of Emission Factor section below the results table contains the quick detail of currently highlighted emission factor or other parameter where the record fields are organized in tabs. Values are presented in a text field which allows select and copy operations.

5 Detail of Emission Factor

This screen contains the complete information for the particular emission factor or other parameter (Figure 5-1). This detail can be exported to Excel format by clicking the **Export to XLS** button.

Figure 5-1 Detail of Emission Factor

Administrative information	
Data provider	IPCC
Data provider country	(Not applicable)
Data provider contact	ipcc-efdb@iges.or.jp
Date calculated	Unknown
Date submitted to EFDB by Data Provider	(Not applicable)
Date posted to EFDB by IPCC	2002-09-27

Technical information	
Gases	NITROUS OXIDE
IPCC 1996 Source/Sink Categories	1A3c - Railways
IPCC 2006 Source/Sink Categories	1.A.3.c - Railways
Fuel 1996	Other Oils
Fuel 2006	Other Petroleum Products
Technologies/Practices	
Parameters/Conditions	In the Revised 1996 IPCC Guidelines, fuel type is specified as "Oil"
Region/Regional Conditions	Not Applicable
Abatement/Control Technologies	
Other properties	
Description	N2O Default (Uncontrolled) emission factors
Value	0.6 KG/TJ
Value in common units	
Equation	
IPCC Worksheet	Worksheet 1-3; Sheet 1-3
Source of data	Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (Table 1-8 on Page 1.36 of the Reference Manual)
Technical reference	These N2O default emission factors are based on CORINAIR90 database, the CORINAIR1994 default emissionf actors, EDGAR Version 2.0 database, National Communications to the UNFCCC, Berndowski, et al(1993), Radian Corporation (1990) and USEPA(1995). Additional research is needed to improve the quality of the emission factors
Reference language	English
Abstract in English	

Export to XLS Close

Appendix. Background of the EFDB development

Development of the EFDB

The quality of national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol (GHG inventories) depends substantially on reliable emission factors and activity data. Although it is preferable to use emission factors that reflect national circumstances, emission factor development is expensive, time consuming and necessitates a wide degree of expertise.

The IPCC Guidelines provide default emission factors for the majority of source and sink categories. Some of these default emission factors are region or country specific, but in general not all regions or countries are covered.

Sharing of research information would enable countries to use or develop emission factors that are more applicable to the circumstances in question than the IPCC default emission factors without having to bear the associated research costs. For this reason, many countries have indicated (e.g. in the Expert Group Meeting on National Feedback on the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Havana, Cuba, September 1998) that an easily accessible public database on GHG emission factors with supporting scientific information would help improve the quality of GHG inventories in a cost-effective way. A database on GHG emission factors with supporting scientific information would also support the future review and update of the *IPCC Guidelines*.

With this background, a project to establish a database on GHG emission factors (EFDB project) was initiated with a scoping meeting in New Delhi, India, on 24-25 July 2000. Subsequently, the functional design was agreed upon at the first expert meeting in Paris, France, on 2-4 July 2001, and a prototype database was constructed in January 2002 based on the agreement at the Paris meeting. It was subject to pilot testing by a number of inventory experts from different countries for 8 weeks, from 11 February to 8 April 2002. At the second expert meeting in Bratislava, Slovakia, on 23-24 April 2002, participants considered the comments obtained through the pilot testing and discussed how to improve the prototype database. The EFDB was improved in accordance with the conclusion of the Bratislava meeting, and finally released to the public at the 8th session of the Conference of the Parties to the UNFCCC (COP8) in October 2002.

The EFDB development was overseen by the EFDB Steering Group established by the Task Force Bureau (TFB) for the IPCC National Greenhouse Gas Inventories Programme (IPCC-NGGIP) at its 6th session⁴.

Processing Data from GPG-LULUCF

In processing data of emission factors and other parameters from the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF)*, 18 new categories were added under “5 Land-Use Change & Forestry” in the list of “IPCC 1996 Source/Sink Category”. These categories consist of 6 land use categories in GPG-LULUCF namely: Forest land (5-FL), Cropland (5-CL), Grassland (5-GL), Wetlands (5-WL), Settlements (5-SL), and Other land (5-OL). Each land use category is further sub-categorized into two based on the status and recent history of land use. Thus, for instance, for Forest land (5-FL), the sub-categories are: Forest land Remaining Forest land (5-FL-1) and Land Converted to Forest land (5-FL-2). These categories correspond to the sections and subsections of Chapter 3 of *GPG-LULUCF*. Linkage between these categories and the *Revised 1996 IPCC Guidelines*’ reporting categories is elaborated in Section 3.1.2 of *GPG-LULUCF* (pages 3.11-3.14)

⁴ The role of EFDB Steering Group has been taken over by the EFDB Management Group which was established by the TFB at its 15th session. The EFDB Management Group consists of 6 members: two Co-chairs of Editorial Board, two Co-chairs of TFB and two members from TSU.

2006 IPCC Guidelines

The 2006 IPCC Guidelines for National Greenhouse Gas (*2006 IPCC Guidelines*) Inventories were adopted/accepted by the IPCC at its 25th Session in Mauritius in April 2006. The source/sink classification was modified in the *2006 IPCC Guidelines*, and it is not the same as that in the *Revised 1996 IPCC Guidelines*.

In this version of EFDB, the source/sink classification in the *Revised 1996 IPCC Guidelines* with additional 18 categories contained in *GPG-LULUCF* (as mentioned above) is used. The new source/sink classification in the *2006 IPCC Guidelines* is fully incorporated in this version, too.

2013 Wetlands Supplement

The 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (*Wetlands Supplement*) was adopted/accepted at the 37th Session of the IPCC, held in Batumi, Georgia, 14 - 18 October 2013.

Six categories according to the *Wetlands Supplement* were introduced to the current version of the EFDB.