GaBi Databases 2021 Edition
Upgrades & Improvements

Please read this document carefully, as it contains:

- Important information regarding changes in the databases
- Details on changes in process datasets and on cross-cutting changes
- Information on new datasets
- Information on outdated datasets

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1 Overview

About this document

This document covers relevant changes in around 13,000 upgraded LCI datasets of the GaBi Databases 2021 Edition. The document addresses both changes in technology and in methodology, when appliable, as well as error corrections and is structured by type of material/process or topic, e.g., electricity, metals, plastics, renewables. It also covers newly added datasets to the database.

In the Annex you will find the list of datasets that are no longer updated, as well as expired EPD datasets.

Sphera uses a professional issue tracking software (JIRA), so the issue numbers in the tables are issue numbers from this software. Please provide us with this number if you have specific questions.

Key changes and affected datasets

In the following paragraphs, you will find a short summary of the most important changes that took place in this year's upgrade.

The reference year of the *GaBi Databases 2021 Edition* is 2017 for all energy carrier supply mixes (e.g., hard coal, crude oil, and natural gas) and energies, using the latest, consistent global data. For the remaining datasets, the reference year is documented in each dataset.

Please note that processes, that will no longer be updated (in the "Version 2020" folder), as well as "flows with limited use" (for further information see Annex I: "Version 2020" discontinued datasets – Explanations and Recommendations) are now marked with a differently coloured icon in the database: .

Selected, important changes made in the 2021 GaBi Databases edition include:

- **Energy update:** all energy-related datasets, such as electricity, thermal energy, fuels, and the like, have been updated in line with the latest available, consistent international energy trade and technology data. Please see Chapters 3.7 for more information.
- **Energy update documentation:** a major change this year is the way how the composition of the different energy carriers for an electricity mix is displayed. The composition of the electricity supply is now displayed using a Sankey diagram instead of cake diagram. This enhances the understanding of the composition (see Chapter 2.6 for more details).
- **LUC (land use change) update:** Emissions from direct land use change are calculated with the approach "weighted average" (as required for compliance with the ENVIFOOD protocol; and can be applied for compliance with WRI GHG Protocol) based on the approach from PAS 2050-1:2012 and WRI GHG protocol.
- **HFC-23 emissions in Chlorodifluoromethane (HCFC-22) production:** The chlorodifluoromethane (HCFC-22) plant data in Europe and Japan were updated. New studies including

specific data showed an up to now unknown emission source in HCFC-22 production. Approximately 2-3% of undesired HFC-23 (Trifluoro methane) is co-produced and partly incinerated, while some emissions occur, which is now implemented in the gate-to-gate unit process. Due to this change, the GWP of the chlorodifluoromethane (HCFC-22) production dataset is increased by about 85%. Polytetrafluorethylene (PTFE) uses HCFC-22 as a precursor, in consequence here the GWP of the dataset is increased by about 50%. Related practices outside Europe and Japan are also known and tend to show even higher emissions. However, due to the unconfident data situation concerning the regular implementation of the Montreal protocol regulations this data could not be implemented.

- **Harmonization of EN15804 module grouping for incineration from C4 to C3:** The end of life datasets for building equipment are now harmonized following the availability of most recent interpretations of the standard. They are now correctly split in C3 and C4. C3 has the impact of the incineration, while C4 gives the impact of the landfill. The user is advised to check his/her model. New datasets for the module C4 are now available. Depending on end of life treatment of the components, impact can decrease or increase. E.g. if incineration was used, C3 will increase, while C4 will decrease. If no incineration is used (only landfill), C3 will have no impact.
- **Update of precious metals:** using consistent price information from USGS, the 10-year average mean price used for economic allocations for PGM (Platinum Group Metals) has been updated. Changes here are visible especially in ADPf (increase by 40%) and ADPe (decrease by 28%) For GLO datasets changes are negligible.
- **Energy use in natural stone crusher:** The energy use of the average/typical natural stone crusher is updated. Benchmarking revealed that former data concerning energy consumption was far too conservative. Now more representative data is available. Energy use for crushing stones (e.g. for use as gravel) is now much lower, from 58 MJ/1000kg to 20MJ/1000kg of stone. Due to this change, impacts of simple mineral products like gravel decrease in all categories by about 60%, whereas it is relativized in all follow up products.
- **Credits in composting datasets:** The credits given for composting decrease because the given credits are harmonized from rather best-case credits to more representative credits. The first effect that leads to this change is the appropriate crediting of straw instead of timber, which was used as a proxy. This influence is mainly on biogenic carbon. The second effect influences mainly the fossil carbon. Formerly hard coal-based steam was credited for the incineration of sieving rests, overly reducing the net fossil CO_2. This has been adjusted to the actual situation of crediting surplus biobased steam. GWP incl. biogenic Carbon changes between +4% to +7%, GWP excl. biogenic Carbon increases between +76% to +1340% (please note that absolute CO_2 fossil figures are still very small per kg of compost, which triggers high percentage in change). AP changes between +0.7% to -28%.

- **Energy credits bioethanol from sugar cane:** Electricity and steam credits are now biobased for bioethanol production, in line with the harmonization and actualization of crediting. All datasets using bioethanol (e.g. fuels, bioplastics) are affected by this change. Since the credits in bioethanol decrease, the impact of downstream datasets may increase. Changes are observable in all categories. Bioplastics (biobased from sugar cane) increase by about 100% to 200% when looking at GWP excl. biogenic carbon (please note that absolute CO_2 fossil figures are still very small, which triggers high percentage in change). When looking at GWP incl. biogenic carbon, the impacts increase between 46% and 54% due to this harmonization of crediting
- **Silicon mix:** Attention: An **error** in the previous version is now corrected. In the model of Silicon mix (99%), the electricity in one production step was improperly connected to the unit process model network and is now accounted for correctly. The amount of consumed electricity increased. This leads to higher impacts in all categories (e.g. GWP increases by 70%). This also affects all datasets which use silicon as an alloy, depending on the amount of silicon used.
- **Cardboard production:** Using the latest available FEFCO report from 2017, the unit processes for Kraftliner, semichemical fluting, wellenstoff, testliner and corrugated board have been updated in the summer 2020 release (see chapter 3.13 for more details). Compared to this version GWP changes minimally (<1%).
- **Electricity consumption of Polyethylene terephthalate fibres (PET) processing:** Electricity consumption of melt spinning of DE and EU-28 Polyethylene terephthalate fibres (PET) fibres is now adapted. Using newer benchmark studies for melt spinning of PET fibers a realistic electricity consumption of 0.5 kWh/kg fibers is now used. All impacts lowered due to less electricity consumption of melt spinning. All impacts lowered between 5% to 19%.
- **Carbon fibers:** Energy required to produce oxidised PAN is adapted. In the dataset Carbon Fiber (CF; from PAN; standard strength) an energy intensive process step is now included. This adaptation is related to the availability of new engineering information about this process step. GWP increases by about 60%.
- **Update production & import mixes of crop plans:** The cultivation <u>production</u> mix plans are now updated with FAOSTAT 2018 data. The cultivation <u>consumption</u> mix plans are updated with FAOSTAT 2017 data, as not all necessary datapoints were available for 2018. The result of these updates are especially observable in EP, which increases by about 200%. All other impact categories change less than 10%.
- **Truck non-exhaust particle emissions:** Attention - New user option: notable addition to truck transport datasets is an optional parameter switch to include non-exhaust particle emissions (such as from brakes, tires,...) that allows users to adjust the datasets as. The default setting is zero (i.e. no such emissions), as the uncertainty for these emissions is very large. However, the user has the option to see what potential impacts those emissions could have.

- **Further regionalization of US and Indian datasets:** Datasets of the US and India are now deeper regionalized, i.e. available precursor and consumables production are updated to the corresponding country conditions. One notable effect of this deeper regionalization is for instance that now US-specific hazardous waste landfill models are used in the background of US datasets. Due to specific hazardous waste treatment procedure in the US the impact is now reflecting the actual conditions more country specific.

All other changes, as well as further details and the related rationale are provided in Chapters 2 ff.

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Abbreviations

AP	Acidification Potential
ADP	Abiotic Depletion Potential
BAT	Best Available Technique
B2B	Business-to-Business
B2C	Business-to-Consumer
CF	Characterisation factor
CHP	Combined Heat and Power Plant
CML	Centrum voor Milieuwetenschappen (Institute of Environmental Sciences)
EF	Environmental Footprint
EP	Eutrophication Potential
EPS	Environmental Priority Strategies
EPD	Environmental Product Declaration
GWP	Global Warming Potential
ILCD	International Reference Life Cycle Data System
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
LCIA	Life Cycle Impact Assessment
ODP	Ozone Depletion Potential
PED	Primary Energy Demand
POCP	Photochemical Ozone Creation Potential
UBP	Umweltbelastungspunkte (Ecological Scarcity Method)

For chemical elements, the IUPAC nomenclature is applied.

Country codes use the ISO 3166-1 alpha 2 2-letter code, plus a few 3-letter codes for regions, such as RER for Europe, RNA for North America and GLO for global. The different combinations of the European Union, reflecting its growth over time, are identified by the prefix EU and the Number of Member States (potentially plus “EFTA” when including the countries of the European Free Trade Association, i.e., Iceland, Liechtenstein, Norway and Switzerland).

2 Introduction to the upgrade of databases available with GaBi

In total, around 50 Sphera employees were involved in the upgrade of the GaBi databases, with the Content Team signing responsible. The invested time, knowledge and dedication of our employees resulted in the new GaBi Databases 2021 Edition, with about 13,000 plans and processes of the regular Professional and Extension Databases, plus more than 2,000 processes as Data-on-Demand-only datasets.

The process of continuous upgrades of the GaBi Databases by the Content Team is enabled and supported with domain expertise along the team structure within Sphera, which is illustrated in the figure below.

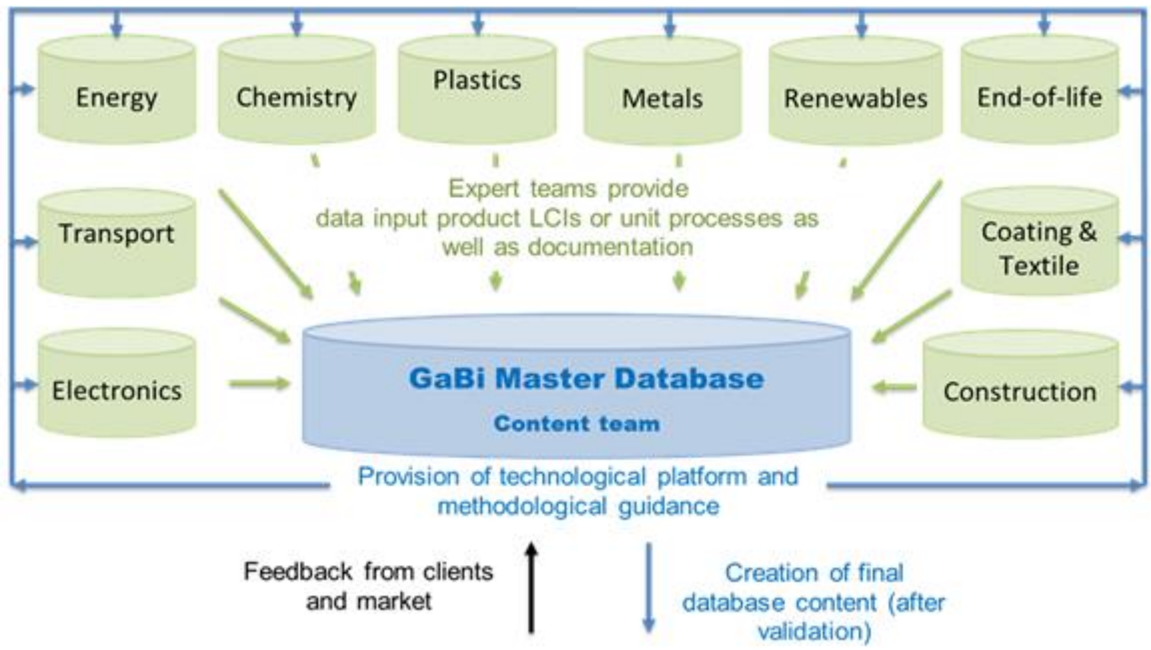


Figure 1: GaBi Master Database maintenance and upgrade process

In the GaBi databases, process documentation is directly integrated in the datasets. Additional information about the modelling principles that are applied to all datasets can be found in the document *GaBi Databases and Modelling Principles.*[1] Furthermore, modelling information on specific topics and recommendations for users to extract the most value out of the GaBi databases can be found in complementary documents which can be accessed on the GaBi Software website.

This document covers relevant changes in the upgraded LCI datasets of the GaBi Databases. The document will address both methodology changes and changes in technology, if any, and is structured by material or topic, e.g., electricity, metals, plastics, renewables. In principle, all Sphera-related datasets have been

[1] http://www.gabi-software.com/index.php?id=8375

upgraded, with some changes occurring exclusively in the background system of datasets, while others also occur in the foreground.

Note: LCI methodology changes do not automatically imply endorsement by Sphera and have been introduced only when necessary: Methodological changes are only useful if these changes or improvements are supported by relevant best practice cases, evolving or edited standards or by relevant stakeholder initiatives with a respective practice approval.

3 GaBi Databases 2021 Edition

"*Facts do not cease to exist because they are ignored.*" – Aldous Huxley

3.1 Principles

Sphera introduced the annual upgrade of the GaBi databases for three main reasons:

- To keep your results as up-to-date and close to evolving supply chains as possible, including automated upgrades of your valued work in alignment with the most current state.
- To avoid disruptive changes caused by multi-year intervals that are often hard to communicate and interpret and that prolong the time that user results are affected by known data errors.
- To keep track of necessary methodological changes and implement them promptly.

Sphera's databases are based on technical facts and are internationally accepted and broadly applied. We preferably use standardized methods established by industry, science, and regulatory authorities. New methods are applied when they have proven to be based on a relevant standard, on broadly and internationally accepted approaches or when enforced by relevant regulations.

Changes in the environmental profile of the datasets, from the preceding year's GaBi Databases to the most recent GaBi Databases, may be attributed to one or more of the following factors:

- **Upgrade of the foreground and/or background systems.** The market situation or newly available technologies result in changed impacts. The environmental profile for the supply of energy carriers or intermediates may be subject to year-to-year changes and affect the environmental profile of virtually all materials and products to a varying extent. For example, a change of the energy carrier mix or of the efficiency for electricity supply, changes the environmental profile of all materials or products using that electricity supply.
- **Improvements and changes in the technology of the production process.** Improvements or developments in production processes might achieve, for example, higher energy efficiency or a reduction of material losses and of process emissions. Sometimes, the technology is subjected to higher quality requirements that are defined further downstream at the final product-level (e.g., more end-of-pipe measures to reduce emissions, stricter desulphurization of fuels) and improved use phase performance. In addition, certain production routes might have been phased out, have changed the production mix of a material, substance, or energy. A frequently changing and quite dynamic example are the electricity grid mix datasets, as some countries reduce or phase-out certain types of energy or fuels in the electricity supply mix, which require the introduction of alternative sources of fuels and energy.

- **Further standardization and the establishment of regulative modelling approaches.** Modelling of realistic technology chains has always been the core focus of the GaBi databases. Further harmonization and improvement in the LCI methodology and feedback from clients and consultants at Sphera have enhanced the modelling approach for the GaBi Databases. Detailed information is given in the document *GaBi Databases and Modelling Principles.*[2] Methodological adoptions are carried out extremely carefully, passing through multiple levels of reviews by Sphera experts responsible for standardization, technology developments and quality assurance. This internal review process was audited within the continuous improvement process by our external verification partner DEKRA. GaBi database updates and upgrades focus on reliability through consistency to ensure clients system models and results are not jeopardized due to research-interest driven and/or short-lived methodological changes.

The degree of influence of each of these factors is specific to each process and cannot be generalized for all cases, nor can a single factor be highlighted. However, as technological excellence is a core value of Sphera data, our focus is to update and apply all relevant and important improvements and changes in technology and the supply chain and the necessary and established improvements and changes in the methodology.

3.2 Reasoning behind this document

GaBi models — leading to a single aggregated dataset in the GaBi databases — consist of many datasets all along the supply chain network towards the product that is represented by the resulting dataset. This means, many smaller or bigger changes within the supply chain contribute to the overall change in impact results. The change analysis from the preceding to the latest databases edition is a time consuming, but important process within Sphera, and the results are documented in this report.

It is important to be aware, that the relevance of changes in the GaBi databases related to the user's own systems is highly dependent on the goal and scope in the specific user model and intended application of the results. This means the same dataset may lead to significant changes for one user and one kind of application (e.g. reporting), whereas in another user's system or another application (e.g. a comparison, with both systems being affected in the same way), the changes might be irrelevant. To shorten the time for users to reflect on the relevancy of the GaBi database changes for their own systems, the analyst function of GaBi Software may support you in an effective way. As a means of guiding users to the relevant changes in their models that are due to changes in external factors and GaBi background data upgrades, Sphera provides the present document "*GaBi Databases 2021 Edition - Upgrades and Improvements*" in addition to the document "*GaBi Databases and Modelling Principles,*" complemented by close to 14,000 interlinked electronical documentation files of the processes supplied with the GaBi databases and also accessible online.

The following sections address the most relevant changes in the GaBi Databases for different topics.

[2] http://www.gabi-software.com/index.php?id=8375

3.3 Regionalization of water use

Where possible, the regionalization of country specific production processes was increased, to better capture water scarcity implications.

Generally, we note that correct modelling of water use – as net abstraction – is inherently challenging and frequently subject to errors in models. For further information regarding water assessment and how to ensure correct and coherent regionalization at the input and output side in your models, please see the documentation in “Introduction to Water Assessment in GaBi”[3].

3.4 Land use Change

Direct land use change (dLUC): Emissions from direct land use change are calculated with the approach “weighted average” (as required for compliance with the ENVIFOOD protocol; and can be applied for compliance with WRI GHG Protocol) based on the approach from PAS 2050-1:2012 and WRI GHG protocol. The calculations for carbon stock changes are based on IPCC rules: The basic approach is to determine the total carbon stock change by assessing the difference between carbon stocks of the e.g. agricultural area — including both, soil and vegetation — of the previous and the changed situation. The assumptions for carbon stocks depend on country, climate, and soil type. The approach is moreover crop-specific: The impacts from land use change are allocated to all crops for which the 'area harvested' increased over time in a specific country. This depends on the crop's respective share of area increase. There are three different calculation approaches that can be applied: 1. country is known and the previous land use is known, 2. the country is known and the previous land use is unknown, 3. the country is unknown and the previous land use in unknown. For all GaBi datasets, the following situation is applied: The country is known (as defined by the respective dataset), but the previous land use is by default unknown. The emissions occurring due to the land use change are distributed over a period of 20 years.

Underlying sources for the calculations are statistical data from:

- FAOSTAT for crop yields, harvested area of crops and area of forest and grassland,
- FAO’s global forest resource assessment for carbon stocks (in case former land use is unknown)
- IPCC Guidelines, Volume 4, for climate zones and soil type map
- IPCC 2006 for above-ground mass carbon stock (if land use change is known), values of soil organic carbon stock and stock change factors.

This methodology takes changes in soil organic carbon stock into account. The emissions that are calculated are connected in the model per hectare and are scaled per reference unit respectively. The emissions are reported separately with the flow “carbon dioxide from land use change” as required by certain standards. The emissions are per default directly released as carbon dioxide. Note that this carbon dioxide has a climate change characterisation factor equivalent to that of fossil carbon dioxide. In case different information is available, partly incineration is applied and is explicitly described in the respective dataset.

Indirect land use change (iLUC): iLUC is not considered.

[3] http://www.gabi-software.com/index.php?id=8375

Please refer to the document “Documentation for Land Use Change Emissions Evaluation in GaBi”[4] for further details.

3.5 LCIA Methods – method updates, characterization factor updates, corrections

3.5.1 Water scarcity WAVE+ (released to GaBi customers summer 2020)

The water scarcity assessment method WAVE+ is now implemented in GaBi. The WAVE+ (Water Accounting and Vulnerability Evaluation) model is used for assessing local impacts of water consumption and focusses on blue water consumption only.

Following the structure in AWARE, three quantities were developed with low, high and OECD+BRIC averages for the unspecified water flows (both for including and excluding hydro power).

3.5.2 USEtox 2.12

A new version of USEtox is now available with updated and additional characterization factors.

Note that USEtox 2.1 can now be found in the folder "earlier versions of methods”.

3.5.3 CML 2001 August 2016 (released to GaBi customers summer 2020)

A new version of CML 2001 is now available. In the version of January 2016, CML had implemented the IPCC AR5 GWP factors with errors. These were corrected in CML 2001 August 2016. Other impact categories were not affected by the update.

Note that CML 2001 January 2016 can now be found in the folder "earlier versions of methods”.

3.5.4 Environmental Footprint (EF)

Except for “Land use”, “Ozone depletion” and “Resource use, mineral and metals”, all EF quantities are renamed, to the official, final names. Some changes are of minor nature, e.g. exchanging a "-" with a ",". For some, the wording changed substantially, e.g. the human toxicity or particulate matter impact methods. The change is done for EF 2.0, EF 3.0 and EN15804+A2 (which uses EF 3.0, with one difference in Climate change only). Table 3-1 shows the name of the quantities before and after this change.

Table 3-1 Previous and current naming of the EF quantities – Before and after the change

Name of impact category – Before	Name of impact category - After
Acidification terrestrial and freshwater	Acidification
Climate Change	Climate Change - total
Climate Change (biogenic)	Climate Change, biogenic
Climate Change (fossil)	Climate Change, fossil
Climate Change (land use change)	Climate Change, land use and land use change
Ecotoxicity freshwater	Ecotoxicity, freshwater - total
Ecotoxicity freshwater (Inorganic)	Ecotoxicity, freshwater inorganics
Ecotoxicity freshwater (Metals)	Ecotoxicity, freshwater metals

[4] http://www.gabi-software.com/index.php?id=8375

Name of impact category – Before	Name of impact category - After
Ecotoxicity freshwater (Organic)	Ecotoxicity, freshwater organics
Respiratory inorganics	Particulate matter
Eutrophication marine	Eutrophication, marine
Eutrophication freshwater	Eutrophication, freshwater
Eutrophication terrestrial	Eutrophication, terrestrial
Cancer human health effects	Human toxicity, cancer - total
Cancer human health effects (Inorganic)	Human toxicity, cancer inorganics
Cancer human health effects (Metal)	Human toxicity, cancer metals
Cancer human health effects (Organic)	Human toxicity, cancer organics
Non-cancer human health effects	Human toxicity, non-cancer - total
Non-cancer human health effects (Inorganic)	Human toxicity, non-cancer inorganics
Non-cancer human health effects (Metals)	Human toxicity, non-cancer metals
Non-cancer human health effects (Organic)	Human toxicity, non-cancer organics
Ionising radiation - human health	Ionising radiation, human health
Photochemical ozone formation - human health	Photochemical ozone formation, human health
Resource use, energy carriers	Resource use, fossils
Water scarcity	Water use

3.5.5 EN 15804 +A1/A2

EPD Proxy flows are inserted into all EN15804 +A1 and A2 quantities. These proxy flows also allow for recreating published EPDs by adding them into a new process and entering the emission factors into the respective proxy flows. The flows inserted into EN 15804 +A2 are named according to the changes highlighted in section 3.5.4.

Certain EN 15804 impact categories are not calculated automatically in GaBi (especially categories regarding resource use and waste): For these categories, the values must be entered by the user into the product model by using the created proxy flows (e.g. Use of renewable primary energy resources in material (PERM)). This ensures that only the relevant data for the foreground system is accounted for, when assessing those quantities. Moreover, double counting and uncertainties of the results can be avoided this way. The flows that have to be defined by the user are listed in Table 3-2.

Table 3-2 EPD quantities that are not automatically calculated in GaBi

Quantity	GUID
Resource use indicators	
02 EN15804+A1/A2 Primary energy resources used as raw materials (PERM)	{fb3ec0de-548d-4508-aea5-00b73bf6f702}
05 EN15804+A1/A2 Non-renewable primary energy resources used as raw materials (PENRM)	{1421caa0-679d-4bf4-b282-0eb850ccae27}
07 EN15804+A1/A2 Input of secondary material (SM)	{c6a1f35f-2d09-4f54-8dfb-97e502e1ce92}

Quantity	GUID
08 EN15804+A1/A2 Use of renewable secondary fuels (RSF)	{64333088-a55f-4aa2-9a31-c10b07816787}
09 EN15804+A1/A2 Use of non-renewable secondary fuels (NRSF)	{89def144-d39a-4287-b86f-efde453ddcb2}
Output flows and waste categories	
01 EN15804+A1/A2 Hazardous waste disposed (HWD)	{430f9e0f-59b2-46a0-8e0d-55e0e84948fc}
02 EN15804+A1/A2 Non-hazardous waste disposed (NHWD)	{b29ef66b-e286-4afa-949f-62f1a7b4d7fa}
04 EN15804+A1/A2 Components for re-use (CRU)	{a2b32f97-3fc7-4af2-b209-525bc6426f33}
05 EN15804+A1/A2 Materials for Recycling (MFR)	{d7fe48a5-4103-49c8-9aae-b0b5dfdbd6ae}
06 EN15804+A1/A2 Material for Energy Recovery (MER)	{59a9181c-3aaf-46ee-8b13-2b3723b6e447}
07 EN15804+A1/A2 Exported electrical energy (EEE)	{4da0c987-2b76-40d6-9e9e-82a017aaaf29}
08 EN15804+A1/A2 Exported thermal energy (EET)	{98daf38a-7a79-46d3-9a37-2b7bd0955810}
Biogenic carbon content	
01 EN15804+A2 Biogenic carbon content in product	{7f02db63-247f-46b5-84f0-1f4850ba76da}
02 EN15804+A2 Biogenic carbon content in packaging	{d221ea29-b6a1-4cc2-90c6-eab9b4d92479}

The renewable (PERM) and non-renewable primary energy indicators (PENRM) used to be included in valuable product flows. For the current update, these quantities are deleted from the product flows, in the corresponding cases,. To allow the users to define the primary energy resources used as raw materials in their products, those two quantities now only include the respective EPD proxy flows. This also prevents double counting and inconsistent results.

