NETL CO2U LCA Toolkit: Applications and Upcoming Updates
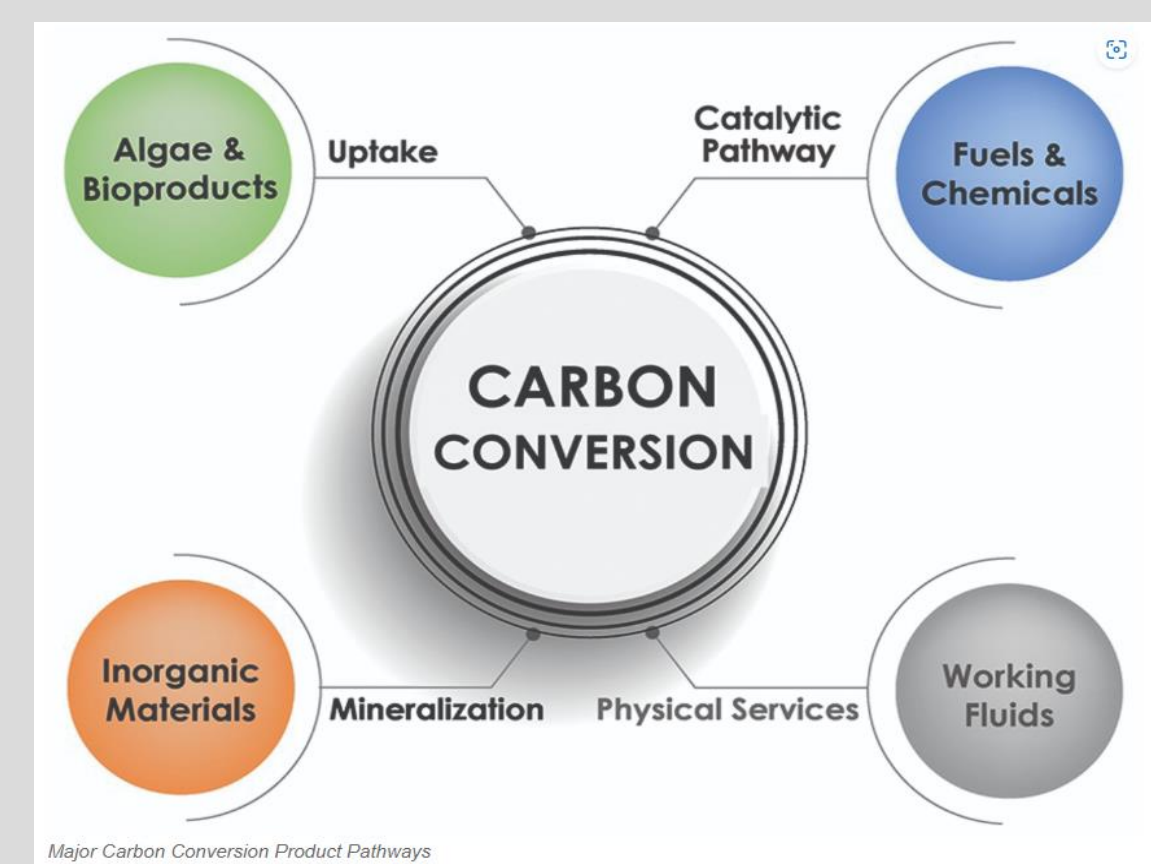
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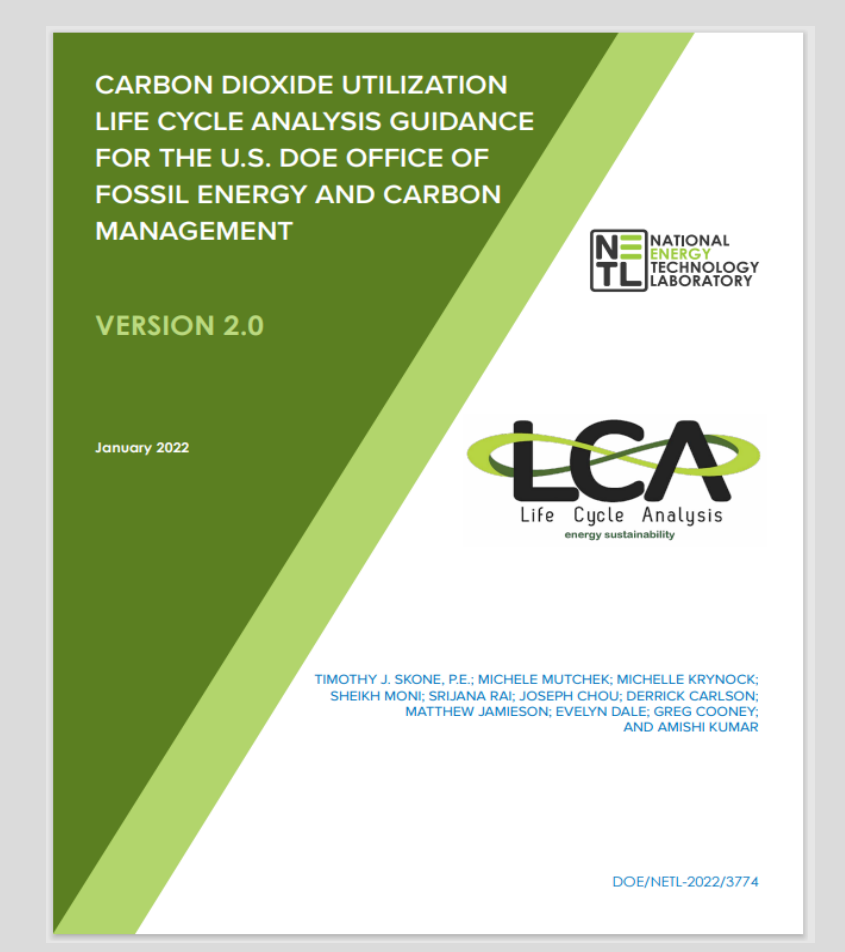Contact: sheikh.moni@netl.doe.gov; michelle.krynock@netl.doe.gov; LCA@netl.doe.gov

