

Concept Development for Web-based Indonesian Life Cycle Inventory Database

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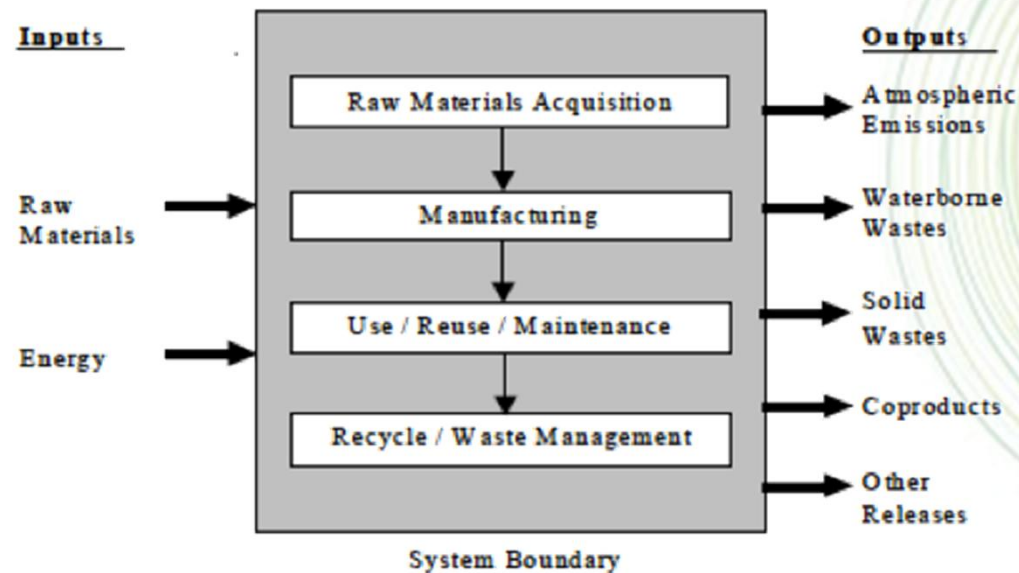
Universitas Pelita Harapan

Outline

- Life Cycle Assessment
- Life Cycle Inventory
- Benchmark
- Web-based LCI database process flow
- Roadmap
- Demo

