

NGA GLASS CONFERENCE™ CARLSBAD

FEBRUARY 3-6, 2025



EPA Grant Workshop

Feb 3, 2025



Agenda

- Intro and Antitrust Reminder
- Current Status
- Refresher on EPD basics
- Go through 4 subprojects:
 1. Primary Flat Glass LCI Data Aggregation
 2. EPD Generator Tool for Processed Glass
 3. EPD Development Assistance for Glass Fabricators
 4. End-of-life LCA data collection on architectural glass recycling
- Benefits / impacts on fabricators
- Discussion and next steps

SECTION 1. POLICY - It is the undeviating policy of the Association to comply strictly with the letter and spirit of all federal, state and applicable international trade regulations and antitrust laws. Any activities of the Association or Association-related actions of its staff, members, officers, directors or chapter officials which violate these regulations and laws are detrimental to the interests of the Association and are unequivocally contrary to Association policy.

SECTION 2. IMPLEMENTATION

2.2 All Association activities or discussions shall be avoided which might be construed as tending to: (1) raise, lower, or stabilize prices; (2) regulate production; (3) allocate markets; (4) encourage boycotts; (5) foster unfair trade practices; (6) assist monopolization; or in any way violate federal, state or applicable international trade regulations and antitrust laws.

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By registering, participating, attending, or speaking at the NGA Glass Conference, I agree that neither I nor my company/employer will transmit information or materials received at the NGA Glass Conference to other companies for their commercial use or to other associations with competing interests to NGA.

Dos and Don'ts for today and all week

- ***DO:***

- Abide by NGA's Antitrust Policy
- *Speak up!* Ask questions, voice concerns, share experiences
- Engage with LCA providers

- ***DON'T***

- Discuss detailed costs of LCA provider proposals
(NGA staff will be discussing with each bidder separately and privately)
- Discuss your internal costs, markets, etc.

Why an EPA grant?

Grants Support EPA's Mission

EPA partners with state, tribal, and local governments; institutions of higher education; non-profit organizations; and other eligible entities to protect human health and the environment. EPA's systematic process of awarding federal grants helps EPA leverage local expertise that is critical to helping the Agency achieve its mission. Every year, EPA awards a significant portion of its budget in grants to its state, tribal, local, educational, non-profit, and other partners.

https://www3.epa.gov/grants-training/epa_grants_management_training_for_applicants_and_recipients_mod_1/story.html



By awarding grants, EPA sustains state, tribal, and local relationships; supports cutting-edge scientific research; and advances community knowledge and empowerment to protect the environment.


Current Status of EPA Grant

- Last July, we were announced as a grant selectee for our \$2.1M proposal “Architectural Glass EPD Development to Reduce Embodied Greenhouse Gas Emissions for Construction Materials and Products”
- Since then, we have been working with the EPA team (EPA project officer is Bill LeRoy) to update workplan, timeline, budget, quality assurance plan, operation policies, and other forms.
- Grant package was submitted on Dec 13, and was hoping for final approval with funds fully obligated by Jan 20. However, internal grant examiners were overwhelmed, and we just missed it.

Current Status of EPA Grant

- On Jan 20, Pres. Trump issued an executive order to “pause the disbursement of funds appropriated through the Inflation Reduction Act of 2022 or the Infrastructure Investment and Jobs Act” and orders a review of programs and policies for issuing grants against newly stated Trump administration policies.
 - <https://www.whitehouse.gov/presidential-actions/2025/01/unleashing-american-energy/>
 - Note that this is separate and unrelated to the recent OMB memo to freeze all federal grants that was then withdrawn.
- This does *not* rescind funding from the IRA or BIL, which would need an act of Congress, but does create at least a 30-90 day delay while each program is reviewed against new policy.

Current Status of EPA Grant

- We are hopeful it is just a pause, as the policy details referenced in the executive order (EO) are more focused on other items like oil and mineral resources as well as EV charging and other areas and does not necessarily target construction or materials industries.
- 
 • But we don't know, and communication with external stakeholders is restricted for now. We are proceeding as normal for now, so that we are prepared when and if the grant approval is finalized.
- We issued two requests for proposals (RFPs) to potential LCA partners.
 - Received 5 proposals to assist in EPD development (Subprojects 1-3)
 - Received 3 proposals to assist in end-of-life LCA data collection on architectural glass and aluminum extrusion recycling (Subproject 4, joint with the Aluminum Extruders Council)
 - Currently reviewing proposals, and collecting more information.

Refresher on EPD Basics

What is an Environmental Product Declaration (EPD)?

- EPDs provide a standardized and transparent way to understand the environmental impact of products, empowering informed decisions and driving a more sustainable future.
- The most important metric or “impact category” is **Global Warming Potential (GWP)**, also often called **Embodied Carbon**.
 - Measured in units of kg or tons of CO₂eq. Accounts for all greenhouse gas emissions, but converted to equivalent amount of carbon dioxide.
- Other impact categories:
 - primary energy use (renewable and non-renewable)
 - acidification potential (causing acid rain)
 - eutrophication potential (pollution causing algae blooms in lakes, rivers)
 - ozone depletion potential
 - smog formation potential
 - and more.

EPDs and LCA

- The environmental impact is determined from a “**Life Cycle Assessment**” or **LCA**.
- This can include different stages over the entire product life from raw material extraction, manufacturing, delivery, use, to disposal and/or recycling.