3.5.6 IPCC AR 5

Although there is no difference for the characterization factors of the impact categories "land use change only" whether excl. or incl. biogenic carbon is considered, this information is added to the name of the quantities. This is a naming clarification, as both quantities existed with the same name. Both subfolders of the IPCC AR5 quantity are renamed accordingly.

3.5.7 ReCiPe 2016

In the quantity “Metal depletion”, the characterisation factors (CF) of most flows that start with “m…” to “z…” of the midpoint “Hierarchist” and “Egalitarian” quantities were off by one position (i.e. they had the CF of the flow stated above them). As multiple flows with the same CF are stated directly below each other in the quantity, not all CFs in the section were wrong, however. This error has been corrected.

3.5.8 Single elementary flows

The following corrected characterization factors of single elementary flows have been implemented:

Anthropogenic Abiotic Depletion Potential (AADP), TU Berlin:

TiO2, 54% in ilmenite [Non renewable resources]: 4.3E-04 kg Sb eq./kg
TiO2, 54% in ilmenite, 2.6% [Non renewable resources]: 4.63E-04 kg Sb eq./kg

TiO2, 95% in rutile, 0.40% [Non renewable resources]: 4.63E-04 kg Sb eq./kg
Titanium dioxide [Non renewable resources]: 4.63E-04 kg Sb eq./kg
Titanium ore [Non renewable resources]: 2.31E-04) kg Sb eq./kg

UBP 2013, Mineral resources:

Titanium [Non renewable elements]: 5.84E+02 UBP/kg
Titanium ore [Non renewable resources]: 1.75E+02 UBP/kg

Cost

Aluminium ingot (secondary) [Metals]: 1.08€/kg

The quantity "cost" has been deleted from the following flows:

Copper cathode (>99.99 Cu) [Metals]
Nickel, ion [surface water]
Nickel, ion [unspecified]
Nitrogen oxides [lower stratosphere + upper troposphere]
Nitrogen oxides [non-urban air or from high stacks]
Nitrogen oxides [urban air close to ground]

Environmental Footprint 2.0:

The normalization factor for EF 2.0 ionizing radiation was corrected from 422 kBq U235 eq. to 4220 kBq U235 eq. according to the official documentation.

EN 15804+A1

In ADP for fossil resources, the following flows are set to "0":

Oil sand (10% bitumen) (in MJ) [Crude oil (resource)]
Oil sand (100% bitumen) (in MJ) [Crude oil (resource)]
Peat (in kg) [Peat (resource)]
Peat (in MJ) [Peat (resource)]
Peat ecoinvent [Non renewable resources]
Peat, in ground, ecoinvent [Peat (resource)]
Pit gas (in kg) [Natural gas (resource)]
Pit gas (in MJ) [Natural gas (resource)]
Pit Methane (in kg) [Natural gas (resource)]
Pit Methane (in MJ) [Natural gas (resource)]
Shale gas (in MJ) [Natural gas (resource)]
Tight gas (in MJ) [Natural gas (resource)]

EN 15804+A2

Methane to air: Characterization factor deleted for Human toxicity, non-cancer

NF EN 15804:

Gypsum (natural gypsum) [Non renewable resources]: characterization factor for "Abiotic depletion potential (elements), complementary factors" is slightly corrected to be-3,58376E-05 kg Sb eq./kg.

Energy (net calorific value)

Black tea leaves (3% H2O content) [Renewable primary products]: 17.3 MJ/kg
Tea (80% H2O content) [Renewable primary products]: 5.6 MJ/kg
Colophony [Materials from renewable raw materials]: 42.12 MJ/kg
Rosin ester tackifier [Organic intermediate products]: 42.12 MJ/kg

Primary energy

In an effort to harmonize the primary energy quantities, product flows are removed from quantities for primary energy (e.g. “Primary energy from renewable resources (gross cal. value)”, “UBP 2013, Energy resources”, “01 EN15804+A1 Use of renewable primary energy (PERE)”, etc.). The quantities now only contain elementary flows. In consequence, the following flows do not contain any primary energy quantities anymore:

Black tea leaves (3% H2O content) [Renewable primary products]
Flax long fibre (8% H2O content) [Materials from renewable raw materials]
Flax, Whole plant (field retted, 10% H2O content) [Renewable primary products]
Hemp, Seeds (15% H2O content) [Renewable primary products]
Natural Rubber, Seeds (50% H2O content) [Renewable primary products]
Natural Rubber, Tapped latex, (not conserved, 36%) [Renewable primary products]
Oil Palm FFB (40% H2O content, 30% C) [Renewable primary products]
Oil palm,19% water content, fruit bunches, 20% Palm oil [Renewable primary products]
Pine log (79% moisture; 44% H2O content) [Materials from renewable raw materials]
Sisal, Leaves (4% Fibre) [Renewable primary products]
Soy bean (12% H2O content) [Renewable primary products]
Soy bean, Beans (13% H2O content) [Renewable primary products]
Spruce log (79% moisture; 44% H2O content) [Materials from renewable raw materials]
Tea (80% H2O content) [Renewable primary products]

Others:

- Ground water, fossil: The flow was previously characterized with the same characterization factor as all the unspecified water flows. However, since fossil groundwater refers to non-renewable aquifers, the scarcity should be very high. For the impact categories AWARE, AWARE 1.2c, ReCiPe 2016 Freshwater consumption (endpoints), WAVE+ and WSI, the scarcity factors of the flow “river water, extreme scarcity” is used instead.
- The flow "Water, turbine use, unspecified natural origin [Water] {0b481c1a-70fc-46b5-b55e-7fb679ec007f}" is deleted from the following quantities:
    - AWARE (excl hydropower), high characterization factor for unspecified water
    - AWARE (excl hydropower), low characterization factor for unspecified water
    - AWARE (excl hydropower), OECD+BRIC average for unspecified water
    - Blue water consumption (excl hydropower)
    - Blue water use (excl hydropower)
    - Total freshwater consumption (excl hydropower, including rainwater)
    - Total freshwater use (excl hydropower)
    - WSI (excl hydropower), high characterization factor for unspecified water

- WSI (excl hydropower), low characterization factor for unspecified water
- WSI (excl hydropower), OECD+BRIC average for unspecified water

- All environmental quantities are deleted from the flow R 125 (pentafluoroethane) {e26bcf60-8cf7-40af-8e72-03097aaecbf9} as it is a product flow.
- Flows merged:
  - Hydrogen sulfide [valuable] {4ac5f808-b687-4721-b764-548cfb16cbb8} is merged into Hydrogen sulphide [valuable] {568e4168-0100-4c14-ae3d-424c9f24e296}
  - The two flows “Peat ecoinvent” [Non renewable resources] {9905abb6-9879-47ad-a9ab-78dc1166e089} and “Peat” [Renewable resources] {126514fa-415f-454a-8425-aa5d54a1402b} are merged into the flow Peat (in kg) [Peat (resource)] {60722096-3393-4b7f-8182-21fbe6583737}
- The quantity Hausmannite (Mn2O3) (E) {7E9EE7C7-21FD-47FC-9C4F-AFF3C9D4EA35} is renamed to Hausmannite ((Mn+2)(Mn+3)2O 4) (E).
- The flow Butyraldehyde [Group NMVOC to air] {D93BE4F9-1948-4456-B127-5E09BB597A77} is renamed to n-Butyraldehyde [Group NMVOC to air].
- The documentation of the two Butyraldehyde (n-; iso-butanal) flows {e6fdeb42-7898-4e44-8645-982afc86a75d} and {dd7bebe2-29fe-4596-9682-c4b422668a42} is completed with the description “Mixture of n-butyraldehyde, CAS number 123-72-8 and isobutyraldehyde, CAS number 78-84-2”.
- The spelling of all Disulfothon flows is aligned.
- The classification of the following two flows has changed to the flag . They now must be treated with care and should be avoided, if possible:
  - Benzenes, alkylated, unspecified {7a86207a-5a4d-4d6a-aa09-cd7acf248a4d}
  - Aldehydes, unspecified {37af7650-51e8-4f99-946c-3b123a5e8fb9}
- The classification of the flow Fresh fruit bunches {476ff3c3-2523-4c62-b862-dfb7e6f32bd6} has been changed to the “standard” flag again. It can be used without special precautions again. The flow was moved from Resources to a valuable substance.

3.6 New datasets

With this year’s upgrade, 338 new processes are additionally made available to users, as part of existing GaBi databases, i.e. without extra charge:

Professional DB: **111 new processes** DE: Carbon black, US: Aluminium can sheet rolling and US: can manufacturing, US, hardwood veneer, EU-28: diverse wastewater treatment plants, RNA: diverse steel, modules C4 for End of life of building equipment, …
Extension DBs:

II "Energy": 35 new processes Natural gas mix for several countries, DE: Electricity grid mix (2019), EU-28: Green electricity grid mix (average power plants) (production mix), DE: Green electricity grid mix (production mix) (2019), ...
V: "non ferrous metals". 1 new process GLO: Manganese
VII "plastics": 1 new process DE: Chloroprene rubber (Neoprene)
IXa "end of life": 11 new processes Diverse cut-off municipal wastewater treatment plant datasets for EU-28 and DE
IXb "end of life parametrised models": 28 new processes Diverse wastewater treatment plant models for Germany
XIV "construction materials": 84 new processes Four different EPDs, cements with economically allocated binders and burden free binders, and modules C4 for End of life of building equipment
XVII "full US": 31 new processes Association datasets for steel from AISI, municipal wastewater treatment plants (cut-off), EPD for spray polyurethane foam insulation, Carbon black, ...
XX "food and feed". 2 new processes BR: Sugar (from sugar cane) (45% burning, energy surplus allocated) US: Sugar (from BR sugar cane) (45% burning, energy surplus looped back to production)
XXI "India": 45 new processes Diverse materials, such as paints, ferro Manganese, steel, viscose fibre, titanium dioxide and rail transport

Details on the new datasets are available in this MS Excel file: http://www.gabi-software.com/fileadmin/GaBi_Databases/Database_Update_2021_DB_content_overview.xlsx and access to the complete dataset documentation is available for searching and browsing by extension database online under http://www.gabi-software.com/international/databases/gabi-data-search/.

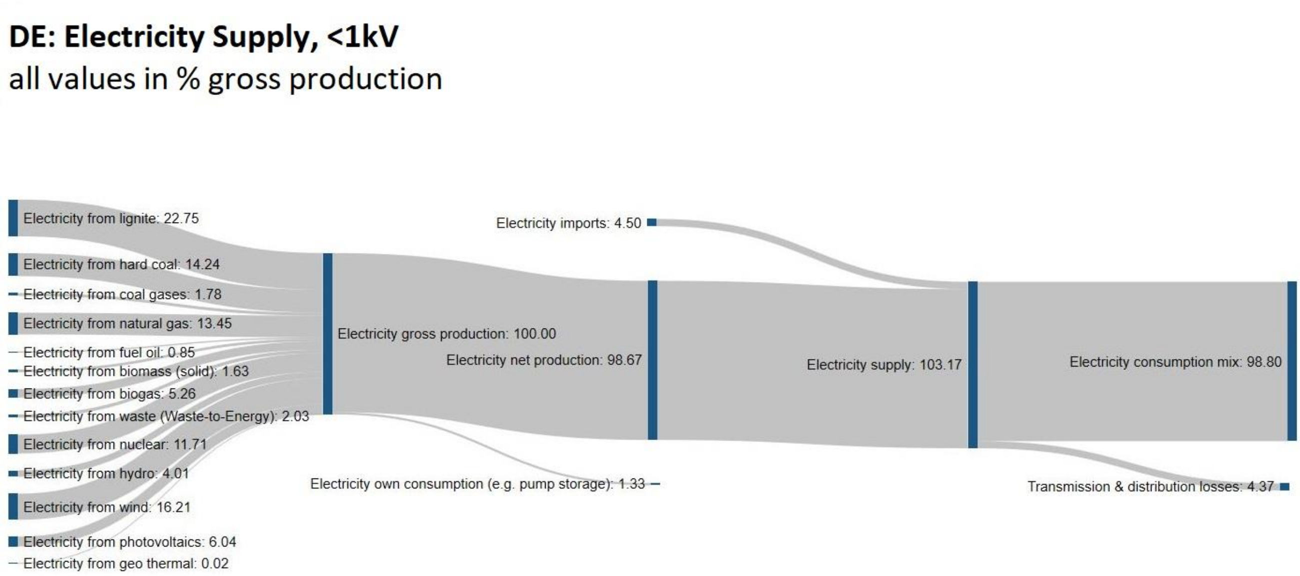
3.7 Inventories for electricity, thermal energy, and steam

Relevant changes in energy carrier mix for electricity generation after the upgrade

In the GaBi databases 2021, the reference year is 2017 for all electricity grid mixes and energy carrier mixes (hard coal, crude oil, and natural gas). The electricity grid mixes in the Extension Module XVII: Full US (electricity grid mixes for US sub grids and subregions under eGRID) refer now to 2018 in the GaBi databases 2021 using the most recent version of eGRID2018 [EPA 2020].

A major change in documentation this year, is the way how the composition of the different energy carriers for an electricity mix is displayed. The composition of the electricity supply is now displayed using a Sankey diagram instead of a cake diagram. This enhances the understanding of the composition.

Below is an example of such a Sankey diagram (shown for Germany):



On the left side, the different electricity production types for the domestic production of electricity are displayed (adding up to 100% of gross production, already including own consumption). Due to some own consumptions of pump storage, at the next step, a loss occurs, which leads to the lower net electricity production. Adding imported electricity, the electricity supply is displayed. This amount is displayed as net import (or export). Transmission and distribution losses are then subtracted to yield the final value.

If one is just looking for the production mix of a country, these can be found as separate plans.

PLEASE NOTE

The following eight processes still included in the data of this update have two diagrams for the consumption mix. The cake diagram with date 2016 is outdated, the correct diagram is the Sankey diagram.

Country	Dataset name	GUID	Source
DE	Electricity grid mix (EN15804 B6)	{F080AC0E-CB7B-4BDB-A079-952EDCDA65B2}	Sphera
UA	Electricity grid mix	{D376A4DD-3FD3-42C5-B33C-82219DAA6596}	Sphera
CN	Electricity grid mix	{7E4084B5-8767-4D3E-A484-C5959600B47E}	Sphera
CN	Electricity grid mix (China electric power yearbook)	{70F3544D-33AC-4E50-BBC2-B2754D4F47F3}	Sphera
CN	Electricity grid mix 1kV-60kV (China electric power yearbook)	{858E328D-3E69-45C0-86CD-590B49E9C3DC}	Sphera
BR	Electricity grid mix	{A4A2888F-44E6-4E7F-934C-2B9A7E19D38F}	Sphera
EU-28	Electricity grid mix 1kV-60kV	{0A1B40DB-5645-4DB8-A887-EB09300B7B74}	Sphera
EU-28	Electricity grid mix	{001B3CB7-B868-4061-8A91-3E6D7BCC90C6}	Sphera

Relevant changes in the life cycle inventory (LCI) of the upgraded national grid mix datasets occur for a couple of countries due to changes in the energy carrier mix that is used for electricity generation, as well as changes in the amount of imported and exported electricity and the country of origin of the imports. The changes in the LCI datasets reveal the following trends:

- An ongoing trend in some countries to increase the share of renewable energies in their electricity generation, which is, for example, the case for, Denmark, Germany, United Kingdom, Finland, or Lithuania
- As in the years before, several transition countries have an ongoing increased electricity consumption. In countries like China, India, Indonesia or Turkey, the domestic electricity production has increased by 3% to 8%. In China, as another example, about 60% of the increased electricity demand (420 TWh) was supplied from coal and approx. 30% from renewables.
- Fluctuations in renewable electricity generation due to weather conditions, especially regarding water availability for hydro power stations (e.g. Portugal, Spain, or Latvia)

The following three figures present the development of the energy carrier mix for electricity generation in Germany, the European Union, and the United States between 2000 and 2017.

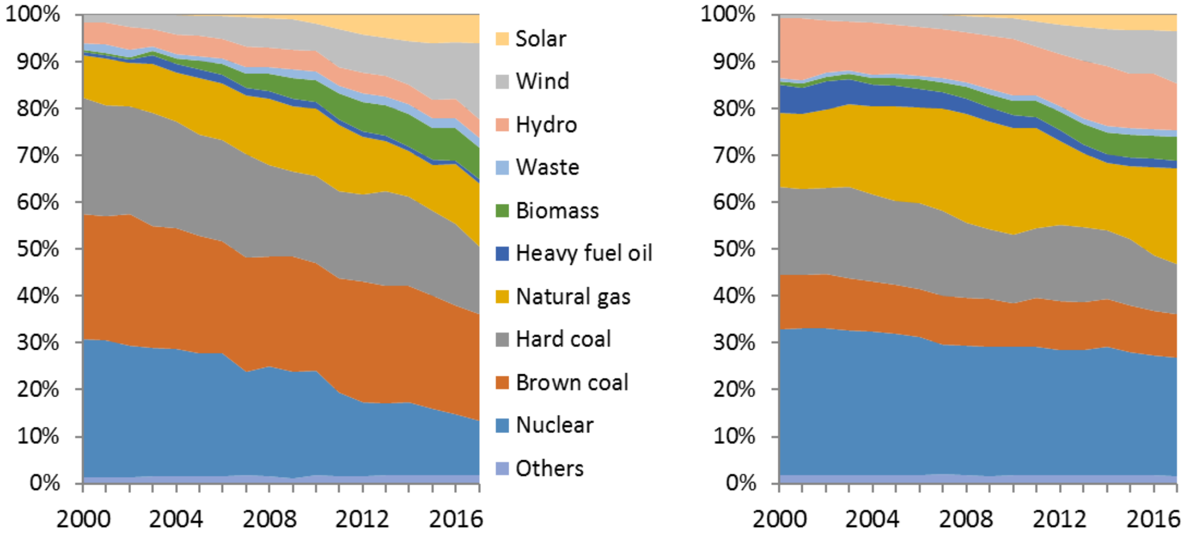


Figure 2: Development grid mix in Germany (left) and EU-28 (right) [Eurostat 2020]

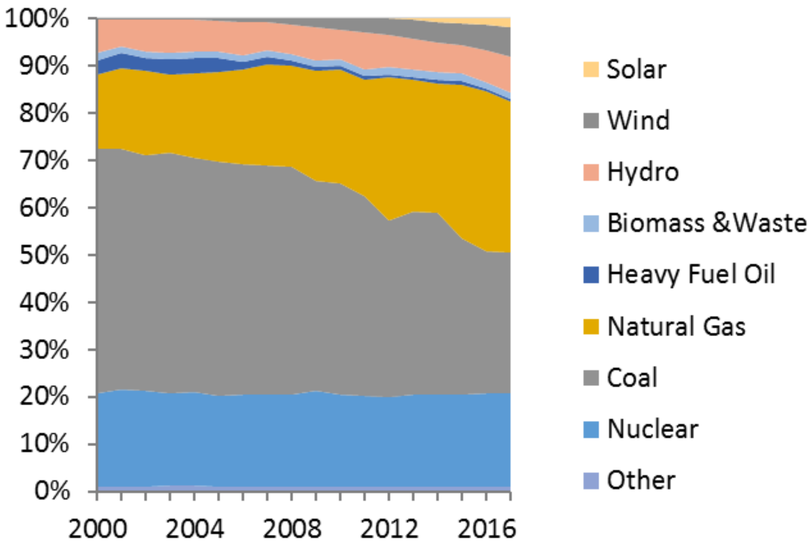


Figure 3: Development grid mix United States [EIA 2020]

In Germany, generation from nuclear and coal power stations dropped further from 13.1% to 11.7% for nuclear power and from 40.4% to 37.1% for coal power. The lower output from these power plants was predominantly substituted by electricity from renewable sources. The share of renewable energy sources for electricity generation in Germany increased from 30.0%[5] in 2016 to 34.2% in 2017. Absolute electricity generation from renewable sources increased from 201 TWh in 2016 to 230 TWh in 2017, most of the incremental renewable electricity was produced by wind power.

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[5] 50% of electricity from waste is accounted as renewable energy

For the EU-28, the share of natural gas in the power mix further increased from 18.8% in 2016 to 20.2% in 2017 after a significant decrease from 22.8% in 2010 down to 14.4% in 2014. The additional 100 TWh of electricity from natural gas have substituted mainly electricity from coal and nuclear, reducing the share of coal in the grid mix from 21.1% to 20.1% and for nuclear from 25.7% to 25.2%. Generation from renewable energy carriers remained nearly stable at 30.3%. Higher output from wind power installations substituted lower output from hydro power plants.

In the U.S., output from coal and nuclear power plants was relatively stable (2058 TWh in 2016 vs. 2032 TWh in 2017). The share of electricity from renewable sources increased from 14.9% in 2016 to 17.1% in 2017, mainly substituting electricity from natural gas.

In the following tables, the energy carrier mixes for 2016 and 2017 are displayed for selected economically relevant countries and those with important changes.

Table 3-3: Energy carrier mix for electricity generation – selected EU countries [IEA 2020]

[%]	France		Germany		United Kingdom		Italy		Poland		Spain	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Nuclear	72.6	71.0	13.1	11.7	21.1	20.8	0.0	0.0	0.0	0.0	21.3	21.1
Lignite	0.0	0.0	23.1	22.8	0.0	0.0	0.1	0.0	30.6	30.6	0.7	0.9
Hard coal	1.5	2.3	17.3	14.2	9.0	6.7	12.2	11.0	47.7	46.4	12.6	15.4
Coal gases	0.4	0.4	1.8	1.8	0.2	0.2	1.0	0.8	1.6	1.3	0.4	0.4
Natural gas	6.3	7.2	12.7	13.4	42.2	40.4	43.6	47.5	4.7	5.9	19.2	23.2
Heavy fuel oil	0.5	1.3	0.9	0.9	0.5	0.5	4.2	3.9	1.4	1.2	6.2	5.7
Biomass (solid)	0.6	0.6	1.7	1.6	5.8	6.1	1.4	1.4	4.2	3.1	1.5	1.6
Biogas	0.3	0.4	5.3	5.3	2.3	2.3	4.5	4.3	0.6	0.6	0.3	0.3
Waste	0.8	0.8	2.0	2.0	2.2	2.2	1.7	1.6	0.1	0.2	0.5	0.6
Hydro	11.8	9.9	4.0	4.0	2.5	2.6	15.3	12.9	1.6	1.8	14.5	7.6
Wind	3.9	4.4	12.1	16.2	11.0	14.8	6.1	6.0	7.6	8.7	17.8	17.8
Photovoltaic	1.5	1.7	5.9	6.0	3.1	3.4	7.6	8.3	0.1	0.1	2.9	3.1
Solar thermal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.1
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.1	0.0	0.0	0.0	0.0
Peat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 3-4: Energy carrier mix for electricity generation – selected non-EU countries [IEA 2020]

[%]	Brazil		China		India		Japan		Russia		USA	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Nuclear	2.7	2.7	3.4	3.7	2.6	2.5	1.7	3.1	18.0	18.6	19.5	19.6
Lignite	1.2	1.0	0	0	10.6	11.7	0.0	0.0	7.1	7.0	1.9	1.8
Hard coal	1.7	1.7	66.8	66.2	64.0	62.2	30.6	30.5	8.0	8.3	29.4	29.0
Coal gases	1.5	1.5	1.5	1.4	0.1	0.1	3.1	3.0	0.6	0.6	0.1	0.1
Natural gas	9.8	11.1	2.7	2.8	4.8	4.6	39.2	38.0	47.8	47.4	32.9	31.2
Heavy fuel oil	2.6	2.7	0.2	0.1	1.6	1.6	8.2	6.7	1.0	0.6	0.8	0.8
Biomass (solid)	8.6	8.7	1	1.2	2.8	2.8	1.4	1.9	0.0	0.0	1.1	1.1
Biogas	0.1	0.2	0	0	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.3
Waste	0.0	0.0	0.2	0.2	0.1	0.1	1.8	2.0	0.2	0.2	0.4	0.4
Hydro	65.8	63.0	19.2	17.9	9.3	9.3	8.2	8.6	17.1	17.1	6.8	7.6
Wind	5.8	7.2	3.8	4.4	3.0	3.3	0.6	0.6	0.0	0.0	5.3	6.0
Photovoltaic	0.0	0.1	1.2	2.0	1.0	1.7	4.9	5.3	0.0	0.1	1.1	1.6
Solar thermal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.4	0.4
Peat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0

Table 3-5: Energy carrier mix for electricity generation – countries with significant changes [IEA 2020]

[%]	Denmark		Croatia		Latvia		Lithuania		Malta		Portugal	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Nuclear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lignite	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hard coal	29.0	20.0	20.1	11.3	0.0	0.0	0.0	0.0	0.0	0.0	21.0	24.7
Coal gases	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Natural gas	7.1	6.2	12.4	25.8	45.8	27.5	24.7	15.2	0.0	78.2	20.9	31.8
Heavy fuel oil	1.1	0.9	0.5	1.8	0.0	0.0	5.5	3.5	84.5	11.7	2.2	2.2
Biomass (solid)	11.4	15.5	1.5	1.8	6.6	7.0	6.6	7.7	0.0	0.0	4.1	4.3
Biogas	1.9	2.2	1.8	2.6	6.2	5.4	3.1	3.2	0.9	0.6	0.5	0.5
Waste	5.1	5.2	0.0	0.0	0.0	0.0	4.0	4.0	0.0	0.0	1.0	1.1
Hydro	0.1	0.1	55.1	46.0	39.4	58.2	26.1	30.0	0.0	0.0	28.1	12.8
Wind	41.9	47.6	7.9	10.0	2.0	2.0	28.4	34.6	0.0	0.0	20.7	20.6
Photovoltaic	2.4	2.4	0.5	0.7	0.0	0.0	1.7	1.7	14.6	9.4	1.4	1.7
Solar thermal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Geothermal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.4
Peat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

The following list summarizes countries with significant changes in the energy carrier mix for electricity generation:

- Croatia (HR) ➔ Reduced generation from hard coal power plants (20.1% to 11.3%) and lower output from hydro power stations (55.1% to 46%) was compensated by generation from natural gas (12.4% to 25.8%) and higher use of renewables other than hydro.