Life Cycle Assessment

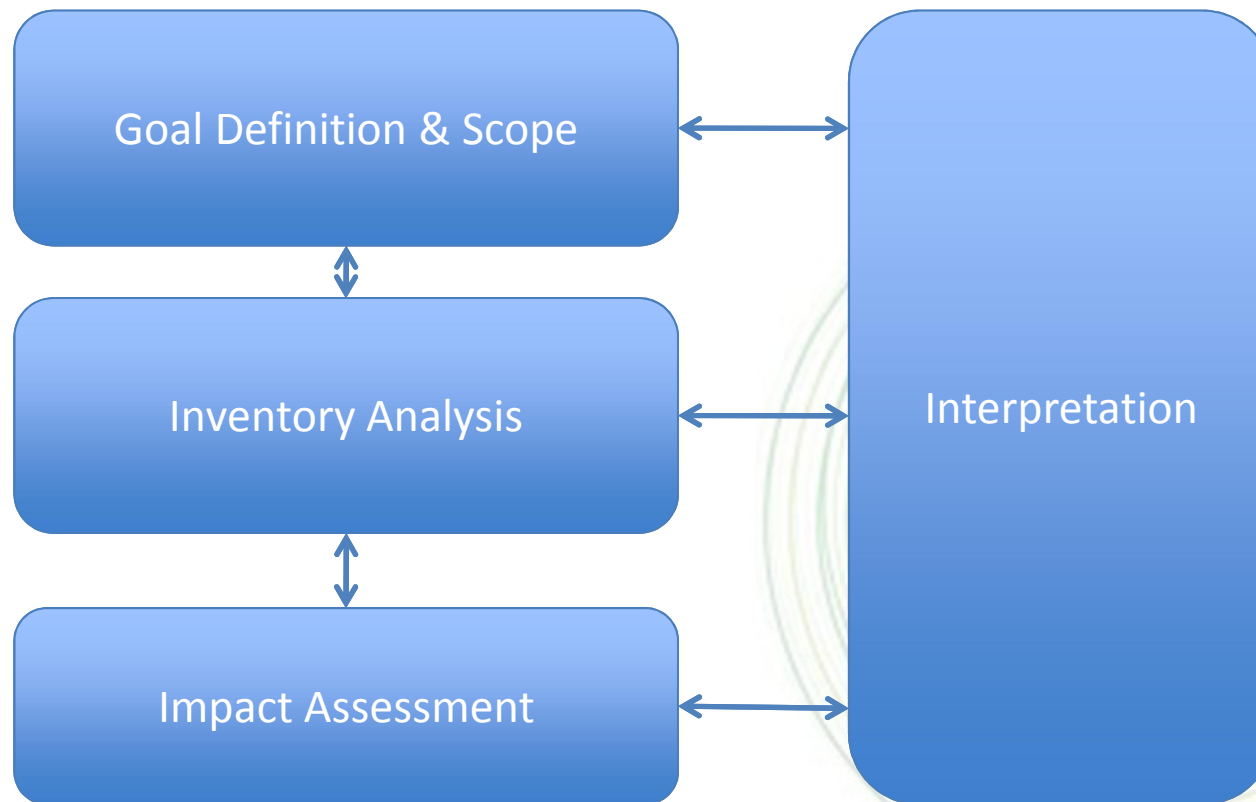
- “Cradle-to-grave” approach for assessing industrial systems
- LCA is a holistic environmental accounting procedure which quantifies and evaluates **all wastes** discharged to the environment