



October 1, 2025

NGA Sustainability & System Life Cycle Assessment Project

Jeff Zeman

Olivia Fritz



October 1, 2025

Sustainability is messy.....



October 1, 2025

Sustainability is messy.....

Good data provides the foundation.....



October 1, 2025

Sustainability is messy.....

Good data provides the foundation.....

...ready to do the heavy lifting...

Agenda

1. [5 min] Introductions
2. [5 min] What have we heard so far?
3. [20 min] Why is this project important?
4. [20 min] What is possible?
5. [5 min] Manufacturer case study (*if time allows*)
6. [5 min] Discussion and next steps





Project Team



Kristin
Morehouse, PE
Project Manager



Olivia Fritz
Lead Strategist



Jeff Zeman
Advisor



Theresa Millard
Advisor



Amir Mousavi
LCA Practitioner



Matt Neiman
Lead LCA
Practitioner

Current Steering Committee Members

Cardinal	Michelle Phan	Infinite Recycled	Patrick Elmore
Guardian	Jon Griggs	Technologies	Stanley Yee
NSG	Kate Krezowski	Kuraray	Vaughn Schauss
Pilkington	Kayla Natividad	Manko	Kevin Dix
Vitro	Logan Tautkus-Berry	Oldcastle Building Envelope	Matt Manning
	Paul Bush	Skyline	Vipul Bhagat
	Steve Marino	Technoform	Helen Sanders
ACE Glass	Courtney Little	Tristar	Rob Carlson
Eastman	Jeff Skaza	Viracon	Aaron Thompson
Safelex	Julie Schimmelpenningh	Walker Glass	Bobby Chestnut
Goldray	Mike Saroka		

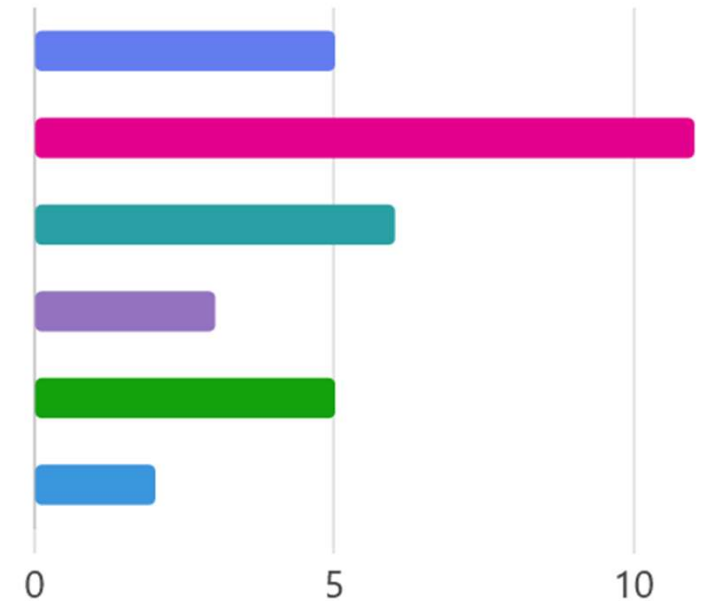


What have we heard so far?

Survey Results (24 responses)

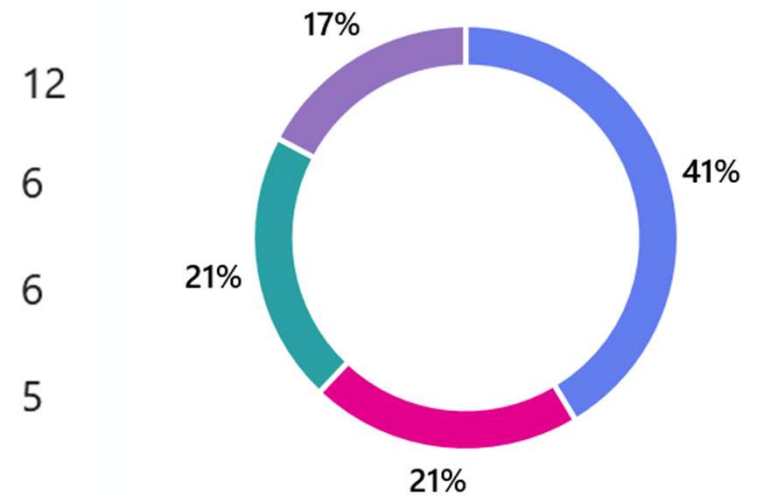
Which industry group(s) do you fit within?

● Float Glass Manufacturer	5
● Glass Fabricator/Processed Glass	11
● End Product Manufacturing (ex. fenestration assemblies)	6
● Installer	3
● Support Services / Suppliers	5
● Other	2



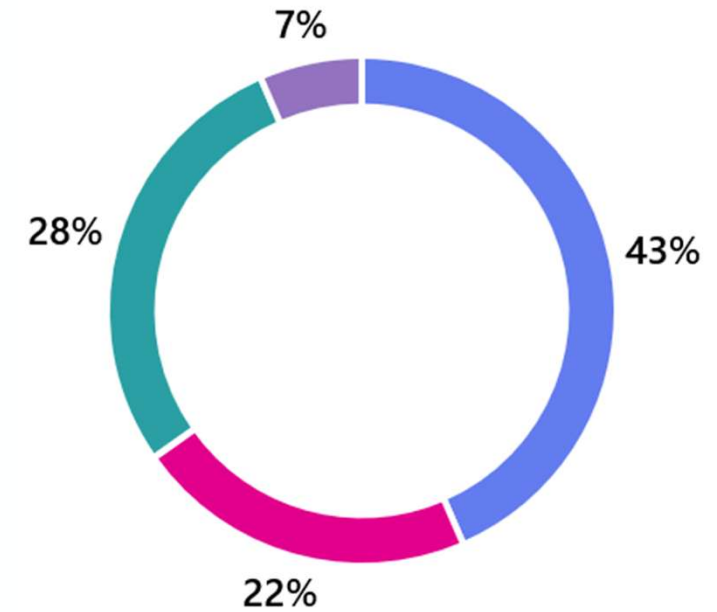
Has your company performed one or more product LCAs?

