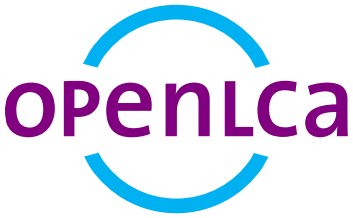
GaBi databases 2018 (Service Pack 36) in openLCA



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Content

1 GaBi databases 2018 – What's new?

As published by thinkstep[1] in the GaBi website, the GaBi databases 2018 include:

- More than 900 new processes have been added:
  - The GaBi Professional database grew considerably, with 189 new processes.
  - The Energy extension database grew by 152 processes that includes country-specific thermal energy and steam amongst others, while the Full US extension database grew by 156 processes related to steel frame roof and wall insulations, roofing systems, rubber sheet flooring and wall base, aluminium frame, to name a few.
  - With 413 new processes, End of Life extension database gained the maximum number of new processes, related mainly to material and country-specific waste-to-energy incineration data sets.
  - The rest of the new processes are included in extension database for construction, food & feed, India, Electronics and Inorganics.
  - Close to 12,000 LCI datasets available as part of gabi database

- Update of all datasets related to energy such as electricity, thermal energy, fuels, etc. (such as change in the reference year to 2014 for all electricity grid mixes and energy carrier mixes)
- Update of datasets related to precious metals, particularly platinum group metals (due to update of metal prices used in allocation of ore-to-metal value chains), renewable products, brick and roof tile amongst others.
- Harmonization and update of steel, deionised water, DE waste incineration, heat pumps, particles from sand & quartz mining, etc. etc.
- For land use assessment, the regionalization in mining and renewable resources datasets (agricultural and wood biomass) which cover the most important sectors of land occupation and transformation was further implemented and harmonized.
- Particles, such as "Dust, unspecified" have been reassigned as "Dust (PM10)" in the light of growing awareness and interest in particle sizes with regards to the environment. Furthermore, certain banned halogenated substances have been removed from the updated datasets, hence, reduced impact factors for ozone layer depletion potential for many datasets in the database.

[1] http://www.gabi-software.com/fileadmin/Documents/Upgrades_and_Improvements_in_GaBi_2018.pdf

- Update of impact assessment methods such as ReCiPe from ReCiPe 2016 to ReCiPe 2016 v1.1:
    - PM/Resp. Inorganics: Secondary particles included, with relevant increase for GaBi datasets in PM impacts (+5 to +500%)
    - Marine EP: added by method developers
    - Terr. Ecotox: corrected by method developers (emissions to urban soil excluded), Human non-cancer changed due to error-correction by ReCiPe method developers

2 GaBi databases 2018 in openLCA

Several modifications from the original ILCD package provided by thinkstep to GreenDelta were carried out during the implementation of the database in openLCA:

- Refactoring of flows to map it to their respective locations to avoid multiple entries of flows with same reference ids, but different locations. (Figure 1)