and **raw materials consumed** throughout the entire life cycle, beginning with **sourcing** raw materials from the earth through **manufacturing** and **distribution** to consumer **use** and **disposal**



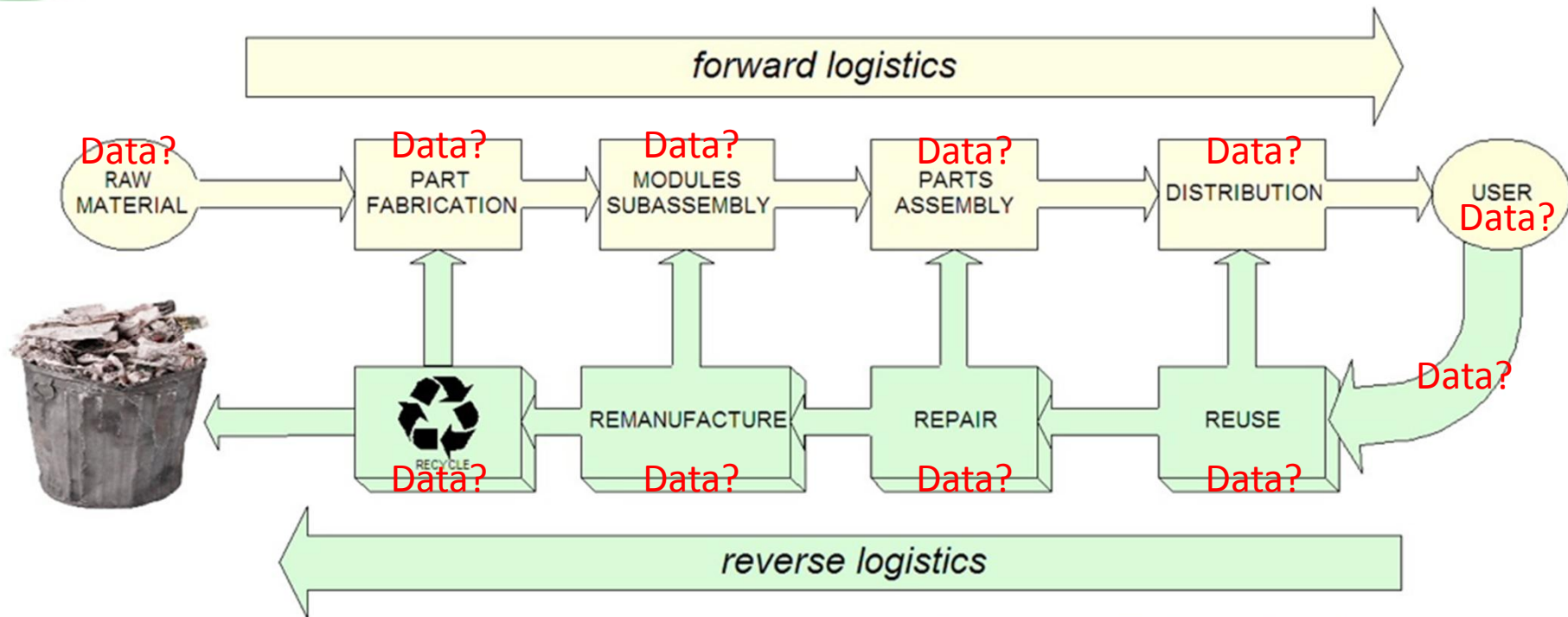
How?