- Yes, previously performed product LCA(s)
- Currently performing product LCA(s)
- Plan to perform product LCA(s) within next 6-12 months
- No, and no plans within next 6-12 months



What is your company's motivation for conducting LCAs?

- Provide data for customer requests such as via EPDs 20
- For internal understanding such as R&D and continuous improvement 10
- For internal goal-setting around sustainability metrics 13
- Other 3



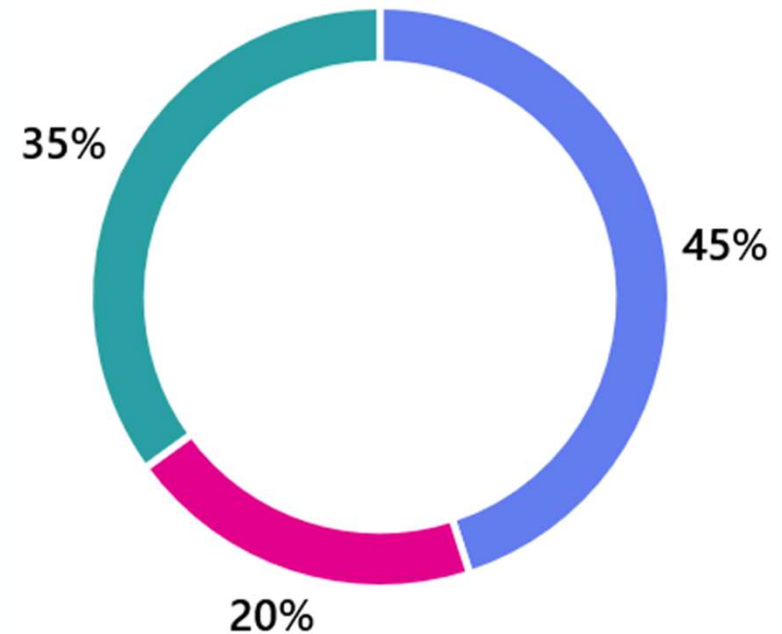
Are any results from your LCA(s) publicly available such as via EPDs?

- Yes
- No, but we make them available case-by-case
- No, only used for internal purposes today

9

4

7



Beyond EPDs, does your company experience product or organizational sustainability data demand, such as customer-specific requests and compliance submittals, that you would like the deliverables of this project to support?





Why is this project important?

Unified NGA Membership

Outcomes with Purpose

Transparency

Making Data do the Heavy Lifting



Environmental Product Declarations

a standardized document that provides transparent and comprehensive information about the environmental performance of a product throughout its entire lifecycle.



Product Category Rules (PCRs)

Set the requirements for carrying out LCA

Product Category Rule for Environmental Product Declarations

NGA PCR for Flat Glass: UN CPC 3711



Program Operator
NSF International
National Center for Sustainability Standards
Valid through September 30, 2025
ncss@nsf.org

Flat Glass
(exp. Sept 30, 2025)

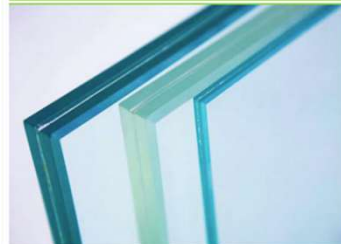
PCR Guidance for Building-Related Products and Services

From the range of Environmental Product Declarations of
UL Environment

Part B: Processed Glass EPD Requirements

www.ul.com/businesses/environment

Document: PCR Guidance for Building-Related Products and Services - Part B: Processed Glass EPD Requirements



Processed Glass
(expired)



NSF 1102-23

Product Category Rule for Environmental Product Declarations

PCR for Fenestration Assemblies



Program Operator
NSF International
National Center for Sustainability Standards
Valid through December 31, 2028
ncas@nsf.org
© 2024 NSF International

Fenestration Assemblies
(exp. Dec 31, 2028)

NGA Conference
© TrueNorth Collective 2025



Unified NGA Leadership Matters

If NGA doesn't lead, someone else will

if NGA leads

- Membership representation and decision-making
- Sets foundation for capturing differentiation
- Ensures fair competition
- Industry owns standardization assets, tools
- Common work creates cost efficiencies

if someone else leads

- Rules may not accurately represent glass performance
- Risk of inconsistent or misleading comparisons
- Tools optimized for a consultant's business model
- Leaves members to fend for themselves



Outcomes with Purpose

Creating a foundation for the future

- 2025+ Project**
 - Member training and steering committee engagement
 - Discovery and alignment of member needs to define success
 - Program Operator selection
- 2026+ Project**
 - Updated PCRs
 - Address learnings from previous PCRs
 - Covers new product types under a single PCR framework
 - Informed by scenario analysis from the screening LCA
 - Industry-average EPDs
 - Tool for on-demand EPD generation



Outcomes with Purpose

Creating a foundation for the future

Beyond 2026 **What else is possible with a “fit for purpose” LCA design?**

- Industry guidance
- Scope 1,2,3 reporting
- Design for Sustainability
- Other priority needs as defined by membership





circular economy



supply chain impacts



operations footprint



material health



water stewardship



packaging



carbon accounting



single-use plastics



life cycle assessment



red list



science-based targets



product transparency



chemical foot printing



green energy



zero waste goals

Sustainability is messy:
good data provides the foundation.....

