The Green Energy Transition

2023 PLM Market & Industry Forum—4 April 2023

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Sustainability & Green Energy

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Practice Overview

Director: Mark Reisig

Mission

- Provide leadership to companies transitioning to sustainable carbon-free products and plants

Areas of Focus

- Provide management consulting services to enable clients to reduce their product carbon footprint
- Assist clients to design more sustainable eco-friendly products
- Enable clients to embed sustainability in PLM business strategies and enabling technologies through end of life, eliminating waste, increasing recyclability, reuse, and repurposing of materials and assets
- Evaluate new technologies and provide strategic management consulting services to help companies transform to meet the demands of a "net-zero" future

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Mark Reisig

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Professional background

- Over 40 years of experience in digital transformation, information technology, and engineering
- Led digital initiatives in PLM, plant design, CAD, ERP, SCM, and MDM for global businesses
- Prior to CIMdata, held executive and senior management positions at Aras, General Electric, Federation, Oracle, Auto-trol Technology, and Kraft Heinz
- Has worked with all the major PLM solution providers from both an industrial perspective responsible for large global deployments, as well as deploying those technologies from a solution provider and consulting perspective
- Industry experience includes energy, aerospace, defense, automotive, industrial, high-tech electronics, medical devices, and food & beverage

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Key Takeaways

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Sustainability & the Green Energy Transition is the defining issue of our time

- We are on pace to reach 2.8°C warmer than the pre-industrial period
- Corporate net-zero emission pledges are gaining momentum, but few companies understand how to reduce their carbon footprint
- Greater visibility into the supply chain is required to reduce a companies product carbon footprint (PCF)
- Embedding sustainability in PLM is fundamental to reducing PCF
- Climate change is an existential threat and offers significant business opportunities

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Agenda

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- Earth Systems
- Sustainability & The Green Energy Transition
- The Green Energy Transition & Sustainability 2023 Survey Results
- Concluding Remarks

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Global Warming & Climate Change

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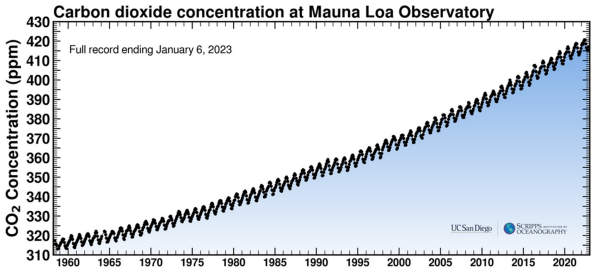
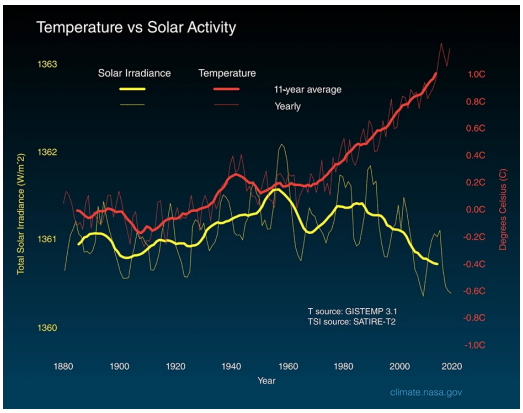
"Humans are changing Earth's climate, primarily through GHG emissions." - NASA



https://keelingcurve.ucsd.edu/



https://climate.nasa.gov/faq/14/is-the-sun-causing-global-warming/

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Greenhouse Gasses Continue to Rise

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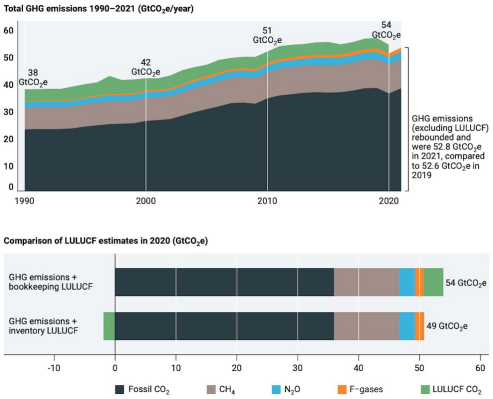
Nothing that we have done to date appears to be stopping its rise