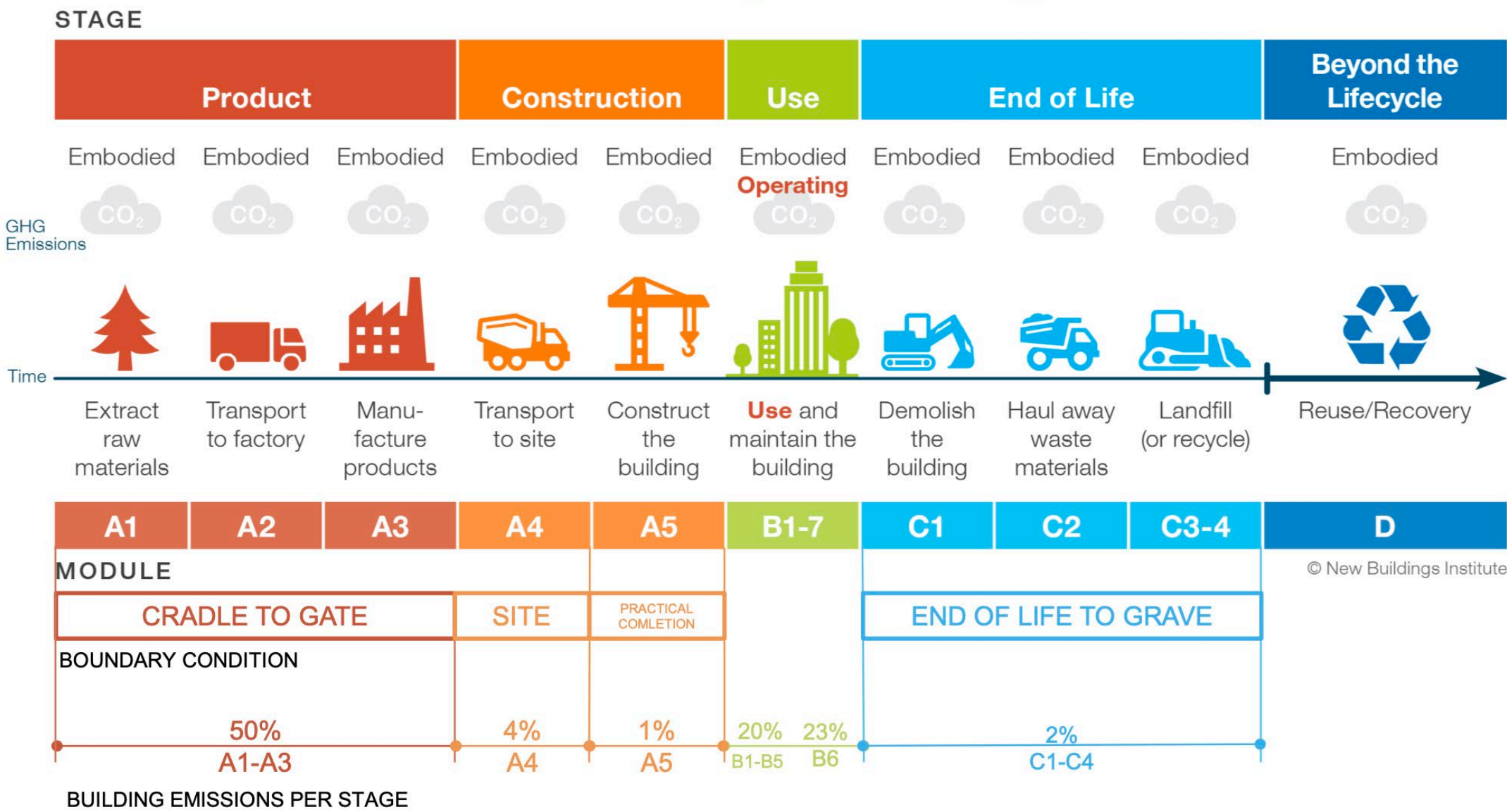
Other acronyms:

- **PCR – Product Category Rule**
 - The rules specifying how to conduct a life cycle assessment for a certain product type.
 - Makes sure everyone is doing it the same way in a given market (e.g. North America)
- **LCI data – Life Cycle Inventory data**
 - All inputs (materials, energy) and outputs (emissions, waste) associated with a product or process throughout its life cycle.
- **PCF – Product Carbon Footprint**
 - Another term for the GWP (global warming potential) or embodied carbon associated with a product, measured in units of kg or tons of CO₂eq.

Life Cycle Stages

- Most EPDs are “**cradle to gate**” as that covers what the product manufacturer can control or has information for: raw materials, transportation to the factory, energy and water inputs, manufacturing processes, waste outputs.
 - Known as modules A1-A3
- The manufacturer can also take credit for recycling at the end of the product life if there is well established data.
 - Known as module D

Embodied Carbon Lifecycle Stages



What is the demand? Who is asking for EPDs?

- **Increasing requests to provide EPDs.**
 - Being added to specifications, or last-minute requests from Architect / GC.
 - Becoming a cost of doing business – potential to lose job if can't provide it.
- **Green programs and “Buy Clean” policies** setting requirements for a certain number of EPDs, and some setting embodied carbon (CO₂eq) limits for construction materials.
 - GSA / Federal Buy Clean Initiative for certain Federal projects
 - Buy Clean California and CALGreen for state-funded projects, large offices, schools
 - Buy Clean Colorado – stick for state-funded project, tax carrot for private projects
 - International Green Construction Code / ASHRAE 189.1; USGBC and LEED
 - Most are prioritizing concrete, steel, **flat glass**, and asphalt.
- **Marketing / Promotion**; support architect's ability to design for sustainability.
- **Better understanding of internal processes and benchmarking.** Aids continuous improvement, enables business decisions based on improved information for both environmental and financial impacts.



