

# Federal LCA Commons: Publishing Open and FAIR Data for LCA



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National Agricultural Library

***84<sup>th</sup> Discussion Forum on LCA***

September 21, 2023

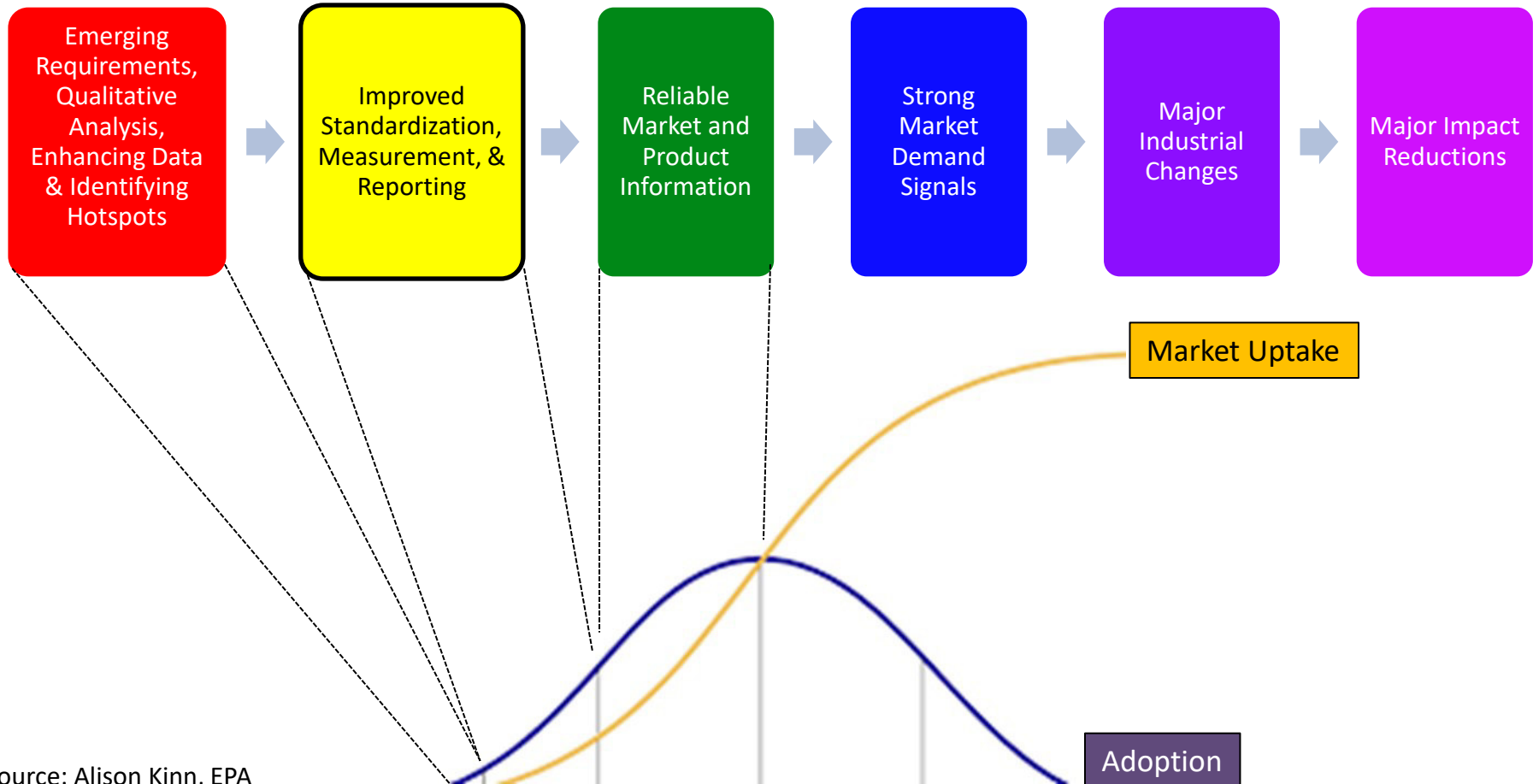


# Overview

- Theory of Change and Innovation Diffusion
- What is the Federal LCA Commons?
- Federal LCA Commons Data Repository
  - Data management and access infrastructure
  - LCA methods consistency
  - Consistent reference models and data