- GHG 2019 – 54.4 $GtCO_2e$
- GHG 2020 – 54.0 $GtCO_2e$
- GHG 2021 – 52.8 $GtCO_2e$
  - Excludes Land Use Change
- GHG 2030 – Est. 58 $GtCO_2e$



https://www.unep.org/resources/emissions-gap-report-2022

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Greenhouse Gas Emissions by Industry

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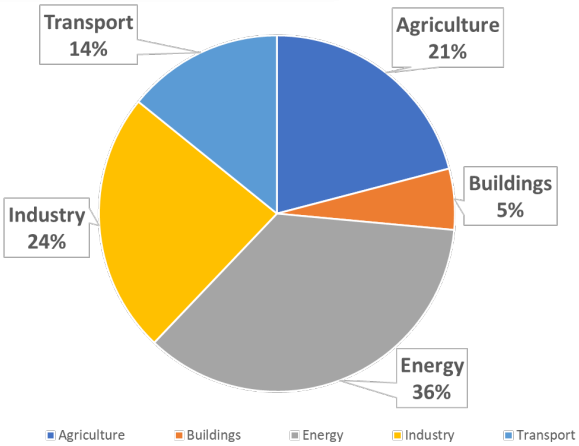
Just about all of these industries use PLM

Transport	**8.2Gt**
Cars	3.3Gt
Trucks/Buses	2.8Gt
Rail	730.4Mt
Shipping	652.1Mt
Air	342.0Mt
Ships	157.7Mt
Cooling	128.6Mt

Industry	**13.7Gt**
Other Industries	4.1Gt
Metals	3.0Gt
Waste	2.6Gt
Chemicals	2.6Gt
Cement	1.5Gt

Note: GHG Emissions in CO_2e



Agriculture	**12.1Gt**
Land Use Change	5.6Gt
Livestock	3.6Gt
Crops	2.9Gt

Buildings	**3.2Gt**
Heating Gas	1.0Gt
Coal Gas	867.2Mt
Cooling	703.8Mt

Energy	**20.6Gt**
Elec: Coal	10.3Gt
Other Use	3.9Gt
Elec: Gas	3.0Gt
Fossil Fuel Prod.	2.4Gt
Elec: Oil	538.6Mt

9 https://worldemissions.io/

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UN Sustainability Goals

"The blueprint to achieve a better and more sustainable future for all"

- The 17 Goals were adopted by all UN Member States in 2015 as part of the 2030 Agenda for Sustainable Development, which set out a 15-year plan to achieve the Goals
- Paris Agreement - The goal is to strengthen the global response to the threat of climate change by limiting global warming to well below 2°C, preferable to 1.5°C, compared to pre-industrialized levels

https://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/

Not on Track for 2030

"We are in the fight of our lives, and we are losing" – Antonio Guterres

Increase in global greenhouse gas emissions projected by 2030, compared to 2010, based on available national action plans

Source: UNFCCC NDC synthesis report (Oct 2022)

Reduction in global greenhouse gas emissions needed by 2030, from 2010 levels, to keep warming to no more than 1.5 degrees Celsius

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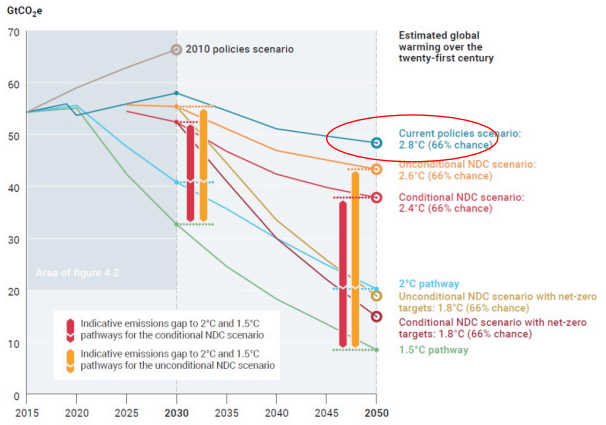
Key Facts

"There's no credible pathway to 1.5℃ in place" – UNEP Emissions Gap Report



- Global Warming 2022: 1.11°C
- Projection by 2100: 2.8°C
- CO_2 Concentration: 420.99 ppm
- Ocean Acidification: 0.01 pH (30%)
- Remaining Wilderness: 23%
- Biodiversity Loss: 0.01/yr. (200/yr.)
- Population: 8 billion people

