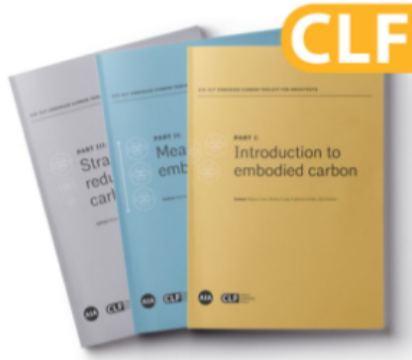


Jun 4, 2022

# CLF Toolkits: Policymakers, Owners, Architects

The Carbon Leadership Forum develops toolkits to aid practitioners in understanding and reducing embodied carbon in built environments.



### AIA-CLF Embodied Carbon Toolkit for Architects

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### CLF Embodied Carbon Toolkit for Building Owners

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Postdoctoral Scholar: LCA Modeling

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Research Position Now Open Life Cycle Assessment (LCA) modeling of carbon-storing materials The Department of Architecture at the University of...

2021-2022 Carbon Leadership Forum Impact Report

Nov 23, 2022

A changed landscape for embodied carbon action In the 2021-2022 fiscal year, the Carbon Leadership Forum experienced rapid growth, confronted...





# An Update on Emissions

# **UN SECRETARY-GENERAL GUTERREZ**

**COP27, Nov. 7, 2022**

**"our planet is fast approaching  
tipping points  
that will make climate chaos  
irreversible."**

**"that 1.5 degree goal  
is on life support"**

**"We are getting dangerously close  
to the point of no return."**

**"The global climate fight  
will be won or lost  
in this crucial decade  
— on our watch."**

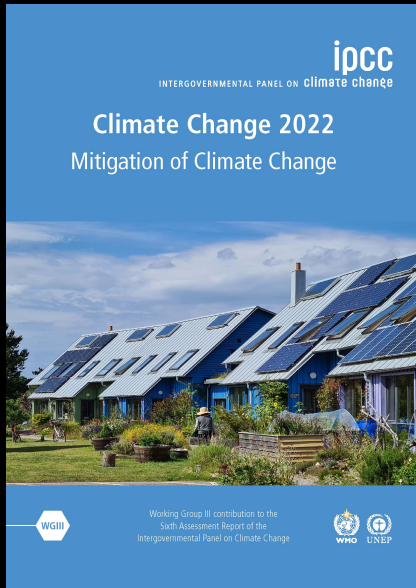
**Table SPM.2: Estimates of historical CO<sub>2</sub> emissions and remaining carbon budgets.**

**Estimated remaining carbon budgets are calculated from the beginning of 2020 and extend until global net zero CO<sub>2</sub> emissions are reached.**

Global warming between 1850–1900 and 2010–2019 (°C)	Historical cumulative CO <sub>2</sub> emissions from 1850 to 2019 ( <i>GtCO<sub>2</sub></i> )
1.07 (0.8–1.3; <i>likely range</i> )	2390 (± 240; <i>likely range</i> )

Approximate global warming relative to 1850–1900 until temperature limit (°C)* <sup>(1)</sup>	Additional global warming relative to 2010–2019 until temperature limit (°C)	Estimated remaining carbon budgets from the beginning of 2020 ( <i>GtCO<sub>2</sub></i> )					Variations in reductions in non-CO <sub>2</sub> emissions* <sup>(3)</sup>
		<i>Likelihood of limiting global warming to temperature limit*<sup>(2)</sup></i>					
		17%	33%	50%	67%	83%	
1.5	0.43	900	650	500	400	300	Higher or lower reductions in accompanying non-CO <sub>2</sub> emissions can increase or decrease the values on the left by 220 GtCO <sub>2</sub> or more
1.7	0.63	1450	1050	850	700	550	
2.0	0.93	2300	1700	1350	1150	900	