# Theory of Change\* and Innovation Diffusion

## Context of Environmental Information



\*Source: Alison Kinn, EPA

# Environmental Product Declarations (EPDs)?

“Nutrition Labels for Products”

Or to be precise, EPDs are a **specific form of LCA result.**

The NAL hosts the National Nutrient Database and Food Data Central, the foundational data product for nutrition labels. The **LCA Commons** can provide the **foundational data for EPDs.**

This Environmental Product Declaration (EPD) reports the impacts for 1 m<sup>3</sup> of ready mixed concrete mix, meeting the following specifications:

- ASTM C94: Ready-Mixed Concrete
- UNSPSC Code 30111505: Ready Mix Concrete
- CSI Section 03 30 00: Cast-in-Place Concrete

#### COMPANY

[REDACTED]

#### PLANT

[REDACTED]

#### EPD PROGRAM OPERATOR

**ASTM International**  
100 Barr Harbor Drive  
West Conshohocken, PA 19428



#### DATE OF ISSUE

06/15/2018 (valid for 5 years until 06/15/2023)

#### ENVIRONMENTAL IMPACTS

##### Declared Product:

[REDACTED]

Compressive strength: 4500 PSI at 28 days

##### Declared Unit: 1 m<sup>3</sup> of concrete

Global Warming Potential (kg CO <sub>2</sub> -eq)	475
Ozone Depletion Potential (kg CFC-11-eq)	1.0E-5
Acidification Potential (kg SO <sub>2</sub> -eq)	2.43
Eutrophication Potential (kg N-eq)	0.56
Photochemical Smog Creation Potential (kg O <sub>3</sub> -eq)	60.3
<b>Total Primary Energy Consumption (MJ)</b>	<b>3,779</b>
Nonrenewable (MJ)	3,671
Renewable (MJ)	108
<b>Total Concrete Water Consumption (m<sup>3</sup>)</b>	<b>3.08</b>
Batching Water (m <sup>3</sup> )	0.12
Washing Water (m <sup>3</sup> )	9.7E-4
<b>Nonrenewable Material Resource Consumption (kg)</b>	<b>2,401</b>
<b>Renewable Material Resource Consumption (kg)</b>	<b>2.66</b>
<b>Hazardous Waste Production (kg)</b>	<b>0.02</b>
<b>Nonhazardous Waste Production (kg)</b>	<b>4.64</b>

**Product Components:** crushed aggregate (ASTM C33), natural aggregate (ASTM C33), Portland cement (ASTM C150), fly ash (ASTM C618), admixture (ASTM C494), batch water (ASTM C1602)

# The Nutrition Label Analogy



[This Photo](#) by Unknown Author is licensed under [CC BY](#)

Nutrition Facts	
Serving Size 1 Package (326 g)	
Servings Per Container 1	
Amount Per Serving	
<b>Calories</b> 320	Calories from Fat 35
% Daily Value*	
<b>Total Fat</b> 4g	<b>6%</b>
Saturated Fat 1.5g	<b>8%</b>
Trans Fat 0g	
Polyunsaturated Fat 1.5g	
Monounsaturated Fat 1g	
<b>Cholesterol</b> 10mg	<b>3%</b>
<b>Sodium</b> 570mg	<b>24%</b>
<b>Potassium</b> 540mg	<b>15%</b>
<b>Total Carbohydrate</b> 55g	<b>18%</b>
Dietary Fiber 4g	<b>16%</b>
Sugars 8g	
<b>Protein</b> 15g	
Vitamin A 10%	• Vitamin C 10%
Calcium 6%	• Iron 10%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:	
Calories: 2,000 2,500	
Total Fat	Less than 65g 80g
Sat Fat	Less than 20g 25g
Cholesterol	Less than 300mg 300mg
Sodium	Less than 2,400mg 2,400mg
Potassium	Less than 3,500mg 3,500mg
Total Carbohydrate	300g 375g
Dietary Fiber	25g 30g