13 https://www.unep.org/resources/emissions-gap-report-2022

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Survey Demographics

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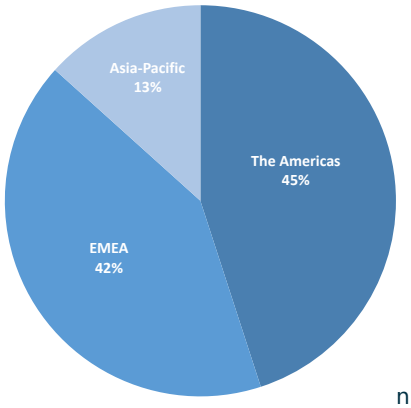
The Green Energy Transition Survey Demographics

- Respondents were historically comparable to previous CIMdata surveys in terms of geography, revenue size, industry, role, and work function
- Poll took place between January 5 – February 20, 2023
- Number of Respondents were 101



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Sustainability Industry Rating

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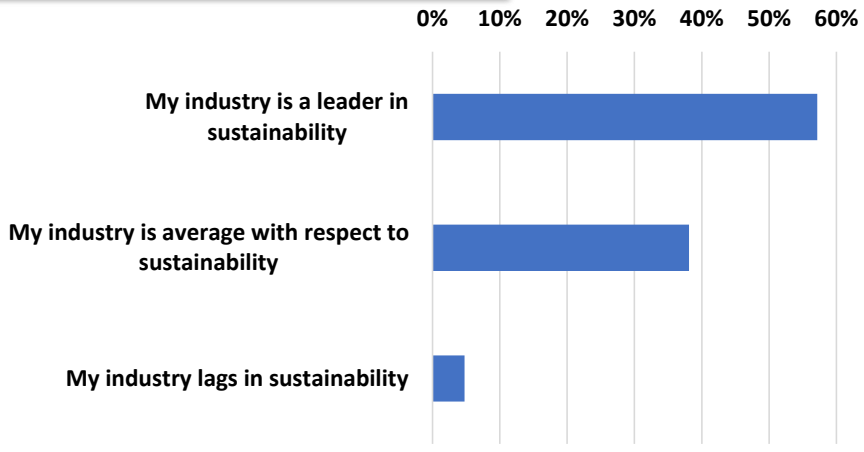
Those rating their industry as a leader doubled since 2021 Survey



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Sustainability Company Comparison

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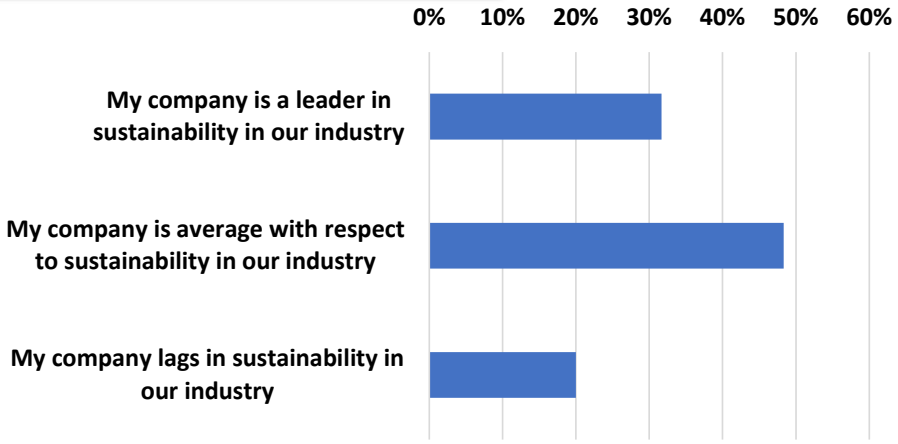
Significantly less believe their own company is a leader