Buy Clean

State	Materials Covered	Flat Glass? (Y/N)	GWP Limit for FO (kg CO2eq)	Description	Bill No.	Reference	Notes
CA	Glass, glass, mineral wool, concrete, gypsum board, insulation, carpet ceiling tiles, future expansion	Y	1450	For eligible projects with contracts signed on or after July 1, 2022, contractors must submit facility-specific material or product EPDs before the material will be accepted for installation. The Environmental Product Declaration must show that the facility's greenhouse gas emissions do not exceed its published global warming potential (GWP) of the material or product.	Public Contract Code Sections 3500-3505	https://www.dir.ca.gov/PD/Resource/Flat-Glass/Environmental-Product-Declarations-Requirements-Construction-Projects-California.htm	
CO	Asphalt, cement, concrete, glass, steel, wood	Y	1510	Applies to the \$500k, and to on or after the demolition, or new, or both the Office of the GWP limit for			
HI							
IL							
ME							
MD	Cement / concrete mix	N		Requiring pre-construction declarations (PCDs) 2024, require global warming by January 2, Declaration & environmental			
MA	Concrete	N					
MA				Establishing & establish and industry and embodied carbon practices for benchmarking building sector for building			
				Set GWP limits and measures, and reinforcing insulation or			



FOR NOW,

what can you do when you receive an EPD request?

- Because of concern about EPD availability, we've negotiated with various groups, so that all programs either:
 - Only require EPD for *primary flat glass*, not processed or fabricated glass.
 - Or for construction assemblies such as a window or curtain wall, allow EPDs covering 80% of the assembly cost or weight to be submitted.
 - Minor parts (sealants, hardware, fasteners, spacers, etc) can be ignored as the bulk of the carbon impact is in the primary glass and framing.
- In other words, architect can often just hand in one EPD for the glass from your primary glass supplier, and one EPD for the aluminum framing (e.g. the AEC industry wide EPD for aluminum extrusions).
 - However, note that the industry wide EPD for flat glass expired in December 2024.
- ***But ...***

But can you get away with that *in the future*?

There is increased demand for **more granular EPDs**:

- Not just industry-wide average EPD, but company & product specific EPDs, and facility-specific EPDs ‘where available’.
- Not just primary flat glass, but processed glass:
 - Coated, tempered or heat-strengthened, laminated, insulated, etc.

- ***Gets complex fast:***

Nearly infinite combinations of annealed glass, heat strengthened glass, tempered glass, laminated glass with different thicknesses and interlayers, coated glass with hundreds of different coating products, fire-rated glazing, ballistic / blast resistant / security glass with different configurations, bird-friendly glass, acoustic glass, patterned / fritted / etched glass, decorative glass, dynamic glass, vacuum insulating glass, and insulating glass unit (IGU) configurations with different numbers of panes, glass types, glass thicknesses, spacers, sealants, and desiccants.

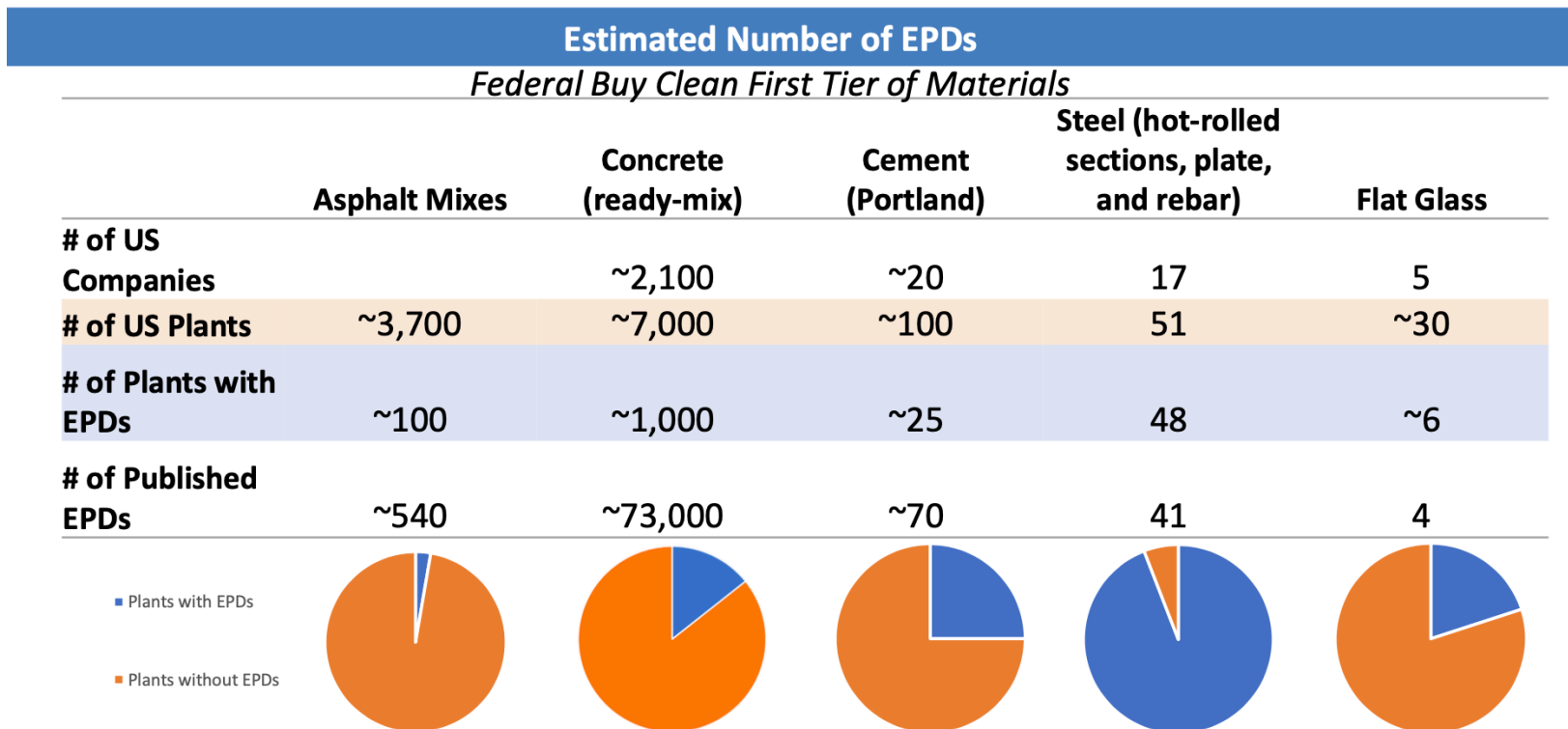
- **How can we prepare for this?**



How can we prepare for this?

