



FROM UNIT PROCESSES TO COMPLETED LCAs: NETL LIFE CYCLE ANALYSIS LIBRARY

the **ENERGY** lab

Website: www.netl.doe.gov
Customer Service: 1-800-553-7681

Life Cycle Analysis at NETL

- Methodology includes the critical analysis of scope, assumptions, level of detail, data quality, interpretation of results, etc.
- Purpose is to perform and publish a transparent LCA
- NETL LCA studies are ISO 14040 compliant



Figure 1. Life Cycle Stage Definition

Unit Process Documentation

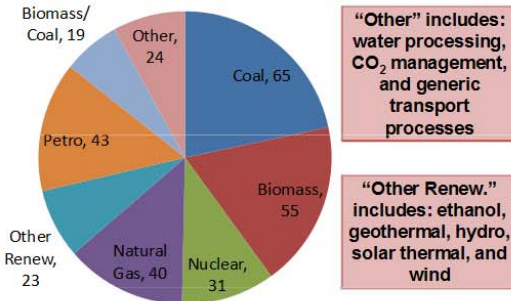
- Two primary documents – the process documentation file (DF) and the data summary sheet (DS)
- DS contains all of the parameters, inputs, and outputs for a given system as well as background data, calculations and quality scores
- DF contains major assumptions and data sources that are the basis for each of the unit processes
- All unit processes go through a full QA check prior to addition to the library

Figure 2. DF/DS Unit Process Documentation Screenshots

NETL Unit Process Library

- Now available on the NETL Energy Analysis website
- 300 unit processes are contained in the NETL library
- Includes unit processes from all 5 life cycle stages and a range of technologies
- Rollup unit processes represent a collection of smaller unit processes that provide cradle-to-gate inventory results for a more complex process (e.g. production of hybrid poplar or refined diesel fuel)

NETL unit processes can be accessed at:
www.netl.doe.gov/LCA



“Other” includes: water processing, CO₂ management, and generic transport processes

“Other Renew,” includes: ethanol, geothermal, hydro, solar thermal, and wind

Figure 3. Unit Process Breakdown by Technology

Upstream Dashboard Tool

- Now available on the NETL Energy Analysis website
- Provides users access to stage-wise life cycle inventory for a variety of feedstock options including coal, natural gas, biomass, uranium, and petroleum
- Built using unit processes from the NETL library
- Allows users to vary default parameter values (e.g. transportation distance, production rate, etc.) and view real-time inventory results
- Results include GHGs, criteria and other air emissions, water emissions, and water and energy use

Published LCA Product Library

- Role of Alternative Energy Sources Technology Assessments (2012):
 - Coal/Biomass Co-firing
 - Hydropower
 - Nuclear
 - Wind
 - Geothermal
 - Natural Gas
 - Solar Thermal
 - Technology Compilation
- NETL Upstream Dashboard Tool (2012)
- Life Cycle Greenhouse Gas Analysis of Advanced Jet Propulsion Fuels: Fischer Tropsch Based SPK-1 Case Study: Report and Model (2012)
- Life Cycle Greenhouse Gas Inventory of Natural Gas Extraction, Delivery, and Electricity Production (2011)
- Life Cycle Analysis: Ethanol from Biomass (2011)
- Life Cycle Analysis: Existing Pulverized Coal (EXPC) Power Plant (2010)
- Life Cycle Analysis: Natural Gas Combined Cycle (NGCC) Power Plant (2010)
- Life Cycle Analysis: Integrated Gasification Combined Cycle (IGCC) Power Plant (2010)
- Life Cycle Analysis: Supercritical Pulverized Coal (SCPC) Power Plant (2010)
- An Evaluation of the Extraction, Transport, and Refining of Imported Crude Oils and the Impact on Life Cycle Greenhouse Gas Emissions (2009)
- Development of Baseline Data and Analysis of Greenhouse Gas Emissions of Petroleum-Based Fuels: Report and Model (2008)

LCA reports and products can be accessed at:
www.netl.doe.gov/energy-analyses

Figure 4. NETL Upstream Dashboard Tool

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