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Publish an ESG Report

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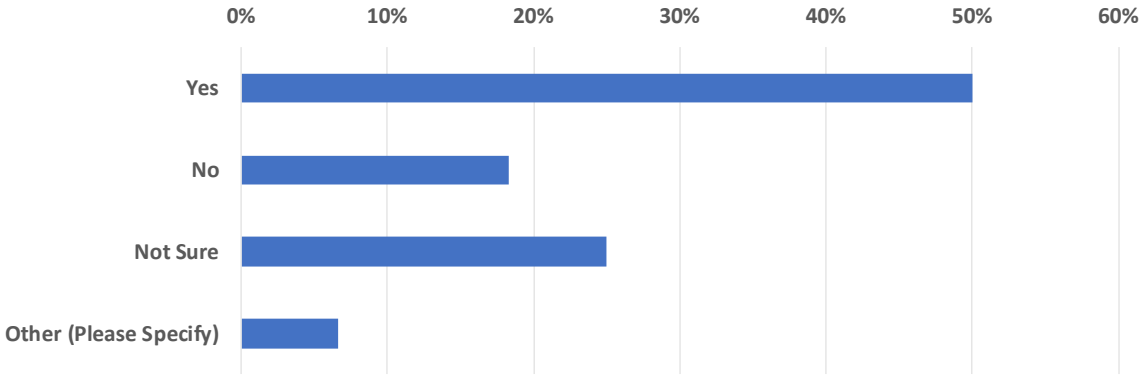
Growing awareness that eventually ESG related disclosures will be mandatory



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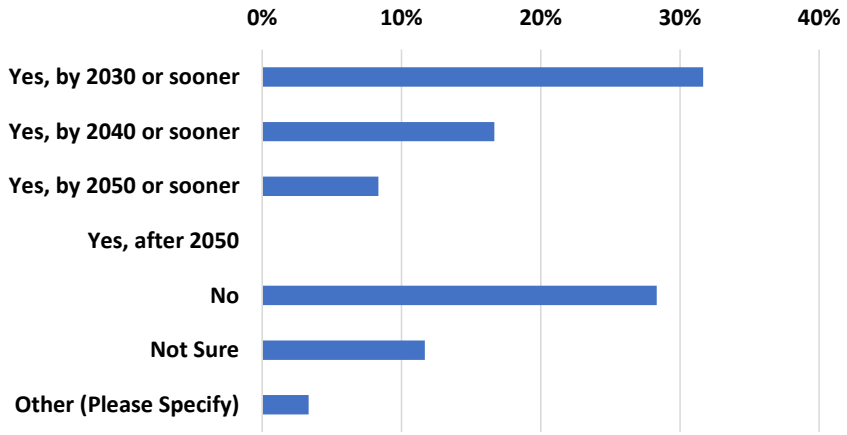
Net-zero Pledge

57% by 2050 and 32% by 2030



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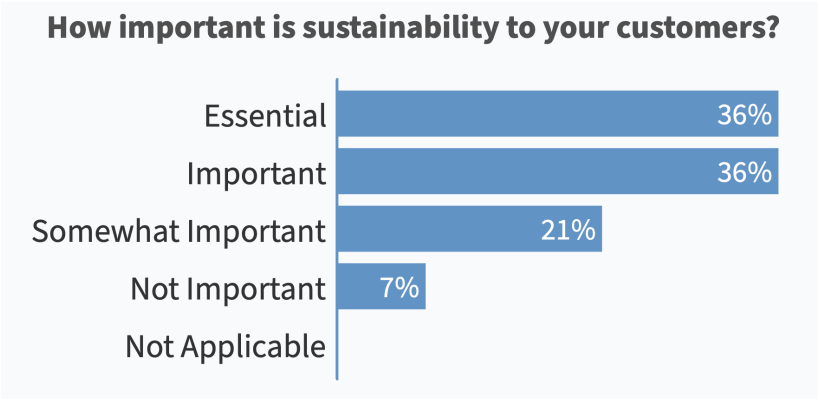
CIMdata Foresight Poll

How important is sustainability to your customers?