- Denmark (DK) ➔ Increased generation from wind power installations back to 2015 level (48.8% in 2015, 41.9% 2016, 47.6% in 2017) and higher generation from biomass (11.4% to 15.5%) resulted in a reduction of electricity generation from coal (decrease from 29.0% to 20.0%).

- United Kingdom (GB) ➔ Due to higher generation from renewables (mainly from wind power) from 26.8% in 2016 to 31.4% in 2017, generation from coal was further reduced from 9.1% to 6.7% an also production from natural gas was reduced from 42.2% to 40.4%.

- Latvia (LV) ➔ Gross production increased from 6.4 TWh to 7.5 TWh. Within the grid mix the share of hydro power increased from 39.4% to 58.2% due to higher water availability, decreasing the share of electricity generation from natural gas from 45.8% to 27.5%.

- Lithuania (LT) ➔ Whereas gross production remained stable at 4.2 TWh, the share of renewables increased from 69.8% in 2016 to 81.3% in. Wind power increased further from 28.4% to 34.6%, hydro power from 26.1% to 30%. Therefore, generation from natural gas and fuel oil decreased from 30.2% to 18.7%.

- Malta (MT) ➔ With the new CCGT unit in the Delimara power station running on natural gas and the retrofitted diesel engine plant which also runs on natural gas since 2017, Malta has switched its electricity generation nearly completely from oil to natural gas. The share of electricity from fuel oil dropped from 84.5% to 11.7%, the share of natural gas in the mix was 78.2% in 2017. Despite higher generation from PV, the share dropped 14.6% to 9.4% due to a significant decrease in imports from 65.5% to 36%.

- The Netherlands (NL) ➔ Electricity generation from hard coal further decreased from 31.9% in 2016 to 26.7% in 2017 and was substituted by electricity from natural gas (increase from 46.9% in 2016 to 50.7% in 2017).

- Portugal (PT) ➔ Like observed in previous years for Portugal, water availability for electricity generation can lead to relevant annual changes in the grid mix. In 2017, the share of hydro power in the grid decreased from 28.1% in 2016 to 12.8%. Consequently, output from natural gas power stations (20.9% to 31.8%) and coal power stations (21% to 24.7%) increased.

- Spain (ES) ➔ Similar like in Portugal, lower water availability for hydro power stations decreased the share of hydro power in the grid mix from 14.5% to 7.6%. The drop in hydro power generation was compensated by higher generation from natural gas and coal power stations.

Development GWP and other impact categories for electricity grid mix datasets

The following figures illustrate the absolute primary energy demand (PED), as well as global warming potential (GWP[6]), acidification potential (AP[6]), eutrophication potential (EP[6]) and photochemical ozone creation potential (POCP[6]) per kWh of supplied electricity in Germany, the European Union and the United States.

In the 2021 GaBi databases, the emission factors for the combustion of fuels in power plants have been unchanged compared to the 2020 edition, with exception of the eGRID subregions (Extension Module XVII: Full US - electricity grid mixes for US sub grids and subregions under eGRID) which have been updated to eGrid2018 [EPA 2020].

In Germany, the grid mix decreased by 5% from 562 g CO_2-eq./kWh in 2016 to 535 g CO_2-eq./kWh in 2017. Generation from coal power stations (down from 261 TWh to 241 TWh) was reduced by higher generation from wind power (from 79 TWh in 2016 to 106 TWh in 2017). Changes in PED, AP, EP and POCP are between 4% and 12% and are linked to the changes in the energy carrier mix.

For the EU-28, the GWP decreased slightly from 397g CO_2-eq./kWh in 2016 to 394g CO_2-eq./kWh in 2017. Due to the reduction of generation of electricity from coal substituted by generation from natural gas the EP, AP, POCP have been reduced by 5-9%.

In the U.S., the GWP decreased from 551 g CO_2-eq./kWh in 2016 to 532 g CO_2-eq./kWh in 2017. The main reason for the decrease in GWP was the higher generation from renewables (increased from 15.5% in 2016 to 17.5% in 2017) reducing the share of fossil fuels, especially generation from natural gas (decreased from 32.9% in 20156 to 31.3% in 2017). Reductions in PED, EP, AP and POCP between 3 and 6% are mainly related to the changes in the energy carrier mix.

[6] CML 2001, Updated January 2016

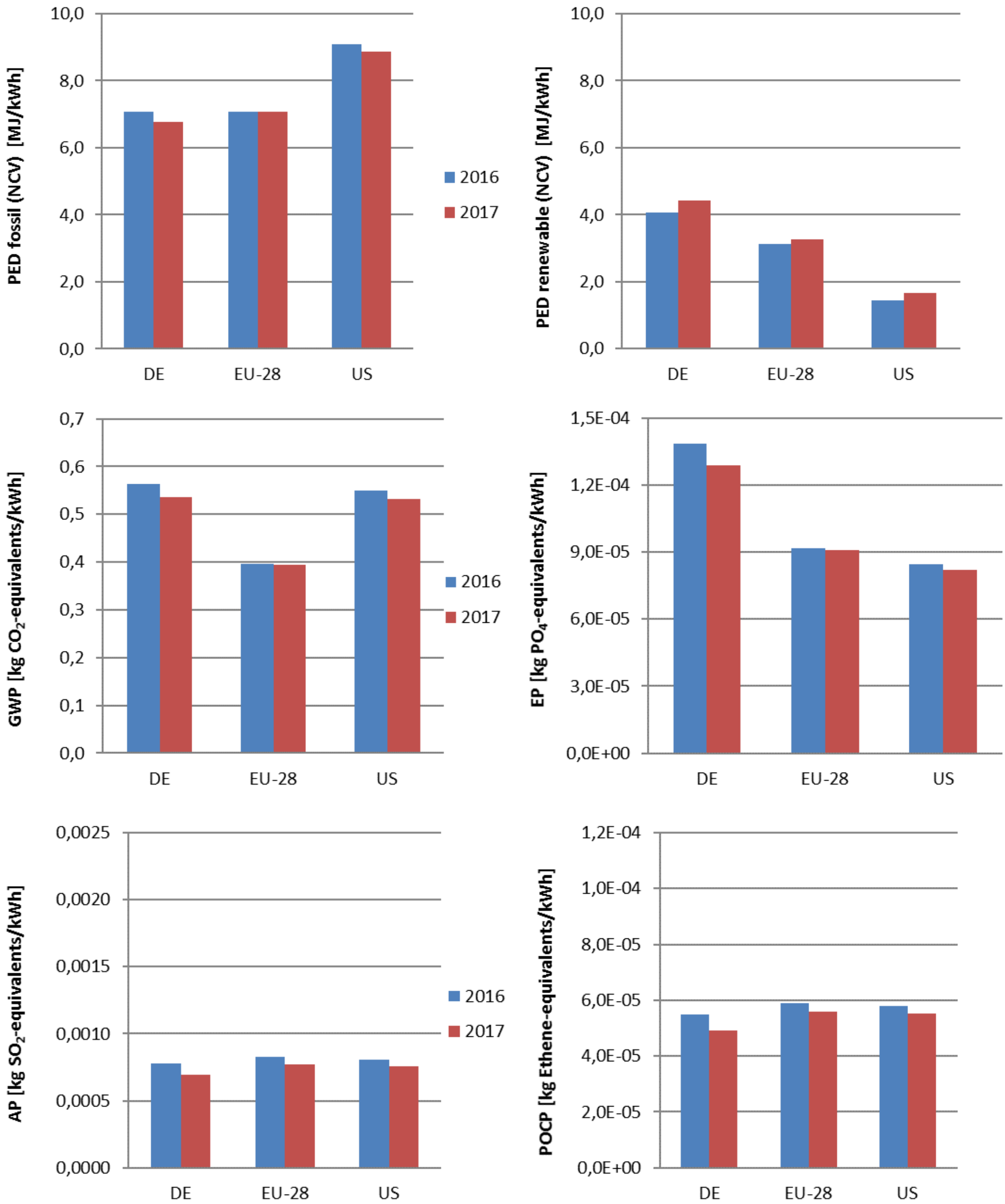

Figure 4: PED, GWP, EP, POCP and AP of electricity grid mixes DE, EU-28 and US

The following figures present the percentile changes of the greenhouse gases for the upgraded electricity grid mixes in the 2021 *GaBi Professional* database and the *Extension Module Energy* compared to the 2020 data (reference year 2016), as well as the absolute greenhouse gas emissions per kWh in the 2020 and 2021 GaBi databases (reference year 2017).

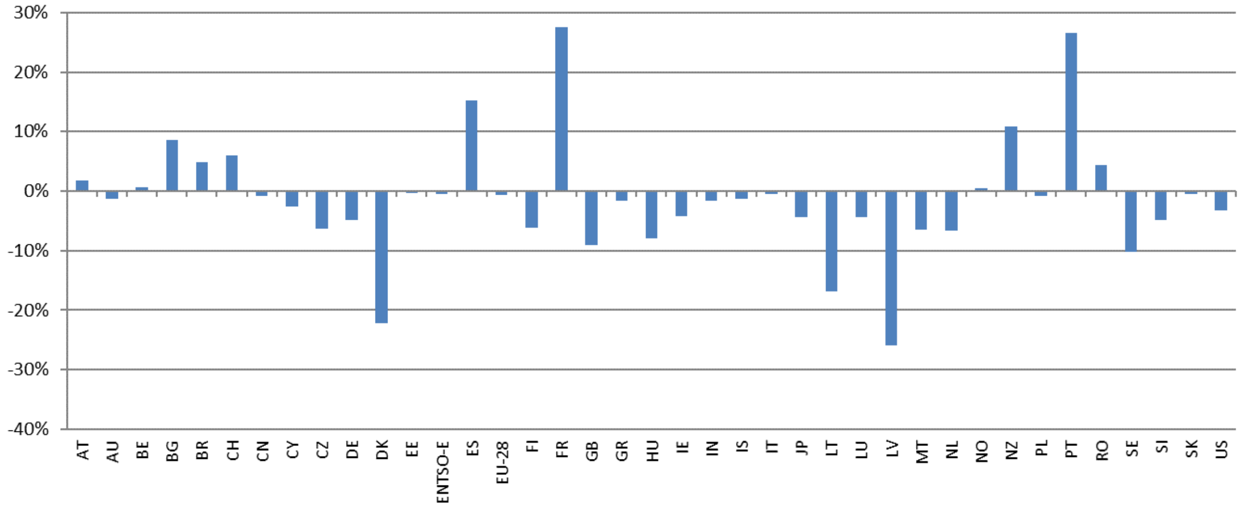

Figure 5: Changes in GWP of electricity grid mix datasets in GaBi Professional 2021 Edition compared to 2020

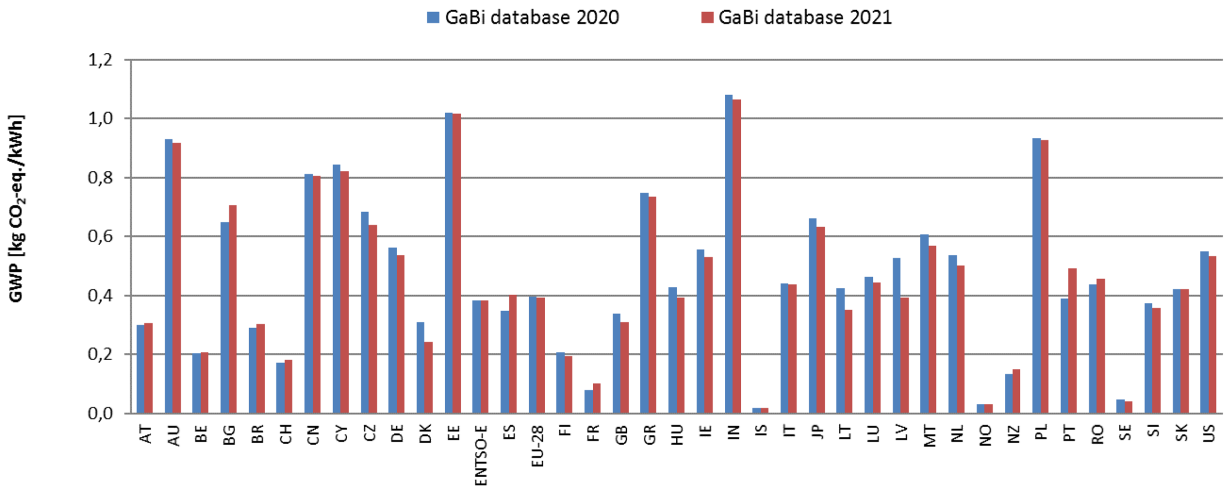

Figure 6: Absolute GWP of electricity grid mix datasets in GaBi Professional 2020 & 2021 Edition

For most cases, the changes in the national electricity grid mix datasets are related to the upgraded energy carrier mix:

- Bulgaria (BG) ➔ Due to lower water availability for hydro power, the share of electricity from lignite increased from 41.8% in 2016 to 45.02% in 2017 (hydro power dropped from 10.1% to 7.7%). The GWP increased accordingly from 650g CO_2-eq./kWh in 2016 to 706g CO_2-eq./kWh in 2017.
- Denmark (DK) ➔ The carbon intensity of the electricity supply in Denmark has been decreased from 310g CO_2-eq./kWh in 2016 to 242g CO_2-eq./kWh in 2017. The reduction in greenhouse gases per supplied kWh of electricity is related to higher output from wind power installation (41.9% in 2016 to 47.6% in 2017), mainly substituting electricity from coal (29.0% in 2016 to 20.0% in 2017).

- France (FR) ➔ Output from nuclear power station (from 72.6% to 71%) and hydro power stations (11.8% to 9.9%) has been decreased and was mainly compensated by generation from coal, fuel oil and natural gas (8.3% in 2016 to 10.8% in 2017), consequently the GWP increased from 79 to 101 g CO_2-eq./kWh.

- United Kingdom (GB) ➔ The carbon intensity of grid electricity has been reduced from 339g CO_2-eq./kWh in 2016 to 309g CO_2-eq./kWh in 2017 through a reduction in coal and natural gas use for electricity generation, substituted mainly by higher output from wind power installations.

- Hungary (HU) ➔ A reduction of coal use for electricity generation (17.2% to 14.4%) by natural gas decreased the carbon intensity of grid electricity from 427g CO_2-eq./kWh in 2016 to 393g CO_2-eq./kWh in 2017.

- Latvia (LV) ➔ Distinct higher water availability for hydro power generation increased the share of hydro power in the grid mix from 39.4% to 58.2%. Generation from natural gas dropped from 45.8% to 27.5%. Therefore, the carbon intensity of grid electricity dropped from 528 CO_2-eq./kWh in 2016 to 391g CO_2-eq./kWh in 2017.

- Lithuania (LT) ➔ The carbon intensity of grid electricity has been reduced from 424g CO_2-eq./kWh in 2016 to 353g CO_2-eq./kWh in 2017 mainly by higher generation from wind power installations.

- Portugal (PT) ➔ Like in previous years, changing water availability for power generation resulted for 2017 in lower output from hydro power stations (decreased from 28.1% in 2016 to 12.8% in 2017) compensated mainly by generation from natural gas (20.9% to 31.8%) and coal (21.0% to 24.7%). The carbon intensity for power generation increased from 389g CO_2-eq./kWh in 2016 compared to 492g CO_2-eq./kWh in 2017.

- Spain (ES) ➔ Similar to Portugal, lower water availability for hydro power generation resulted in higher GWP values for grid electricity (increase from 350g CO_2-eq./kWh in 2016 to 403g CO_2-eq./kWh in 2017).

The following Figure 7 illustrates the GWP of the electricity supply in selected countries over the last ten years. Compared to 2008, the GWP in Germany has been reduced by 14%, in the EU by 19%. The share of renewables for power generation in Germany has increased significantly from 16% in 2008 to 35% in 2017, substituting mostly nuclear power from coal. In some of the EU Member States, relevant GWP reductions have been achieved over the last seven years, mainly due to a substitution of fossil fuels by renewable sources, e.g., Denmark -53%, Finland -37%, United Kingdom -47%, Greece -28%, Hungary -27%, Malta -55% and Romania -30%. In the U.S., the substitution of electricity from hard coal by electricity from natural gas, as well as a higher share of electricity from renewables, has decreased the GWP per kWh of supplied electricity between 2008 and 2017 by 20%. In Japan, a different development can be seen, related largely to the shift toward more fossil fuels after the 2011 Fukushima catastrophe.

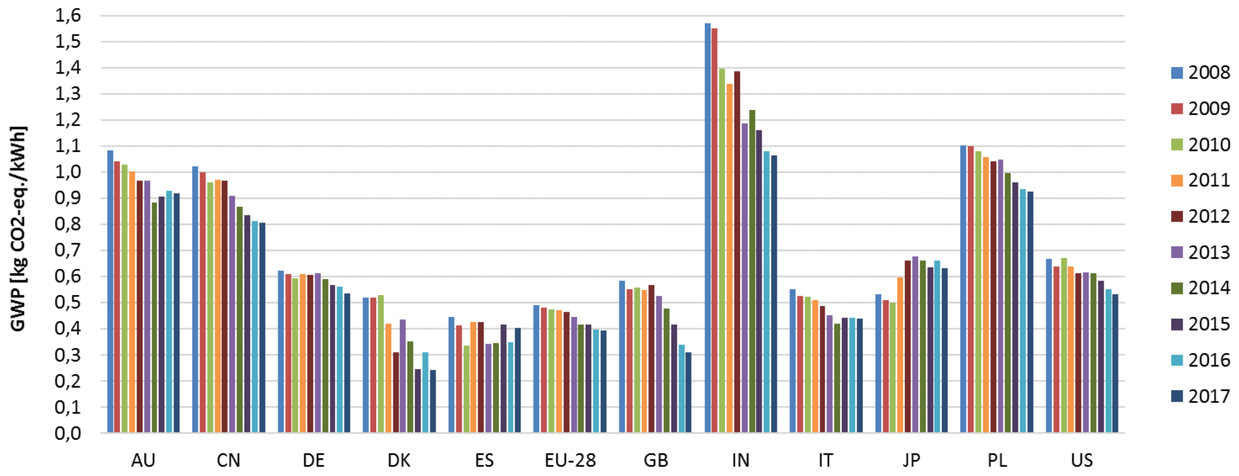

Figure 7: Development GWP for electricity supply in selected countries

The following three figures illustrate the relative and absolute changes of the GWP for the electricity grid mix datasets in the extension module Energy, as well as the changes over time.

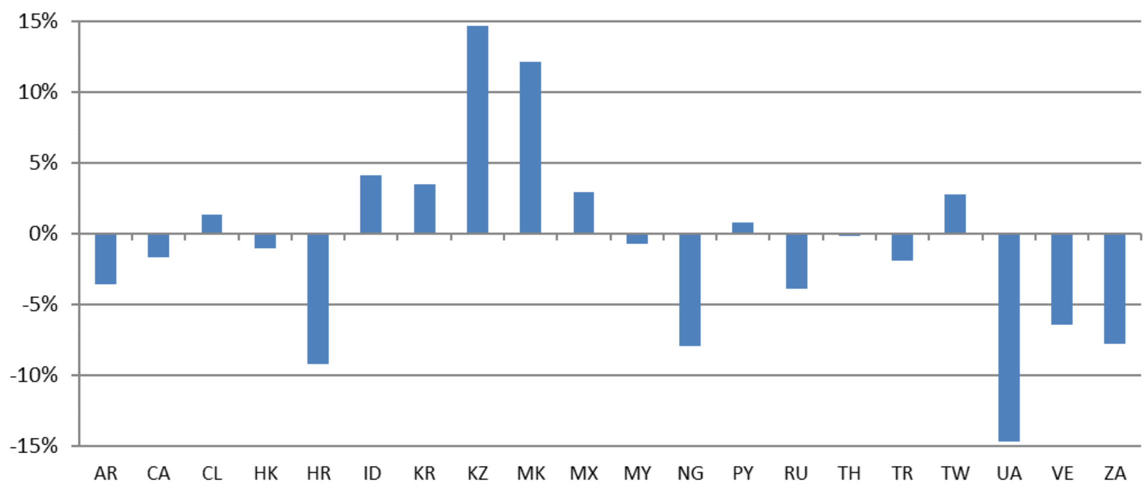

Figure 8: Changes in GWP electricity grid mix datasets in GaBi Extension Module Energy 2021 compared to 2020

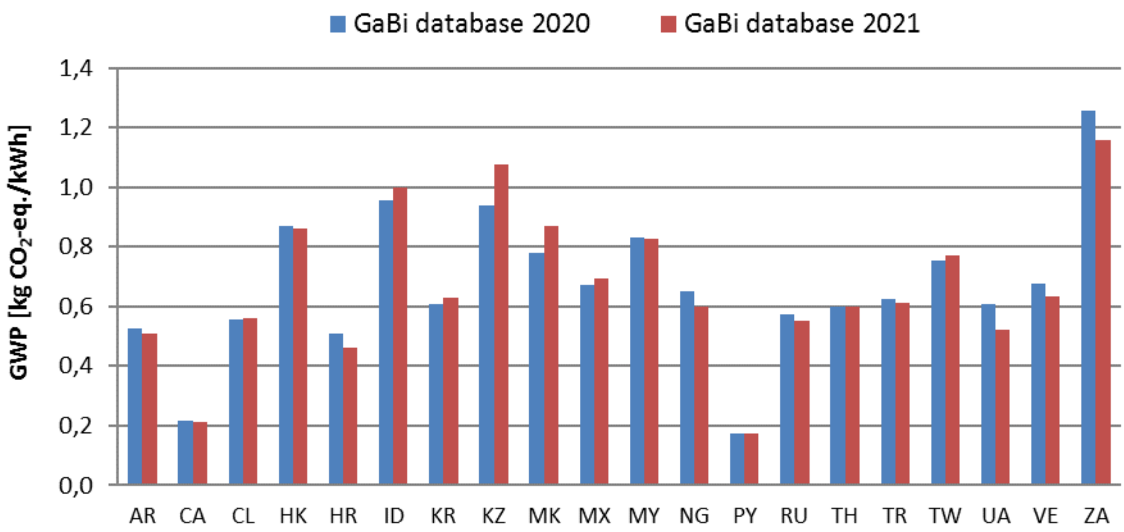

Figure 9: Absolute GWP of electricity grid mix datasets in GaBi Extension module Energy 2020 & 2021

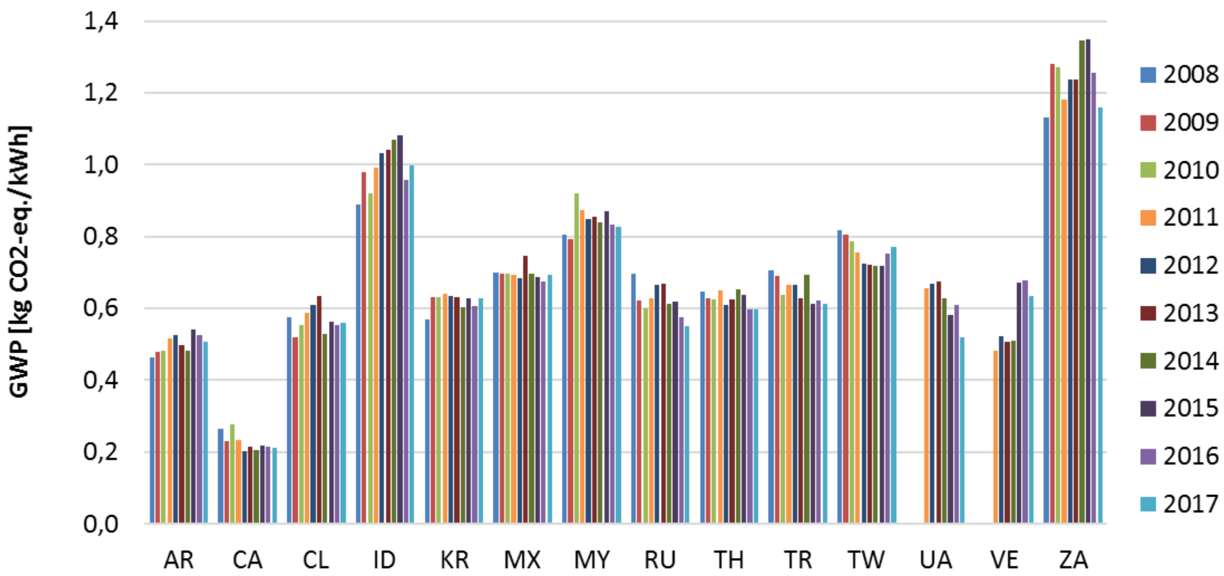

Figure 10: Development GWP for electricity supply in selected countries

Extension module XVII: Full US – electricity grid mixes US subregions

Figure 11 and Figure 12 illustrate the absolute and relative changes in GWP of the eGRID subregions, as well as the five subgrids and the US average comparing data from eGRID2018 used within the GaBi databases 2021 and data from eGrid2016 used in the GaBi databases 2019 and 2020. For the sub-regions (see Figure 13 to get an overview) and subgrids in GaBi, the reference year has been updated from 2016 in GaBi databases 2019/2020 to 2018 in GaBi databases 2021. The changes in GWP are mostly related to the updated energy grid mixes and partly to updates in the supply of energy carriers and infrastructure.