# The Nutrition Label Analogy



Nutrition Facts	
Serving size 1/2 cup (50g)	
Amount per serving	
<b>Calories</b>	<b>230</b>
Total Fat	10g
Sodium	500mg
Total Carbohydrate	45g
Dietary Fiber	3g
Sugars	1g
Protein	8g



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Serving size 1/2 cup (50g)	
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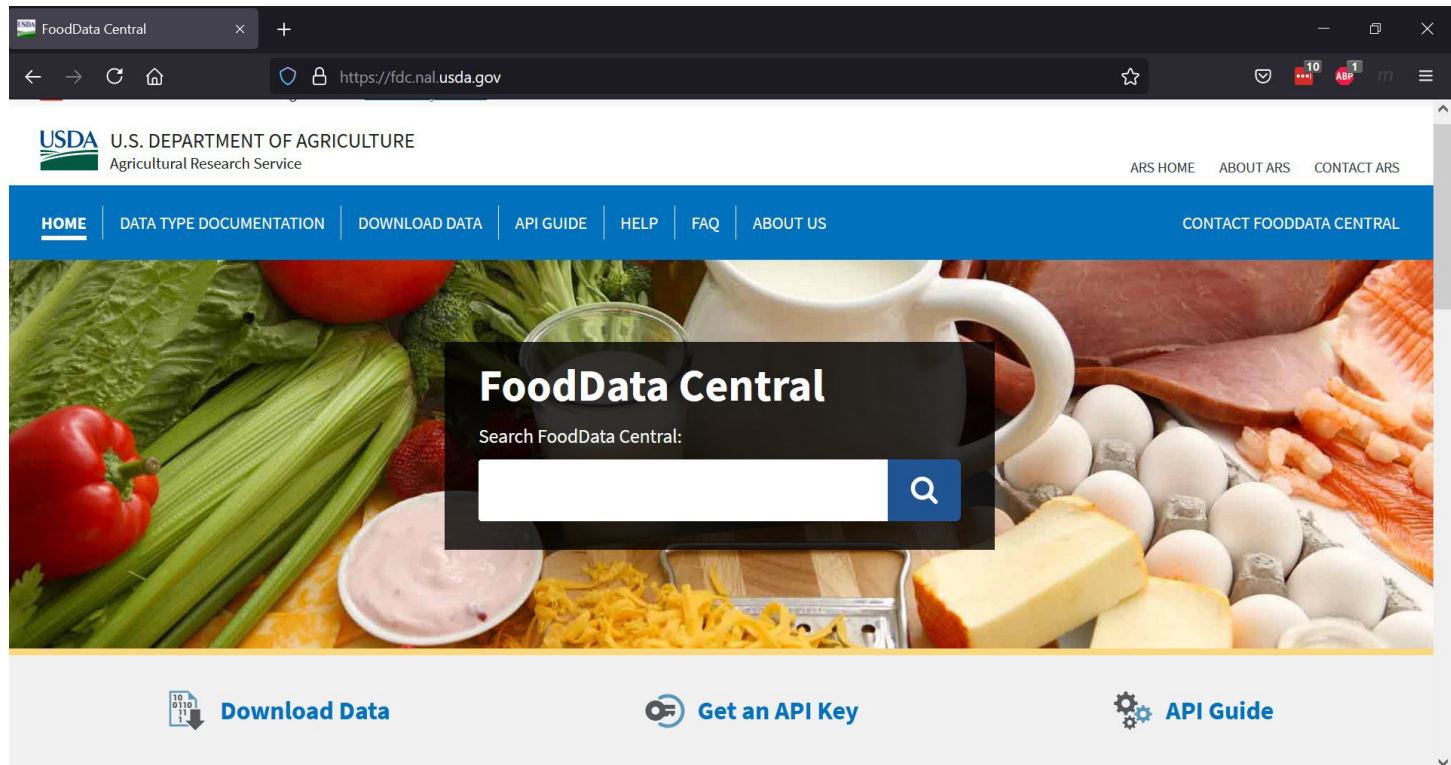


