



UPGrants Overview & LCA Review

45Q LCA Workshop



July 17th, 2024



U.S. DEPARTMENT OF
ENERGY

Fossil Energy and
Carbon Management



Fossil Energy and
Carbon Management

FECM: Carbon Conversion & Utilization

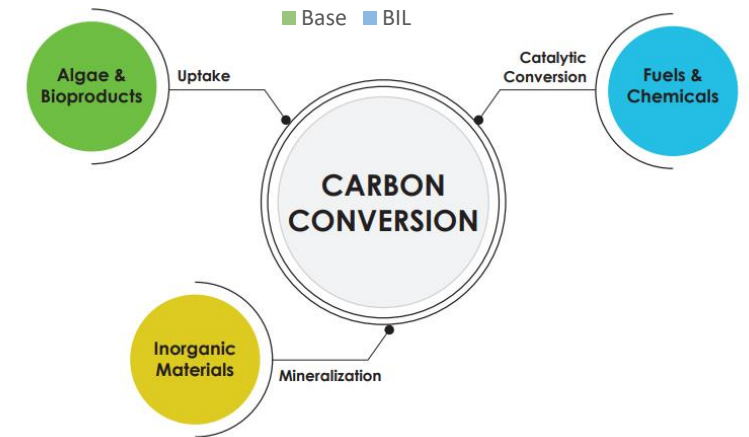
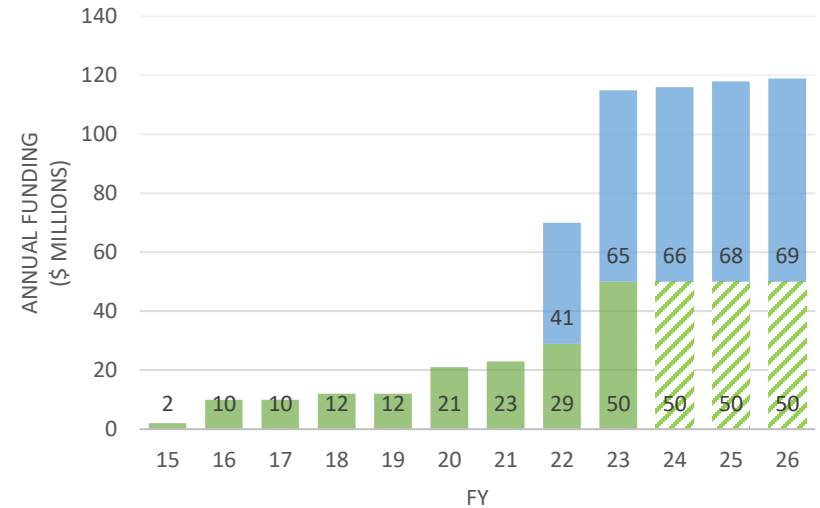
Carbon Conversion Program:

“Research, develop, and demonstrate a broad suite of technologies that **convert CO₂ into environmentally responsible, equitable, and economically valuable products**, and enable low-carbon supply chains to meet the goal of a decarbonized economy by 2050.”

– FECM Strategic Vision 2022




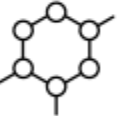


- Annual appropriations in conjunction with IIJA will support overall program goals to advance the performance, economic viability and commercialization of technologies along various conversion pathways
- Each pathway has unique challenges, but certain areas, such as **improved TEA/LCA capabilities and support for FOAK demonstration/pilot sites are critical for all technologies**

CONVERSION PROGRAM FUNDING





Applications for Carbon Conversion & Utilization

\$0.5 – \$2 trillion / year opportunity		2 – 8 Gigatons of CO ₂ / year	
		Annual Market Opportunity (Billion USD)	Annual CO ₂ Consumption (Million Tons)
	Construction Materials Concrete, aggregates	165 - 550	900 - 5000
	Fuels Natural gas replacement, gasoline, diesel fuel, jet fuel	10 - 250	700 - 2100
	Chemicals Solvents, detergents	200 - 750	135 - 565
	Engineered Materials Carbon fiber, carbon nanotubes, graphene, carbon ceramics	140 - 400	30 - 84
	Polymers Plastic foils, containers, furniture, plastic housings, toys	2 - 25	1 - 20
	Agriculture and Food Fertilizer, protein for human consumption, animal feed	> 25	> 40

Conversion and utilization can support the transition from status quo to a future 2050 carbon neutral chemicals & fuels scenario

Ongoing funding requires robust LCA and TEA analysis to evaluate the full lifecycle emissions impacts of all new and developing technologies to ensure overall emissions reductions