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Organization to Achieve Sustainability

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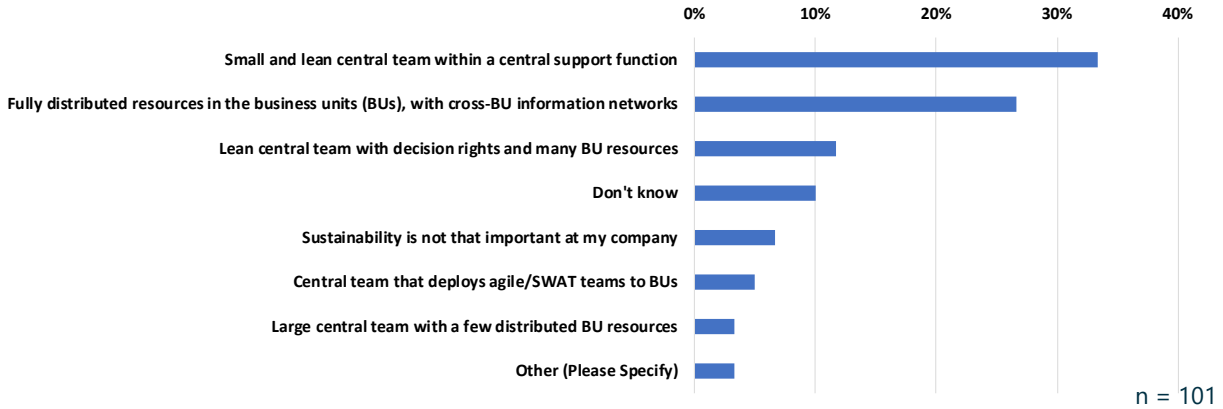
Lean centralized teams will result in weak adoption



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Features of Sustainability Program

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Very little action being taken on sustainability

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Corporate Sustainability Culture

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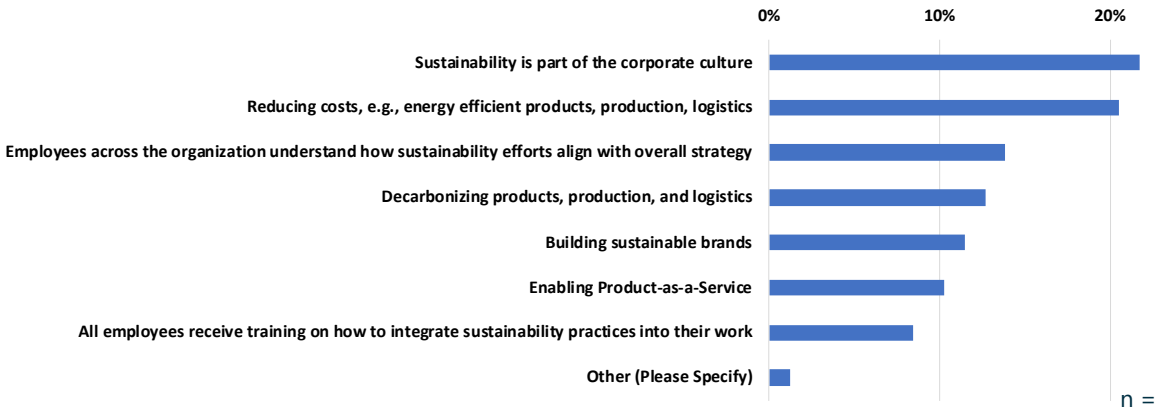
Corporate culture lags far behind net-zero ambitions



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Motivation to Address Sustainability

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Diversity of responses indicates a lack of strategy

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Circular Concepts in Company's Strategy

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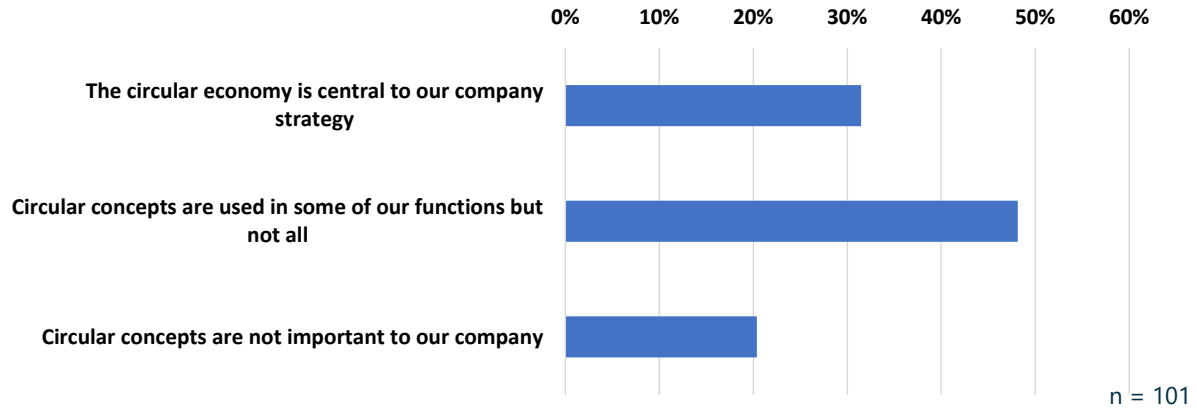
Growing number of rate circular concepts as central to their company's strategy