Nutrition Facts	
Serving Size 1 Package (320g)	
Amount Per Serving	
<b>Calories</b> 320	Calories from Fat 35
<b>Total Fat</b> 4g	6%
<b>Saturated Fat</b> 1.5g	8%
<b>Trans Fat</b> 0g	
<b>Polyunsaturated Fat</b> 1.5g	
<b>Monounsaturated Fat</b> 1g	
<b>Cholesterol</b> 10mg	3%
<b>Sodium</b> 570mg	24%
<b>Potassium</b> 540mg	15%
<b>Total Carbohydrate</b> 55g	18%
<b>Dietary Fiber</b> 4g	16%
<b>Sugars</b> 8g	
<b>Protein</b> 15g	
<b>Calcium</b> 6%	
<b>Vitamin A</b> 10%	
<b>Vitamin C</b> 10%	
<b>Iron</b> 10%	

# The Nutrition Label Analogy: *Why does this work?*

## *Inter-agency collaboration*

Collaboration: FDA, USDA, NIST and Industry on Policy, Science, Standards and Measurement, and Data Management



The screenshot shows the FoodData Central website in a browser window. The address bar displays <https://fdc.nal.usda.gov>. The page header includes the USDA logo and text: "U.S. DEPARTMENT OF AGRICULTURE Agricultural Research Service". Navigation links include "ARS HOME", "ABOUT ARS", "CONTACT ARS", "HOME", "DATA TYPE DOCUMENTATION", "DOWNLOAD DATA", "API GUIDE", "HELP", "FAQ", "ABOUT US", and "CONTACT FOODDATA CENTRAL". The main content area features a large image of various food items (vegetables, dairy, meat, eggs) with a search bar overlay that says "FoodData Central" and "Search FoodData Central:". Below the image are three buttons: "Download Data" (with a download icon), "Get an API Key" (with a key icon), and "API Guide" (with a gear icon).

<https://fdc.nal.usda.gov/>

# The Federal LCA Commons

*Collaboration between Federal Agencies to advance LCA*

## Our Mission:

- Advance LCA data, research and information systems
- Improve modeling methods consistency
- Enhance public access to Federal LCI data



<https://www.lcacommons.gov/memorandum-understanding-0>



# Community of Practice

## Research and Methods

### Model and Data development

- Energy supply chains
- Energy generation and transmission
- Transportation systems
- Waste management
- Environmental impacts
- Construction materials
- Carbon capture and storage
- Agricultural production

### Knowledge Management

- Whole building LCA analysis tools
- Open access data repositories and publication workflows
- Tools and resources for interoperability and data reuse