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Background

- Conversion of captured carbon dioxide (CO_2) into environmentally responsible and economically valuable products can play a significant role in meeting decarbonization goals.

- Life cycle analysis (LCA) aims to determine the potential environmental impacts and net life cycle greenhouse gas (GHG) reductions of carbon conversion technologies.

- In 2019, the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) developed a CO_2 utilization (CO2U) LCA Toolkit to support the creation of useful and consistent LCAs for carbon conversion projects.

- Initially, the NETL CO2U LCA Toolkit was intended to assist funding recipients with projects in the DOE Carbon Conversion Program and support program managers in decision-making.

- NETL also released an addenda to the CO2U LCA Toolkit to support the development of LCAs for Utilization Procurement Grants (UPGrants) and tax incentives, such as 26 CFR § 1.45Q-4, "45Q".

Major Carbon Conversion Product Pathways

NETL CO2U LCA Toolkit v2.1

CO2U LCA GUIDANCE DOCUMENT FOR THE U.S. DOE OFFICE OF FECM, VERSION 2.0
Analysis requirements and instructions for using the supporting data and tools

NETL CO2U LCA DOCUMENTATION SPREADSHEET
Excel file that can be used to document data when not using openLCA

TRAINING RESOURCES
Provided to funding recipients to aid in modeling an LCA

NETL CO2U OPENLCA LCI DATABASE VERSION 2.1
openLCA database that includes NETL unit process data and an example CO2U LCA

45Q ADDENDUM AND TOOLS
Information pertaining to the use of this toolkit in performing life cycle analyses in support of the 26 CFR § 1.45Q tax credit, including an addendum to the Guidance Document.

OPENLCA CONTRIBUTION TOOL
Excel template that translates openLCA results into required charts

NETL CO2U LCA REPORT TEMPLATE
Word report template for summarizing data and results

NETL ADDITIONAL DOWNLOADS
↓ Download Full Toolkit
↓ Patches, Archives, and Version History

Upcoming NETL LCA Toolkit Updates

1. LCA guidelines

- Expand guidelines for reactive capture and CO_2 removal.
- Expand guidelines for industrial CO_2 sources.

2. Life cycle inventory (LCI) data tools

- Expand and improve existing LCI database based on advancements in NETL LCA data and tools.
  - Additional LCI data (e.g., industrial carbon dioxide capture, carbon conversion pathways, example cases etc.).
  - Update and modification of existing datasets for more granular information, parameterization, and ease of use.
- Better consistency with LCA Commons datasets.
  - Update flows to Federal Elementary Flow List (FEDEFL) format (*mapping tools from openLCA reference flows to FEDEFL available from the EPA on GitHub*).
  - Incorporate EPA data quality index (DQI) framework.
  - Organize file structures to follow the North American Industry Classification System (NAICS) format.
- Update TRACI impact method (include new categories and IPCC GWP AR6).
- Transition to the openLCA v2.0 format.
  - Supports more geographical information and enhanced editing in model graph.
  - Will support models in openLCA v1.11 and v2.0 during the transition period.

3. Additional updates

- Modification of openLCA Excel contribution tool.

Existing LCA Guidance Documents

Additional Information

- Carbon conversion website: https://netl.doe.gov/carbon-management/carbon-conversion
- CO2U LCA guidance toolkit: https://netl.doe.gov/LCA/CO2U
- UPGrants website: https://netl.doe.gov/upgrants
- UPGrants LCA guidance toolkit: https://netl.doe.gov/LCA/UPGrants
- 45Q LCA Guidance Toolkit: https://www.netl.doe.gov/LCA/CO2U/45Q

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