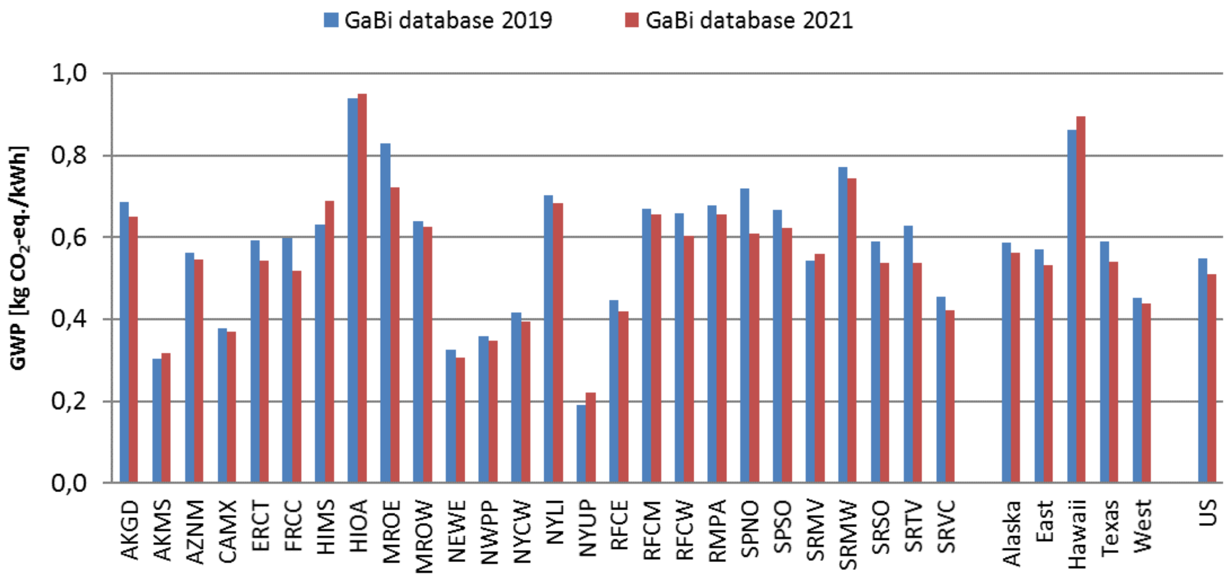

Figure 11: Absolute GWP of electricity grid mix datasets in GaBi Extension module Full US 2019 & 2021

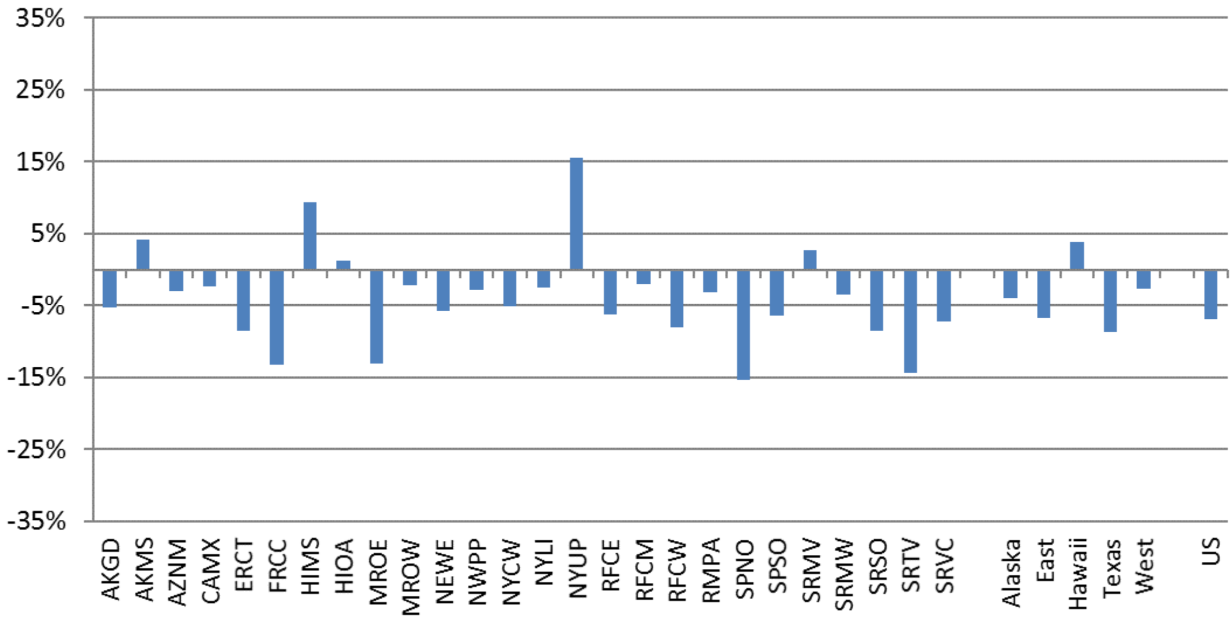

Figure 12: Changes in GWP electricity grid mix datasets in GaBi Extension Module Full US 2019

Other impact categories, such as acidification or eutrophication are in addition to the updated energy carrier mixes also affected by updated emission factors of combustion power plants.

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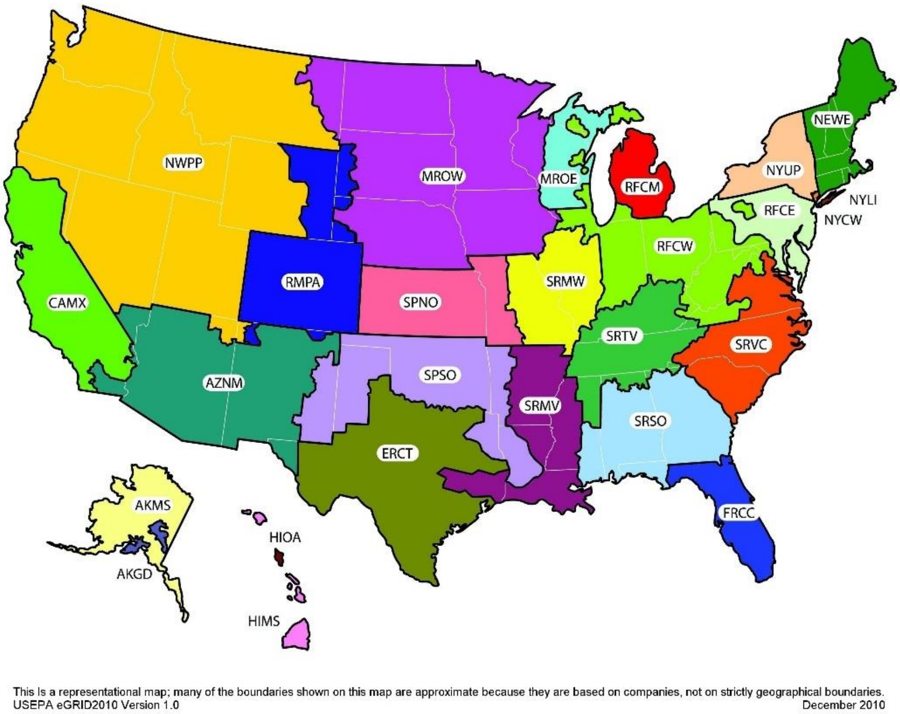

Figure 13: 26 eGRID subregions

Further developments in electricity datasets

Changes in electricity datasets from specific fuels:

Power plant efficiencies, calculated based on energy statistics, can significantly vary between reference years. The following reasons are considerations for variations over time:

- final or periodic shutdown and use as reserve capacity of specific power plants
- different share between CHP and direct production over time (e.g., different heat demand over time)
- technology measures to increase efficiency (or to reduce emissions and thereby reduce efficiency)
- rounding effects (if a small amount of fuel is used)
- correction of statistical errors
- a combination of several of the factors listed above

3.8 Inventories for primary energy carriers

As already stated more above, the reference year of the GaBi databases 2021 Edition is 2017 for all energy carrier supply mixes (e.g., hard coal, crude oil, and natural gas). The changes in the environmental impacts of the energy carrier datasets after the upgrade are described in the following paragraphs:

- The environmental impacts of the lignite mixes of countries that burn lignite, changed due to the update of the country-specific consumption mixes (mix of domestic production and imports) and changes in the background data. The country-specific lignite mixes show smaller changes for GWP of below 5%.
- Changes in the results of the hard coal mixes are related to the update of the country-specific consumption mixes and changes in the background data, too. All country-specific hard coal mixes show GWP changes of less than 10% except the following two mixes:
    - Hard coal mix of Morocco (MA) ➔ GWP decreases by 11% due to higher hard coal imports from Russia and the United States, and less imports from South Africa, Poland, and Colombia.
    - Hard coal mix of Norway (NO) ➔ higher impacts (e.g., GWP +10%) because of lower shares of domestically produced hard coal and increased shares of hard coal imports with higher environmental impacts (e.g., from Colombia and Russia).
- The environmental impacts of the natural gas mixes changed due to the update of the country-specific consumption mixes and changes in the background data. Additionally, the production of unconventional natural gas, like shale gas, tight gas, and coalbed methane, was updated as well as the natural gas production of Germany, the Netherlands, Nigeria, Norway, and Russia. Natural gas mixes with changes in the GWP results of more than 10% are listed in the following:
    - Natural gas mix of Austria (AT) ➔ the GHG emissions were reduced by 19% due to the update of the Russian natural gas production. Russian gas is the main contributor to the consumption mix.
    - Natural gas mix of Azerbaijan (AZ) ➔ higher impacts (e.g., GWP +12%) because of lower shares of domestically produced natural gas and increased shares of imports from Iran and Russia.
    - Natural gas mix of Bulgaria (BG) ➔ the GWP increased by 20%. Reason is the correction of pipeline distances in the natural gas supply.
    - Natural gas mix of the Czech Republic (CZ) ➔ the GHG emissions were reduced by 26% due to the update of the Russian natural gas production and small changes in the consumption mix. Russian gas is the main contributor to the consumption mix of the Czech Republic.
    - Natural gas mix of Egypt (EG) ➔ some of the imports via liquefied natural gas (LNG) transport from Australia, Malaysia, Norway, Qatar and Trinidad and Tobago were replaced by domestic natural gas production. This resulted in a reduction of the GWP by 29%.
    - Natural gas mix of Estonia (EE) ➔ the update of the Russian natural gas production resulted in a reduction of the GHG emissions by 23%. Russian gas is the main contributor to the consumption mix of Estonia.
    - Natural gas mix of Europe (EU-28) ➔ the GWP emissions were reduced by 11% due to small changes in the consumption mix and the update of the Russian natural gas production. Russian gas is one of the main contributors to the European consumption mix.

- Natural gas mix of Finland (FI) ➔ the GHG emissions were reduced by 27% due to the update of the Russian natural gas production. Russian gas is the main contributor to the consumption mix of Finland.
- Natural gas mix of Germany (DE) ➔ the GWP increased (+12%). Reasons are the declining share of domestic natural gas production and the compensation by natural gas imports from the Netherlands, Norway, and Russia.
- Natural gas mix of Greece (GR) ➔ less natural gas imports from Russia and Turkey and increased LNG imports from Algeria and Qatar led to an increase of the GWP by 12%.
- Natural gas mix of Hungary (HU) ➔ the GHG emissions were reduced by 22% due to the update of the Russian natural gas production and small changes in the consumption mix (declining domestic production). Russian gas is the main contributor to the consumption mix.
- Natural gas mix of Kuwait (KW) ➔ the GWP increased by 10%. Reasons are the declining share of domestic natural gas production and the compensation by LNG imports from Algeria, Egypt, Nigeria, and the United States.
- Natural gas mix of Latvia (LV) ➔ less LNG imports from Norway, increased natural gas imports from Russia and increased LNG imports from Nigeria and the United States, as well as the update of the Russian natural gas production, led to a reduction of the GWP by 23%.
- Natural gas mix of Luxembourg (LU) ➔ the GHG emissions were reduced by 13% due to the update of the Russian natural gas production.
- Natural gas mix of Macedonia (MK) ➔ the GWP decreased by 28%. The main reason for the changes is Russian natural gas imports due to the updated Russian natural gas production.
- Natural gas mix of the Netherlands (NL) ➔ less domestic natural gas production, less natural gas imports from Russia, and higher natural gas imports from Germany, Denmark, United Kingdom and Norway led to a reduction of the GWP by 15%.
- Natural gas mix of Nigeria (NG) ➔ the update of the domestic natural gas production of Nigeria resulted in a reduction of the GHG emissions by 45%.
- Natural gas mix of Poland (PL) ➔ the GHG emissions were reduced by 23% due to the update of the Russian and German natural gas production. Along with the Polish domestic natural gas production, Russian and German gas imports are the main contributors to the consumption mix of Poland.
- Natural gas mix of Romania (RO) ➔ some of the LNG imports from Nigeria and Norway were replaced by domestic natural gas production. This resulted in a reduction of the GWP by 10%.
- Natural gas mix of Russia (RU) ➔ the update of the domestic natural gas production of Russia resulted in a reduction of the GHG emissions by 22%.
- Natural gas mix of Serbia (RS) ➔ the GHG emissions were reduced by 35% due to the update of the Russian natural gas production and small changes in the consumption mix (declining domestic production). Russian gas is the main contributor to the consumption mix of Serbia.
- Natural gas mix of Slovakia (SK) ➔ the GWP decreased by 21%. The main reason for the changes is Russian natural gas imports due to the updated Russian natural gas production.
- Natural gas mix of Sweden (SE) ➔ higher impacts (e.g., GWP +32%) because of lower shares of natural gas imports from Denmark and increased shares of LNG imports from Norway.

- Natural gas mix of Switzerland (CH) ➔ the GWP decreased by 40% due to the update of the German natural gas production and small changes in the consumption mix. German gas is the main contributor to the consumption mix of Switzerland.
    - Natural gas mix of Ukraine (UA) ➔ the GHG emissions were reduced by 21% due to the declining share of domestic natural gas production, changes in the consumption mix and the update of the German natural gas production. German gas is one of the main contributors to the consumption mix of the Ukraine.
- Changes in the results of the crude oil mixes were related to the update of the country-specific consumption mixes and changes in the background data. Additionally, the production of tight oil was added to the crude oil production mix of the United States. In detail:
    - Crude oil mix of Bulgaria (BG) ➔ the GHG emissions increased by 14% because of major changes in the consumption mix (less crude oil imports from Russia and more imports from Iraq, Iran, Kuwait, Kazakhstan, and Saudi Arabia).
    - Crude oil mix of Denmark (DK) ➔ changes in the consumption mix (more crude oil imports from Norway and the United States, less domestic production and less crude oil imports from Angola, Nigeria and the Netherlands) led to a reduction of the GWP by 11%.
    - Crude oil mix of Germany (DE) ➔ the GHG emissions increased by 12% due to increased crude oil imports from Iraq, Libya and Nigeria, less domestic production and less crude oil imports from Angola, Azerbaijan, Algeria, and Russia.
    - Crude oil mix of Hungary (HU) ➔ more crude oil imports from Iraq, and reduced imports from Russia and Kazakhstan worsened the GWP result by 24%.
    - Crude oil mix of Ireland (IE) ➔ the GWP result increased by 25% due to changes in the crude oil consumption mix (higher crude oil imports from the United Kingdom, Nigeria, and less imports from Norway and Azerbaijan).
    - Crude oil mix of Romania (RO) ➔ reduced domestic crude oil production, less crude oil imports from Oman and Turkmenistan, and more crude oil imports from Azerbaijan, Iraq and Kazakhstan led to an increase of GHG emissions by 14%.
    - Crude oil mix of Serbia (RS) ➔ major changes in the consumption mix (less crude oil imports from Russia and Romania, but more imports from Iraq) led to a significant higher GWP result (+ 30%).
    - Crude oil mix of Sweden (SE) ➔ the GWP result increased by 11% due to lower crude oil imports from Denmark and Russia, and higher crude oil imports from Libya, Nigeria, and Norway.
    - Crude oil mix of Switzerland (CH) ➔ less crude oil imports from the United States, Russia, Mexico and Iraq, and an increase of imports from Kazakhstan, Libya, Nigeria led to an increase of the GWP by 11%
    - Crude oil mix of Ukraine (UA) ➔ the domestic crude oil production and imports from Kazakhstan were significantly reduced and compensated by crude oil imports from Azerbaijan. As a result, the GWP decreased by 14%.
    - Crude oil mix of the United States (US) ➔ the GHG emissions increased by 29% because tight oil production was added to the crude oil production mix of the United States and small changes occurred in the consumption mix.

- Increases in the GWP results of the refinery products of the United States by 5% to 19% are mainly related to changes in the crude oil consumption mix of the United States. The changes in the GWP results of refinery products from other countries are below 10%.
- The environmental impacts of the fuel mixes (diesel and gasoline, at refinery and filling station) change because of updated country-specific biofuel and fossil fuel consumption mixes, the update of the country-specific blending quota of biofuels and changes in the biofuel and crude oil supply chains. All country-specific fuel mixes show GWP changes of less than 10% except for:
    - Diesel mix of Brazil (BR) ➔ the GWP increased by 14% due to the updates stated above.
    - Gasoline mix of Brazil (BR) ➔ the GWP decreased by 20% due to the updates stated above.

3.9 Inventories for organic and inorganic intermediates

Possible updates and upgrades of technologies may happen on three different levels, while in the upgraded datasets in most cases multiple effects can be observed:

- due to possible breakthrough technologies (improvements in the foreground system of the existing technology),
- due to changed situations in a production or consumption mix of different technologies providing the same product, and lastly,
- due to changes and updates in the background system of resources and energy supply.

In addition, errors in the data can of course affect a single dataset or several when the product is used downstream.

The required information to check and update the technologies and supply chains is based on the knowhow of our engineers as well as on information shared by our clients who are active in the chemical sector. The provided documentation of GaBi datasets serves as a viable basis to discuss supply chain aspects and demands.

Our experts use moreover scientific and engineering knowhow (e.g., thermodynamic laws, the mass- and energy conservation, stoichiometric balances, combustion calculation and the like) as a basis to quality-assure, maintain, and update chemical LCA data. All chemical technologies were checked in this sense. In relation to possible breakthrough technologies, no major new technologies or significant process improvements on existing technologies that would affect dataset results relevantly were identified by Sphera experts in this year’s upgrade.

Changes in the background system mainly relate to:

- Upgraded distribution on primary, secondary, and tertiary fossil resource extraction, such as for oil and gas
- Upgraded market share of imported fossil resources
- Upgraded distribution of the type of resources used (oil, gas, and coal, etc.)
- Increased amounts of renewable feedstock and energy supplies

Changes in the energy sector and supply chain are, in most cases, a key driver for overall improvement throughout several impact categories. The intermediates are directly influenced by the upgraded performance of the energy supply and the feedstock, i.e. crude oil and natural gas.

The following table documents the issues in this sector, the principle effect on the results (if any) and the affected extension databases.

Issues with a larger effect on single or multiple datasets are highlighted with a bold JIRA[7] number. Moreover, all issues with changes of a high or very high relevance in one of the more robust impact categories for at least one dataset are highlighted with a **bold JIRA number**; the same is done for all material groups/sub-chapters below:

Table 2- 1: JIRA issues for organic and inorganic intermediates

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-10030	Improvement	Water to river water - regionalization of LDPE and Cyclohexane	The output flow water to river water is now regionalized.	This change is visible in AWARE 1.2C water scarcity impacts, from minor changes (0,2%) to major changes (-160%), depending on the specific dataset	Professional database Extension database XVII: full US Indian database Extension database VII: plastics Extension database XIX: bioplastics
GC-10319	Improvement	Updated technology mix of chlorine for India and US	The technology mix for chlorine for US and India is now updated	Almost no change to the previous mix, varying from +1% to +10% (AP for MY). US has a difference from +1 to +3%	Extension database XVII: full US Extension database XXI: India
GC-10434	Improvement	Benzene mix update	The benzene technology mix of EU-28, US, GB, DE, and NL is now updated with 2019 statistics. For DE and NL, the same mix as for EU for 2019 is used as no further information was found. For GB the mix is updated with technologies in use nowadays. Companies producing benzene in GB and the production technology used were researched. The new technology mix is now much more similar with the EU-28 mix.	Little difference is noted for DE, NL, EU, and US with GWP varying from -1% to -6% (other categories in similar behaviour). For GB, as the technology before was toluene dealkylation (with 51%), the difference is now -15% in GWP.	Professional database Indian database Extension database Ia: organic intermediates Extension database XVII: full US
GC-10725	Improvement	Allocation for DE: Hydrogen (steam reforming natural gas) now based on energy	The allocation to produce DE: Hydrogen (steam reforming natural gas) is now based on energy content (LCV)	EP increases by about 40%.	Professional database
GC-10803	Editorial	Naming consistency for Toluene	The technology production route is now included in the process name for all available country-specific datasets.	Does not change the results	Professional database Extension database Ia: organic intermediates Extension database XVII: full US

[7] JIRA is our issue tracking system. Please provide this number if you have specific questions back to us.

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-10804	Editorial	Naming consistency for Butanediol	The production route is now included in the process name for all available country-specific datasets. For DE datasets, the hydrogen production route (steam cracker or steam reforming via NG) was added in the process name as well.	Does not change the results	Professional database Extension database XVII: full US
GC-10827	Documentation	Documentation of Ethyne datasets	Technical purpose has been adapted.	Does not change the results	Extension database Ia: organic intermediates
GC-10985	Editorial	Naming of ethine (acetylene)	Ethyne datasets now have the correct English spelling Ethyne instead of Ethine.	Does not change the results	Extension database Ia: organic intermediates
GC-4963	Editorial	Scaling of datasets: now 1kg instead of 1000kg	The following datasets are now also scaled to 1kg: EU-28: Diethanolamine EU-28: 3-Dimethylaminopropylamine (DMAPA) EU-28: Dimethylsulphate (DMS) Production via Ethers and Sulphur Trioxide EU-28: Aminoethylethanolamine (AEEA) Production from MEG and Ammonia EU-28: Dimethylamine (Production from Alcohols) EU-28: Triethanolamine (TEA) EU-28: Chloroacetic acid by catalysed chlorination of acetic acid EU-28: Tallow fatty acid (C16-C18 fatty acid from tallow)	Does not change the results (as datasets are scaled automatically). Please be aware, that if the process is used and fixed without connection, that in this case the results will change.	Extension database Ia: organic intermediates
GC-9804	Improvement	Update N_2O emissions in nitric acid datasets	Using new available data from the National Inventory Reports, N_2O emissions in nitric acid production is now updated. As nitric acid is used in ammonium nitrate, these datasets are changed as well. For IN Nitric acid, the emissions are now harmonized.	Differences between -5% to 4% in EP and GWP, depending on the country. For IN, GWP and EP increase by 48%.	Professional database Extension database Ib: inorganic intermediates Indian database

3.10 Inventories for metal processes

All data and models have been checked by Sphera metals experts regarding technological upgrades.