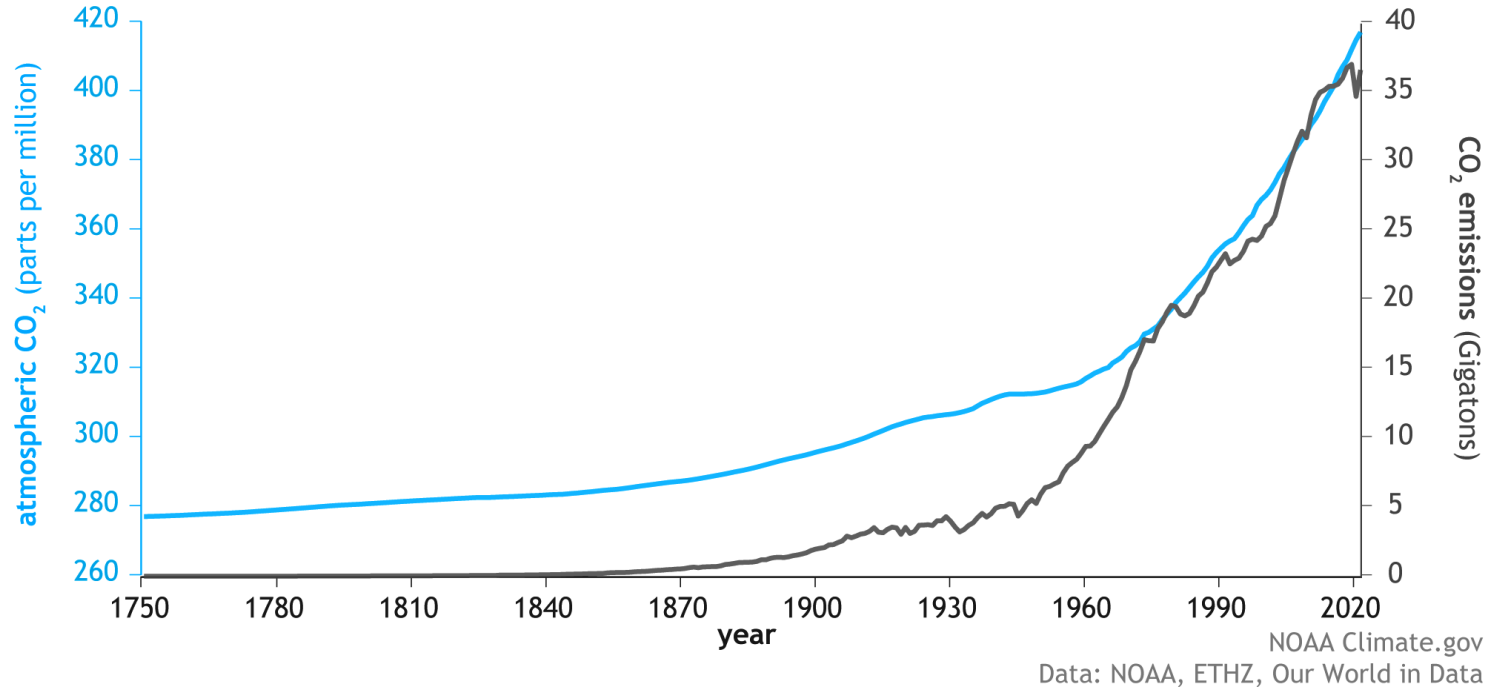




**"Unless there are immediate and deep emissions reductions across all sectors, limiting global warming to 1.5°C will be beyond reach."**

**"This implies that mitigation after 2030 can no longer establish a pathway with less than 67% probability to exceed 1.5°C during the 21st century . . ."**