That's why we submitted the EPA grant proposal!

- It would be cost prohibitive to develop individual EPDs for all these combinations. Other material groups have successfully employed “EPD generator tools” to overcome this barrier.



Note: this is out-of-date, from 2-3 years ago

EPD Calculator Tools

- In an ideal world (which may or may not be realistic), a software or web-based generator tool would allow fabricators to create both LCA data reports and full EPDs for all configurations ‘at the click of a button’.
 - Models for our key unit processes (heat-treating, laminating, etc) will be developed and third-party reviewed.
 - Fabricators would work with LCA partner to input their key data (annual energy use, water use, material inputs, volumes, wastes, etc) while protecting confidentiality.
 - Tool will be able to quickly and cheaply generate PCF report or EPD for a given product configuration, and be flexible for different product configurations.

EPD Calculator Tools

- Sounds easy on paper, but it's not.
- Still lots of questions about how it will work, what fabricator will need to provide, data security, etc.



“Scary and Confusing”



- That's why we are looking for a good LCA partner, funded by the grant.

So let's talk about the EPA grant ...

EPA GRANTS =160M

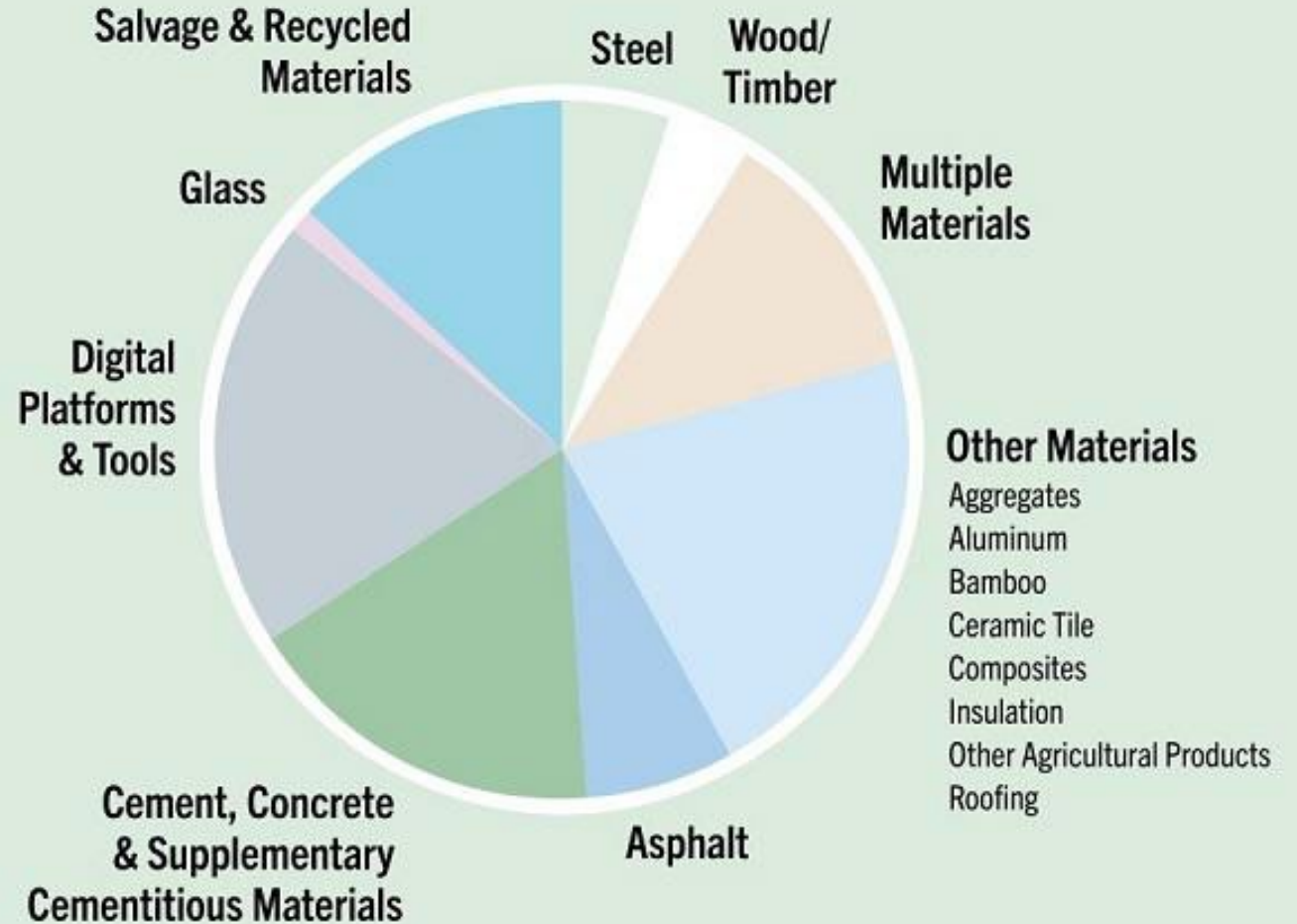
NGA - \$2.1 million
over 5 years

38 grantees selected
14 material types

NGA is the ONLY glass
representative

Material & Product Categories for Grant Selections

Reducing Embodied Greenhouse Gas Emissions
for Construction Materials*



*Selections are contingent upon completion of legal and administrative requirements.

EPA Grant Details

- NGA applied for grant of \$2.1M over 5 years.
- Highlighted what our industry has already done with primary flat glass EPDs, complexity and diversity of the industry with regards to processed glass products, industry needs and issues.
- Proposal divided into 4 subprojects.