Table 2- 2: JIRA issues for metal processes

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-9486	Bug	Mass balance for DE: Aluminium cast part machining (0,02 - 0,3kg chip)	The mass of the used cutting oil is now accounted for in the output of the process. The cutting oil contaminates the aluminium scrap and can either be separated from the scrap or else will be burned in aluminium recycling. The waste flow of aluminium scrap is now replaced with aluminium scrap contaminated by cutting oil. The mass of the scrap is now increased by the mass of the cutting oil. The practitioner needs to account for either separation or treatment in the model. Practitioners using DE: Aluminium cast part machining (0,02 - 0,3kg chip){4a0d0540-fa7c-46c1-8dbf-874fbe17ffda} or DE: Aluminium cast part machining (0,02 - 0,04 kg chip) {fe58962f-fe67-4b85-9716-4bb9108973ed} are advised to check their models accordingly.	Mass of alu scrap may change considerably (dependent on parameter value of the user).	Extension database X: machining processes
GC-9571	Improvement	Mass balance of secondary lead	Lead sheets consist to 70% of secondary lead. The mass balance for secondary lead was adjusted. Datasets affected are Lead sheets for BR, UA, DE, and CN.	Changes are minimal (<3%)	Professional database Extension database XIV: construction materials
GC-10902	Editorial	Naming of secondary aluminium datasets	Dataset naming for secondary aluminium datasets has been improved to make it clearer that they are made from sec. aluminium.	Does not change the results	Several
GC-10729	Bug	Update DLR unit process CN: Ferrosilicon (75%)	The unit process was updated. CO_2 emissions were increased, from previously 0,0186 kg CO_2 emissions per kg of Ferrosilicon to now 4 kg CO_2 per kg Ferrosilicon.	GWP increases by a huge margin.	Professional database
GC-10717	New	New GLO: Silicon mix production dataset is now available	A new dataset GLO: Silicon mix (99%, using fossil reduction agents) is now available.	New dataset	Professional database
GC-10570	Improvement	Harmonize manganese dataset in background models	Due to the availability of a new GLO: Manganese dataset, this is now used in the background models. The replacement is done for Refined FeMn, High Carbon FeMn and for pure Mn.	Due to the change to the GLO datasets, the changes in the LCAI results of the steel data/alloy steel is only minor. The AP changes are visible, which are reduced by -10%. For metal intermediates like Manganese sulphate or Manganese nitrate, the changes are	Extension database V: nonferrous metals

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
				visible in all categories, for the common LCIA methods (AP, EP, GWP...), the impact is reduced by -20% to -60%.	
GC-10461	New	New GLO: Ferro-manganese high-carbon and refined datasets	Based on statistical information (Report 2019) from the International Manganese Institute (IMnI), a "GLO: Ferro-manganese, high-carbon (HC FeMn), 74 to 82 wt. % Mn, up to 7.5 wt % carbon" and a "GLO: Ferro-manganese, refined (Ref. FeMn), 80 to 85 wt. % Mn, less than 1.5 wt % carbon" dataset is now available.	New datasets	Professional database
GC-10250	Improvement	Ferrochrome furnace emissions	Data was compared to the ICDA data. In the open furnace (OP), the CO_2 emissions are now increased, considered that some carbon is stored in the Ferro chrome and in the slag. Affected datasets are ZA: Ferro chrome.	GWP increases only by about +1.5%	Extension database V: nonferrous metals 2021
GC-10247	New	New GLO: Manganese dataset	Based on statistical information (report 2019) from the International Manganese Institute (IMnI), a global manganese metal dataset is now available. For the mining and concentration, the statistics for the ore producing countries were used, whereas the calcining, leaching and the electrolysis takes place in China (IMnI reports that 97% of metal manganese output is in China).	New dataset	Extension database V: nonferrous metals 2021
GC-10189	Improvement	Update 10 annual mean quantity	Quantity for 10 annual mean was updated using the latest metal prices from USGS.	Overall, almost all changes are well below 10%	Professional database Extension database VI: precious metals

3.11 Inventories plastics processes

The environmental profile of polymers is largely influenced by the monomer production impacts. Sphera experts have verified whether the polymerisation technologies are still representative. To our knowledge, no completely new process designs in polymerization are in industrial use compared to the preceding year. The polymerization technologies in the GaBi Databases are considered representative. This is supported by our experience working for the chemistry and polymer industries.

More specific aspects are mentioned in the following table:

Table 2- 3: JIRA issues for plastics processes

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-7775	Improvement	Energy required to produce oxidised PAN	In the dataset Carbon Fiber (CF; from PAN; standard strength) an energy intensive process step is now included.	GWP increases by about 62%	Extension database VII: plastics Indian database
GC-2565	Improvement	Electricity consumption of Polyethylene terephthalate fibres (PET) processing	Electricity consumption of melt spinning of DE and EU-28 Polyethylene terephthalate fibres (PET) fibres is now adapted. Using newer benchmark studies for melt spinning of PET fibers a realistic electricity consumption of 0.5 kWh/kg fibers is now used.	All impacts lowered between 5% to 19%	Professional database Extension database VII: plastics Extension database XVI: seat covers Indian database
GC-10125	Improvement	HFC-23 emissions in Chlorodifluoromethane (HCFC-22) production	The chlorodifluoromethane (HCFC-22) plant data in Europe and Japan were updated. In HCFC-22 production, approx. 2-3% of undesired HFC-23 (Trifluoro methane) is co-produced, which is now implemented in the gate-to-gate unit process. In Europe, the HFC-23 is destroyed via incineration, therefore a specific incineration process was added. Although the HFC is destructed, some HFC-23 emissions to air occur, e.g. when transporting it to an external incineration site. The HFC-23 emission is implemented based on data for Europe and Japan from Ökorecherche Frankfurt. For the implementation, a 5 annual mean (year 2012 to 2017) was used. The changes have an impact on the PTFE datasets, as HCFC-22 is used as raw material in the PTFE production. Since not enough data for India and the US was found how the HFC-23 by-product is further treated, the European value is used as an estimation.	GWP of chlorodifluoromethane (HCFC-22) increases by about 85% for the US dataset. For Polytetrafluorethylene (PTFE) datasets, the GWP is increased by about 45%. The Indian dataset is increased by ca. 80%, as the Indian model was further regionalized with Indian specific upstream data.	Extension database VII: plastics Extension database XVII: full US Indian database
GC-10815	Improvement	Update of chloroprene rubber production	The chloroprene rubber was revised by using updated technology information. Besides the chloroprene, carbon black and additives (metal oxides, nitrates) are used in the compounding and vulcanization step. The electricity demand for the chloroprene rubber is increased.	AP is increased by about 160%, GWP by about 30%. The impact categories EP freshwater and the primary energy demand are increased by 10% to 20%. Due to the use of Antimony trioxide as additive, the ADP element result is hugely increased.	Extension database VII: plastics Extension database XIV: construction materials

3.12 Inventories for End-of-life processes

All data and models have been checked by Sphera metals experts regarding technological upgrades and were identified as representative for their technology descriptions in 2020.

Other more specific aspects are mentioned in the following table.

Table 2- 4: JIRA issues for end-of-life processes

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-9654	Improvement	Harmonization of wastewater treatment datasets in background systems	Throughout the database the usage of wastewater treatment plants datasets were checked and if necessary exchanged with a more appropriate dataset.	Hardly any change (below 4%) in categories such as GWP, EP, POCP.	Several
GC-9608	Documentation	Documentation: domestic waste incineration datasets	The amount of iron credited can now correctly be seen in the documentation of waste incineration datasets.	Does not change the results	Several
GC-9009	Improvement	Iron/metal scrap recuperation from domestic waste incineration	The amount of iron ore credited (from iron recovered from the waste) is now harmonized throughout all domestic waste incineration plants	No change in GWP ADPe decreases by around 6% AP decreases by about 12% EP decreases by about 7% POCP decreases by about 11%	Professional database
GC-4443	Improvement	Credits in composting datasets	The credits given for composting decrease because the given credits are harmonized from rather best-case credits to more representative credits. The first effect that leads to this change is the appropriate crediting of straw instead of timber, which was used as a proxy. This influence is mainly on biogenic carbon. The second effect influences mainly the fossil carbon. Formerly hard coal-based steam was credited for the incineration of sieving rests, overly reducing the net fossil CO_2. This has been adjusted to the actual situation of crediting surplus biobased steam.	GWP incl. biogenic Carbon changes minimally (between +4% to +7%), GWP excl. biogenic Carbon increases between +76% to 1340%. AP decreases between +0.7% to -28%.	Professional database
GC-10791	Documentation	Documentation of EU-28: Wastewater treatment (parameterized, emissions to water only)	This dataset has a special scope: parameterized modelling of the wastewater treatment of emissions to water. Emissions to air and sludge generation/treatment are not included. This is now clearly stated in the documentation (general comment).	Does not change the results	Professional database

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-10766	Improvement	Update of container glass scenarios	Batch material input, energy consumption and CO_2 emissions were updated for container glass datasets (EU-28: Container Glass, EU-28: Production of container glass (100% cullet), EU-28: Production of container glass (100% batch). For EU-28: Container Glass, the glass cullet share was set to 52% according to FEVE.	Changes in the EF3.0 categories in the affected plans for Acidification are -0.8% to -7%, for Climate Change -7.9% to + 6.5%, for Eutrophication -5.5% to + 6.4% and for PED (ren + non ren, net cal.) -3.7% to +0.85%	Extension Database IXb: end of life parameterised models
GC-10760	Improvement	Waste Treatment: Landfill, Incineration, Composting - implementation	The plans for disposal of glass (landfill/incineration), disposal of paper/cardboard (landfill/incineration), disposal of plastics (landfill/incineration) are now updated using EUROSTAT data.	Changes in impacts are very different for each country: Average trend of EU-28 for disposal of glass: slightly increase in share of incineration, which leads to a decrease in the EF3.0 impact categories Acidification (-110%) and Eutrophication (-16% to -100%) and to an increase in Climate Change (+300%) Average trend of EU-28 for disposal of paper/cardboard: increase in share of incineration with energy recovery, decrease in incineration without energy recovery and landfill, which leads to an increase in the EF3.0 impact categories of Acidification (+5), Climate Change (-+20%) and Eutrophication (+8% to +43%) Average trend of EU-28 for disposal of glass: increase in share of incineration with energy recovery, decrease in incineration without energy recovery and landfill, which leads to a decrease in the EF3.0 impact categories of Acidification (-160%), Climate Change (-107%) and Eutrophication (-66% to -80%)	Extension database IXa: end of life

3.13 Inventories for renewable processes

The datasets, including renewable materials (e.g., crop cultivation), are modelled with a comprehensive agricultural model. The model considers local and regional aspects of climate, soil, and farming practices on the technical side. In addition, it considers international guidelines, current scientific literature, and available databases on the methodological side. The Sphera agriculture and farming experts maintain and enlarge the model frequently, making it one of the most advanced LCA models related to this topic.

As part of the 2021 annual upgrade, the agrarian and renewable processing datasets have been reviewed and updated based on the most recent information identified by the Sphera experts, considering the aspects previously mentioned. In addition, the documentation of certain datasets has been improved.

Emissions from direct land use change are now calculated with the "direct land use change as-assessment excel tool" for the approach “weighted average” (as required for compliance with the ENVIFOOD protocol; and can be applied for compliance with WRI GHG Protocol) based on the approach from PAS 2050-1:2012 and WRI GHG protocol (see Chapter 2.4).

The biogenic carbon balance was harmonized in all the foreground and background systems when renewable materials are involved, what is especially resulting in relevant changes in the cases when economic allocation approach has been used. The primary energy data has been harmonized and corrected in all the datasets used as fuel, where an allocation based on a different reference than mass was applied.

Table 2- 5: JIRA issues for renewable processes

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-8579	Improvement	Update FEFCO datasets	Using the latest available FEFCO report from 2017, the unit processes have been updated (in the summer 2020 release): Kraftliner: Transport distances, especially ship transport much higher / less energy from fossil sources, more from renewables (e.g. bark) / Less emissions of metals to water Testliner and Wellenstoff: less natural gas / more emissions of SO_2 to air / Less emissions of metals to water Semichemical fluting: less emissions of SO_2 to air / Less emissions of metals to water Cardboard production: more electricity needed / transport distances, especially ship transport much higher	Impact changes vary depending on the dataset.	Professional database
GC-8535	New	Two new sugar datasets	Two new datasets are now available: BR: Sugar (from sugar cane) (45% burning, energy surplus allocated) and US: Sugar (from BR sugar cane) (45% burning, energy surplus looped back to production)	New datasets	Extension database XX: food & feed

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-7429	Improvement	Regionalize PH: Crude Coconut oil	Further regionalisation is now done for PH: Crude coconut oil (i.e. energies, country specific water,...)	Differences after the changes range between -5% and +9%, whereas most differences are not higher than +-2%. Exceptions are: EF 3.0 Cancer human health effects (Organic) [CTUh] +11% EF 3.0 Ecotoxicity freshwater (Metals) [CTUe] +30% EF 3.0 Non-cancer human health effects (Inorganic) [CTUh] +10%	Extension database XX: food & feed
GC-10732	Improvement	Update EU-28: Starch (from winter wheat)	The dataset now uses the updated European winter wheat production mix.	Main changes: EF 3.0 Acidification terrestrial and freshwater +12% EF 3.0 Climate Change (land use change) +17% EF 3.0 Eutrophication freshwater -12% EF 3.0 Eutrophication terrestrial +12% EF 3.0 Water scarcity -26%	Extension database XX: food & feed
GC-10720	Bug	Energy credits bioethanol from sugar cane	Electricity and steam credits are now biobased for bioethanol production, in line with the harmonization and actualization of crediting. All datasets using bioethanol (e.g. fuels, bio-plastics) are affected by this change. Since the credits in bioethanol decrease, the impact of downstream datasets may increase.	Changes are visible in all categories. Bioplastics (biobased from sugar cane) increase by about 100% to 200% when looking at GWP excl. biogenic carbon. When looking at GWP incl. biogenic carbon, the impacts increase between 46% and 54%.	Several
GC-10676	Bug	Emissions from wood combustion in dried shea kernels	In the datasets GLO: Dried shea kernels {0B9BF405-9624-418A-AA8A-C19BD3E3F4B9} emissions to air in wood combustion processes were adapted, leading to relevant changes among others for N_2O emissions.	CML2016: Acidification has decreased by 33%, Climate Change has decreased by 57%.	Extension database XII: renewable materials
GC-10660	Improvement	Update direct land use change (LUC) emissions	Emissions from direct land use change are now calculated with the "direct land use change assessment excel tool" for the approach “weighted average” (as required for compliance with the ENVIFOOD protocol; and can be applied for compliance with WRI GHG Protocol) based on the approach from PAS 2050-1:2012 and WRI GHG protocol	Impact changes vary considerably between datasets	All
GC-10589	Improvement	Update production & import mixes of crop plans	The cultivation production mix plans are now updated with FAOSTAT 2018 data. The cultivation consumption mix plans are updated with FAOSTAT 2017 data, as not all necessary datapoints were available for 2018.	No change in results	Extension database XX: food & feed

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-10197	Improvement	Update pig and broiler to SFIs Phase 3 baseline scenario	The pig and broiler (poultry) raising data is now updated to match the SFIs phase 3 baseline scenario.	Due to different feed conversion ratio, the environmental impacts reduce relevantly in almost every category (as less feed is needed per kg of broiler and pig).	Extension database XX: food & feed

3.14 Inventories for transport processes

In this year's upgrade, harmonization for transport datasets used throughout the database was improved.

Notable addition to truck transport datasets is a switch for non-exhaust particle emissions (such as from brakes, tires,...). The default setting is zero (i.e. no such emissions), as the uncertainty for these emissions is very large. However, the user has the possibility to see what potential impacts those emissions could have in their model.

The parameter is named "switch_part_NE" and can be changed in the parameter section of a truck transport.

switch_part_NE	0	0	1	0 %	[0;1] switch: 0= no non-exhaust PM, 1 = non-exhaust PM included. I

Table 2- 2: JIRA issues for transport processes

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-10422	Improvement	Harmonization emission factors for trains in background systems	The emission factors for train transport datasets are updated. In the background systems, those emission factors for trains are now harmonized (adjusted the parameters for the specific country).	As train transports do not have a big influence, the changes in datasets of transported goods are minimal.	Several
GC-10252	Improvement	Non-exhaust particle emissions for trucks- tire wear particles	GLO truck transport datasets now have a parameter switch to add non-exhaust particle emissions. Default setting is zero (i.e. not accounted for)	In default setting no change in results.	Professional database
GC-10251	New	Diesel mix at filling station with DEF (diesel exhaust fluid) datasets	When using Euro 6 trucks, the user is advised to use the new dataset "Diesel mix at filling station with DEF", which already contains this DEF.	New dataset	Professional database

3.15 Inventories for construction processes

Foreground data and models were checked by Sphera construction experts regarding technological upgrades. Identified technology improvements were updated in the database. In total, 4 new EPDs datasets have been included in the extension database XIV: construction materials.

Country	Process name	Process GUID Can be entered in the search tool
EU-28	Bluclad (Etex Building Performance International) (EN15804 A1-A3)	{5c933e32-e8fe-4f62-92a7-ead0f3c5b600}

EU-28	Hydropanel Drywall Panel 9 mm (Etex Building Performance International) (EN15804 A1-A3)	{942b5e3c-2541-4310-b35b-7df5db0a85f6}
CH	IGP HWFclassic 5903 S-Typ (EN15804 A1-A3)	{1d4e2bd0-47b9-48ef-be98-9b491ba07f59}
CH	IGP-DURA®face 5807 S-Typ (EN 15804 A1-A3)	{a9d5d10d-98cf-4c93-b461-a528c9e41014}

For EPD datasets with expired validity, please see Annex II.

Further changes in the background system (energy, intermediates) are responsible for the remaining differences between GaBi Databases 2020 and 2021 for construction. Noteworthy changes in this update is the harmonization of building equipment' end of life modules. They are now correctly split into C3 and C4.

Specific aspects for this year's upgrade are mentioned in the following table.

Table 2- 6: JIRA issues for construction processes

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-9926	Improvement	Update cement datasets with newest release from VDZ (2020)	Using the latest available publication from VDZ (reference year 2018), the German clinker production was updated. Fuel supply was updated, as well as emissions.	Almost no change for GWP (below 5%). For CML2016, POCP decreases. USEtox decreases.	Extension database XIV: construction materials
GC-9603	Editorial	Product flow of DE: Aluminium sheet anodized (1 sqm/2.7 kg)	The valuable substance flow is now "Aluminium sheet anodized" instead of "Aluminium extrusion profile (anodised)". The kg to sqm conversion is now in the dataset name, process documentation and in the flow properties. The dataset will update automatically if connected in a plan model.	Does not change the results	Extension database XIV: construction materials
GC-9012	Improvement	Cement binder's harmonization	Cement datasets now consistently use either burden free binders or binders with an economic allocation (fly ash, slag, and gypsum). The dataset name now states the allocation type of binders. For the burden free BF slag, a grinding step was added.	Does not change the results	Professional database Extension database XIV: construction materials
GC-9100	Bug	Metal recycling calculation	The amount of metals recycled is now correctly calculated.	Due to the change, more steel is credited, which means Module D gives a higher credit, especially when looking at Resource Depletion.	Professional database Extension database XIV: construction materials
GC-8611	Improvement	Energy use for natural stone crusher	The energy use of the natural stone crusher was updated. Energy use for crushing stones (e.g. gravel) is now much lower, from 58 MJ/1000kg to 20MJ/1000kg of stone.	Impacts decrease in all impact categories by about 60%	Professional database Extension database XIV: construction materials

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-7551	Improvement	Asphalt binder (rolling asphalt) - thermal energy to be modelled	Asphalt binder datasets are more detailed in composition, additionally more thermal energy is added.	Most impacts increase by 10 to 20%, due to more thermal energy consumed	Professional database Extension database XIV: construction materials
GC-7467	Improvement	Mass balance for lightweight wood fibers	Mass balance is now closed, by adjusting the water vapour from 0,08 kg / kg output in the production up to 0,084 kg / kg output.	Negligible changes in results.	Professional database Extension database XIV: construction materials
GC-5934	Bug	Correction PEX pipe extrusion	The production of PE-X pipes now correctly uses polyethylene and silane (crosslinking agent) instead of already crosslinked PE-X, thus reducing double counting.	Impacts are lower now, GWP decreases by about -20%.	Professional database Extension database XIV: construction materials
GC-4374	Improvement	EVA roof sheet data include processing of the granulate	A processing step for the roofing membrane was added.	Impacts increase between +4% to +10%.	Extension database XIV: construction materials
GC-10873	New	New Cement with complementing allocations for binders	New cement datasets are now available. EU-28 cement datasets are in the professional database, whereas DE cement datasets are in the Extension database XIV - construction materials. Those cement datasets are mostly cement datasets where the binders used are economically allocated, as burden free binders where available before. In some cases, additionally a dataset for burden free binders is now available.	New datasets	Professional database Extension database XIV: construction materials
GC-10687	Improvement	Harmonization of EN15804 module grouping for incineration from C4 to C3	The end of life datasets for building equipment are now harmonized following the availability of most recent interpretations of the standard. They are now correctly split in C3 and C4. C3 has the impact of the incineration, while C4 gives the impact of the landfill. The us-er is advised to check his/her model. New datasets for the module C4 are now available.	Depending on end of life treatment of the components, impact can decrease or increase. If incineration was used, C3 will increase, while C4 will decrease.	Professional data Extension database XIV: construction materials
GC-10674	Improvement	Update Euro 3 trucks in background systems	In the background systems, transports using trucks Euro 3 were exchanged with Euro 0-6 mix.	Minimal changes to results in majority of cases. For aerated concrete, AP and EP decreases by 50%.	Extension database XIV: construction materials
GC-10458	Improvement	Truck transport distances for concrete	For concrete, transport distances for the raw material transport of cement, sand,	Almost no change in GWP (below 4%). AP and EP decrease, as the	Extension database XIV:

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
			gravel, and fly ash have been harmonized.	transport distances are now shorter.	construction materials

3.16 Inventories for US regional processes

The datasets in the US extension database were checked by Sphera experts for their technological validity.

10 datasets were added to the Extension database XVII: full US.

Table 2- 7: JIRA issues for US regional processes

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-8721	New	New EPD dataset US: Industry average uncoated glass (NGA)	A new EPD dataset "US: Industry average uncoated glass (NGA) (A1-A3)" via float flat glass from the National Glass association is now available.	New dataset	Extension database XVII: full US
GC-4663	Bug	Correction of VOC emissions in dataset US: Plastic waste on landfill, post-consumer	Emissions of VOC are now not accounted anymore in the dataset US plastic waste on landfill. Since plastics (and other materials) do not decompose within the first 100 years of depositing, they don't contribute any C to the chemical reactions that lead to VOC emissions. Reason was a miscalculated parameter in the model.	For TRACI2.1, AP decreases by -73% and Smog Air by -35%.	Extension database XVII: full US
GC-1116	New	New US Plastic datasets	Three new plastic production processes are now available: US: Melamin resin (MF) US: Polyester Resin (unsaturated) (UP) US: Polyphenylene Sulfide Granulate (PPS)	New datasets	Extension database XVII: full US 2021
GC-10610	Documentation	Documentation: US: Dried starch (corn wet mill) (mass allocation)	The flow diagram for this dataset has been improved.	Does not change the results	Extension database XVII: full US

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-10380	Documentation	Documentation for US: Lime (CaO; quicklime lumpy)	Documentation of quicklime dataset has been improved.	Does not change the results	Extension database XVII: full US

3.17 Inventories for India regional processes

52 datasets have been added to the Extension database XXI: India and 60 to the separately available Indian database 2021.

A variety of datasets are now available, among others six new regional electricity mixes for different parts of India (East, North, North East, South, West and NPP), two fertilizers, different landfills, organic and inorganic intermediate products, several plastics and some construction materials.

Table 2- 8: JIRA issues for India regional processes

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-10347	Editorial	Process type now p-agg instead of agg	Some process types are changed from agg (aggregated) to p-agg (partly aggregated) to harmonize dataset type description throughout the database.	Does not change the results	Extension database XXI: India 2021 Indian database 2021
GC-10341	Improvement	India - Truck trailer transport datasets diesel sulphur revision	Bharat Stage II Transport processes: As per Bharat stage norms for Bharat, stage II diesel has sulphur content of 500 ppm, which was adapted in the processes (old value 350 ppm). Due to the change in sulphur content the tail pipe emissions of SOx increase by 43%. Bharat Stage IV Transport processes: As per Bharat stage norms for Bharat, stage IV diesel has sulphur content of 50 ppm, which was adapted in the processes (old value 350 ppm).	For Bharat Stage II: CML2001 - Aug. 2016, Acidification Potential (AP) increases in the range of 1% to 3% For Bharat stage IV: CML2001 - Aug. 2016, Acidification Potential (AP) decreases in the range of 5% to 7%	Extension database XXI: India Indian database

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
			Due to this change in sulphur content, the tail pipe emissions of SOx decrease by 86%.		

4 Industry data in GaBi

Even though several associations have updated their data, some associations did not update this year. Since they have their own cycle for upgrading their data, **these processes cannot be updated by Sphera in the annual upgrade without permission.** Sphera must keep the unchanged processes identical to those in the GaBi Databases 2020 Edition until the associations decide to update and make them available. However, several additional associations now use the GaBi Databases to reach global customers.