## Atmospheric carbon dioxide amounts and annual emissions (1750-2021)

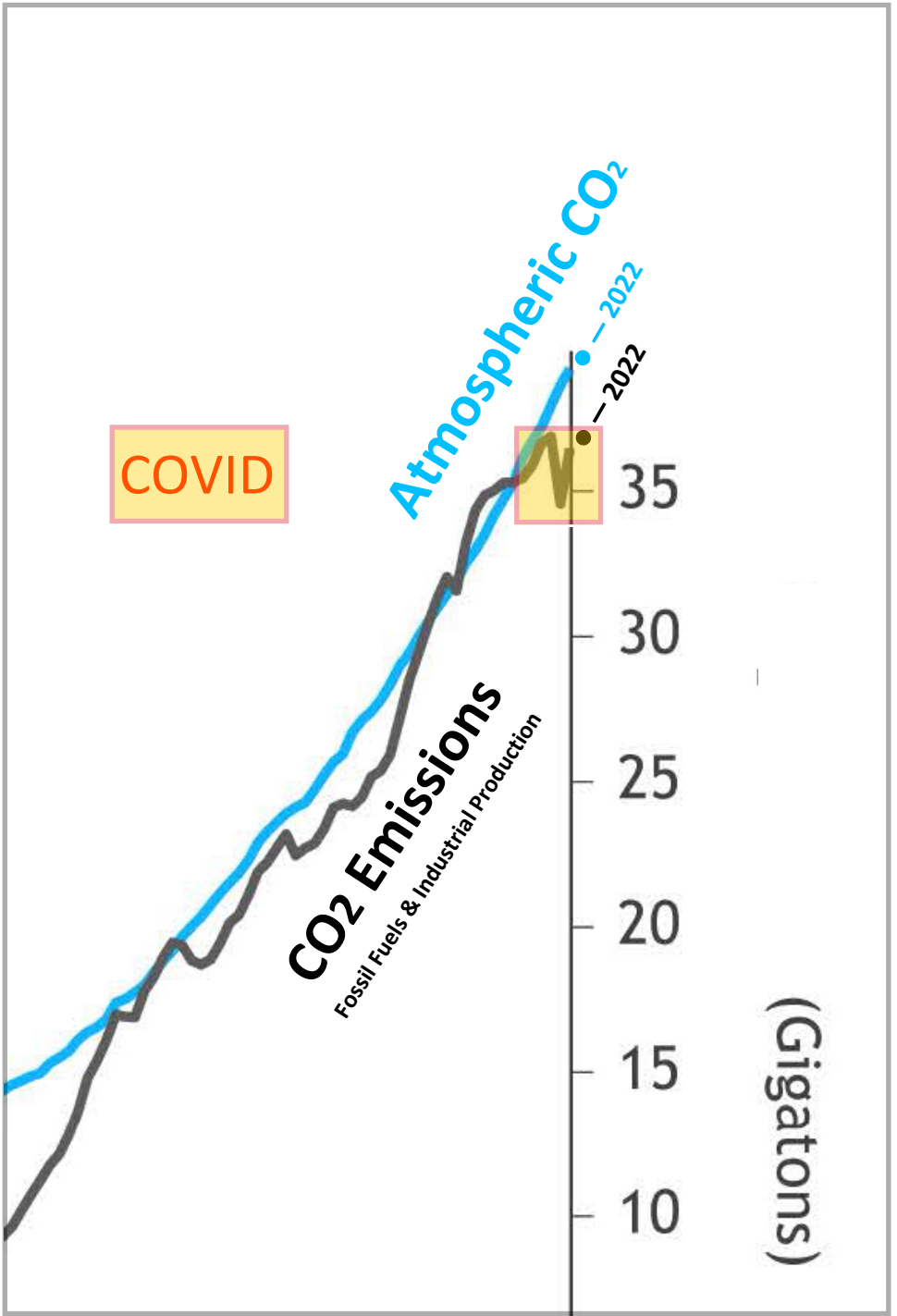


**Note: CO<sub>2</sub> emissions from Fossil Fuel & Industrial Emissions**

<https://www.climate.gov/media/14596>