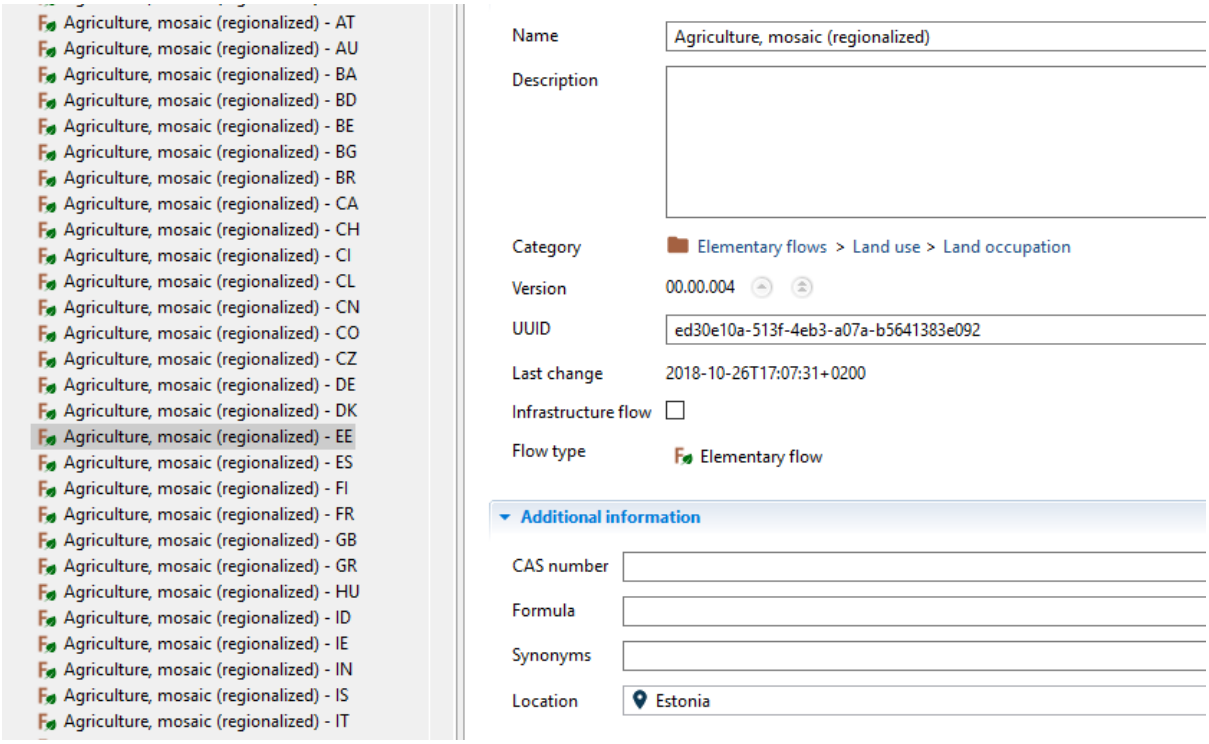

Figure 1: mapping flows to the assigned locations

- Refactoring of categories for the flows in the database: the original ILCD package contained a structure of categories with duplicate folders or inconsistent organization (Figure 2).

Figure 2: Before refactoring on the right, after refactoring on the left

- Adapt the GaBi datasets to the modelling requirements of openLCA (e.g. mapping of flow properties and unit groups from openLCA to the gabi flows, etc.).
- Addition of gabi data quality system for the first time with gabi databases in openLCA. (Figure 3)

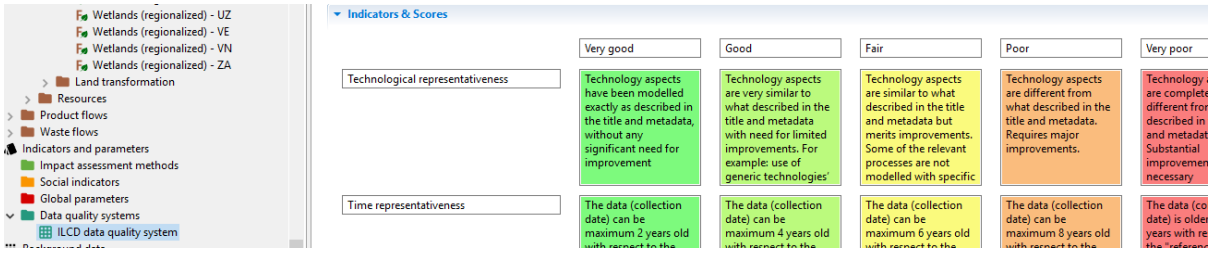

Figure 3: ILCD Data quality system for the gabi databases

- Implementation of GaBi Impact Assessment methods in openLCA, which can be imported separately through the JSON-LD format. These methods are designed specifically for the new GaBi sp36 databases. Users should keep in mind that using any other impact assessment packages might lead to inaccurate results. (This is because the flows in the other method packages are not mapped to the flows in the exchanges of the GaBi sp36 databases. This was done to maintain the originality of the GaBi databases in openLCA)

- With the expansion in the capabilities of openLCA[3], it is now possible to have quantitative references on the input side, thereby, eliminating the issues with waste modelling or processes having no quantitative references on the output.

The next sections contain specific information about some of the modifications done, as well as tips and recommendations for the usage of the GaBi databases in openLCA.

2.1 General modelling

GaBi databases are created with the LCA software GaBi and, therefore, the structure of their datasets is, in some cases, highly influenced by the type of modelling carried out in that software. For instance, it includes:

- Graphical modelling: the user creates the connections in the supply chains manually in the model graph; automatic connections are not feasible. That is one reason because most of the datasets included in GaBi databases are either fully aggregated or partially aggregated processes (i.e. creating thousands of linkages manually as when using unit processes might require too much effort).
- The same flow can be generated by multiple processes within the database (e.g. "electricity", by all electricity mixes).
- Default providers cannot be set within the software, neither are supported by ILCD, which is the format used by thinkstep to provide to GreenDelta the datasets.