New industry data added in GaBi Databases 2021 Edition:

From AHEC (American Hardwood Export Council)

(https://www.americanhardwood.org/)

Country	Process name	Process GUID Can be entered in the search tool
US	Hardwood Veneer AHEC Rotary (0,6 mm)	{51dbdabe-5ea0-42ef-9e30-9a7751b5883e}
US	Hardwood Veneer AHEC Slicer	{79cd4c46-d72f-430c-8473-d0a210d41297}
US	Hardwood Veneer AHEC Rotary Thicker (2-2,5mm)	{deaed37c-13c7-46fd-8841-085b9dbca0a4}

From AISI (American Iron and Steel Institute)

(https://www.steel.org/)

Country	Process name	Process GUID Can be entered in the search tool
RNA	Steel pickled hot rolled coil	{f324ec29-b865-468d-8996-104e3a881e70}
RNA	Steel hot dip galvanized	{975238de-f7df-40fe-a17b-c6c03ecd5327}
RNA	Steel sections	{8076b56c-e01d-4ce8-abb2-34d69ab49431}
RNA	Steel plate	{9a6590ed-9b40-4af0-b2e1-9ded3bb925fa}
RNA	Steel cold rolled coil	{7655fe9a-05dc-4e67-a55a-e67a4f84e899}
RNA	Steel hot rolled coil	{f3248a31-05e2-4c4f-9f1f-957670288c8e}

PLEASE NOTE

Last minute notification: related to the six above mentioned AISI datasets we got notified by the American Iron and Steel Institute that updated information is available which could not be implemented due to deadline reasons. The following tables list the related heavy metals emission flows in the different datasets. The first table shows the values implemented in this database update (2021.01). The second table shows the values, which will be implemented in the next official update as soon as possible. Changes will only be observeable in Toxicity impact categories.

Flow [Heavy metals to ...]	Value in 2021.01 database release [kg]					
	HRC	PHRC	CRC	HDG	Plate	Sections
Arsenic [freshwater]	5.02E-07	6.24E-07	1.04E-06	1.09E-06	5.05E-11	1.60E-09
Cadmium [freshwater]	8.69E-08	1.02E-07	9.94E-08	1.25E-07	5.00E-08	7.32E-08

Chromium (+III) [freshwater]	6.07E-08	6.54E-08	1.93E-07	2.10E-07	7.22E-08	9.32E-08
Copper [freshwater]	1.90E-07	2.18E-07	6.39E-07	7.11E-07	1.56E-07	1.91E-07
Lead [freshwater]	1.39E-07	1.58E-07	1.58E-07	3.38E-07	1.05E-07	1.21E-07
Manganese [air]	1.90E-05	2.40E-05	1.39E-05	9.74E-06	1.74E-07	1.26E-06
Molybdenum [freshwater]	1.27E-07	1.38E-07	3.62E-07	4.14E-07	1.35E-07	1.63E-07
Nickel [freshwater]	2.29E-07	2.61E-07	5.90E-06	6.22E-06	1.75E-07	1.53E-07
Selenium [freshwater]	1.56E-06	1.94E-06	8.04E-07	8.48E-07	1.31E-08	1.39E-08
Zinc [freshwater]	1.10E-07	1.00E-07	2.38E-07	1.62E-06	-5.71E-08	6.75E-08

Flow [Heavy metals to …]	**Newly reported value by AISI [kg]**					
	HRC	**PHRC**	**CRC**	**HDG**	**Plate**	**Sections**
Arsenic [freshwater]	1.14E-09	1.44E-09	1.41E-09	1.45E-09	5.05E-11	1.60E-09
Cadmium [freshwater]	8.69E-08	1.02E-07	9.21E-08	1.17E-07	5.00E-08	7.32E-08
Chromium (+III) [freshwater]	5.81E-08	6.21E-08	5.05E-08	6.04E-08	7.22E-08	9.32E-08
Copper [freshwater]	1.92E-07	2.20E-07	1.96E-07	2.46E-07	1.56E-07	1.91E-07
Lead [freshwater]	1.38E-07	1.57E-07	1.58E-07	3.37E-07	1.05E-07	1.21E-07
Manganese [air]	3.52E-07	4.25E-07	3.13E-07	3.62E-07	1.74E-07	1.26E-06
Molybdenum [freshwater]	1.27E-07	1.38E-07	1.25E-07	1.64E-07	1.35E-07	1.63E-07
Nickel [freshwater]	2.29E-07	2.61E-07	2.61E-07	2.86E-07	1.75E-07	1.53E-07
Selenium [freshwater]	1.31E-08	1.49E-08	1.28E-08	1.67E-08	1.31E-08	1.39E-08
Zinc [freshwater]	9.90E-08	8.74E-08	2.33E-07	1.62E-06	-5.71E-08	6.75E-08

Flow [Heavy metals to …]	**% Change**					
	HRC	**PHRC**	**CRC**	**HDG**	**Plate**	**Sections**
Arsenic [freshwater]	-99.8%	-99.8%	-99.9%	-99.9%	0%	0%
Cadmium [freshwater]	0%	0%	-7.3%	-6.1%	0%	0%
Chromium (+III) [freshwater]	-4.4%	-5.1%	-73.8%	-71.2%	0%	0%
Copper [freshwater]	0.8%	0.9%	-69.3%	-65.5%	0%	0%
Lead [freshwater]	-0.4%	-0.4%	-0.2%	-0.1%	0%	0%
Manganese [air]	-98.1%	-98.2%	-97.7%	-96.3%	0%	0%
Molybdenum [freshwater]	0%	0%	-65.6%	-60.4%	0%	0%
Nickel [freshwater]	0%	0%	-95.6%	-95.4%	0%	0%
Selenium [freshwater]	-99.2%	-99.2%	-98.4%	-98.0%	0%	0%
Zinc [freshwater]	-9.6%	-13.1%	-2.2%	-0.3%	0%	0%

5 General continuous improvements

5.1 Editorial

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-8964	Documentation	Documentation: Biomethane datasets	Documentation of biomethane datasets has been improved.	Does not change the results	Extension database II: energy
GC-9780	Documentation	Documentation: Improve documentation of lumber data Sphera/AHEC	The mix and location type has been harmonized in the lumber data from Sphera/AHEC.	Does not change the results	Professional database Extension database XVII: full US 2021

5.2 Fixing issues and improvements of cross-cutting aspects

In this chapter. JIRA issues for bugs and improvements of process datasets and a few other dataset types are detailed.

JIRA Tracking Number	Issue Category	Item	Description	Change in results	Affects Extension module
GC-9681	New	Create DE: Electricity grid mix 2019 in GaBi (incl. process documentation)	A new DE: Electricity grid mix 2019 dataset is now available in the professional database.	New dataset	Professional database
GC-10640	Improvement	Regionalization: EU Tap Water	In the background systems. further harmonization of regionalised water is now done.	Changes are minimal	Several

References

EIA. U.S. Energy Information Administration: Electricity Data – Generation and thermal out-put by energy source. total of all production types. release date January 2020. http://www.eia.gov/electricity/data.cfm#generation

EPA. U.S. Environmental Protection Agency. "eGRID2018 - Emissions and Generation Resource integrated database (eGRID)". 2018 data. Washington. 2020. https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid

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IEA. International Energy Agency Data services: World Energy Balances. World Energy Statistics. Electricity Information (2020 edition). Paris. 2020

Sphera. "GaBi Database & Modelling Principles". 2021

Sphera. "Introduction to Water Assessment in GaBi". 2021

Sphera. "The GaBi refinery model". 2021

Sphera. "The Agricultural LCA Model Documentation". 2021

Sphera. "Land Use Change Emissions in GaBi Documentation". 2021

Sphera. "Documentation of land use inventory in GaBi". 2021

Sphera. "Documentation for Passenger Vehicle Processes". 2021

Sphera. "Documentation for Duty Vehicle Processes". 2021

Further. dataset-specific sources are documented in the corresponding datasets…

Annex I: “Version 2020” discontinued datasets – Explanations and Recommendations

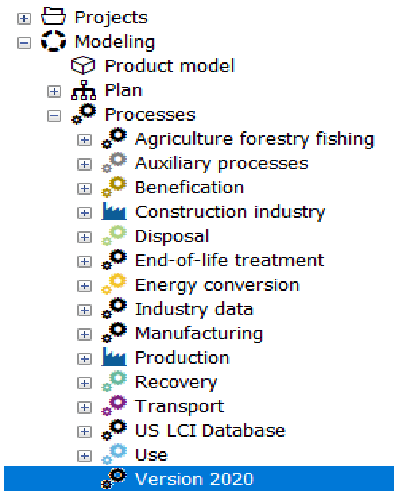
For various reasons. there are a few processes in the Databases 2021 Edition that are no longer appropriate. including that the respective technology is not used anymore. In other cases. updated data sets have been made available by the respective association. These discontinued datasets have been moved into a folder called “Version 2020.” **They are still available for clients who need to work with them but will not be upgraded anymore and are not part of the delivery scope for new GaBi clients.** There are two reasons behind this approach:

i) Sphera is committed not to provide information that is not up-to-date. and. at the same time.

ii) Sphera wants to enable users who have used the dataset to decide if it is still appropriate for their specific goal and scope.

The tables in Annex I and Annex II list all those processes along with the explanations and recommended alternatives where applicable.

Please note: processes that will no longer be updated (in the Version 2020 folder), as well as flows with limited use are now marked with a differently coloured icon in the database: 



Version 2020 processes					Alternative process to be used instead			
Country	Process name	Type	Source	Process GUID (can be entered in the search tool)	Country	Process Name	Source	GUID
RNA	Aluminum Can Scrap Shredding & Decoating	p-agg	AA	{132518dd-1903-43aa-8ded-962937740c2b}	If relevant. please contact the data on demand team from Sphera for alternative processes.			
RNA	Primary Aluminum Ingot	agg	AA/Sphera	{768dd9de-0553-4857-b3ed-a40e0b0f10ef}	RNA	Primary aluminum ingot	AA/Sphera	{5f36c9ee-edd6-4e02-b792-1d7730681a0c}
US	Chlorine from chlorine-alkali electrolysis (Amalgam)	agg	Sphera	{216d618f-da49-4ffc-a3c0-a4fcd6db2d81}	US	Chlorine from chlorine-alkali electrolysis (Diaphragm)	Sphera	{16045857-fb39-4346-b70a-d235ee13df5b}
IT	Chlorine from chlorine-alkali-electrolysis (amalgam)	agg	Sphera	{7c06c915-1cd6-4036-913e-a94435195f9c}	IT	Chlorine from chlorine-alkali-electrolysis (membrane)	Sphera	{a39ced5c-81c7-4e2b-98ff-f094b83e981e}
GB	Chlorine from chlorine-alkali-electrolysis (amalgam)	agg	Sphera	{49f192bd-c7f4-4160-a094-8ef60c6d1097}	GB	Chlorine from chlorine-alkali-electrolysis (membrane)	Sphera	{f1b3fee1-c51e-4b83-828c-f29dc04a9b80}
FR	Chlorine from chlorine-alkali-electrolysis (amalgam)	agg	Sphera	{741cfcf0-2649-464a-a497-91ed7638e5a2}	FR	Chlorine from chlorine-alkali-electrolysis (membrane) Chlorine from chlorine-alkali-electrolysis (diaphragm)	Sphera	{4859a845-3619-48d5-abda-396235330703} {f4d32d80-2aa6-4c80-87ad-98b966834947}
EU-28	Chlorine from chlorine-alkali-electrolysis (amalgam)	agg	Sphera	{0f333f72-2452-4b75-bc00-01aab00daafe}	EU-28	Chlorine from chlorine-alkali-electrolysis (diaphragm)	Sphera	{b92dc3d1-96a0-4d03-940b-4d6fefaa87d6}
EU-28	DUPLICATE - Glass/inert waste on landfill	agg	Sphera	{64197304-3307-11dd-bd11-0800200c9a66}	EU-28	Inert matter (Unspecific construction waste) on landfill	Sphera	{68b5b6e9-290b-47c7-a1fa-465588d81906}
DE	Electricity grid mix (2017)	agg	Sphera	{0502466a-0534-4d0a-bbfb-336958bcc4f4}	DE	Electricity grid mix (2019)	Sphera	{a8edec5d-e84f-403c-a63f-1fe4b0a3b694}
DE	Pellet boiler 20-120 kW (EN15804 B6)	agg	Sphera	{308eb76a-3b83-4cab-9552-35e33fdde79d}	DE	Pellet boiler 20-120 kW (EN15804 B6)	Sphera	{fe144b23-d001-4217-980d-84399de40a23}
DE	Chlorine from chlorine-alkali electrolysis (Amalgam)	agg	Sphera	{c67b751d-fb2e-40e0-923c-8dda41ffd4f4}	DE	Sodium hydroxide (from chlorine-alkali electrolysis. diaphragm)	Sphera	{6c6ad0bc-d2d1-4740-a1b8-249630d1b6a3}
US	Spray Foam Life Cycle - Low Density 1	agg	SPFA	{faefc29c-21c0-420f-9ce5-bbe87a3ad501}	US	Spray polyurethane foam insulation. open cell. low density (A1-A3) Spray polyurethane foam insulation. open cell. low density (A5)	SPFA/Sphera	{399f531d-b110-4039-a4cd-306212b86fab} {a9edc220-2247-4b6e-9114-2139634b5bdd}
US	Spray Foam Life Cycle - Low Density 2	agg	SPFA	{0c2363d1-fdcf-4f41-8895-495affbb82ba}				
US	Spray Foam Life Cycle - Medium Density 1	agg	SPFA	{4d34e371-35fc-48cb-8631-585079c476aa}	US	Spray polyurethane foam insulation. closed cell. med density. HFC blowing agent (A1-A3) Spray polyurethane foam insulation. closed cell. med density. HFC blowing agent (A5) Spray polyurethane foam insulation. closed cell. med density. HFO blowing agent (A1-A3) Spray polyurethane foam insulation. closed cell. med density. HFO blowing agent (A5)	SPFA/Sphera	{d5dbc836-a469-4c66-9930-b0fe097a426e} {bb043648-95fa-44fc-bbdf-6a9878fabb2d} {d4306090-b0ca-4f93-9574-54b0f62007db} {32ac2ff8-27f9-4165-8679-ed6160aa5ff6}
US	Spray Foam Life Cycle - Medium Density 2	agg	SPFA	{4305563f-c06f-4852-a227-50b9081b42e0}				
US	Spray Foam Life Cycle - Roofing	agg	SPFA	{13d0c894-bd26-4eca-a257-d444f32055ee}	US	Spray polyurethane foam insulation. roofing. HFC blowing agent (A1-A3)	SPFA/Sphera	{10668b3a-8b19-4abd-b84d-c8df0b3de3cb} {c1ac9fa3-4804-4188-b739-a3c022101175}

Version 2020 processes					Alternative process to be used instead			
Country	Process name	Type	Source	Process GUID (can be entered in the search tool)	Country	Process Name	Source	GUID
						Spray polyurethane foam insulation. roofing. HFC blowing agent (A5) Spray polyurethane foam insulation. roofing. HFO blowing agent (A1-A3) Spray polyurethane foam insulation. roofing. HFO blowing agent (A5)		{ca4347a5-9fd9-4e0b-8df9-91c121808eea} {a69a3ac5-059c-42b8-bc05-30d234b24d21}
RNA	Steel cold rolled coil (version released in 2011)	p-agg	worldsteel	{f2452efc-7855-488b-af02-6f1944214fab}	RNA	Steel cold rolled coil	AISI	{7655fe9a-05dc-4e67-a55a-e67a4f84e899}
RNA	Steel hot dip galvanized (version released in 2011)	p-agg	worldsteel	{6dd36bd2-04ca-4c05-aab1-9f4ce3622c31}	RNA	Steel hot dip galvanized	AISI	{975238de-f7df-40fe-a17b-c6c03ecd5327}
RNA	Steel hot rolled coil (version released in 2011)	p-agg	worldsteel	{9fd354ea-f6b5-4477-b39e-bd1c3e6867fd}	RNA	Steel hot rolled coil	AISI	{f3248a31-05e2-4c4f-9f1f-957670288c8e}
RNA	Steel pickled hot rolled coil (version released in 2011)	p-agg	worldsteel	{27e239fb-ac72-4196-91b4-8b69b8ac80df}	RNA	Steel pickled hot rolled coil	AISI	{f324ec29-b865-468d-8996-104e3a881e70}
RNA	Steel plate (version released in 2011)	p-agg	worldsteel	{ba2424f1-8578-4a40-a801-75ad01e4341e}	RNA	Steel plate	AISI	{9a6590ed-9b40-4af0-b2e1-9ded3bb925fa}

Annex II: EPDs with expired validity

EPDs with expired validity date can be found in the folder Industry data -> EPDs with expired validity. Those datasets will however still be contained in further updates.

Country	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*
DE	Acoustic panel. StoSilent Panel Aluminium 15mm - StoVerotec GmbH (A1-A3)	agg	Sphera-EPD	{80a4496a-1089-4811-91e6-8de53ae1a0de}
DE	Acoustic panel. StoSilent Panel Aluminium 15mm - StoVerotec GmbH (C4)	agg	Sphera-EPD	{34e65296-a21c-42aa-a67e-9a4c37a76968}
DE	Acoustic panel. StoSilent Panel Aluminium 25mm - StoVerotec GmbH (A1-A3)	agg	Sphera-EPD	{414e4f6b-7c11-4c15-84e4-7abf2537f6d3}
DE	Acoustic panel. StoSilent Panel Aluminium 25mm - StoVerotec GmbH (C4)	agg	Sphera-EPD	{5a76f19a-684d-48a5-b9b4-2e4592a8c6a7}
DE	Acoustic panel. StoSilent Top Panel Aluminium 15mm - StoVerotec GmbH (A1-A3)	agg	Sphera-EPD	{b16bd9aa-95b1-4444-871f-09e7eb746da5}
DE	Acoustic panel. StoSilent Top Panel Aluminium 15mm - StoVerotec GmbH (C4)	agg	Sphera-EPD	{8c3e3f3e-cbc2-4d68-b3e0-c6eff40fb559}
DE	Acoustic panel. StoSilent Top Panel Aluminium 25mm - StoVerotec GmbH (A1-A3)	agg	Sphera-EPD	{5711c91f-08c2-479a-accb-5070829df57e}
DE	Acoustic panel. StoSilent Top Panel Aluminium 25mm - StoVerotec GmbH (C4)	agg	Sphera-EPD	{5cc69974-b310-4b30-9ff6-946916544272}
DE	Adhesive and flush with organic binder - VdL (A1-A3)	p-agg	Sphera-EPD	{e787d2d3-9bae-44dc-93fd-ddee02d88289}
DE	Adhesive and flush with organic binder - VdL (A4)	p-agg	Sphera-EPD	{d11fe1fe-b6a6-4495-93bf-18be24d60bab}
DE	Adhesive and flush with organic binder - VdL (A5)	p-agg	Sphera-EPD	{b92600ed-e4f2-4266-9ba7-a8765a72c9b7}
DE	Aerated concrete P2 04. not reinforced - H+H Deutschland GmbH (A1 - A3)	p-agg	Sphera-EPD	{52d56fff-eacb-49be-848d-e95bac36f02d}
DE	Aerated concrete P8 08. not reinforced - H+H Deutschland GmbH (A1 - A3)	p-agg	Sphera-EPD	{187af247-e29c-4f8e-b215-47b40f2fe065}
EU-28	Aluminium profile (folded 65/400) - IFBS (A1-A3)	agg	Sphera-EPD	{7cc334e8-f827-4eaf-89fe-219fbc3c12ae}
EU-28	Aluminium profile (trapezoidal 35/207) - IFBS (A1-A3)	agg	Sphera-EPD	{2885d9bf-c4c5-4905-99fa-76c4f186d1a4}
RNA	Aluminum specialty product- CISCA (A1-A3 & A5)	agg	Sphera-EPD	{a6654e85-c766-4df4-b63c-ff13cd5a6066}
US	Anodized Aluminum Extrusion - FRONTIER (A1-A3)	agg	Sphera-EPD	{e6a7da6d-a712-4e5e-9937-964c458be361}
AT	Backing brick - Initiative Ziegel (A1-A3)	p-agg	Sphera-EPD	{104ff3f7-86bc-4cb9-9353-be67d654d02a}
AT	Backing bricks - Initiative Ziegel (A1-A3)	agg	Sphera-EPD	{4bfc6613-f03b-45ee-8b86-c8e624d66ad6}
DE	Bi-metal screw - EJOT (A1-A3)	p-agg	Sphera-EPD	{69723890-3640-4948-9285-89dd18312e0b}
DE	Bonding agent on dispersion silicate-based - VdL (A1-A3)	p-agg	Sphera-EPD	{1728546d-8da8-4c06-946c-fd6fac6840c7}
DE	Bonding agent on dispersion silicate-based - VdL (A4)	p-agg	Sphera-EPD	{24d23afb-0729-48f6-8536-effbbd62f658}
DE	Bonding agent on dispersion silicate-based - VdL (A5)	p-agg	Sphera-EPD	{a54bf2dc-d2ec-4e23-8e90-f60d91c3b323}
DE	Bonding agent on dispersion-based - VdL (A1-A3)	p-agg	Sphera-EPD	{ec02341e-5fc2-4610-80a6-79f166f499ea}
DE	Bonding agent on dispersion-based - VdL (A4)	p-agg	Sphera-EPD	{13ae8f9a-b29e-4580-ab7a-e06171113e71}

Country	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*
DE	Bonding agent on dispersion-based - VdL (A5)	p-agg	Sphera-EPD	{5a5368f4-ba85-4378-8086-48d105c4eb6c}
NO	Brick - Wienerberger (A1-A3)	p-agg	Sphera-EPD	{f5d5a383-d534-4d49-ad9d-c05014864fb2}
ES	Bright-Rolled Zinc Sheet elZinc Natural - Asturiana de Laminados (A1-A3)	agg	Sphera-EPD	{ec61d60e-c359-42cb-8d90-488dbfdf91fe}
DE	Calcium sulphate screed - IWM (A1-A3)	p-agg	Sphera-EPD	{c968fbda-0ef0-4d31-a3b1-bd2bf94fc476}
DE	Calcium sulphate screed - IWM (A5)	p-agg	Sphera-EPD	{de9cc573-3177-45de-bbbb-65a2e2ca3518}
GLO	Cast-In Channels HTA-HZA (Halfenschiene) 1m (EN15804 A1-A3)	p-agg	Sphera-EPD	{ea8566de-f14a-4b9c-85af-cba830bad18a}
DE	Cement screed - IWM (A1-A3)	p-agg	Sphera-EPD	{e909f5ab-91db-424f-9a39-a187679923c1}
DE	Cement screed - IWM (A5)	p-agg	Sphera-EPD	{5b35c6c8-abcf-4c4d-becd-701f9341c7a6}
DE	Ceramic cladding elements incl. substructure TONALITY® - CREATON (A1-A3)	agg	Sphera-EPD	{71a2cdd8-8a57-48de-9f52-cc7c39a1992c}
DE	Ceramic cladding elements incl. substructure TONALITY® - CREATON (C4)	agg	Sphera-EPD	{9fc19f22-cdf4-4ffa-8ead-7f72d406f9c6}
DE	Ceramic cladding elements incl. substructure TONALITY® - CREATON (D)	agg	Sphera-EPD	{559ad979-48b8-4a3a-95be-63c1b1913589}
DE	Ceramic facade panels Argeton - Wienerberger GmbH (Module A1-A3)	agg	Sphera-EPD	{b39794d0-5f98-40ce-9d19-b55be911b702}
DE	Ceramic facade panels Argeton - Wienerberger GmbH (Module A5)	agg	Sphera-EPD	{e6596092-43f5-4339-a0d4-894f1272d13a}
DE	Ceramic facade panels Argeton - Wienerberger GmbH (Module C4)	agg	Sphera-EPD	{3c948bf0-c2dd-4707-8660-be8ef1c8ed03}
DE	Ceramic facade panels Argeton - Wienerberger GmbH (Module D)	agg	Sphera-EPD	{4a0ebc22-5ec9-4f92-bf03-7369dceb0f33}
GLO	Ceramic tile use stage (RSL = 1 year) (B1-B2)-Stonepeak	agg	Sphera-EPD	{33d36383-83ca-47d6-a488-bf51a9c6a18d}
DE	Chipboard (average)	agg	Sphera-EPD	{0d98e99d-9ff4-46b1-adf0-b638f97e114a}
DE	Chipboard (average)	agg	Sphera-EPD	{5be2a1d7-b4e8-4309-91c3-f88ab5c7aa1c}
DE	Chipboard Eurospan - Egger	agg	Sphera-EPD	{0f9705f0-12d3-4341-aecb-18ad55fb6ea8}
DE	Chipboard Eurospan - Egger	agg	Sphera-EPD	{30db63bf-23f8-4332-bd3d-31d11a70452b}
AT	Clay roofing tile - Initiative Ziegel (A1-A3)	p-agg	Sphera-EPD	{0fe692cc-3c9e-4103-a739-ae86b5d745ad}
DE	Concrete admixtures – Air entrainers - Deutsche Bauchemie e.V. (DBC) (A1-A3)	p-agg	Sphera-EPD	{1707db29-84db-4527-8cc5-24e5f83cc242}
DE	Concrete admixtures – Hardening accelerators - Deutsche Bauchemie e.V. (DBC) (A1-A3)	p-agg	Sphera-EPD	{f02c2d42-2b70-4eee-aa13-67277a0c0e69}
DE	Concrete admixtures – Plasticizer and superplasticizer - Deutsche Bauchemie e.V. (DBC) (A1-A3)	p-agg	Sphera-EPD	{bd57dd8e-68bb-4aea-84c9-f1b087d81ba2}
DE	Concrete admixtures – Retarders - Deutsche Bauchemie e.V. (DBC) (A1-A3)	p-agg	Sphera-EPD	{9d0a7f1a-0f8a-423f-b86c-ac80b44663dc}
DE	Concrete admixtures – Set accelerators - Deutsche Bauchemie e.V. (DBC) (A1-A3)	p-agg	Sphera-EPD	{168c2bfe-388d-4a77-b2bb-a81b5e0baa49}
DE	Concrete admixtures – Water-resisting admixtures - Deutsche Bauchemie e.V. (DBC) (A1-A3)	p-agg	Sphera-EPD	{9b651c5c-bb05-421f-be5e-87ace922add9}
DE	Concrete roofing tile - ETERNIT AG (A1 - A3)	p-agg	Sphera-EPD	{89fce0a7-f102-41b9-988f-980d5fdc574c}
DE	Construction panel Eterplan - Eternit (A1-A3)	agg	Sphera-EPD	{732cc1f9-7761-4bec-837b-79d3cf6e6496}
DE	Corrugated panel - Eternit (A1-A3)	agg	Sphera-EPD	{9a2fa45e-56c6-4847-8b5e-368221e05d3e}
DE	Dispersion plaster - VdL (A1-A3)	p-agg	Sphera-EPD	{f4fe9120-8a14-41eb-8bb4-269fe8b09124}
DE	Dispersion plaster - VdL (A4)	p-agg	Sphera-EPD	{ec009580-2d18-487b-a632-4d740229921b}