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Does your Company Perform LCAs?

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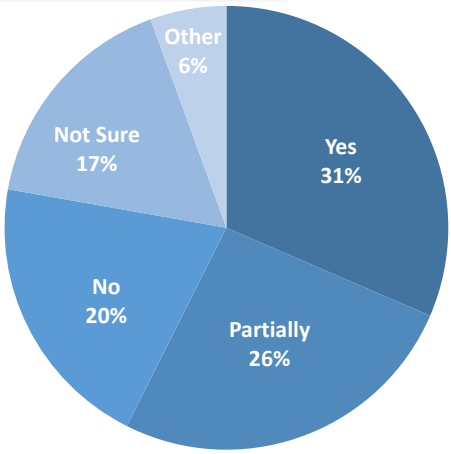
57% of companies are performing some aspects of LCAs



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Product Carbon Footprint During Design

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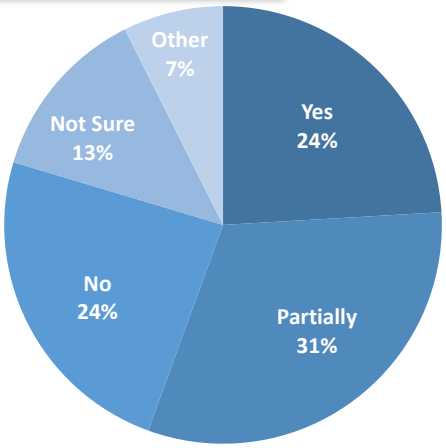
80% of environmental impact is locked-in during design. PCF is not captured in design



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Design Engineers Accessing Suppliers PCF

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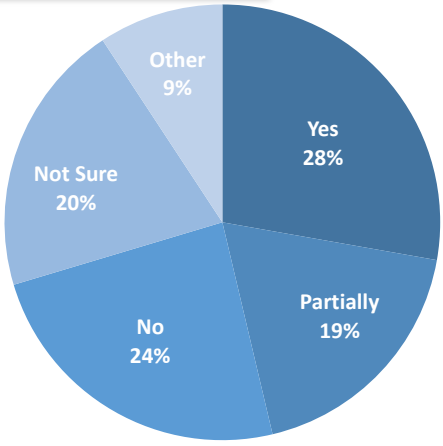
65-95% of the environmental impact is in the supply chain (Scope 3 emissions)



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Elements Included in Calculating PCF

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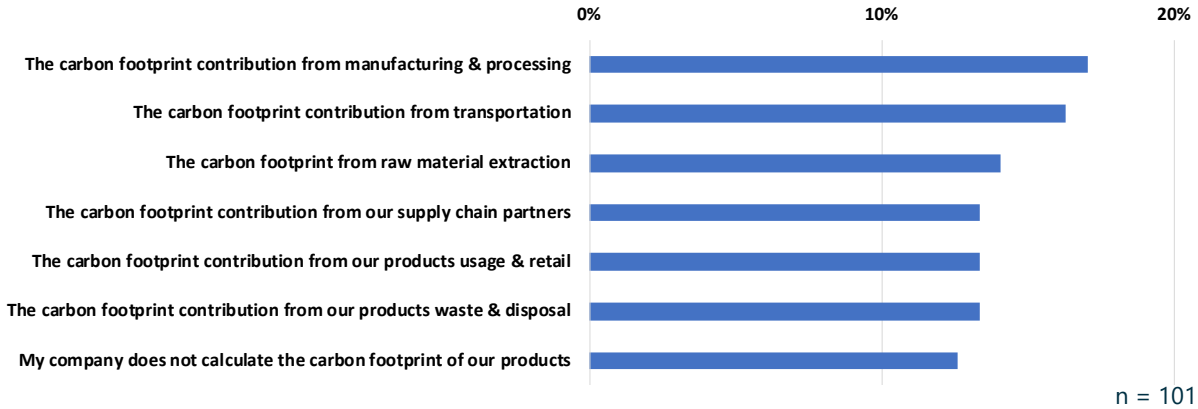
Only 13-17% know their carbon footprint