- ✧ Compile an **inventory** of relevant energy and material inputs and environmental releases
- ✧ Evaluate the potential environmental **impact** associated with identified inputs and releases
- ✧ **Interpret** results for decision makers

Life Cycle Assessment Framework



Life Cycle Concept



(Hanafi et al, 2007)

Life Cycle Inventory

- LCI is a process of quantifying energy and raw material requirements, atmospheric emissions, waterborne emissions, solid wastes, and other releases for the entire life cycle of a product, process or activity
- Accurate data = reliable LCA process

Advantage of Life Cycle Inventory

- Process analysis
- Material selection
- Product evaluation
- Product comparison
- Policy making



**IDENTIFY “HOTSPOT”,
LESS ENERGY CONSUMPTION,
LESS RESOURCE CONSUMED, LESS WASTE,
ECOLABELING**

- Analogy to Scientific Management in Industrial and System Engineering:
- Collect data and time associated with data to improve process efficiency

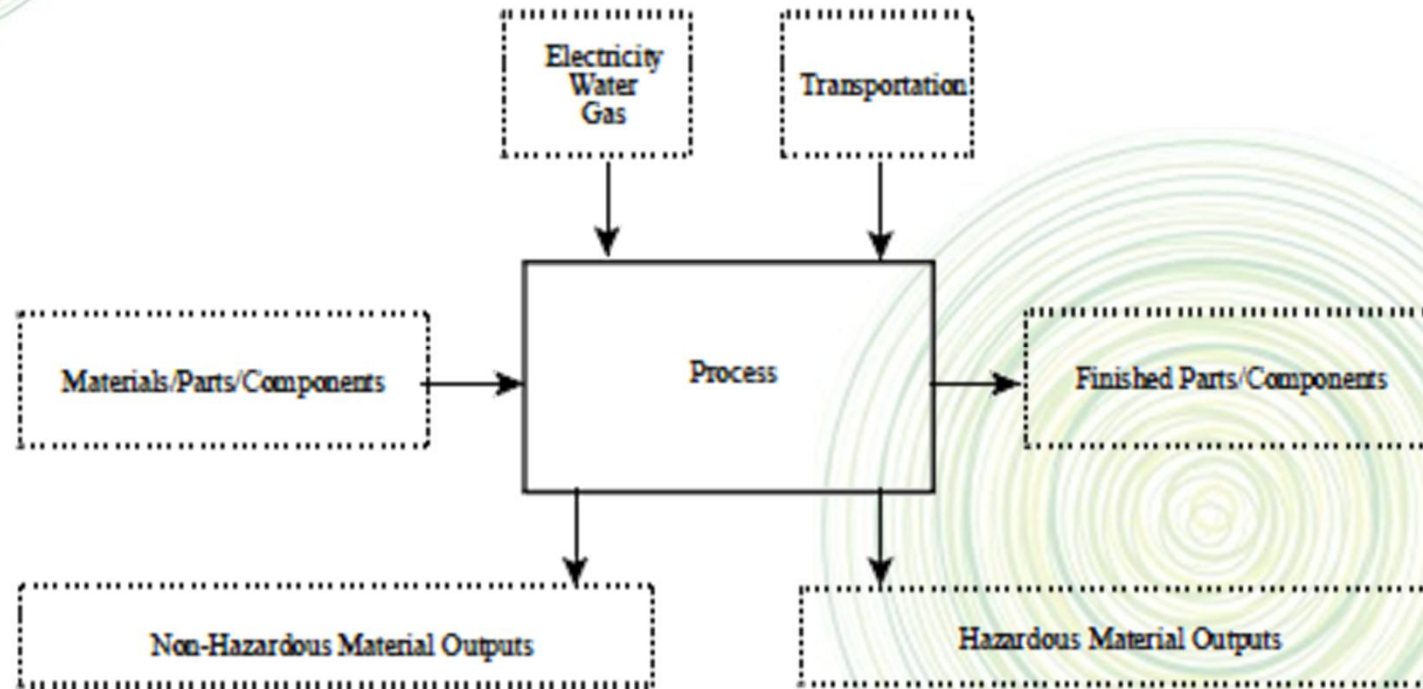


**JUST IN TIME,
LEAN MANUFACTURING,
EFFICIENCY**

Key Step in LCI

1. Develop flow diagram of process
2. Develop a data collection plan
3. Collect data
4. Evaluate and report results

1. Develop Flow Diagram of Process



Complex flow diagram →
greater accuracy and utility of the result →
more time and resources → more cost

2. Data Collection Plan

- Determining Data Quality Goals:
 - Framework of Time Vs. Resources Quality
 - Performance criteria
- Identifying data sources:
 - Meter readings from equipment,
 - industry data reports,
 - database,
 - lab results,
 - journals, papers, books,
 - government documents,
 - LCI studies,
 - equipment, process specifications
- Identify Data types, e.g. measured, modeled, sampled, non-site specific, non-LCI data, vendor data
- Identifying Data Quality Indicators
 - Benchmark to measure the quality of data collected, E.g. precision, completeness, representativeness, consistency, and reproducibility
- Developing a data collection worksheet and checklist
 - Purpose of the inventory
 - System boundaries
 - Geographic scope
 - Types of data used
 - Data collection procedures
 - Data quality measures
 - Computational spreadsheet construction
 - Presentation of results

3. Data Collection


- Research
- Site visit and direct contact with experts
- Commercially available LCA Software package
- Non-specific inventory data

PROBLEM


- Data is unavailable:
 - not measured,
 - not collected,
 - not analyzed
- Scattered data



The need for
centralized
DATABASE for
INDONESIAN LIFE
CYCLE INVENTORY



PROTOTYPE OF WEB-BASED INDONESIAN LIFE CYCLE INVENTORY DATABASE





The ecoinvent Database

The ecoinvent database provides well documented process data for thousands of products, helping you

- About the Project >
- Database >
- Publications >

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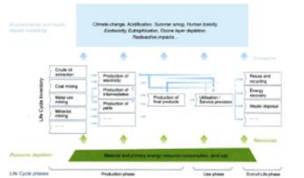
JOINT RESEARCH CENTRE

European Platform on Life Cycle Assessment

JRC > IES > EPLCA

Home About us Data & Models Methods Tools Resource Directory Library Forum

Data & Models > European Life Cycle Database



The European reference Life Cycle Database (ELCD) provides Life Cycle Inventory (LCI) data from front-end to back-end, covering the entire value chain. It is a key resource for running EU-level business associations for key materials, energy carrier management. Focus is to freely provide data that are required in a high performance European market context. Data is facilitated through compliance requirements of the Life Cycle Database.

well as through endorsement by the organisations that provide the data.