Country	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*
DE	Dispersion plaster - VdL (A5)	p-agg	Sphera-EPD	{d4ca9dec-fcc0-4b8e-a8d0-d6b3081e9676}
DE	Dispersionbased facade paint. high quality - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{1d04de47-cc30-4c2b-8ec3-9482451bebe5}
DE	Dispersionbased facade paint. high quality - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{7973147e-bb7e-44ae-99a7-c42779559bd0}
DE	Dispersionbased facade paint. low quality - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{0fa58227-3e61-4785-a453-f43f44fce6c1}
DE	Dispersionbased facade paint. low quality - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{e2345ebc-4881-494c-9d1c-f9babcd9b91b}
DE	Dispersionbased interior wall paint. wet abrasion resistance 1. hiding power 1 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{6a15838f-2f30-4270-ae47-b28009d5baa6}
DE	Dispersionbased interior wall paint. wet abrasion resistance 1. hiding power 1 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{2246868a-6e05-4b3f-b1cf-d63834266f8a}
DE	Dispersionbased interior wall paint. wet abrasion resistance 1. hiding power 2 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{5d2e7df8-eeb7-4990-8d64-aa3eb546ae6d}
DE	Dispersionbased interior wall paint. wet abrasion resistance 1. hiding power 2 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{25efcde2-a780-4240-b62c-a9eaa2bb78df}
DE	Dispersionbased interior wall paint. wet abrasion resistance 2. hiding power 1 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{ab8a879c-284f-4aa3-bcc8-c4a9e195f2d5}
DE	Dispersionbased interior wall paint. wet abrasion resistance 2. hiding power 1 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{43837d22-57a5-4856-b721-396ac286b007}
DE	Dispersionbased interior wall paint. wet abrasion resistance 2. hiding power 2 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{7093c73e-53fc-4a09-bcff-846807328a91}
DE	Dispersionbased interior wall paint. wet abrasion resistance 2. hiding power 2 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{37750913-d7a1-4ccb-a28e-cb114ba61328}
DE	Dispersionbased interior wall paint. wet abrasion resistance 3. hiding power 1 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{9c16919f-f3a0-41f5-adc4-facd1551cbe3}
DE	Dispersionbased interior wall paint. wet abrasion resistance 3. hiding power 1 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{ba8f8a3d-3c9e-42cb-995c-ab1365fb0316}
DE	Dispersionbased interior wall paint. wet abrasion resistance 3. hiding power 2 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{ad17bebd-7693-411f-b2d9-dd69d12483a5}
DE	Dispersionbased interior wall paint. wet abrasion resistance 3. hiding power 2 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{d63c5982-1d20-4a54-ab00-2444932d75fe}
DE	Dispersionbased product. class a - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{f55c67cd-b71c-4c28-aae1-bb1da5fbac99}
DE	Dispersionbased product. class a - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{3b7fce41-4678-4206-9be9-1e5fdf299ced}
DE	Dispersionbased product. class b - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{34d66a3d-cc53-4062-b92a-42da1937ed9a}
DE	Dispersionbased product. class b - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{773d7461-334b-42da-abdd-75fffb8ea9f6}
DE	Dispersionbased product. solvent-free - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{c97aeb16-aea3-4c2c-8d81-9f602cc8717b}
DE	Dispersionbased product. solvent-free - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{a8c484e9-8cd7-42f2-ad6b-7bcdfbc51f81}
BE	Dry construction panel HYDROPANEL 12mm - Eternit (A1-A3)	agg	Sphera-EPD	{24062c57-a2bb-4873-8669-8c4f6314de31}
BE	Dry construction panel HYDROPANEL 9mm - Eternit (A1-A3)	agg	Sphera-EPD	{425e3c5a-93b1-4b50-9300-7db31d7dd1ae}
DE	ETIC I - Brillux (A1-A3)	agg	Sphera-EPD	{efb30ec4-2b97-4418-8bf1-a311064a7267}
DE	ETIC I - Brillux (C4)	agg	Sphera-EPD	{f5d185d0-f168-4a08-be25-708782624faa}
DE	ETIC I - Brillux (D)	agg	Sphera-EPD	{67cc7d57-933e-486c-9e30-f3a8f80bc661}
DE	ETICS anchor with usable length 121-140 mm - fischerwerke (A1-A3)	agg	Sphera-EPD	{7f380aef-37c5-4ac8-a289-0ddefd35b7d2}
DE	ETICS anchor with usable length 121-140 mm - fischerwerke (C4)	agg	Sphera-EPD	{08339344-b684-44ed-b97b-63d96b396aef}
DE	ETICS anchor with usable length 141-160 mm - fischerwerke (A1-A3)	agg	Sphera-EPD	{c300df17-ecfc-4d70-b467-42b425f4cbbc}
DE	ETICS anchor with usable length 141-160 mm - fischerwerke (C4)	agg	Sphera-EPD	{ddc6a299-9866-4423-a7e8-d3b6285b0647}

Country	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*
DE	ETICS anchor with usable length 75-120 mm - fischerwerke (A1-A3)	agg	Sphera-EPD	{a0d4e3b0-f128-4f66-9b80-491abbc8be48}
DE	ETICS anchor with usable length 75-120 mm - fischerwerke (C4)	agg	Sphera-EPD	{18690cf8-d1c1-4133-bce5-9990ca05b004}
DE	EVALASTIC V (mechanically attached. 1.96kg/m2 / 1.5mm) - alwitra GmbH - (A1-A3)	agg	Sphera-EPD	{a65e7492-211d-4155-a88c-33c81faa00c3}
DE	EVALASTIC V (mechanically attached. 1.96kg/m2 / 1.5mm) - alwitra GmbH - (A5)	agg	Sphera-EPD	{bddee8b7-5954-401c-8ceb-8d772d15cd45}
DE	EVALASTIC V (mechanically attached. 1.96kg/m2 / 1.5mm) - alwitra GmbH - (C3/1 - 100% incineration)	agg	Sphera-EPD	{26c84d63-8e21-4071-80bd-4cf70a77804b}
DE	EVALASTIC V (mechanically attached. 1.96kg/m2 / 1.5mm) - alwitra GmbH - (C3/2 - 100% recycling)	agg	Sphera-EPD	{68390515-9cb3-498c-b190-be1090365bb8}
DE	EVALASTIC V (mechanically attached. 1.96kg/m2 / 1.5mm) - alwitra GmbH - (D/2 - 100% recycling)	agg	Sphera-EPD	{e8b77849-9f03-42a0-bca7-06e206963ec0}
DE	EVALON V (mechanically attached. 2kg/m2 / 1.5mm) - alwitra GmbH - (A1-A3)	agg	Sphera-EPD	{47bbc4f2-2f6d-4171-9b70-cd4dc982ff35}
DE	EVALON V (mechanically attached. 2kg/m2 / 1.5mm) - alwitra GmbH - (A5)	agg	Sphera-EPD	{da00f6d3-a4cf-4b2d-ba9a-5baa5b9afe3c}
DE	EVALON V (mechanically attached. 2kg/m2 / 1.5mm) - alwitra GmbH - (C3/1 - 100% incineration)	agg	Sphera-EPD	{107f903d-9e35-45cf-b262-22914995d3db}
DE	EVALON V (mechanically attached. 2kg/m2 / 1.5mm) - alwitra GmbH - (C3/2 - 100% recycling)	agg	Sphera-EPD	{d94ba390-003b-4441-bb36-dfb20e63e0d4}
DE	EVALON V (mechanically attached. 2kg/m2 / 1.5mm) - alwitra GmbH - (D/2 - 100% recycling)	agg	Sphera-EPD	{41e29206-9757-4576-8b85-f211128cb6cf}
US	Fabricated hollow structural sections (HSS) - AISC & STI (A1-A3)	agg	Sphera-EPD	{31a35a86-6f19-4468-94b7-d126d3be9d5c}
BE	Facade panel CEDRAL - Eternit (A1-A3)	agg	Sphera-EPD	{eaabaee2-343e-42e7-acc2-31804d442671}
DE	Facade panel NATURA - Eternit (A1-A3)	agg	Sphera-EPD	{c1e5437f-293c-41ff-979a-7023b0407379}
DE	Facade Panel PICTURA/NATURA PRO - ETERNIT AG (A1 - A3)	agg	Sphera-EPD	{06364305-8cf4-4740-9cf2-b6bcd80f4afd}
DE	Facade panel TEXTURA - Eternit (A1-A3)	agg	Sphera-EPD	{4f245afa-fdd5-4176-ac78-39bd2612537e}
DE	Facing bricks/clinker bricks/quater bricks (BV Ziegel) (A1-A3)	agg	Sphera-EPD	{3d14509a-d8c6-4996-9366-47bfb22e7d8e}
DE	Facing mortar /Mortar with particular properties - IWM (A1-A3)	p-agg	Sphera-EPD	{d90a8e1f-bba4-4fd2-9344-6af709c60178}
DE	Facing mortar /Mortar with particular properties - IWM (A5)	p-agg	Sphera-EPD	{c1aff019-0d68-4039-ae3e-1c3f240aa183}
AT	Heradesign acoustic board - Knauf AMF (A1-A3)	p-agg	Sphera-EPD	{33f31d99-a633-44ae-9239-1bda2b86af26}
AT	Heradesign acoustic board - Knauf AMF (C4)	agg	Sphera-EPD	{8eef6cad-afea-4cb5-a24d-780ec6492e81}
EU-28	HIT ISO-Element 1m (EN15804 A1-A3)	p-agg	Sphera-EPD	{917c7c17-eaf9-4e68-b3e6-08b71da9e847}
DE	KRONOPLY flex wood fibre insulating material (A1-A3)	agg	Sphera-EPD	{a40df6b3-190e-4b0c-9f09-9c975f7dc0cc}
DE	KRONOTEX sound wood fibre insulating material (A1-A3)	agg	Sphera-EPD	{2b837060-2541-46da-bb41-2cec67d4b32f}
DE	Laminate flooring (DPR) - Egger (A1-A3)	p-agg	Sphera-EPD	{cc053a89-4fe0-4117-a0a8-dc76a86b5049}
DE	Laminate flooring DPL (Mix) - Egger (A1-A3)	p-agg	Sphera-EPD	{4ea31f2f-c87e-4f3e-b267-177ef4f88d0f}
AT	Laminated raw chipboard Eurodekor - Egger (A1-A3)	p-agg	Sphera-EPD	{19bf6299-e6f9-4da9-848e-1e15b0d2dfd8}
RNA	Leak barrier. asphalt shingle roofing system component - ARMA (A1-A3)	agg	Sphera-EPD	{8104830f-9b8c-4779-920d-9b50d9a58cb5}
SI	Life cycle rock mineral wool. DP-3 - Knauf Insulation (A1-A3)	agg	Sphera-EPD	{f2486aa4-b706-46ff-b105-49752f781dd1}
SI	Life cycle rock mineral wool. DP-3 - Knauf Insulation (C4)	agg	Sphera-EPD	{d0d1b690-9a44-428b-b817-3c2133f88584}
DE	Lightweight cementitious plaster - IWM (A1-A3)	p-agg	Sphera-EPD	{4384b818-8c09-4a2e-b54f-3573f9cef6b9}

Country	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*
DE	Lightweight cementitious plaster - IWM (A5)	p-agg	Sphera-EPD	{c2efd8f7-add0-4a43-8182-4b46a7255060}
DE	Lightweight masonry mortar - IWM (A1-A3)	p-agg	Sphera-EPD	{75ee3a21-eda3-438c-8b68-9152558e3826}
DE	Lightweight masonry mortar - IWM (A5)	p-agg	Sphera-EPD	{758298b3-ee2a-4e75-80fb-8cf2e2ba1c47}
DE	Lime sand brick (Kalksandsteinverband e.V.) (EN15804 A1-A3)	agg	Sphera-EPD	{928d5917-c780-4646-9e79-21c6702dc7cd}
DE	Lime sand brick Silka - Xella Baustoffe GmbH (Module A1 - A3)	agg	Sphera-EPD	{41b7a5cf-f509-4b0d-bd9b-0fa2b470741b}
US	Low-VOC membrane adhesive manufacturing (A1-A3) - SPRI	agg	Sphera-EPD	{e6e3a8e4-b6eb-4c84-9565-2ef7edfbba46}
DE	Methacrylate resin products. highly-filled. flow coatings - Deutsche Bauchemie e.V.(DBC) (A1-A3)	p-agg	Sphera-EPD	{83013d5e-500a-48c7-919b-f6a91d2bb587}
DE	Methacrylate resin products. highly-filled. flow coatings - Deutsche Bauchemie e.V.(DBC) (A5)	p-agg	Sphera-EPD	{6efc0e89-b322-4730-9837-081f7c2c011a}
DE	Methacrylate resin products. highly-filled. mortar - Deutsche Bauchemie e.V.(DBC) (A1-A3)	p-agg	Sphera-EPD	{4176e95e-706d-4ea3-bee9-df254e9fd62e}
DE	Methacrylate resin products. highly-filled. mortar - Deutsche Bauchemie e.V.(DBC) (A5)	p-agg	Sphera-EPD	{dd6abc89-a215-45dd-8197-9766c151471f}
DE	Methacrylate resin products. unfilled or low-filled - Deutsche Bauchemie e.V.(DBC) (A1-A3)	p-agg	Sphera-EPD	{2c70d7fb-4658-418f-b1a7-44c9a094436e}
DE	Methacrylate resin products. unfilled or low-filled - Deutsche Bauchemie e.V.(DBC) (A5)	p-agg	Sphera-EPD	{95d26e07-e6df-4969-9f75-c29531717112}
DE	Methacrylate resins as binding agents for MA resin products - Deutsche Bauchemie e.V.(DBC) (A1-A3)	p-agg	Sphera-EPD	{3b4311fe-4943-4cd0-9c39-e023cecec38f}
US	Mill Finished Aluminum Extrusion - FRONTIER (A1-A3)	agg	Sphera-EPD	{71726bbd-85fc-41db-a43f-614827635fa1}
DE	Mineral insulating board Multipor - Xella Baustoffe GmbH (Module A1 - A3)	agg	Sphera-EPD	{dcb37b83-04f7-4569-99bb-401e99573d0f}
DE	Mineral panel. 1 m2. WETEC. (A1-A3)	agg	Sphera-EPD	{27c95712-eb0d-464a-9577-61b14c45025c}
DE	Modified mineral mortars. group 1 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{0af843df-2527-41b3-bdb7-38222a1c0de9}
DE	Modified mineral mortars. group 1 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{d99ded71-e589-4a49-956d-40b61ac22a04}
DE	Modified mineral mortars. group 2 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{1b363af8-3fd9-434f-9eb8-1bb0168277f0}
DE	Modified mineral mortars. group 2 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{3ee54194-0615-484c-8721-4f58a41cd35f}
DE	Modified mineral mortars. group 3 - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{7850b0ab-d16b-4373-ad65-54578c5c7aad}
DE	Modified mineral mortars. group 3 - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{1ba832b9-48de-4500-b28c-69dc0d7ab9c6}
US	Non-reinforced ethylene propylene diene monome roofing membrane.45 mils (A5)- Carlisle	agg	Sphera-EPD	{0b5ba5a8-1cca-495d-a32f-ddfb676c4aaa}
US	Non-reinforced ethylene propylene diene monome roofing membrane.60 mils (A5)- Carlisle	agg	Sphera-EPD	{0a709e97-f4c7-40e2-a038-5570eea0217d}
US	Non-reinforced ethylene propylene diene monome roofing membrane.90 mils (A5)- Carlisle	agg	Sphera-EPD	{889b95ba-2bc4-46f9-90b8-64ff8e9e2635}
US	Non-reinforced ethylene propylene diene monomer roofing membrane [45mils] (A1-A3) - Carlisle	agg	Sphera-EPD	{19e0907d-ee9a-48c8-90ea-55d2fa30f657}
US	Non-reinforced ethylene propylene diene monomer roofing membrane [60mils] (A1-A3) - Carlisle	agg	Sphera-EPD	{e76a6b5d-fbb9-4561-b719-adead70fdc5f}
US	Non-reinforced ethylene propylene diene monomer roofing membrane [90mils] (A1-A3) - Carlisle	agg	Sphera-EPD	{a3e813be-cafc-41fc-8280-03e0d9030e3b}
DE	Normal cementitious plaster /Finishing cementitious plaster - IWM (A1-A3)	p-agg	Sphera-EPD	{b6d171b9-6b15-4020-8956-1a84f8e86dc5}
DE	Normal cementitious plaster /Finishing cementitious plaster - IWM (A5)	p-agg	Sphera-EPD	{de7f32d2-9860-46bd-be3b-9f6f11190303}
DE	Normal cementitious plaster /Finishing cementitious plaster with particular properties - IWM (A1-A3)	p-agg	Sphera-EPD	{9a2ee66b-b95f-44f3-9ed1-7b96fd4fd743}
DE	Normal cementitious plaster /Finishing cementitious plaster with particular properties - IWM (A5)	p-agg	Sphera-EPD	{1eec34b5-ba42-4c55-bdbf-d08be6f6d908}

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DE	Normal masonry mortar - IWM (A1-A3)	p-agg	Sphera-EPD	{2437950a-2946-464d-a4e5-65e3c7a92675}
DE	Normal masonry mortar - IWM (A5)	p-agg	Sphera-EPD	{ccd4443d-4d1e-4b01-9a6d-b0ad01c5f980}
EU-28	Oriented Strand Board (OSB) (4.5% Humidity) - Kronoply (A1-A3)	agg	Sphera-EPD	{33b800a7-ceb2-4340-b604-1e1cc74cc737}
RNA	Painting of aluminum extrusion. AEC	p-agg	Sphera-EPD	{0b0415f1-57ec-48eb-a245-852eda74c403}
DE	Particle board. StoVentec 12mm- StoVerotec GmbH (A1-A3)	agg	Sphera-EPD	{fc3c9bfd-0f1e-4206-97af-ef5cc4d203e5}
DE	Particle board. StoVentec 12mm- StoVerotec GmbH (C4)	agg	Sphera-EPD	{9538852b-4267-4a8e-b495-4341df1b275a}
DE	Particle board. StoVentec 20mm- StoVerotec GmbH (A1-A3)	agg	Sphera-EPD	{f69111e2-da82-49fe-8240-4527daf33688}
DE	Particle board. StoVentec 20mm- StoVerotec GmbH (C4)	agg	Sphera-EPD	{8924efd8-de77-49b2-9e81-3ec415c86c13}
BE	Plaster baseboard BLUCLAD - Eternit (A1-A3)	agg	Sphera-EPD	{647bfa3a-bafc-48e1-9ec7-a8f53b2f183f}
DE	Powder coating based on epoxy resin) (EN15804 A1-A3)	agg	Sphera-EPD	{66ac29da-dee0-4787-b92f-38c2837b060c}
DE	Powder coating based on polyester (EN15804 A1-A3)	agg	Sphera-EPD	{f3af9882-7ae1-4017-8cb8-f6632162c02e}
DE	Powder coating based on polyester/epoxy resin (EN15804 A1-A3)	agg	Sphera-EPD	{4aa038d4-e993-4049-9818-ea7344ffa2de}
CH	Powder coating IGP-DURA®face 5807 - IGP Pulvertechnik AG (A1-A3)	p-agg	Sphera-EPD	{29c0b645-c574-42a0-8011-17381637deed}
CH	Powder coating IGP-HWFclassic 5903 - IGP Pulvertechnik AG (A1-A3)	p-agg	Sphera-EPD	{99558e38-9da4-4b46-a3fb-e3c3c582bdf5}
DE	Pressure laminate Flex - Egger (A1-A3)	p-agg	Sphera-EPD	{1cbc18ad-0506-42df-a7e6-b198e5d2bc79}
DE	Pressure laminate MED - Egger (A1-A3)	p-agg	Sphera-EPD	{72496d99-8106-4c95-8cfd-a6dea0472bab}
DE	Pressure laminate Micro - Egger (A1-A3)	p-agg	Sphera-EPD	{6a00be33-769b-4940-87bf-05fa62e157e0}
ES	Prewetheared Zinc sheet elZinc Slate - Asturiana de Laminados (A1-A3)	agg	Sphera-EPD	{bbca517b-9ebd-4f97-9279-0baeb9d88792}
DE	Primers and facade paints."Grundierungen 3710 and 3644" - Brillux (A1-A3)	agg	Sphera-EPD	{8639aaa3-9eda-49b4-8b80-47492a055b3e}
DE	Production (A1-A3) Lucobit 1210A (ECB)	agg	Sphera-EPD	{5683c209-e00e-4cbe-a92d-cdeb3cf1519b}
DE	Production (A1-A3) Lucobit 1235 (ECB)	agg	Sphera-EPD	{779527de-9e1f-48d4-b226-26a93923312b}
EU-28	PU insulation block foam (EN 15804 A1-A3)	agg	Sphera-EPD	{433704f4-75eb-4eed-8d5f-f5ef32f0067d}
AT	Raw chipboad EUROSPAN - Egger (A1-A3)	p-agg	Sphera-EPD	{80d12fb4-915d-415f-a86d-81d52085436d}
DE	Reactive resins based on polyurethane or SMP. filled or aqueous. solvent-free - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{896bcae0-8529-40f2-9994-a6898bdeafb2}
DE	Reactive resins based on polyurethane or SMP. filled or aqueous. solvent-free - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{8355b3d9-5ee3-48fc-9b3b-63e2c8e1ac27}
DE	Reactive resins based on polyurethane. containing solvent of <10% - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{20611054-dae3-4cf7-b262-d5da48b31f56}
DE	Reactive resins based on polyurethane. containing solvent of <10% - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{0046ad4b-a14f-4027-a35b-b8bbdd9d9164}
DE	Reactive resins based on polyurethane. containing solvent of 10%-50% - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{89689ec4-dced-4fb6-a91a-4364037cdf7f}
DE	Reactive resins based on polyurethane. containing solvent of 10%-50% - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{074d19f8-23f6-4ab1-a304-dbd6b26a0a28}
DE	Reactive resins based on polyurethane. unfilled/solventfree. containing polyols - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{d3b0d840-a915-4d24-b565-0dd1f32d91f0}
DE	Reactive resins based on polyurethane. unfilled/solventfree. polyol-free - DBC/IVK/VdL (A1-A3)	p-agg	Sphera-EPD	{549ef33d-4107-46ef-bec8-957c8b664bc2}
DE	Reactive resins based on polyurethane. unfilled/solventfree. polyol-free - DBC/IVK/VdL (A5)	p-agg	Sphera-EPD	{b8b7d843-4e26-491c-b42c-9458b7951c78}