Setting the Stage for Transparency

Market demand for environmental data isn't going away

Investors demanding transparent business accountability

Regulators mandate targets and progress reporting

Green Building Movement becoming table stakes



Investors demanding transparent business accountability

Cost of Capital

Opportunity Cost

Cost of Delay



Investors demanding transparent business accountability

Set a science-based target for GHG



Communicate with their investor community about ambition and results

Reduces cost of capital by demonstrating risk reduction

Investors demanding transparent business accountability

Marriott International targets reaching **net-zero** greenhouse gas (GHG) emissions across the value chain by no later than 2050.

2028 22% of Marriott suppliers by emissions covering purchased goods and services, capital goods, and upstream transportation and distribution will have science-based targets by 2028.

SCOPE 1 AND 2 EMISSIONS

-46.2%

-90%

SCOPE 3 EMISSIONS

-27.5%

-90%

Note: Emissions reduction targets are from a 2019 base year. Read more about our net-zero target announcement on news.marriott.com.



To reach its net-zero targets, Marriott is focusing its efforts in three distinct areas.



ENERGY
REDUCTION



SOURCING ENERGY
FROM RENEWABLE
SOURCES



PURCHASING
GOODS WITH
LOWER CARBON
FOOTPRINTS



Regulators mandate targets and progress reporting

State Buy Clean Regulations (procurement requirements)

California Regulations SB261 and SB253

- 2026 Report Scope 1 and 2
- 2027 Report Scope 3
- Report climate-related financial risks and mitigation bi-annually

European Regulations



- Need product-specific data
- Enables cause-and-effect understanding
- Facilitates impact improvement

Facilitates impact improvement

Green Building Standards becoming table stakes



**Boston Zoning Code Article 37 Green Buildings
and
Climate Resiliency
Review Procedures and Submittal Requirements**



Green Building Standards becoming table stakes



Since the goal is optimization and improvement, transparency is just step #1.

Your data is part of your customer's impact.

Glass manufacturers without environmental data risk being left out of major commercial and infrastructure projects.



What is possible?

Guiding principles of a system LCA solution

How does it work?

What does it deliver?

Guiding principles for this project

- Provide a source of credible LCA results
- Safeguard data ownership and confidentiality
- Enable LCA impact calculation across a wide range of products
- Respond on-demand to transparency requests
- Support sustainability strategy and programming
- Be flexible to evolving LCA needs
- Incorporate the best available data



System vs. Product LCA: *How it works*

DATA TO MODEL

System



Multiple products or categories based on common processes/materials in the value chain

Estimates environmental impacts of key parts of the business and highlights relative contribution