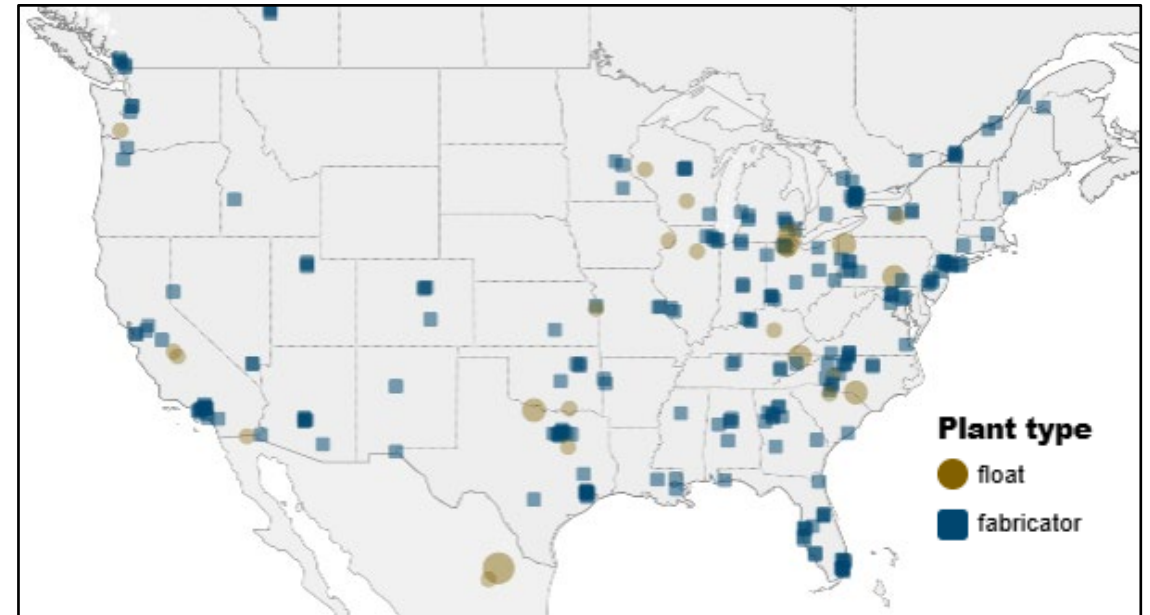


Figure 1. U.S. flat glass float plants and glass fabricator locations. <https://www.glass.org/world-glass-map>

Architectural Glass EPD Development Grant

Four subprojects:

1. Primary Flat Glass LCI Data Aggregation (\$333k)

- Provide support to improve granularity of primary flat glass LCI data, as well as PCR update.

2. EPD Generator Tool for Processed Glass (\$379k)

- Develop robust generator tool capable of producing both LCA data reports and full 3rd-party reviewed EPDs for processed glass products in conformance with ISO standards.

3. EPD Development Assistance for Glass Fabricators (\$1.2M)

- Provide technical, educational, and financial assistance to glass fabricator members for EPD development.

4. End-of-life LCA data collection on architectural glass recycling (\$226k)

- To improve the understanding about glass end-of-life and quality of LCA part D data, quantify glass recovery rates and track end-use outcomes for recycled glass on 1-3 deconstruction projects.

EPA Grant Details

Subproject 1. Primary Flat Glass LCI Data Aggregation

- Provide support to improve granularity of primary flat glass LCI data, as well as PCR update.

TASK	2024	2025				2026				2027				2028				2029				
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
0 Kick-off meeting (virtual)		█																				
1 Subproject #1: Primary Flat Glass LCI Data Aggregation																						
1.1 Identify and select LCA partner		█	█																			
1.2 Refine scope with LCA partner			█	█																		
1.3 LCI regional data gathering with primary manufacturers			█	█	█	█	█	█	█													
1.4 LCA partner data aggregation on regional basis, draft report					█	█																
1.5 3rd party review					█	█																
1.6 Flat glass PCR update and review		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1.7 Individual company EPD updates						█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1.8 Midyear updates and Annual progress review				█		█		█		█		█		█		█		█		█		█

█ indicates milestone

Subproject 1: Primary Flat Glass LCI Data Aggregation

- Focus on collecting and updating LCI data for primary flat glass on a more refined basis with improved data quality for three purposes:
 - (a) use in whole building life cycle assessment by designers and LCA practitioners,
 - (b) support updating and/or development of manufacturer-specific EPDs for flat glass
 - (c) provide input data for a processed glass EPD generator tool in subproject #2.