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US	Reinforced ethylene propylene diene monomer roofing membrane [45mils] (A1-A3) - Carlisle	agg	Sphera-EPD	{43e83d5f-e4aa-483f-99ab-f29298344a61}
US	Reinforced ethylene propylene diene monomer roofing membrane [60mils] (A1-A3) - Carlisle	agg	Sphera-EPD	{c65878ee-cc4a-409a-87fc-ad163ba70b89}
US	Reinforced ethylene propylene diene monomer roofing membrane [75mils] (A1-A3) - Carlisle	agg	Sphera-EPD	{1dec6c5e-c04b-4c11-9e12-929b78d32203}
US	Reinforced ethylene propylene diene monomer(EPDM) single ply roofing membrane.45 mils (A5) -Carlisle	agg	Sphera-EPD	{cdde02d7-c6ad-4b20-a52e-92796de49c18}
US	Reinforced ethylene propylene diene monomer(EPDM) single ply roofing membrane.60 mils (A5) -Carlisle	agg	Sphera-EPD	{c009a2fe-b9e0-47f9-a3ec-72032ac146bd}
US	Reinforced ethylene propylene diene monomer(EPDM) single ply roofing membrane.75 mils (A5) -Carlisle	agg	Sphera-EPD	{cc815819-63b3-4d05-9e1e-240bf6fd8ba9}
DE	Reinforcement cementitious plaster - IWM (A1-A3)	p-agg	Sphera-EPD	{c7a59221-deb6-49b7-8576-8b2215345777}
DE	Reinforcement cementitious plaster - IWM (A5)	p-agg	Sphera-EPD	{35a46cf5-2d81-4e50-a69f-08b495a1f961}
CN	Resilient flooring. Halstead Expona Commercial (PVC). 1m2	agg	Sphera-EPD	{db1a805c-4343-4d75-9f95-33b15fa227d6}
CN	Resilient flooring. Halstead Expona Design (PVC). 1m2	agg	Sphera-EPD	{4da305c9-a081-45b1-bdb7-83891e9d1283}
CN	Resilient flooring. Halstead Expona Domestic (PVC). 1m2	agg	Sphera-EPD	{726bc1ba-6bdd-4b05-af12-f11e61b2e0d8}
FI	Resilient flooring. Upofloor. synthetic thermoplastic polymer. EN 14565. 1m2	agg	Sphera-EPD	{bd3ff061-97f7-4287-8f37-73688901a21b}
DE	Rock mineral wool. DDP - Knauf Insulation (A1-A3)	agg	Sphera-EPD	{1326a599-3572-462b-9158-ee7aa4e93df5}
DE	Rock mineral wool. DDP - Knauf Insulation (C4)	agg	Sphera-EPD	{c05457ef-b158-4bbd-8d1a-0dd431b733b3}
DE	Rock mineral wool. DDP - Knauf Insulation (D from C4)	agg	Sphera-EPD	{d0028f4d-4133-4e65-b091-f1601820549d}
DE	Rock mineral wool. DDP-RT - Knauf Insulation (A1-A3)	agg	Sphera-EPD	{3eb1aa2c-2d92-455c-b47a-59330df09402}
DE	Rock mineral wool. DDP-RT - Knauf Insulation (C4)	agg	Sphera-EPD	{5d1c6271-a861-4b81-af0c-ca6e0428656e}
DE	Rock mineral wool. DDP-RT - Knauf Insulation (D from C4)	agg	Sphera-EPD	{25673c17-3a0d-451c-85a9-f9713e7a60ca}
DE	Roofing and facade Panel - Eternit (A1-A3)	agg	Sphera-EPD	{2d70fb29-f279-4ecc-b57f-e9271302547b}
DE	Roofing membrane ECB. O.C. Plan 3020 - POLYFIN AG (A1-A3)	agg	Sphera-EPD	{4b2b36fc-c1e5-411a-a133-f837e539e036}
DE	Roofing membrane ECB. O.C. Plan 3020 - POLYFIN AG (A5)	agg	Sphera-EPD	{a5822c1e-c0f5-42ab-b2a7-0cad4351e344}
DE	Roofing membrane ECB. O.C. Plan 3020 - POLYFIN AG 0% recycling (C3)	agg	Sphera-EPD	{168b1b05-b32b-42d1-996c-36a5348297cf}
DE	Roofing membrane ECB. O.C. Plan 3020 - POLYFIN AG 0% recycling (D)	agg	Sphera-EPD	{f28905c1-6ca6-474a-b4b9-59eaf0a6fbf8}
DE	Roofing membrane ECB. O.C. Plan 3020 - POLYFIN AG 100% recycling (C3)	agg	Sphera-EPD	{3ce7b217-65cf-407a-b793-ff6c7b9371d0}
DE	Roofing membrane ECB. O.C. Plan 3020 - POLYFIN AG 100% recycling (D)	agg	Sphera-EPD	{469ce5d5-7aa4-451d-bb58-a816a26fdcad}
DE	Roofing membrane ECB. O.C. Plan 4230 - POLYFIN AG (A1-A3)	agg	Sphera-EPD	{9c76e1ea-b40c-408c-b7fc-8f2712bf7fe9}
DE	Roofing membrane ECB. O.C. Plan 4230 - POLYFIN AG (A5)	agg	Sphera-EPD	{ac102c1f-b977-4079-8d71-1e7b062fdeaf}
DE	Roofing membrane ECB. O.C. Plan 4230 - POLYFIN AG 0% recycling (C3)	agg	Sphera-EPD	{27a9a717-00b5-4205-9a44-282fb433dc05}
DE	Roofing membrane ECB. O.C. Plan 4230 - POLYFIN AG 0% recycling (D)	agg	Sphera-EPD	{5c8aa1ec-e028-4c6d-aa83-85f09b3c3275}
DE	Roofing membrane ECB. O.C. Plan 4230 - POLYFIN AG 100% recycling (C3)	agg	Sphera-EPD	{f647c6b3-9995-4bb3-9034-c3b1166cf893}
DE	Roofing membrane ECB. O.C. Plan 4230 - POLYFIN AG 100% recycling (D)	agg	Sphera-EPD	{4b84f06e-3f21-4241-81ac-fb09045b4cdf}
DE	Roofing membrane FPO. Polyfin 3020 - POLYFIN AG (A1-A3)	agg	Sphera-EPD	{17d2ab12-827f-40e2-829f-384dbaa4b31d}

Country	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*
DE	Roofing membrane FPO. Polyfin 3020 - POLYFIN AG (A5)	agg	Sphera-EPD	{577e9f00-b214-43cf-a92b-91dcdc8f9a50}
DE	Roofing membrane FPO. Polyfin 3020 - POLYFIN AG 0% recycling (C3)	agg	Sphera-EPD	{27fdb4ba-bc6e-4257-996e-8f63113f40a4}
DE	Roofing membrane FPO. Polyfin 3020 - POLYFIN AG 0% recycling (D)	agg	Sphera-EPD	{02bf92d3-1534-439e-ae17-e2e0eaf45a72}
DE	Roofing membrane FPO. Polyfin 3020 - POLYFIN AG 100% recycling (C3)	agg	Sphera-EPD	{441eae60-846b-42fa-b7d5-6172ce1d4c52}
DE	Roofing membrane FPO. Polyfin 3020 - POLYFIN AG 100% recycling (D)	agg	Sphera-EPD	{5ebdcac2-291b-4acb-b6b1-f76749b97992}
DE	Roofing membrane FPO. Polyfin 4230 - POLYFIN AG (A1-A3)	agg	Sphera-EPD	{ce5ad078-d940-4172-831d-1ac8a898e5ed}
DE	Roofing membrane FPO. Polyfin 4230 - POLYFIN AG (A5)	agg	Sphera-EPD	{0e257598-b32b-45d1-b908-e16f2f265609}
DE	Roofing membrane FPO. Polyfin 4230 - POLYFIN AG 0% recycling (C3)	agg	Sphera-EPD	{e5d9ef5d-c4da-4071-8095-337647463584}
DE	Roofing membrane FPO. Polyfin 4230 - POLYFIN AG 0% recycling (D)	agg	Sphera-EPD	{51e2f408-aa05-4cdd-bda6-b93547bcf17a}
DE	Roofing membrane FPO. Polyfin 4230 - POLYFIN AG 100% recycling (C3)	agg	Sphera-EPD	{86ea3e7f-6e83-4aa8-b3de-2c0889e7754d}
DE	Roofing membrane FPO. Polyfin 4230 - POLYFIN AG 100% recycling (D)	agg	Sphera-EPD	{c594fda6-2584-4790-99ba-37a556f63c9e}
DE	Roofing membrane PIB. Rhenofol CG 1.8 mm- FDT GmbH (A1-A3)	agg	Sphera-EPD	{3fe0f8ba-76f3-4684-8aca-f4e2a406fbcd}
DE	Roofing membrane PIB. Rhepanol fk 1.5 mm- FDT GmbH (A1-A3)	agg	Sphera-EPD	{ad12c447-7d4d-4474-a435-5d15abcb34cb}
DE	Roofing membrane PVC. Rhepanol hg 1.8 mm- FDT GmbH (A1-A3)	agg	Sphera-EPD	{cb61e594-47b5-47c0-920e-a9d6cefb1c3c}
DE	Roofing membrane RESITRIX MB+CL - CCM GmbH - (A1-A3)	agg	Sphera-EPD	{9c4a0e48-47d9-45b3-b6a2-114ca32c85df}
AT	Roofing tile - Initiative Ziegel (A1-A3)	agg	Sphera-EPD	{47a2ecb3-15ee-434a-83ee-3e8b0739a258}
EU-25	Rubber flooring smooth EN 1817	agg	ERFMI	{ad76e6db-ffdb-4bc5-8a68-3ea1bd06d359}
AT	Sandwich panel (facade) BRUCHAPaneel FP PU REP- Brucha (A1-A3)	p-agg	Sphera-EPD	{fe4b0adf-3e3c-4373-8804-5438cde46b6c}
AT	Sandwich panel (roof) BRUCHAPaneel DP PU REP - Brucha (A1-A3)	p-agg	Sphera-EPD	{a5a89855-f043-42d5-aafd-c4a38a4e186d}
AT	Sandwich panel (wall) BRUCHAPaneel WP PU REP - Brucha (A1-A3)	p-agg	Sphera-EPD	{8de359da-c4c6-45ad-b35d-2ba53fba73fa}
EU-28	Sandwich panel MiWo 100mm - EPAQ (A1-A3)	agg	Sphera-EPD	{683ccf0c-e2f4-468e-bec2-135496d7ad75}
EU-28	Sandwich panel PU 100mm - EPAQ (A1-A3)	agg	Sphera-EPD	{05e1f401-53be-4175-b692-38ca80d58575}
AT	Sandwich panels (facade) filled with mineral wool BRUCHAPaneel FP-F REP - Brucha (A1-A3)	p-agg	Sphera-EPD	{5675e8f0-7753-4656-a212-83125691b03f}
AT	Sandwich panels (roof) filled with mineral wool BRUCHAPaneel DP-F REP - Brucha (A1-A3)	agg	Sphera-EPD	{014a847d-3699-4fc7-a63a-fed19a325b6c}
AT	Sandwich panels (wall) filled with mineral wool BRUCHAPaneel WP-F REP - Brucha (A1-A3)	agg	Sphera-EPD	{03aa5ff1-b0d1-4e74-af1a-cbf0a69fc8cf}
DE	Sealants based on polysulfide - Deutsche Bauchemie e.V. (DBC) (A1-A3)	p-agg	Sphera-EPD	{83ca9f79-4c30-415b-b71a-20f58a8eff8f}
DE	Sealants based on polysulfide - Deutsche Bauchemie e.V. (DBC) (A5)	p-agg	Sphera-EPD	{f7e16360-e3ed-4589-b683-0950097864c8}
DE	Sealants based on silicone - Deutsche Bauchemie e.V. (DBC) (A1-A3)	p-agg	Sphera-EPD	{8dc1df27-e2f0-4a59-914e-3f02dbb69771}
DE	Sealants based on silicone - Deutsche Bauchemie e.V. (DBC) (A5)	p-agg	Sphera-EPD	{342a63d9-941e-43f9-a145-1baa9f278382}
DE	Silicat dispersion plaster - VdL (A1-A3)	p-agg	Sphera-EPD	{42691e6f-d69d-4714-af94-587f9f5c3007}
DE	Silicat dispersion plaster - VdL (A4)	p-agg	Sphera-EPD	{e72664a1-9fc7-4a45-99f3-1a0ca4ff9cb7}
DE	Silicat dispersion plaster - VdL (A5)	p-agg	Sphera-EPD	{c1f328da-43d2-4446-a305-b05dbcd686d2}

Country	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*
DE	Silicone resin plaster - VdL (A1-A3)	p-agg	Sphera-EPD	{7ee3a984-f185-4ac8-be28-a0ce7260b406}
DE	Silicone resin plaster - VdL (A4)	p-agg	Sphera-EPD	{f9ee9969-a44a-49fa-b8b8-ea1137c207b8}
DE	Silicone resin plaster - VdL (A5)	p-agg	Sphera-EPD	{40229088-8176-4365-8f1f-4afa891a4aba}
EU-28	Special mortar (Bulwark - joint mortar) - IWM (A1-A3)	agg	Sphera-EPD	{963bef67-aebb-4dac-b0f8-bb28f3a26d99}
DE	Stainless steel screw - EJOT (A1-A3)	p-agg	Sphera-EPD	{e27158a3-2720-448a-8f2f-f0d05a4e0217}
DE	Steel screw - EJOT (A1-A3)	agg	Sphera-EPD	{0860c140-a647-4fbe-a7a2-1d4e570affbd}
RNA	Steel specialty product- CISCA (A1-A3 & A5)	agg	Sphera-EPD	{3e7dc6ee-1d7e-488a-a468-2d5172cebeaa}
DE	Stone wool - Rockwool	agg	Sphera-EPD	{4c7f15d9-f7e0-4c11-84f5-29985b11d958}
EU-28	Structural Steel (sections and heavy plates) - bauforumstahl (A1-A3)	p-agg	Sphera-EPD	{3f1fc556-622c-4e9b-b51f-d220e929b364}
EU-28	Structural Steel (sections and heavy plates) - bauforumstahl (D)	agg	Sphera-EPD	{025dd3ce-e160-457b-9126-44724a5e1546}
US	Tarkett rubber sheet flooring (A1-A3)	agg	Sphera-EPD	{57164099-f55d-43d0-ba0b-eaf909640f1e}
US	Tarkett rubber sheet flooring installation (A5)	agg	Sphera-EPD	{3b3d42ac-e7a4-441c-af23-18c16a5ed416}
US	Tarkett rubber wall base installation (A5)	agg	Sphera-EPD	{a7b0a08e-eaaa-4be6-8ccd-81f3745eb147}
US	Tarkett thermoset rubber wall base (A1-A3)	agg	Sphera-EPD	{1cc7d32b-63bc-46e5-a031-5bd13431260f}
DE	Technical textile VALMEX® FR 1000 - Mehler Texnologies (A1-A3)	agg	Sphera-EPD	{b06c3139-4d45-45db-bcee-086974daf9a1}
DE	Technical textile VALMEX® FR 1000 - Mehler Texnologies (C2)	agg	Sphera-EPD	{d5bb65f0-1f63-469d-9653-de3b59fe0028}
DE	Technical textile VALMEX® FR 1000 - Mehler Texnologies (C4)	agg	Sphera-EPD	{47cb5e11-9682-4b48-8f13-964a741079ba}
DE	Technical textile VALMEX® FR 1000 - Mehler Texnologies (D)	agg	Sphera-EPD	{a3aecbf5-fde5-4a00-9bb6-03068c183c50}
DE	Texlon System - Vector Foiltec (A1-A3)	p-agg	Sphera-EPD	{ebf34cfc-44e6-4452-aaab-603c9b85c51b}
GLO	Texlon System - Vector Foiltec (A5)	p-agg	Sphera-EPD	{23dae2e8-585e-4538-b787-be446f553a8c}
GLO	Texlon System - Vector Foiltec (B6)	p-agg	Sphera-EPD	{d673f5d3-d35c-4c9d-95ac-11cfb5db12d8}
GLO	Texlon System 100% Incineration - Vector Foiltec (C4)	p-agg	Sphera-EPD	{40ec82c8-fcbc-445b-b83f-8f5bd8b633ad}
GLO	Texlon System 100% Incineration - Vector Foiltec (D)	p-agg	Sphera-EPD	{d1318853-ba5d-4d49-810a-fa6cdcae56de}
DE	Texlon System 100% Recycling - Vector Foiltec (C3)	p-agg	Sphera-EPD	{9510fb94-60ca-4878-bf3a-2b3efdcd039c}
DE	Texlon System 100% Recycling - Vector Foiltec (C4)	p-agg	Sphera-EPD	{60ffd9fc-5b74-48b2-9843-1564022ddc63}
DE	Texlon System 100% Recycling - Vector Foiltec (D)	p-agg	Sphera-EPD	{ef319c30-6b5d-4066-9bb9-ecae1f850a99}
DE	Thermal cementitious plaster EPS - IWM (A1-A3)	p-agg	Sphera-EPD	{d8364313-ad3c-4331-ab48-ace2cdaf30a3}
DE	Thermal cementitious plaster EPS - IWM (A5)	p-agg	Sphera-EPD	{35fbd1d0-6b7a-43fd-94d7-964ced476c2f}
US	Thermoplastic polyolefin (TPO) single ply roofing membrane [45 mils] (A5)-Carlisle	agg	Sphera-EPD	{ec5f3864-484d-4128-b1fe-8c24ead5a3ca}
US	Thermoplastic polyolefin (TPO) single ply roofing membrane [60 mils] (A5)-Carlisle	agg	Sphera-EPD	{579af7a6-dac8-4146-89c9-4ab396c26bfa}
US	Thermoplastic polyolefin (TPO) single ply roofing membrane [80 mils] (A5)-Carlisle	agg	Sphera-EPD	{cd9ba567-300d-4eb5-a6c7-6fabaebf85d6}
US	Thermoplastic polyolefin (TPO) single ply roofing membrane. 45 mils (A1-A3) - Carlisle	agg	Sphera-EPD	{55c6b476-a9b6-4b89-8439-d149ac915d5d}

Country	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*
US	Thermoplastic polyolefin(TPO) single ply roofing membrane. 60 mils (A1-A3) - Carlisle	agg	Sphera-EPD	{25977c91-d2dd-458a-826f-faf4a7f19104}
US	Thermoplastic polyolefin(TPO) single ply roofing membrane. 80 mils (A1-A3) - Carlisle	agg	Sphera-EPD	{0d8d26f8-ddb9-45ce-a862-c0ae2aad38f5}
DE	Thin-layer mortar /Mortar with particular properties - IWM (A1-A3)	p-agg	Sphera-EPD	{849f5569-b58b-495b-93df-2711fecb5bf5}
DE	Thin-layer mortar /Mortar with particular properties - IWM (A5)	p-agg	Sphera-EPD	{274adacc-c923-436c-8f89-cafd7af73ae0}
EU-28	Tiles and slabs from natural stone (average) - Euroroc (A1-A3)	agg	Sphera-EPD	{06bbf03c-5b42-4044-8fd9-0b204b6a5a04}
EU-28	Tiles and slabs from natural stone (average) - Euroroc (A4)	agg	Sphera-EPD	{ab197cdf-f16d-4e0b-96a0-f4227def5a3e}
EU-28	Waste incineration of glass/inert material	p-agg	ELCD/CEWEP	{60815257-bdaa-495a-a8da-163c5ed2439d}
EU-28	Waste incineration of paper fraction in municipal solid waste (MSW)	p-agg	ELCD/CEWEP	{77b31dcd-5acd-47bf-8b6e-d9eadfd8b136}
DE	Wood cement board Duripanel A2 - Eternit AG (D/1)	agg	Sphera-EPD	{a4edb40f-44a7-43cd-a64a-9fe06bcd4397}
DE	Wood cement board Duripanel A2 & B1 - Eternit AG (C3/1=C3/2)	agg	Sphera-EPD	{0ba62a88-2a42-468e-bf83-e14faf2d590f}
DE	Wood cement board Duripanel A2 & B1- Eternit AG (D/2)	agg	Sphera-EPD	{f20bf17a-392b-4e94-9cfc-c3b51a2f0a3b}
DE	Wood cement board Duripanel B1 - Eternit AG - (D/1)	agg	Sphera-EPD	{53af9284-c998-470a-90e2-4c4770186c70}
DE	Wood cement board Duripanel B1 & A2 - Eternit AG (C2)	agg	Sphera-EPD	{87a0f70c-073d-458b-a31b-fcff434e6ac2}
DE	Wood cement boards Duripanel A2 - Eternit AG (A1-A3)	p-agg	Sphera-EPD	{9bf4fe21-45d6-4e5b-ae8a-a6590d7333cb}
DE	Wood cement boards Duripanel B1 - Eternit AG (A1-A3)	p-agg	Sphera-EPD	{fec1629f-9c53-4f16-8124-0d437c61a5c7}
DE	XPS board with HBCD (EXIBA/FPX; DE mix) (A1-A3)	agg	Sphera-EPD	{b6251eec-c80d-4e27-986a-d9303d841866}
EU-28	XPS board with HBCD (EXIBA; EU mix) (A1-A3)	agg	Sphera-EPD	{723befed-6373-494a-91d7-2b02dc307e35}
US	YKK AP America aluminum curtain wall system (A1-A3)	p-agg	Sphera-EPD	{859e6c97-52a9-4652-b9de-80ade10660a7}
US	YKK AP America aluminum entrance system (A1-A3)	p-agg	Sphera-EPD	{3582fff2-26de-4813-98bf-394ff8240678}
US	YKK AP America aluminum storefront systems (A1-A3)	p-agg	Sphera-EPD	{aab08d18-b890-45d1-acba-fcf6dae857e3}
US	YKK AP America aluminum window system (A1-A3)	p-agg	Sphera-EPD	{2eab1d45-597e-47a0-96d3-684ed2537d85}
US	YKK AP America aluminum window wall system (A1-A3)	p-agg	Sphera-EPD	{57c3d2f2-0785-4323-9b55-4d24df854ffb}
US	YKK AP America sun control system (A1-A3)	p-agg	Sphera-EPD	{093460f3-9fd8-46b3-8513-eb06f9f2d03d}
US	YKK AP America terrace door system (A1-A3)	p-agg	Sphera-EPD	{64b7f4ba-ad7f-41df-b57c-72fa75552189}
ES	Zinc scrap elZinc - Asturiana de Laminados (D out A5)	agg	Sphera-EPD	{4167206a-c4ea-4a2d-8696-90e8ff9abfc7}

Annex III: Datasets with changed valuable substance flows

Flow changes are necessary in order to clearly specify outputs. or if the previous output/waste flow was not correct. This list is for information only. When updating a database during GaBi upgrade. the updater should automatically replace all flow connections used by the process.

Region	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*	Previous valuable substance flow name and GUID	New valuable substance flow name and GUID	Flow type
DE	Aluminium cast part machining (0.02 - 0.04 kg chip)	u-so	Sphera	{fe58962f-fe67-4b85-9716-4bb9108973ed}	Aluminium chips {C5A6AAFB-D261-4B1A-97CF-B23463F53DAD}	Aluminium chips (oil-contaminated) {2143448A-3D04-4D45-8D46-E5ADA2B5ACE3}	waste flow
DE	Aluminium cast part machining (0.02 - 0.3kg chip)	u-so	Sphera	{4a0d0540-fa7c-46c1-8dbf-874fbe17ffda}	Aluminium chips {C5A6AAFB-D261-4B1A-97CF-B23463F53DAD}	Aluminium chips (oil-contaminated) {2143448A-3D04-4D45-8D46-E5ADA2B5ACE3}	waste flow
DE	Aluminium sheet anodized (1 sqm/2.7 kg)	agg	Sphera	{c990583e-8659-45b8-9123-cdc1d9db4682}	Aluminium extrusion profile (anodised) {55E9AF32-C448-47F8-BC33-27BCD2916EB3}	Aluminum sheet (anodized) {8BAB2573-5FCA-4C77-822B-556722618AE5}	product flow
DE	Chloroprene rubber (Neoprene) 0.18kg	agg	Sphera	{053879fd-b6d4-47a7-aed7-01278d2b2008}	Plastic extrusion profile (unspecific) {1AC03B7C-0EED-47D7-964F-FD22BDD4C797}	Plastic profile CR (Chloroprene-Rubber) {486E3597-0BFA-4DE9-BDD1-54148CBEE27F}	product flow
DE	Chloroprene rubber (Neoprene) 1kg	agg	Sphera	{d5fd849a-9202-4192-9963-110e977d6217}	Plastic extrusion profile (unspecific) {1AC03B7C-0EED-47D7-964F-FD22BDD4C797}	Plastic profile CR (Chloroprene-Rubber) {486E3597-0BFA-4DE9-BDD1-54148CBEE27F}	product flow
GLO	Drum drying	u-so	Sphera	{9a76bc82-7db7-41bb-bcf7-1ad402d8e611}	Product (unspecified) {E946AAB4-7CA0-4DD7-A1BA-4C90EF6DBC44}	Product (dried) {A4ABD2A0-1152-4E84-BD87-25BA28A5E9FB}	product flow
GLO	Ferronickel (27% Nickel)	agg	Nickel Institute	{1671ea28-ebe1-4ec0-9277-abfbf2cbd5a8}	Ferro nickel (29%) {5C6F9360-4DE2-44E7-B239-B12176315F49}	Ferro nickel (27%) {70D5845E-BC32-491C-B5D7-6F4B1C7903B3}	product flow

Region	Process name	Type	Source	Process GUID *(Can be entered in the search tool)*	Previous valuable substance flow name and GUID	New valuable substance flow name and GUID	Flow type
CN	Ferrosilicon (75%) production	u-so	DLR/IMA/Sphera	{49a9b9dd-0db8-4bf9-941e-843a0f397479}	Ferro silicon (90%) {61DEABB1-4BF6-4975-9835-6E4326602676}	Ferro silicon (75%) {2D41ECB9-4BD4-4FCD-B03A-45963181133E}	product flow
CN	Magnesium production. pidgeon process	u-so	DLR/IMA/Sphera	{653fd903-2a29-4750-8ca5-15eed0682172}	Ferro silicon (90%) {61DEABB1-4BF6-4975-9835-6E4326602676}	Ferro silicon (75%) {2D41ECB9-4BD4-4FCD-B03A-45963181133E}	product flow
EU-28	Winter rape - consumption mixer	u-so	Sphera	{0b296ddb-af9f-4950-abfb-73bcbf6ce248}	Winter canola (rapeseed) (75% H2O content) {82CDBBE0-1D6F-48D3-9A37-77B0C40773C5}	Canola (rapeseed) seeds (15% H2O content) {E9985CC4-7471-4B33-9D70-0FB84B344B2B}	product flow

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