Product

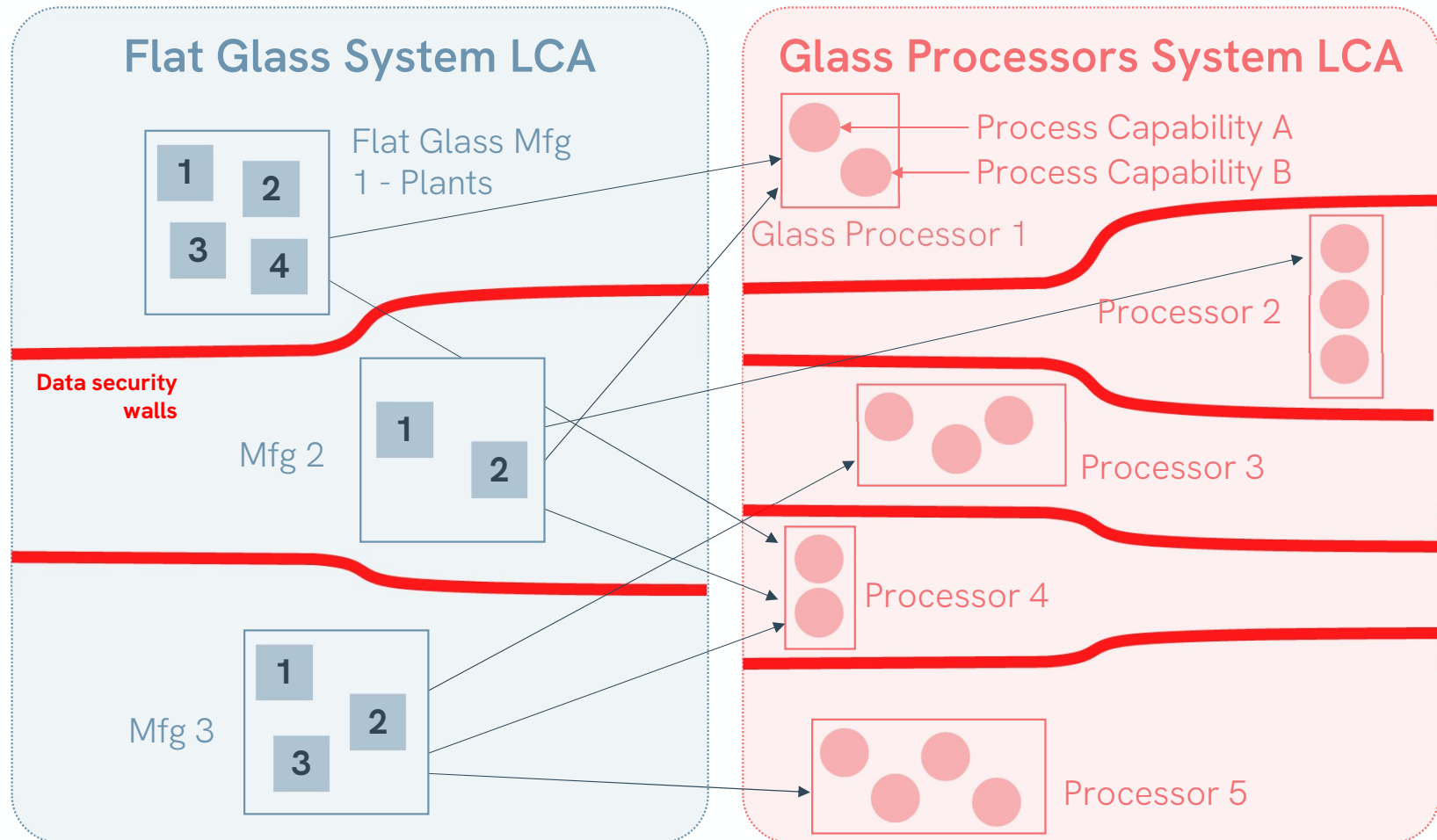


Single or handful of products using primary or secondary data

Results demonstrate impact distribution by life cycle stages



System LCA Model Design



At-Scale System Model Capability Summary

01 Generate Product Transparency: EPDs, carbon footprint data

02 Refine Scope 1, 2, 3 GHG Emissions Accounting

03 Inform Sustainable Decision Making

04 Ensure Accountability to Improvements through Metrics

Generate Product Transparency: EPDs

The collage features four overlapping website screenshots:

- Pilkington:** A sustainability page with a green header and a "Back to Sustainability" button.
- Guardian Glass:** A page titled "Guardian Glass publishes new Environmental Product Declarations" for North America, dated April 9, 2024. It mentions the publication of new EPDs for flat unprocessed glass products and processed glass products, including float glass, low-E glass, and SunGuard architectural glass.
- Cardinal:** A page titled "Environmental Product Declarations" explaining that an EPD is a voluntary, independently verified report regarding the life-cycle of products and their environmental impact. It includes a link to the ASTM International website.
- Vitro:** A page titled "Sustainability Resources" with a blue header and a "GET SAMPLES" button. It includes a section for "Sustainability Programs & Resources" and a "Sustainability" icon.