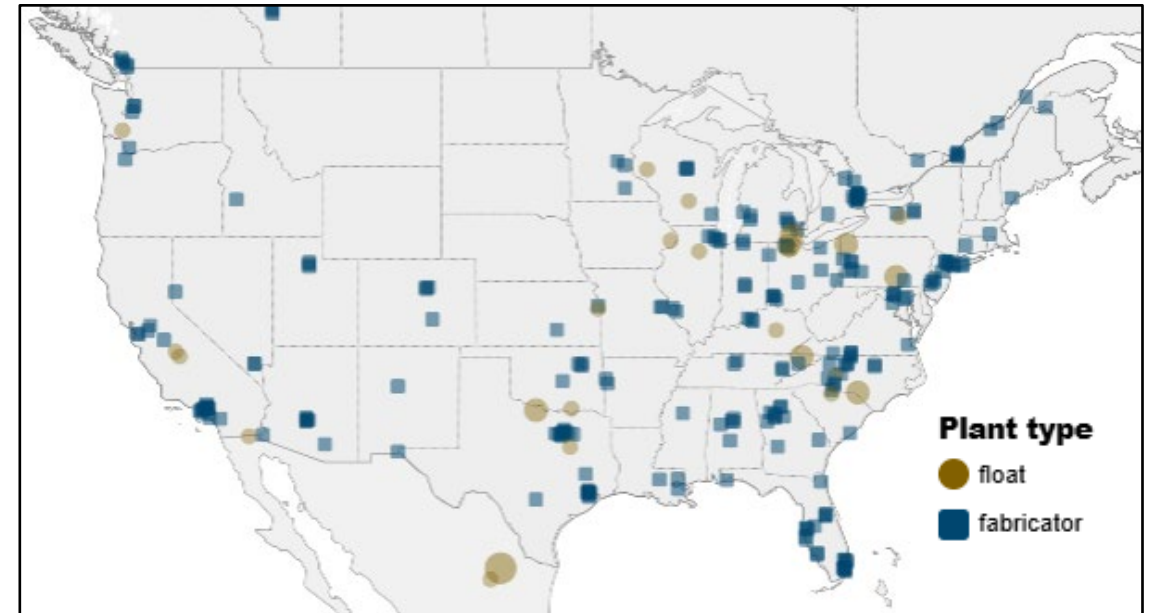


Figure 1. U.S. flat glass float plants and glass fabricator locations. <https://www.glass.org/world-glass-map>

Subproject 1: Primary Flat Glass LCI Data Aggregation

Some of the issues we must deal with together with LCA contractor:

- *Extremely important* – cannot publish facility-specific data, but we are getting pushed to provide more refined data (not just industry-wide nor company-wide average)
 - Regional aggregation?
 - Secure pass-through of data, not published?
 - How address data security?
- Seamless and secure feed-through of LCI data to processed glass EPD generator tool?

Other items:

- Update of flat glass PCR included as part of grant.
- Grant includes stipends to help offset primary glass manufacturers internal costs (total \$75k)
- May or may not include update of industry-wide EPD (not a focus, but still may need the data for benchmarking)

Subproject 2: EPD Generator Tool for Processed Glass

Some of the issues we must deal with together with LCA contractor:

- What unit process models are to be developed?
- Exactly what input data will fabricator need to provide, and is it available and practical?
- Pass-through of flat glass input data, and other input materials.
- What exactly are the ongoing costs *after* the tool is developed?

Other items:

- Update of processed glass PCR included as part of grant. This expired summer 2024.

EPA Grant Details

Subproject 3. EPD Development Assistance for Glass Fabricators

- Provide technical, educational, and financial assistance to glass fabricator members for EPD development.

3 Subproject #3: EPD Development Assistance for Glass Fabricators												
3.1 NGA education & training sessions for fabricator engagement (ongoing)	[Gantt chart showing activity from Q2 to Q4]											
3.2 Technical assistance from LCA contractor in LCI data gathering for tool	[Gantt chart showing activity from Q3 to Q4]											
3.3 EPD generator tool training sessions (ongoing)	[Gantt chart showing activity from Q3 to Q4]											
3.4 LCA contractor technical advisement on future improvements (ongoing)	[Gantt chart showing activity from Q3 to Q4]											
3.5 Midyear updates and Annual progress review	[Gantt chart showing periodic reviews]											

Subproject 3: EPD Development Assistance for Glass Fabricators

- Education training for fabricators, and potentially also architect outreach.
- Technical support from LCA partner on use of tool.
- Financial assistance for fabricators including:
 - Stipends to help offset fabricators internal costs (total \$450k)
 - Partial coverage of initial tool use and report fees (total \$450k)
 - NGA staff will determine fair way to allocate funds for participating fabricators.

Subproject 4: End-of-life LCA data collection on architectural glass recycling (and now aluminum too)

- Aluminum Extruders Council (AEC) is also an EPA grant selectee and submitted a parallel project on end-of-life data for aluminum extrusion recovery and recycling.
- EPA has agreed to the NGA + AEC projects being run jointly, tracking both glass and aluminum recovery in façade or building deconstruction projects. Joint resources may allow more projects to be included.
- Similar to previous studies in Europe on aluminum recovery, but will provide data in the U.S. Going further, the recovered aluminum and glass will be “followed” to document processing, clean-up, and final end-uses to improve full LCA circularity data.
- Separate RFP issued for a LCA partner to help with 3rd party tracking, analysis, and white paper.
- Some funds to help recycling member with internal costs, and for NGA to update <https://www.glass.org/world-glass-map> with recycling facilities.

So what's next?

- Questions / discussion with you.
- Call to action to find out which fabricators are interested as initial participants.
- Interviews with finalist LCA partners for Subprojects 1-3 and 4, tentative selection, and contract negotiation.
- We want to be ready to roll when / if EPA grant moves forward.



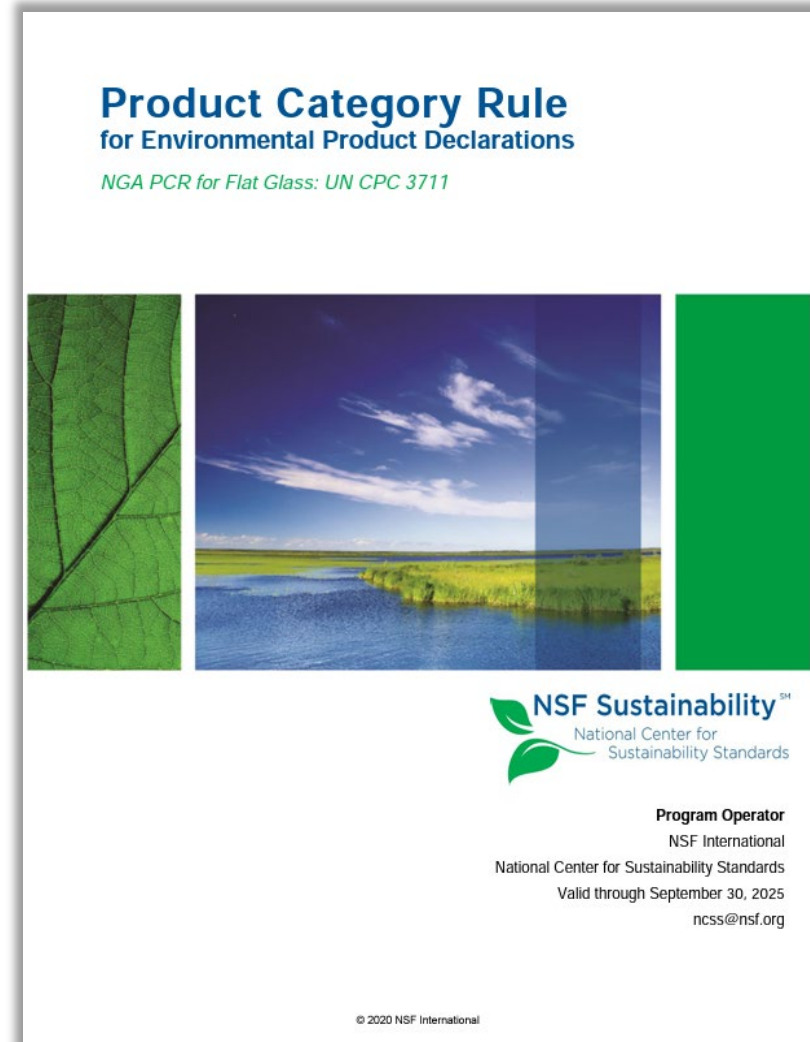
Questions / Discussion?