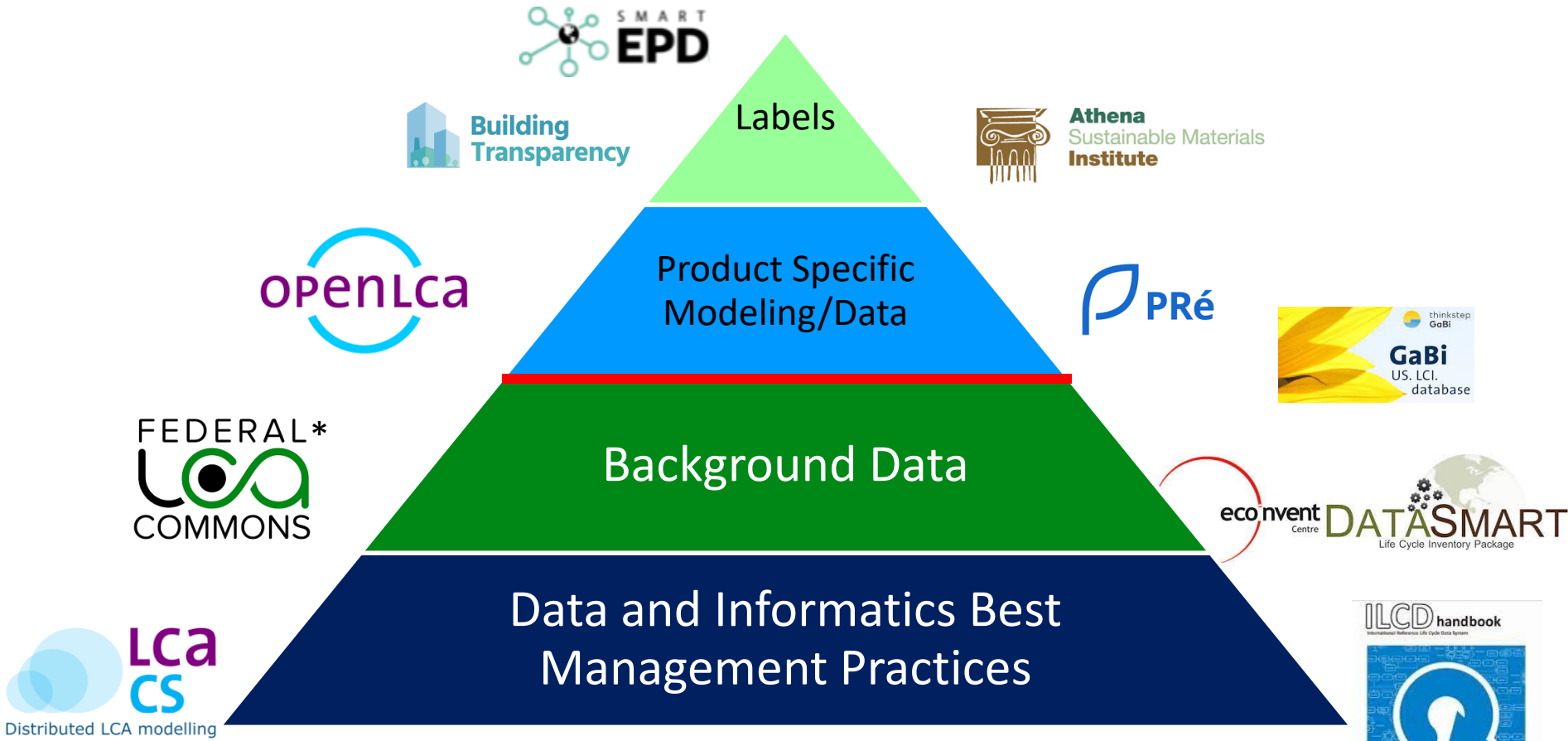
## Knowledge Management

### LCA Deployment and Policy Support

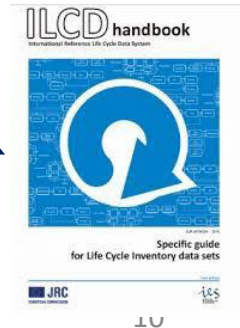
- Use of LCA in pavement design and procurement through FHWA LCA PAVE tool
- Guidance and technical reviews of LCA in support of Internal Revenue Service 45Q tax credit
- Conduct LCAs for DOE, Loan Program Office greenhouse gas analysis loan requirements

## Policy and Deployment

# LCA Commons Role



\*US LCI is part of the Federal LCA Commons.




# Work Products to Increase Consistency and Access

- **US Electricity Baseline:**  
*Consistent Background Models*
- **Elementary Flow List:**  
*Consistent Elementary Flows and LCIA*
- **Data Portal**  
[www.lcacommons.gov](http://www.lcacommons.gov)

**The Federal LCA Commons**  
*Collaboration between Federal Agencies to advance LCA*

- Leverage individual agency mission activities to:
  - Advance LCA data, research and information systems
  - Improve modeling methods consistency
  - Enhance public access to Federal LCI data