Refine Scope 1-3 GHG Emissions Accounting

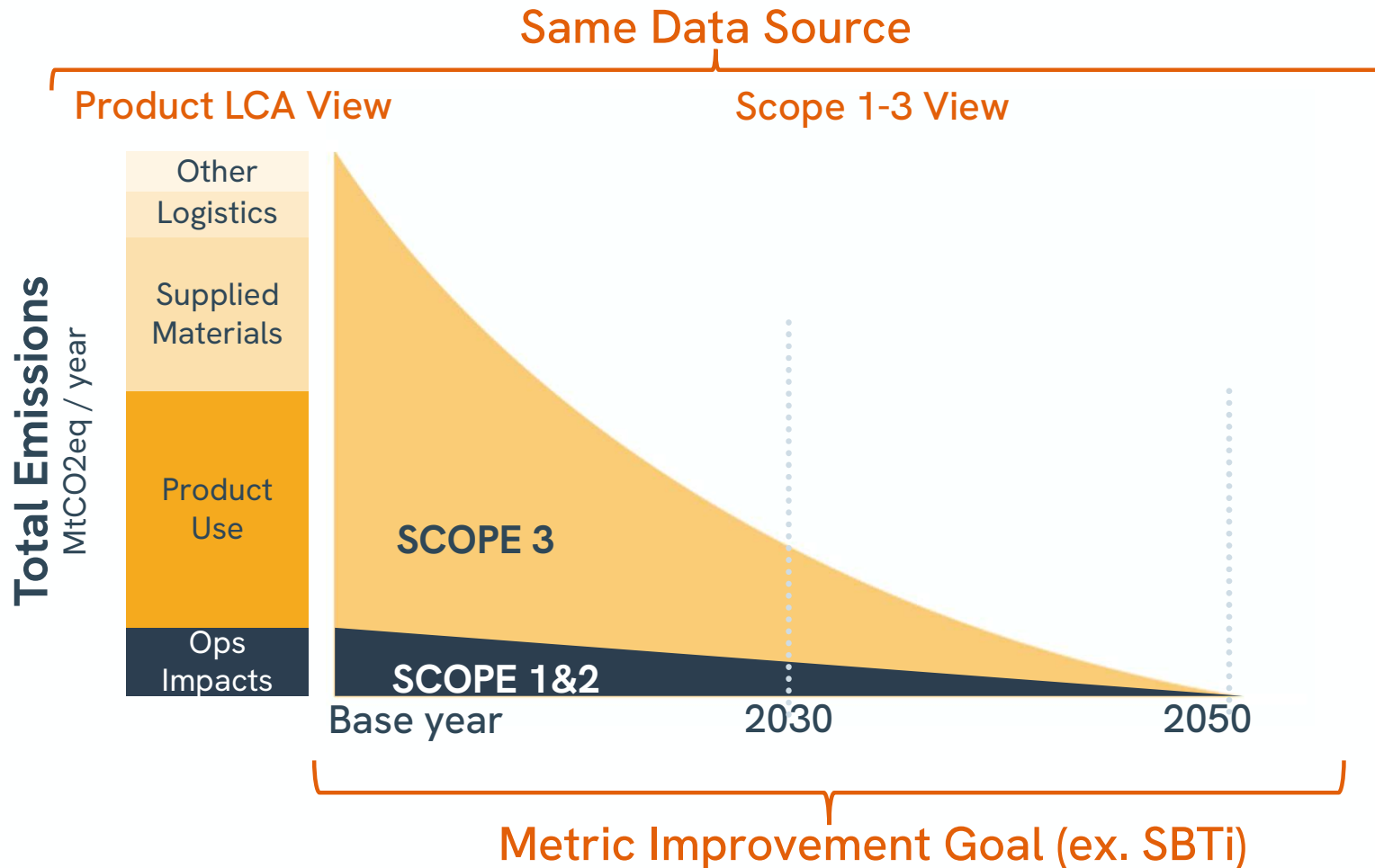


Scope 1-3 emissions accounting is another form of transparency

Environmental impact is the sum of the impact assigned to the value a business creates- products and services

System LCA acts as an environmental impact “data engine” with flexibility to provide output at multiple levels

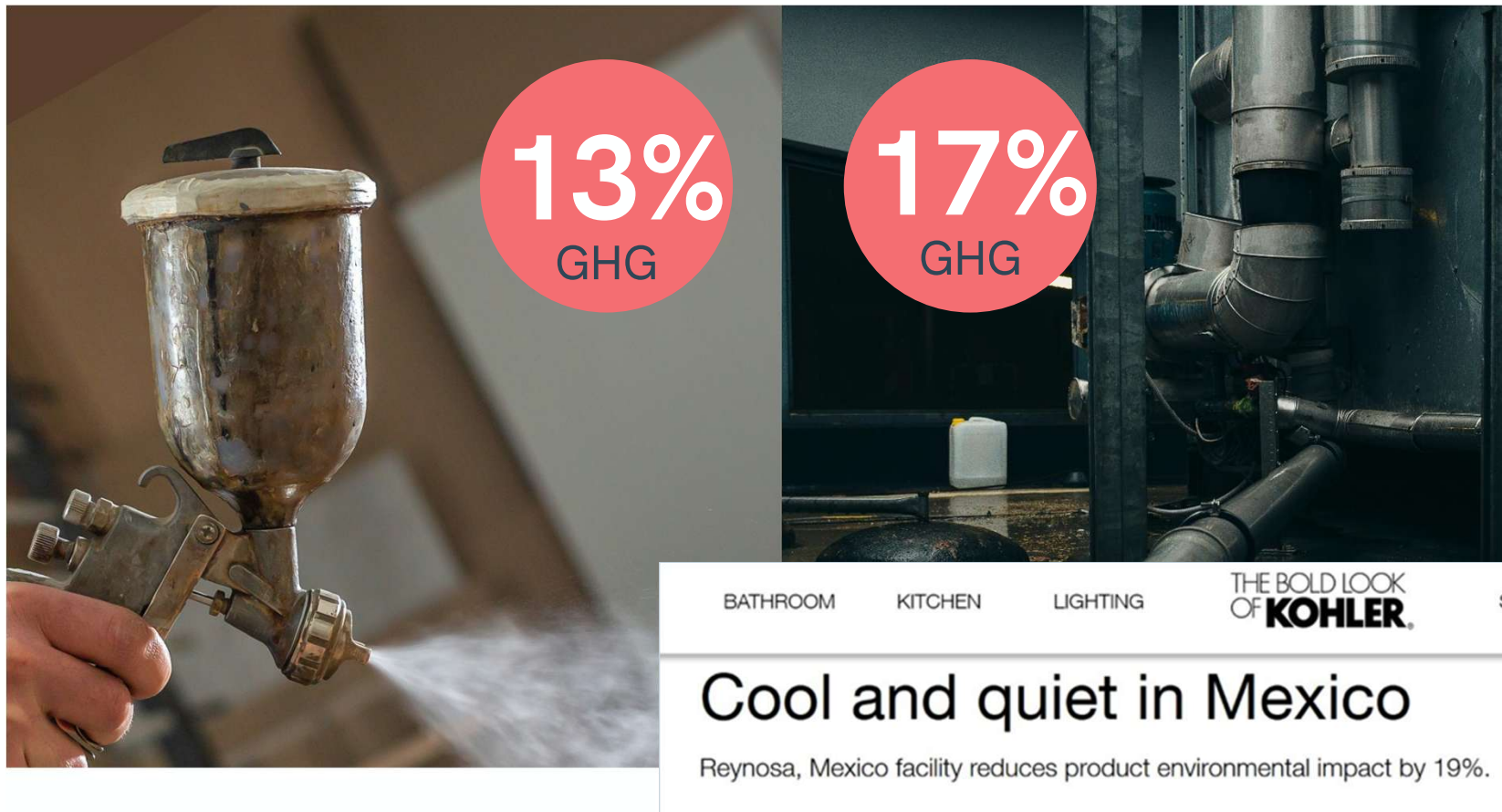
Refine Scope 1-3 GHG Emissions Accounting