Concerned / Excited?



Flat Glass PCR

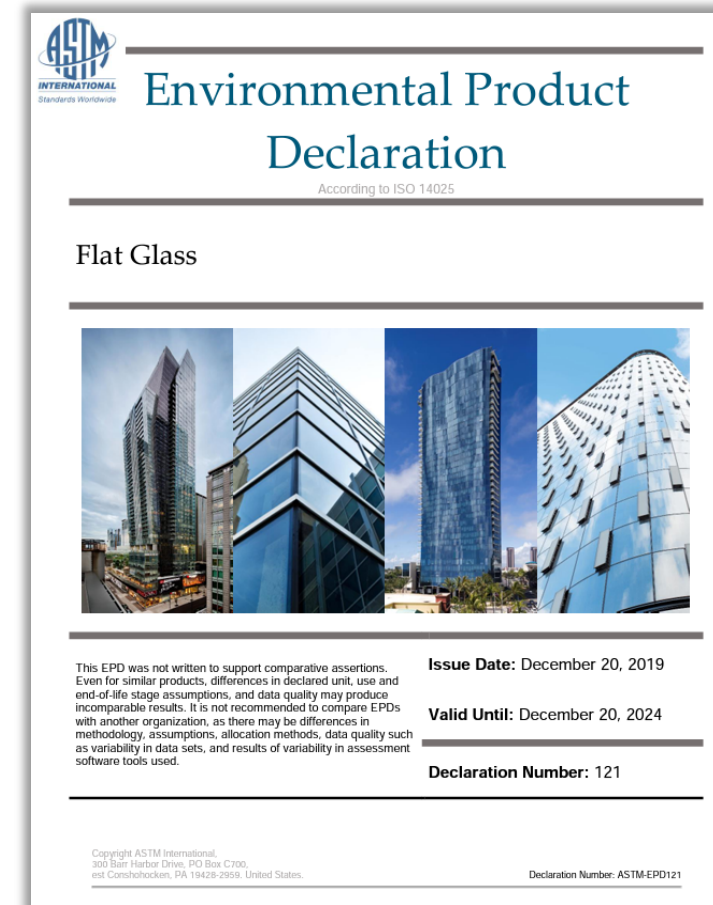
- NGA PCR for Flat Glass was published by NSF describing requirements for LCAs and EPD of flat glass
- Valid through Sept. 30, 2025



https://www.glass.org/sites/default/files/2021-10/pcr_flat_glass_2020.pdf

Flat Glass EPD: Industry Average

- NGA flat glass member companies (members of Forming Committee) published an industry average EPD for flat glass produced in the US in December 2019.
 - Average GWP is 1,430 kg CO2 eq
- Valid through Dec. 20, 2024



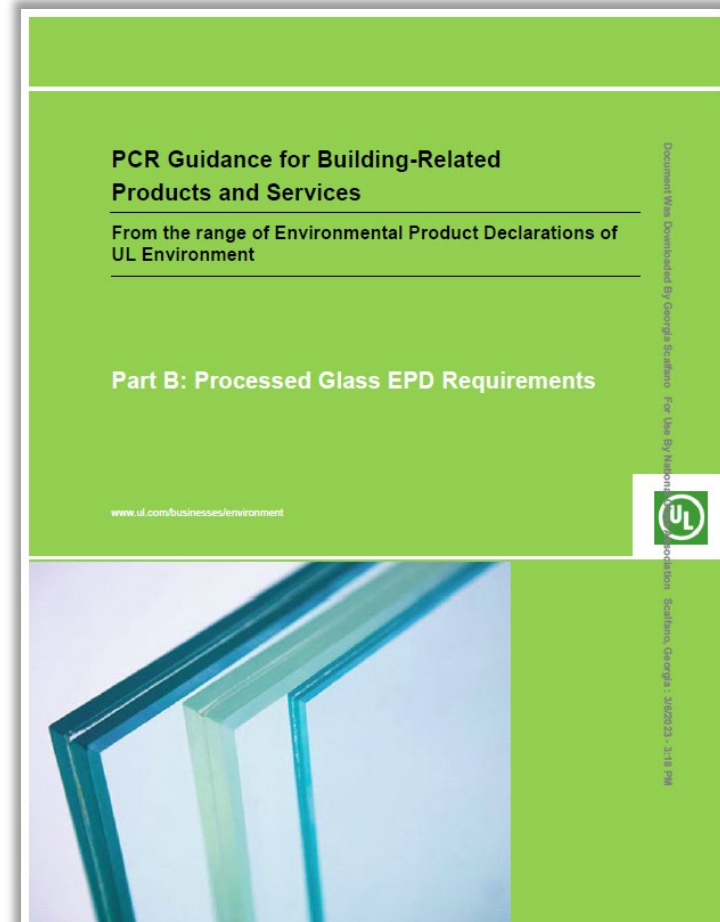
[https://www.glass.org/sites/default/files/2019-12/NGA EPDPD 2019 12 16 signed.pdf](https://www.glass.org/sites/default/files/2019-12/NGA_EPDPD_2019_12_16_signed.pdf)