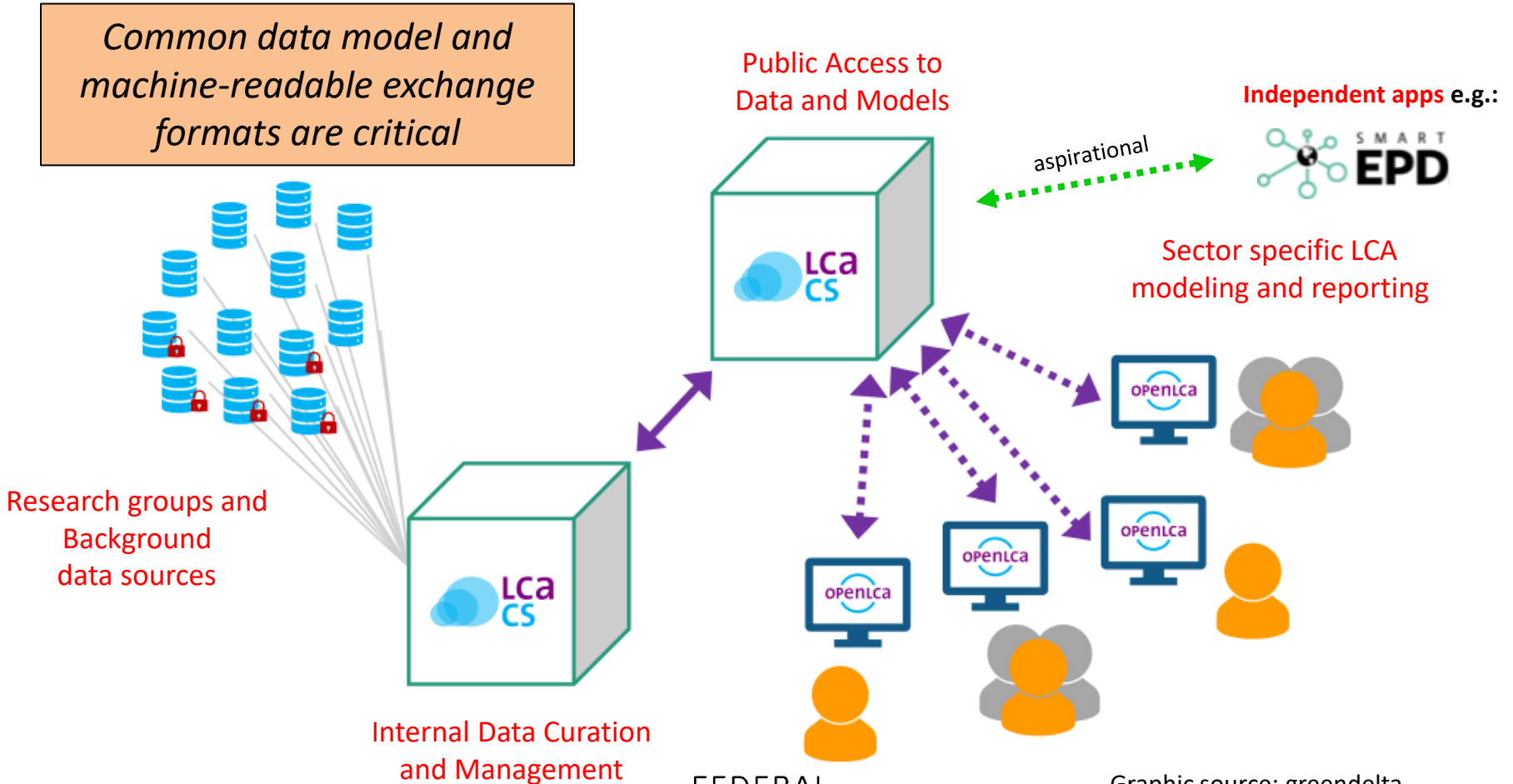
Formalized with a MOU signed by USDA, DOE, USEPA  
<https://www.lcacommons.gov/memorandum-understanding-0>

FEDERAL  
LCA  
COMMONS

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# Federal LCA Commons Knowledge Management Open Data Services