03

Inform Sustainable Decision Making

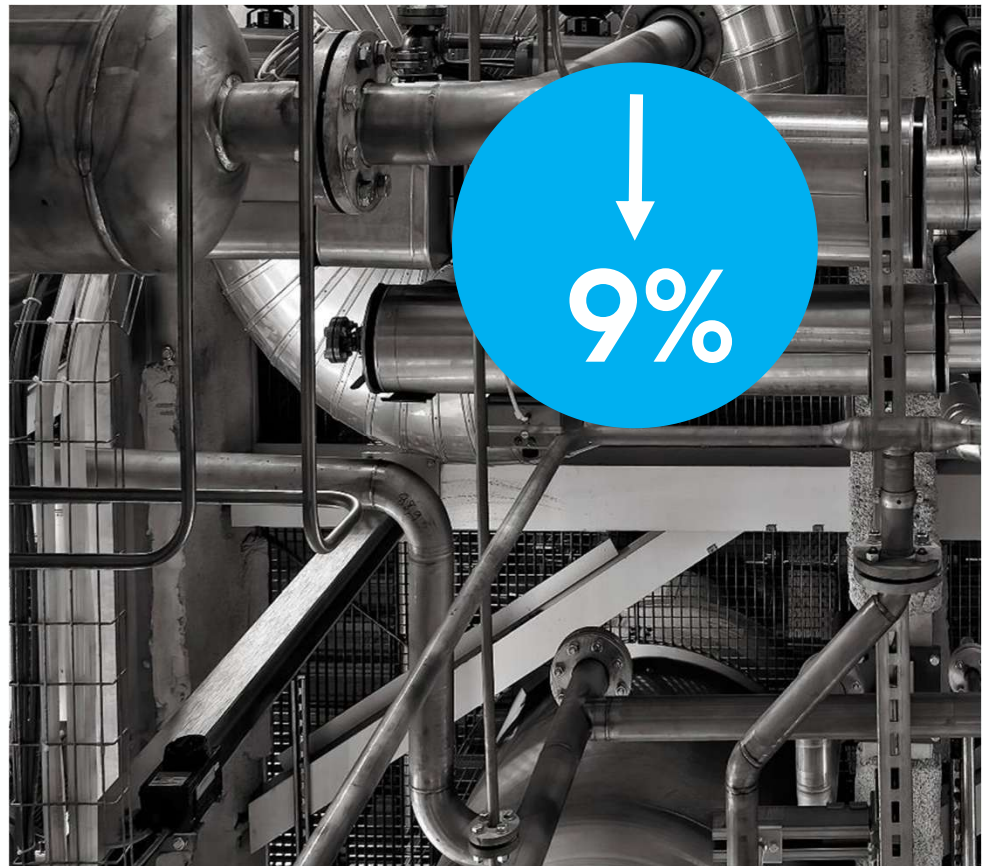
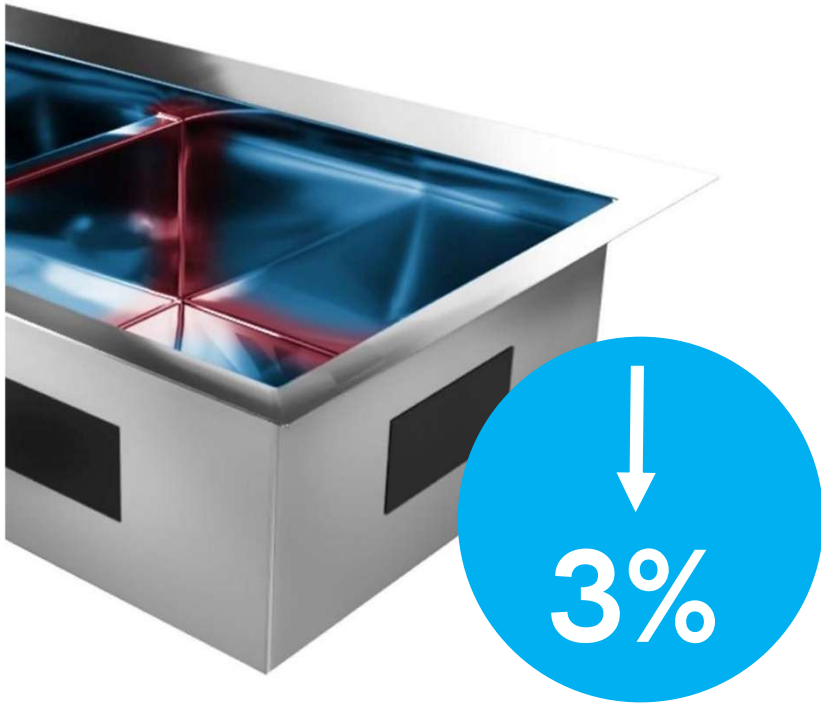
Reynosa, Mexico team requested support to reduce their footprint