Data are accessible from the following link: [ELCD3.2](#)

U.S. Life Cycle Inventory Database



U.S. Life Cycle Inventory Database

Partners created the U.S. Life Cycle Inventory (LCI) Database to help life cycle inventory (LCI) practitioners answer questions about environmental impact. It provides individual gate-to-gate, cradle-to-gate and cradle-to-grave energy and material flows into and out of the environment that are associated with producing a material, component, or assembly in the U.S.

U.S. LCI Database project are:

- High data quality and transparency
- Commonly used materials, products, and processes in the United States
- Up-to-date, critically reviewed LCI data
- Expanded use of LCA as an environmental decision-making tool
- Compatibility with international LCI databases

FIND WHAT YOU NEEDED?

Did you find what you needed?

U.S. Life Cycle Inventory Database Roadmap



U.S. Life Cycle Inventory Database Dataset Additions



Access the U.S. Life-Cycle Inventory Database



- Home page
- Datasets
 - Agriculture
 - Bio based materials
 - Chemicals
 - Electricity
 - Materials
 - Transport
 - Waste treatment
- Licence agreement

About AusLCI

The Australian National Life Cycle Inventory Database (AusLCI) is a major initiative currently being delivered by the Australian Life Cycle Assessment Society (ALCAS). The aim is to provide and maintain a national, publicly-accessible database with easy access to authoritative, comprehensive and transparent environmental information on a wide range of Australian products and services over their entire life cycle. It is an invaluable tool for those involved in environmental assessment and particularly life cycle assessment (LCA), as it provides consistent guidelines, principles and methodologies for the collection of life cycle inventory (LCI) data, along with protocols for LCA processes for different sectors.

The project brings together stakeholders from industry, government and academia to develop a methodology to standardise the interpretation of ISO 14040 in Australia. The LCI database will then enable suppliers to use LCA to reduce environmental impacts and to appropriately promote the environmental attributes of their products and services.

The initiative will deliver substantial benefits to manufacturers and retailers, who may be able to use it to

in the [U.S. Life Cycle](#)

Database
 ing format: "U.S. Life
 gy Laboratory, 2012.
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BENCHMARK



JARINGAN INDONESIA UNTUK
 PENGKAJIAN SIKLUS HIDUP
 Indonesian Life Cycle
 Assessment Network