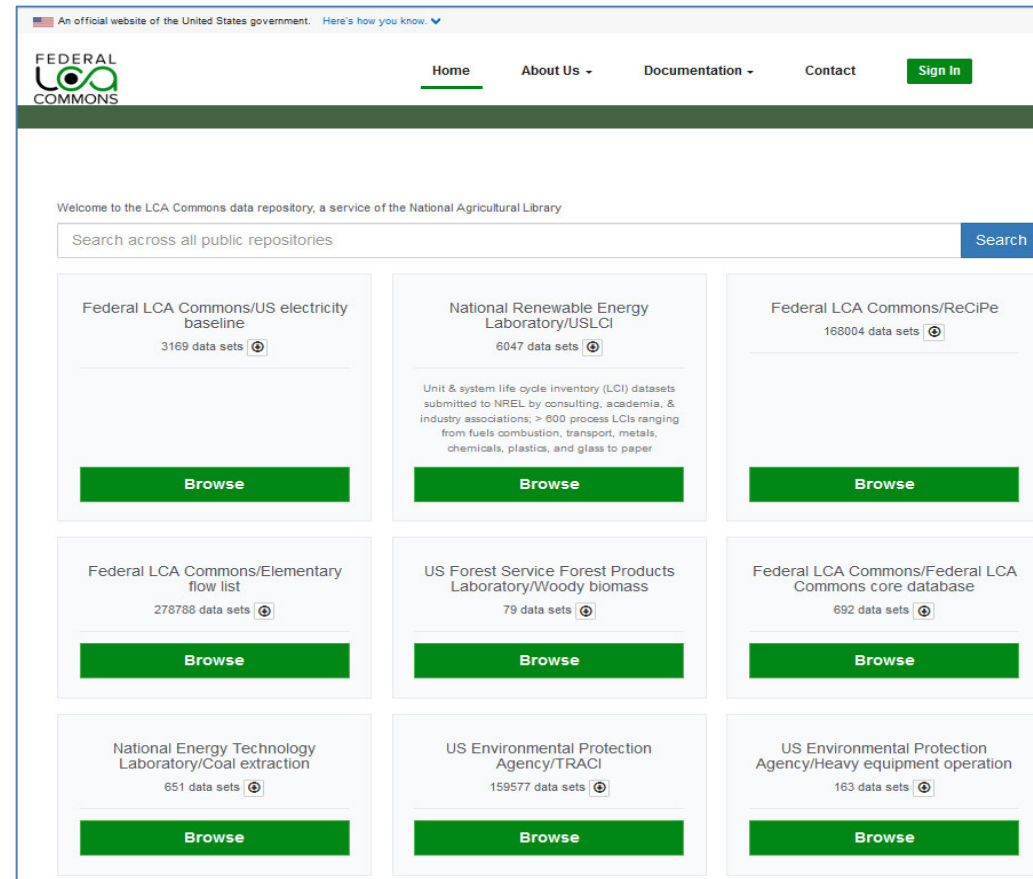
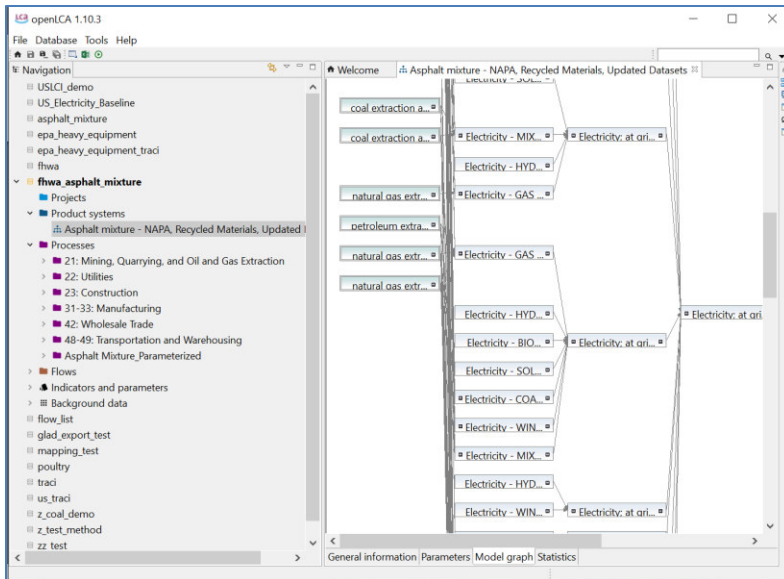
## Managing community data and reference models



Graphic source: greendelta

# Federal LCA Commons Knowledge Management Open Data Services

- Integrated open data workflow
- Metadata services
- Interoperability and reuse guidance and standards



# Summary

- As government, we see this as early days and we are building capacity for industry to compete on product environmental performance.
  - Laying the foundation for more consistent use of life cycle assessment in markets and policy.
  - Collaboration is critical to coordinate policy, standards, data, and infrastructure to support applications.
- “Knowledge Creation” platform engenders consistency in collaborative data development, curation, transfer, publication, and open access.

# Questions?



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