03

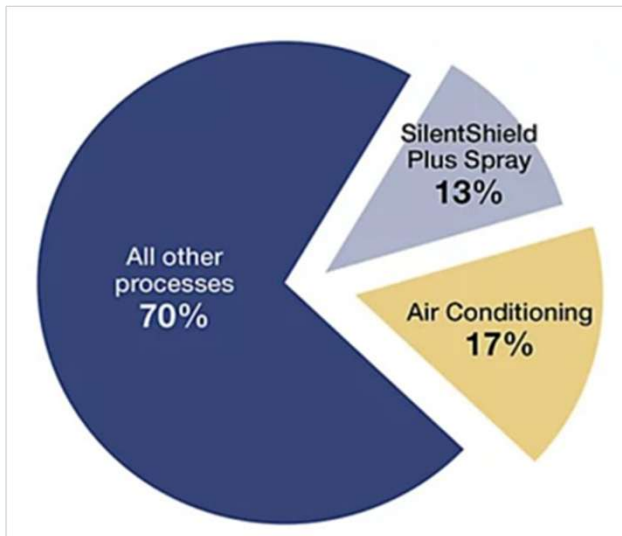
Inform Sustainable Decision Making

Reynosa, Mexico team requested support to reduce their footprint



Inform Sustainable Decision Making

THE BOLD LOOK
OF **KOHLER**®



PEOPLE

Cooler working conditions

Reduced worker exposure to chemicals

PLANET

19% reduction in impacts

Removal of Red List chemicals

PROFIT

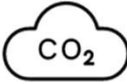



Cost savings: reduction per product

Enhanced visibility to cost drivers

+Sales from differentiated product

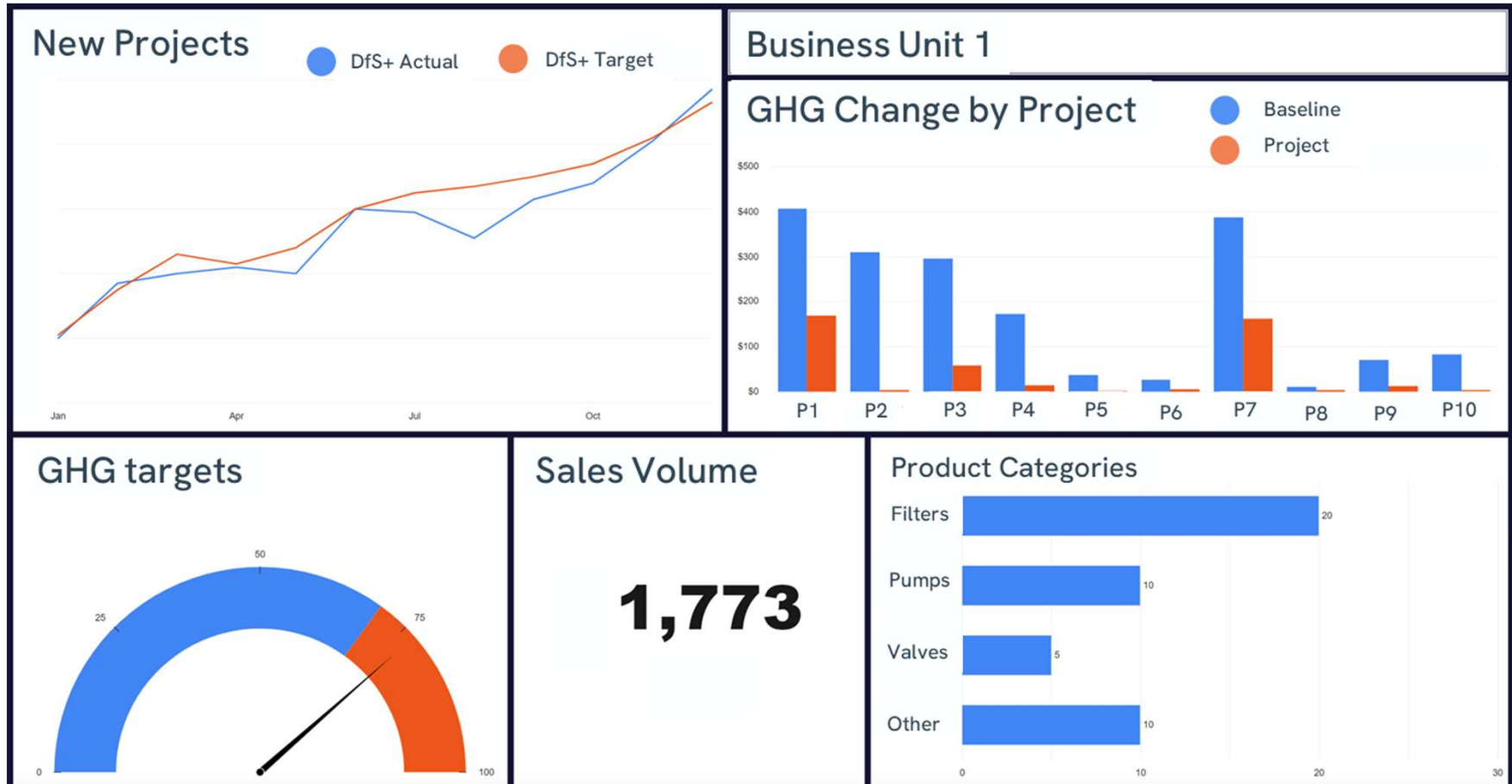
EPD capability

Ensure Accountability to Improvements through Metrics

		LIFE CYCLE PHASE				
		SUPPLIER OPERATIONS	OWNED OPERATIONS	USE AND END OF LIFE	OVERALL CHANGE	
IMPACT		GLOBAL WARMING POTENTIAL	↑ 7%	↓ -6%	↓ -6%	↓ -6%
		WATER SCARCITY	↓ -15%	↑ 2%	↓ -6%	↓ -4%
		HUMAN TOXICITY	↑ 4%	↓ -6%	↓ -6%	↓ -2%
		COST IMPACT	↑ 3%	↓ -6%	↓ -6%	↓ -4%