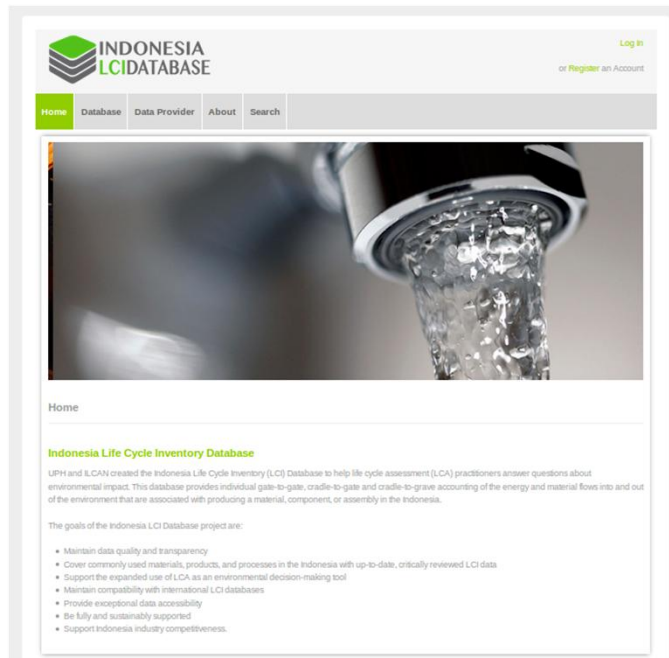
GOVERNMENT

INDUSTRY

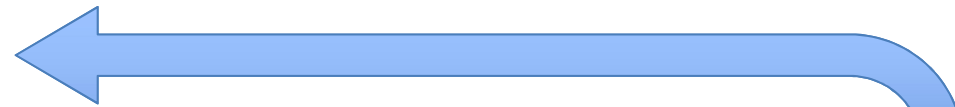
ACADEMICS



Submit Data Online



Feedback and revision



Review Process by



Data
OK?

YES

NO



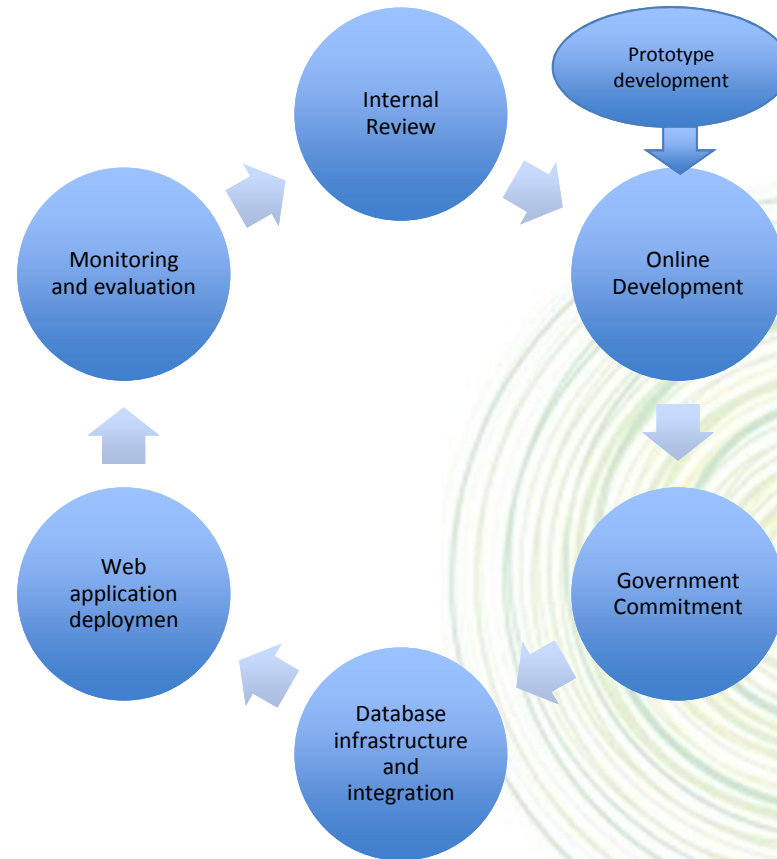
LIFE CYCLE ASSESSMENT



JARINGAN INDONESIA UNTUK
PENGKAJIAN SIKLUS HIDUP
Indonesian Life Cycle
Assessment Network



ROADMAP





DEMO



The screenshot shows the homepage of the Indonesia LCIDATABASE. At the top left is the logo, which consists of a green cube-like shape above the text 'INDONESIA LCIDATABASE'. To the right of the logo are links for 'Log in' and 'or Register an Account'. Below the logo is a navigation menu with 'Home' highlighted in green, followed by 'Database', 'Data Provider', 'About', and 'Search'. The main content area features a large image of water flowing from a faucet. Below the image, the text reads: 'Home', 'Indonesia Life Cycle Inventory Database', and a paragraph explaining that UPH and iLCAN created the database to help LCA practitioners. It also lists the goals of the project, such as maintaining data quality, covering commonly used materials, and supporting the expanded use of LCA.



Feedback and Comments are Welcome