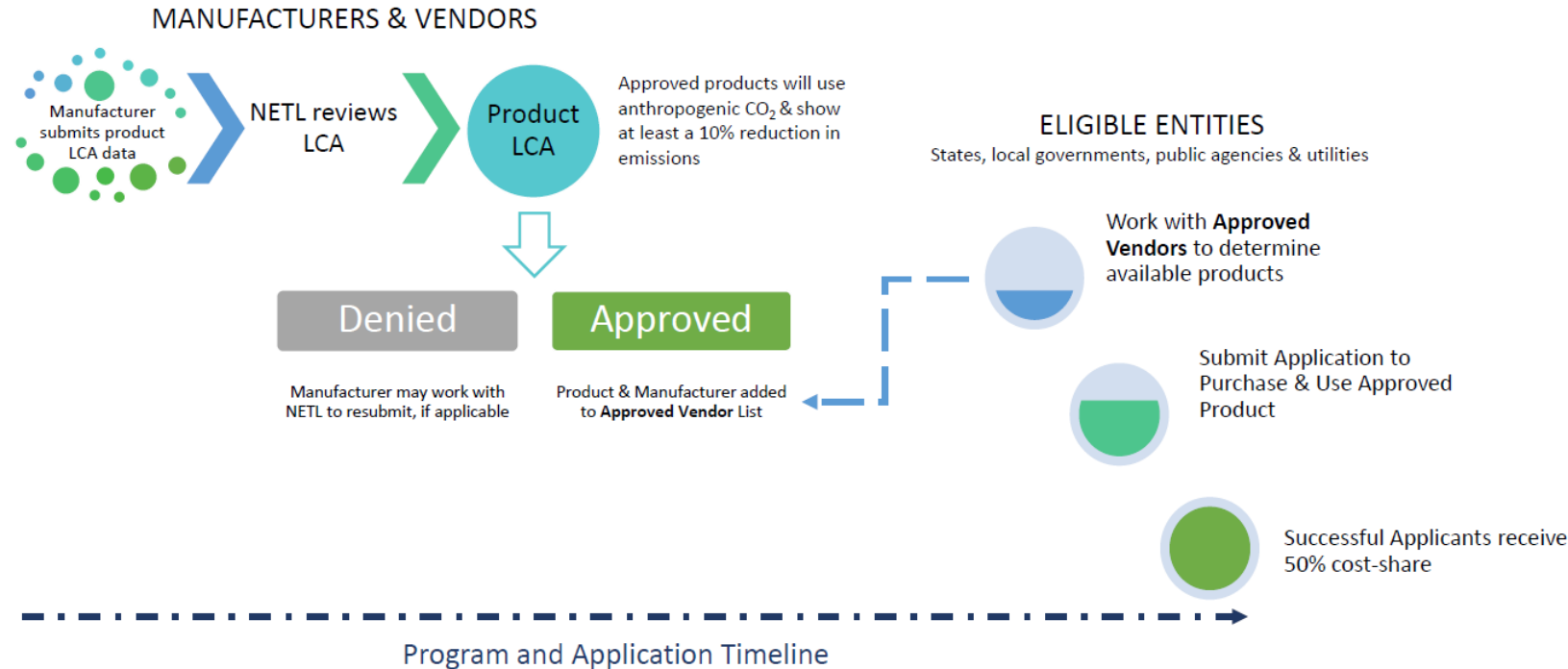
National Academies of Sciences, Engineering, and Medicine. 2023. Carbon Dioxide Utilization Markets and Infrastructure: Status and Opportunities: A First Report. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26703>.



Supporting CO₂ Products: UPGrants Program

Utilization & Procurement Grants (UPGrants)

- **\$100 million** available to **states, local governments, and public agencies & utilities** to purchase commercial and industrial products that use converted carbon emissions
- Products must demonstrate at least 10% reduction in emissions compared to incumbent products
- Product LCAs are reviewed and approved by DOE's National Energy Technology Laboratory



◆ UPGrants: LCA Process



Product manufacturer completes LCA for eligible product(s) in accordance with **NETL** guidelines and submits for review



NETL reviews manufacturer LCA to confirm it meets guidelines and a **minimum of 10% emissions reduction**



Once approved, manufacturer and product are added to an approved vendors list



Eligible entities engage approved suppliers and establish a purchase agreement



UPGrants: LCA Process Expansion

DOE is bolstering resources and encouraging applicants to make use of the LCA review process established in support of the UPGrants program. This review process provides additional support and technical assistance to product manufacturers, program applicants, and technology developers in the carbon utilization space to develop product specific LCAs in accordance with the [FECM/NETL Guidance](#) and ISO standards.

The LCA review process established in support of the UPGrants program will provide:

- **Technical assistance** in the form of critical reviews to make progress towards LCA submissions required for IRS approval for the 45Q tax credit for utilization compliant with the FECM/NETL guidance for utilization products
- Preparation for submitting for **Environmental Product Declarations (EPDs)**
- Preparation for application to the UPGrants Program as an **Approved Vendor**
- **Feedback on first of a kind and novel technologies and processes for carbon conversion and utilization**

Technical assistance provided during this LCA review will **not** provide:

- Pre-approval for any program, certification, or tax credit, including the 45Q tax credit
- Feedback on theoretical manufacturing processes

UPGrants LCA Submission

Those wishing to submit their LCA for review should be able to:

- Provide initial LCA data, inputs, and conclusions consistent with [information required of applicants to the UPGrants Program](#)
- Show that the proposed utilization product uses carbon oxide sources that meet the definition required under the UPGrants Program

Visit: [Utilization Procurement Grants \(UPGrants\) | netl.doe.gov](#)



LCAs: UPGrants vs. 45Q

UPGrants	45Q
<ul style="list-style-type: none">• Accepts submissions for novel or yet to be built projects	<ul style="list-style-type: none">• Project must be in operation
<ul style="list-style-type: none">• DOE/NETL approves and may review submissions with applicants	<ul style="list-style-type: none">• IRS approves LCA
<ul style="list-style-type: none">• Approved products will be publicly posted for use in UPGrants	
<ul style="list-style-type: none">• NETL tools/ resources available	



Contact

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