



Technical Helpdesk for National LCA Databases

Frequently Asked Questions

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Q1. What is a Life Cycle Assessment (LCA) database?

An LCA database is constituted by the following elements:

1. **An LCA data repository:** typically a database file structured particularly for LCA data, but it may also be a collection of separate LCA data files, LCA raw data or modeled datasets.

LCA data is the data needed to perform an LCA study. Typically LCA data is categorized as LCI data, which is data needed for the Life Cycle Inventory step of an LCA, and Impact Assessment data, which is data needed to perform an impact assessment of a life cycle inventory. One may also refer to LCA data when addressing results of partial or whole LCA. Hence, an LCA database is a repository of LCI and/or Impact Assessment data.

2. **A database software system:** typically consists of a file management system and server functionality that allows database administrators to manage the database system and allows data users to add, update and access data in the repository.

3. **A database management organization:** describes how the data repository is managed and accessed, including aspects such as data quality review, data access and pricing policies. Typically these policies are stated in an online or stand-alone document often referred to as an operating policy or operating charter.

Q2. Are there any international standards for LCA databases?

There is no standard for databases *per se*. In 2011 the Life Cycle Initiative published the results of an intensive expert workshop that developed guidance for LCA databases. The report, titled “Global Guidance Principles for LCA Databases: A basis of greener processes and products”, also known as the “Shonan Guidance Principles”, is available in the documents section of the Helpdesk.

The closest to an International standard for LCA data formats presently is the Technical Specification (TS) in ISO14048 describing an LCI data documentation format. Though it is a specification developed within the international standardization body of ISO, as a precursor for all modern LCA data formats, it still does not specify how to smoothly convert between different, ISO14048-compliant, LCA data formats. Since the publication of the TS, many formats have been created that are ISO compliant and all have been deployed in databases, both public and commercial.

Its focus is limited to data sets and excludes both databases and also product system models (or, in effect, aggregated datasets). TS 14048 has an “insufficient scope” to cover the activities of the helpdesk, and in addition it does not explicitly describe a number of format aspects, e.g. format conversion.

For additional details see the Data and Database Training package, Part 8 in the Helpdesk Document Resources library.



Q3. What type of software or system is best for setting up a national database?

There is no simple correct answer for this question. Databases can be set up in various desktop, web-based or cloud-based applications. While simple spreadsheet systems have been used in some instances, there are many more capable applications that should be considered with a qualified IT professional. Criteria for selection of the software or system include: flexibility to contain needed data and meta-data, ability to expand as more datasets or data fields are needed, ease of importing raw data and creation of new datasets, compatibility with external databases and networks, convenience of delivering data to users, and support for multiple exchange formats, or at least currently used international ones, such as ecospold2, ILCD, or JSON LD2. More on this topic may be found on the Helpdesk in the Data and Database Training package, especially Part 8.

Q4. What information is available to help me get started?

The LCA Databases Helpdesk has supported the creation of a training module on national database development to support practices for data acquisition and database development. The current package contains eight modules covering the following topics:

- Relating data and databases to LCA software
- Raw data acquisition
- Secondary data acquisition
- Dataset modeling
- National dataset development by adjustment and regionalization
- Country-specific data modeling
- Datasets in databases, and
- Converting and linking datasets, databases, and LCA software.

The entire package is available in the document resources section of the Helpdesk. If you are a developer or prospective developer of a national database, you may also submit a specific question in the “Ask an Expert” forum of the Helpdesk. Experts who have signed up to collaborate on the forum may be able to provide additional information specific to your situation.

Q5. Is there a list or compilation of what databases are currently available or what they contain?

There is no comprehensive list of databases endorsed by the Technical Helpdesk. There is, however, a list of databases and their contents available on the openLCA Nexus site maintained by GreenDelta



(<https://nexus.openlca.org/databases>). This is not claimed to be comprehensive nor is it endorsed by the LCA Databases Helpdesk, but it is a good starting point. The Life Cycle Initiative (<http://www.lifecycleinitiative.org/>) has also developed a report titled “Opportunities for national life cycle network creation and expansion around the world, with a special focus on mainstreaming and LCA database development in emerging economies, based on a global survey”, available in the Helpdesk document resources, which identifies existing databases and LCA Networks. Since more new databases and regional networks are being established all the time, there is no guarantee that all databases are covered.

Q6. Are there experts who can support our efforts to establish a national database?

The Helpdesk has established a forum on the Exchange Space called “Ask an Expert”. While the experts are self-selected, anyone wishing to designate themselves as an expert has been asked to submit their qualifications for review by Helpdesk management. In most cases, you should be able to receive guidance to support your efforts. In certain instances the Helpdesk may be able to provide additional assistance. If you are unable to get the support you need through the experts’ forum or other online Helpdesk resources, please contact Helpdesk Management.

Q7. How to prioritize data collection for the purpose of populating national LCI databases?

Though there is no universally accepted guideline, it is important to make structured decisions about the strategy for how to populate the database. Most important is to have a clear target audience and supported applications in mind. Depending on the needs and interests of the target audience and the application, it may be concluded that export-oriented sectors may be targeted (specifically if the customers along the downstream supply chain require environmental declarations), or it may be concluded to prioritize sectors which contribute more to GDP or environmental burdens. Other possible approaches may be to include LCI datasets about resources used more prevalently in the target audiences’ intended LCA applications, such as energy production and transportation.

In cases where it is decided to use an existing set of background processes as a starting point rather than build the database from scratch, it may be appropriate to see which group of background processes are not representative of national conditions and prioritize those for the databases. Additional considerations may include:

- whether to prioritize impacts from natural resource depletion, industrial production, or consumption;
- whether to prioritize industrial, residential, or infrastructure/construction; or
- whether there are specific applications (such as energy production) that are of particular national interest.