Due to all the above-mentioned conditions, it is strongly recommended to create the product systems only linking the default providers for GaBi databases in openLCA. Therefore, please remember to select the "Only link default providers" option in the product system wizard (Figure 4) for provider listing, when creating new product systems.

In case of selecting the "prefer default providers" option in the product system wizard (Figure 4) for provider listing, please check the model graphs to eliminate the unwanted providers to avoid miscalculations in the impact assessment.

[3] http://www.openlca.org/openlca/new/

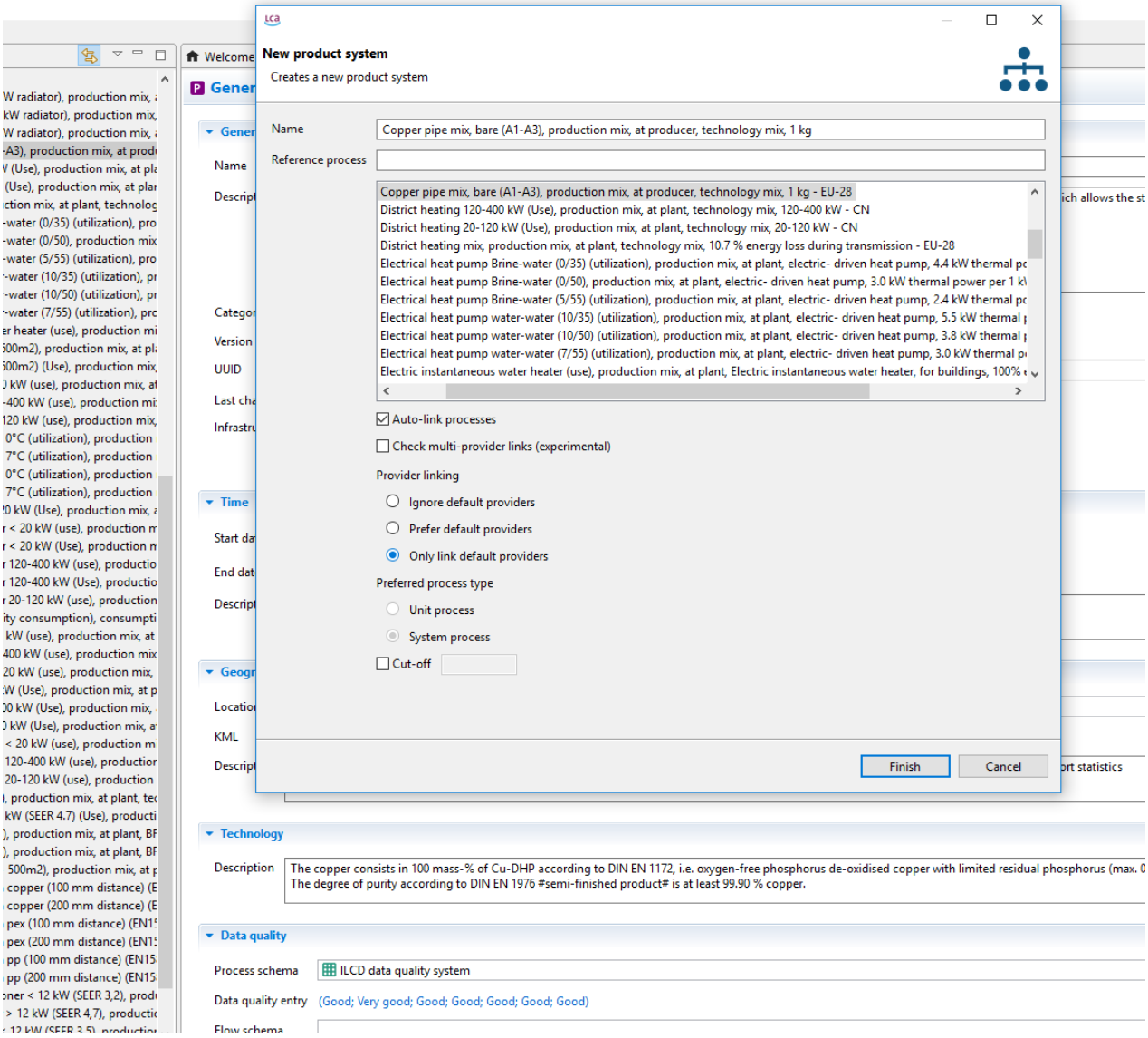

Figure 4: wizard for creating a product system in openLCA 1.7.4

3 Feedback & Contact

If you have other questions not addressed by this document, or should you need further clarifications on any of the points commented, then please contact us:

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