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Sustainable Design

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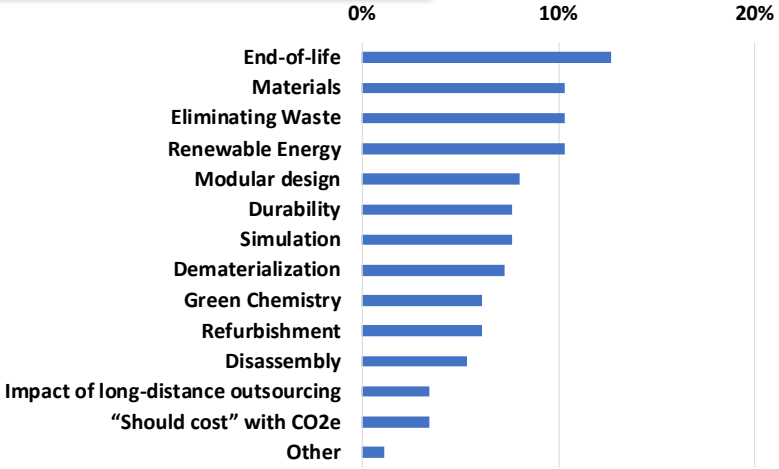
Very few companies practice sustainable design



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Where PLM Can Help Sustainability Goals

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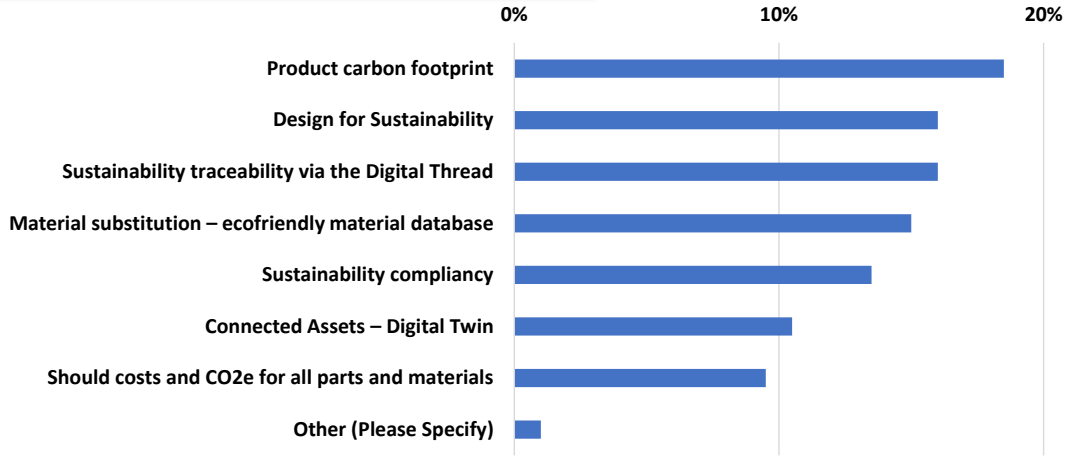
Product Carbon Footprint was the leading use case



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Technologies Critical to Sustainability