Processed Glass PCR

- PCR Guidance for Building-Related Products and Services Part B: Processed Glass EPD Requirements (Established Aug. 2016)
 - Original expiration date Dec. 6, 2023 extended to June 2024

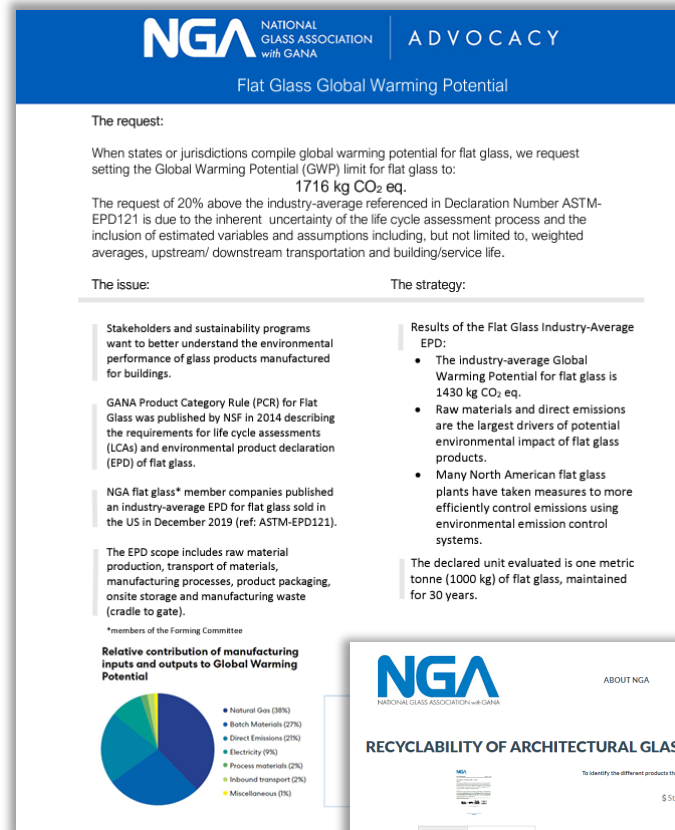
Updates

- UL is working with industry stakeholders to update. EPA PCR requirements. EPA Grant



<https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=35842>

Other NGA Sustainability Resources



NGA NATIONAL GLASS ASSOCIATION with GANA | **ADVOCACY**

Flat Glass Global Warming Potential

The request:

When states or jurisdictions compile global warming potential for flat glass, we request setting the Global Warming Potential (GWP) limit for flat glass to:

1716 kg CO₂ eq.

The request of 20% above the industry-average referenced in Declaration Number ASTM-EPD121 is due to the inherent uncertainty of the life cycle assessment process and the inclusion of estimated variables and assumptions including, but not limited to, weighted averages, upstream/ downstream transportation and building/service life.

The issue:

Stakeholders and sustainability programs want to better understand the environmental performance of glass products manufactured for buildings.

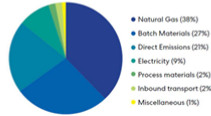
ANA Product Category Rule (PCR) for Flat Glass was published by NSF in 2014 describing the requirements for life cycle assessments (LCAs) and environmental product declaration (EPD) of flat glass.

NGA flat glass* member companies published an industry-average EPD for flat glass sold in the US in December 2019 (ref: ASTM-EPD121).

The EPD scope includes raw material production, transport of materials, manufacturing processes, product packaging, onsite storage and manufacturing waste (cradle to gate).

*members of the Farming Committee

Relative contribution of manufacturing inputs and outputs to Global Warming Potential



Category	Percentage
Natural Gas	28%
Batch Materials	27%
Direct Emissions	23%
Electricity	9%
Process materials	2%
Inbound transport	2%
Miscellaneous	7%

The strategy:

Results of the Flat Glass Industry-Average EPD:

- The industry-average Global Warming Potential for flat glass is 1430 kg CO₂ eq.
- Raw materials and direct emissions are the largest drivers of potential environmental impact of flat glass products.
- Many North American flat glass plants have taken measures to more efficiently control emissions using environmental emission control systems.


The declared unit evaluated is one metric tonne (1000 kg) of flat glass, maintained for 30 years.

- *Download from NGA Store:*

- FB40-14 (2021) [Recyclability of Architectural Glass](#)
- FM06-20 [General EPD Education](#)
- FM07-21 [Flat Glass Industry Environmental Transparency Documents](#)

- *Download from glass.org*

- [NGA One-Pager Flat Glass Global Warming Potential](#)



NGA NATIONAL GLASS ASSOCIATION with GANA

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RECYCLABILITY OF ARCHITECTURAL GLASS (FB40-14) - DOWNLOADABLE

To identify the different products that can be recycled

\$ Standard Price	\$ Member Price
\$0.00	\$0.00

QUANTITY: 1

PRODUCT DETAILS

The interest in recycling architectural glass products is growing; however, information on companies offering recycling services is fragmented and difficult to find. The purpose of this bulletin is to identify the different products that can be recycled and those that cannot. Another objective is to clarify any misconceptions regarding glass recycling and identify sources for recycling architectural glass. Finally, examples of a variety of products that can be created from the use of recycled glass are provided.

This original version of this document was published in January 2014. This version was updated and published in June 2021. All purchases will be electronically accessed or delivered.

ADD TO CART | DETAILS | PHOTOS | FIND RELATED PRODUCTS