Q8. How often should the LCI data be updated?

The simple answer is “whenever it is necessary”, and by this is meant when the dataset no longer meets its Goal and Scope requirements. In practice, this means that datasets that are highly dynamic, e.g. rapidly changing technologies, time-variable market mixes, new entrants to the processes, etc., will need more frequent updating. Especially for core processes in a database, those used in many LCI studies, such as electricity grids, transportation networks, and certain infrastructure, will need to be re-evaluated fairly frequently. It is hard to be specific but experts generally recommend at least assessing the process every two to three years to see if it still meets its defined attributes.

Most important is that the database management organization has a defined routine for review and updating of datasets, and that there is a conscious strategy in the operational budget for the updating.

Q9. I have heard the term GLAD referring to an international data project. What is it and how can I find out more?

GLAD is an acronym that stands for **Global LCA Data Access network**. It is an intergovernmental effort established in 2014 to address LCA and data quality for policymaking. The Global LCA Data Access network aims towards ‘a global network comprised of independently-operated and interoperable LCA databases, connecting multiple data sources to support life cycle assessment’ (<https://www.unep.org/resourceefficiency/what-we-do/assessment/life-cycle-thinking/global-lca-data-access-network>).

GLAD will be a website which provides users an interface to find and access life cycle inventory datasets from different dataset providers. GLAD delivers two main services: 1. **Find datasets** (through a search component, including globally agreed metadata descriptors); 2. **Use datasets** (by allowing their conversion and download into the user’s software, in the desired format). Essentially, GLAD will allow users to convert a dataset from its native format in the source database (node) into another format convenient for the user. This functionality is based on key metadata descriptors that will be required from datasets to be connected to GLAD in order to allow for interoperability between them, as well as a global mapping of flows nomenclature.

The platform will consist of a central portal and connected datasets (nodes) representing data providers who wish to share databases and datasets through the network with users around the globe. Nodes will be required to meet certain requirements for interoperability in order to be connected to GLAD. It is expected to launch the data network by the end of 2017 or early 2018.



Q10. Can my database become a part of Global LCA Data Access network (GLAD)?

The purpose of GLAD is to connect databases around the world for the purpose of data conversion and easy access by users. The main requirements for a database to become a node of GLAD are the following:

1. Conformance to a set of meta-indicators that ensures interoperability for all databases connected to the network. There are additional recommended indicators to assist users of the network to understand “fitness for purpose” in a particular study or application.
2. The other requirements for a database to join GLAD are adherence to harmonized nomenclature and being able to support common data formats in use.

If you would like to find out more about how to join the GLAD network, please get in touch with the Helpdesk administration (contacts provided on the Helpdesk website).

Q11. What are the differences between a unit process dataset and an aggregated dataset?

These concepts are defined and discussed in the Global Guidance Principles (Sonnemann and Vigon, 2011) in Annex 1 as well as Chapters 2 and 3. This document may be accessed and downloaded from the Helpdesk shared document library.

The ISO 2006 definition cited in the glossary of the Global Guidance Principles states that “a unit process is the smallest element considered in the life cycle inventory analysis for which input and output data are quantified”. On a more practical level, unit processes usually contain one or a small number of activities often within a facility boundary. They may be single or multi-product and allocated or unallocated.

Aggregated processes, as the name suggests, combine a number of unit processes through various forms of vertical (along the life cycle) or horizontal (across activities at the same stage of the life cycle) averaging. Unit process datasets are preferable because of increased transparency, but there may be business or technical reasons to aggregate. If aggregation is used the Global Guidance Principles provide recommendations on documentation of such datasets.

For additional information, please access the training resource on Datasets and Databases Development, Part 4 in the document library.

Q12. What are the key decisions in terms of organization and contents to be taken upfront before getting started?



Mainly these decisions have to do with who will use the database and for what purpose. The LCA Database Helpdesk is focused on national databases. This is not to say that only users within the country will be able to access and use the database, but rather that the intent is to capture data and create datasets that represent the typical situation within the country boundaries. This objective and the resulting collection of datasets has been referred to as a “core” database. The number of datasets contained in a core database is variable, depending on the size and complexity of the national economy, but can range from 200 to 600 datasets.

As might be expected, the contents of a core database are those processes which contribute significantly to the national economy, including central infrastructure such as the electricity grid. National databases are public but that does not necessarily mean that all of the contained data are derived from public sources. A national database developer will need to decide how particular datasets will be created, i.e. whether using primary or secondary data and how the average situation for the country will be calculated from the raw data.

For additional information, please access the training resource on Datasets and Databases Development, especially Parts 5 and 6, in the document library.

Q13. What are the differences between LCA software and LCA databases?

LCA databases are first and foremost structured information systems for storing data, usually in the form of unit process or aggregated datasets. A few databases also provide the national accounts data necessary to support extended input/output or hybrid (I/O plus process) inventory analysis. Additional features of databases may include the ability to import raw data or to export datasets in various exchange formats. In a few instances databases may also perform some modeling calculations, for example allocation.

LCA software, on the other hand, primarily performs the computational and modeling functions necessary to link datasets into a modeled LCI system and in many cases to compute both a life cycle inventory and apply impact characterization factors to produce a set of impact indicator results at the mid-point, end-point or a combination of both. LCA software may also support attributional and/or consequential LCA approaches.

For additional information, please access the training resource on Datasets and Databases Development, especially Parts 1, 4, 7, and 8, in the document library.