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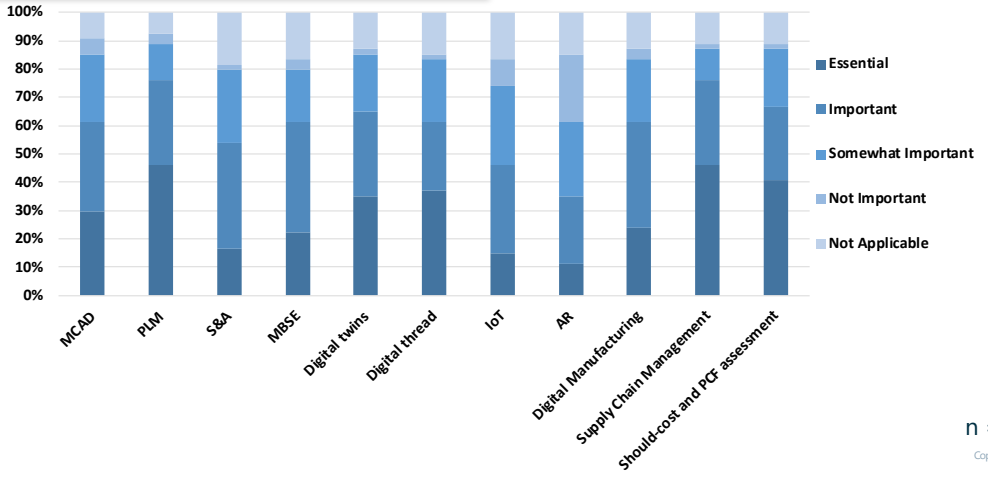
PLM and Supply Chain are the most essential



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Bottlenecks to Achieving Sustainability

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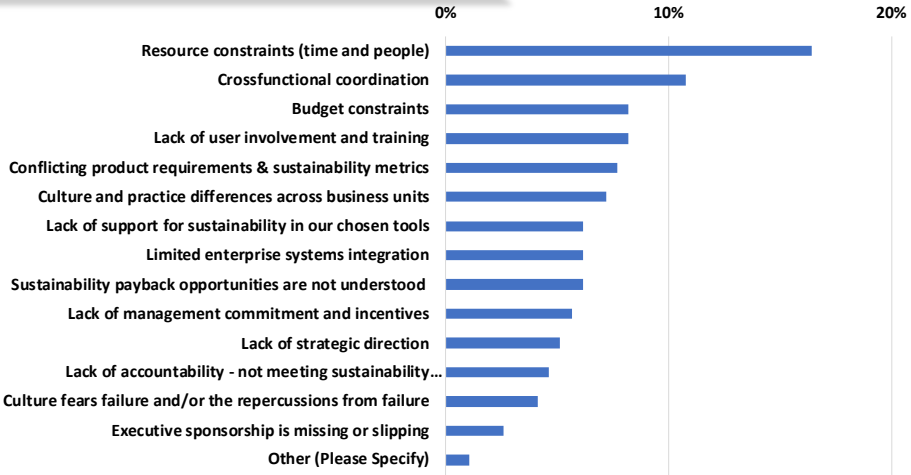
PLM can overcome most of these barriers



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The Business Opportunity

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How can PLM providers best support sustainability requirements

- Organizations need sustainability embedded in PLM to reduce their PCF, engage in sustainable design and the circular economy
- Just like PLM, this is a people, process, and technology issue
- ISVs and SIs et al. can help with all three, depending on their expertise and offerings
- Demands a systemic approach and needs to be supported by a business platform with supply chain visibility, a robust digital thread, and in many cases, digital twins
- PLM and SCM must be more symbiotic

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Concluding Remarks

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Climate change is an existential threat that offers significant business challenges

- All life on earth is vulnerable to global warming and climate change
- Sustainability requirements are being driven top-down in companies, but not yet ingrained in the corporate culture
- Industrial organizations have a gap between their ambition and actions required to meet their goals
- Advanced capabilities in PLM, supply chain, reducing PCF, and digital twin are seen as essential
- PLM is central to sustainability; industrials, ISVs, and SI/Reseller/VARs need to succeed together

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To Learn More…

- Mark Reisig, Executive Consultant, and Sustainability & Green Energy Practice Director
- m.reisig@CIMdata.com
- Mobile: +1.864.320.7987
- CIMdata has several useful resources on this topic:
  - Sustainability and Green Energy Consulting Practice on this topic
  - Webinar: The Green Energy Transition and Sustainability January 23, 2023
  - Webinar: Webinar: Meeting Sustainability and Green Energy Transition Objectives: The industrial Perspective, April 27, 2023, 11:00 AM EDT
  - Article: Accelerating the Transition to Green Energy with Product Lifecycle Management (www.powermag.com)
  - Article: Climate Change is Transforming PLM Strategies March 10, 2023, (https://industrytoday.com/)

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Questions & Answers

What's on your mind?

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