**not based on actual data; only used for education purposes*

Ensure Accountability to Improvements through Metrics



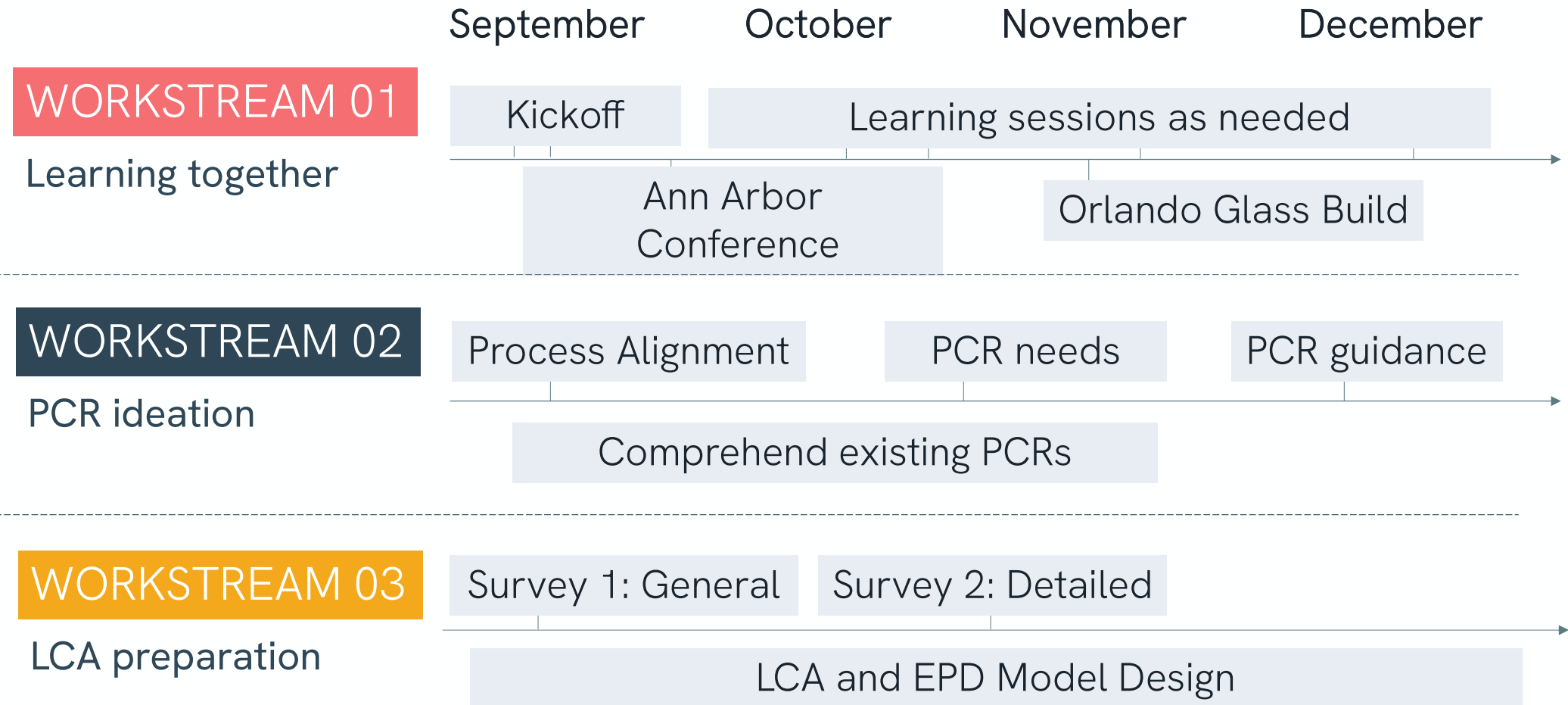


Discussion and Next Steps

Overall project plan

Get involved

How and where will we work together?



Deliverables in depth

WORKSTREAM	OUTCOME/DELIVERABLES
01	<p>Define Success</p> <ul style="list-style-type: none"> • Consensus of what success looks like and path to get there • Activated cohort of industry members engaged for next steps
02	<p>Facilitate voice of industry</p> <ul style="list-style-type: none"> • PCR guidance document representing the will of industry. • Vetted and on-boarded Program Operator
03	<p>System LCA/EPD generator design</p> <ul style="list-style-type: none"> • LCA model design aligned to expected applications and PCR content ready for build-out

Next Steps

Homework: Complete Survey #1

Early Oct: Kick-off: Workstream 2: PCR ideation

Mid-Oct:

- Session 3: Education Continued – 75 min virtual call (all NGA members)
- Survey #2 detailed
- Workstream 3: LCA preparation begins