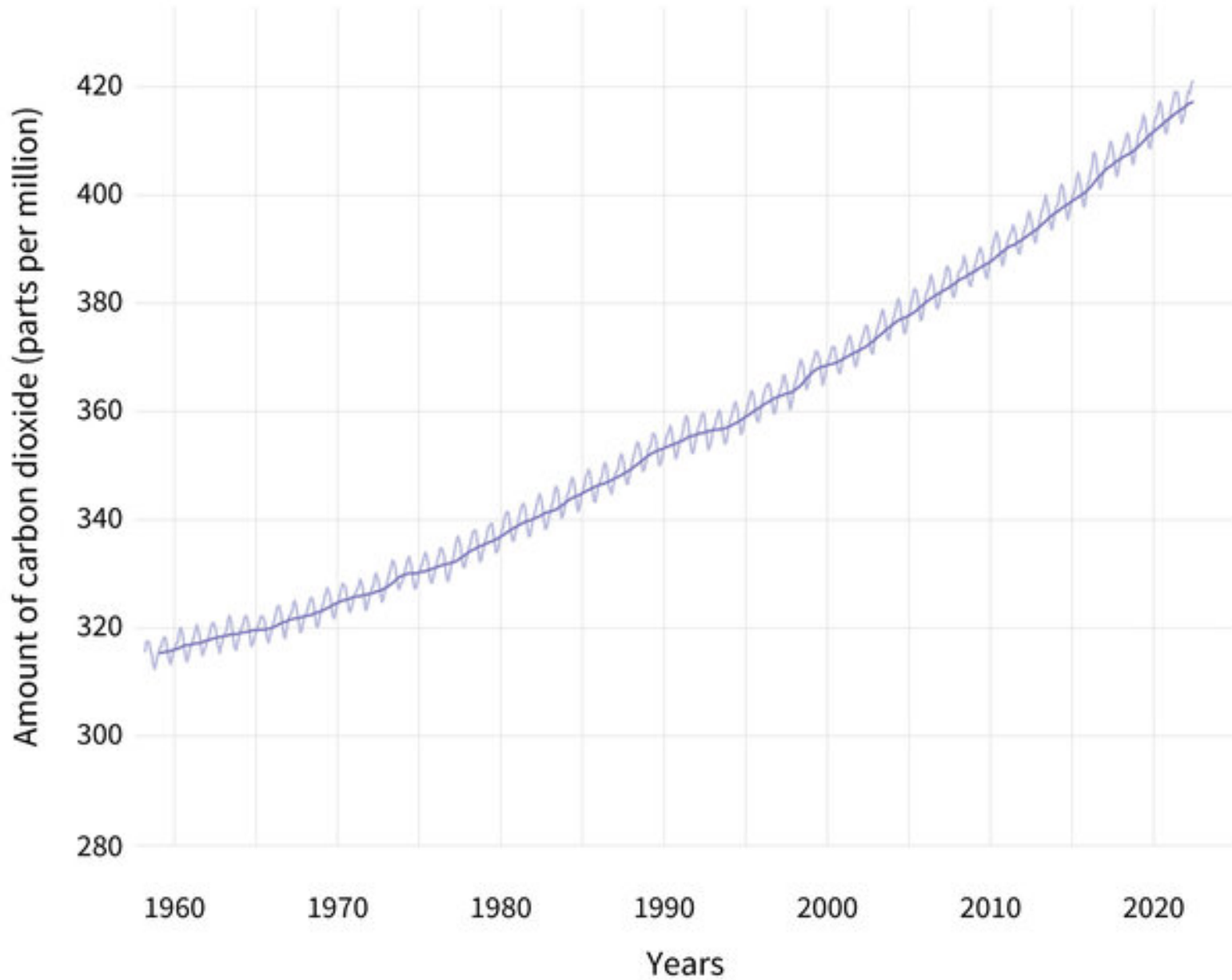
Date Published: June 13, 2022

NOAA Climate.gov graph, adapted from original by Dr. Howard Diamond (NOAA ARL). Atmospheric CO<sub>2</sub> data from NOAA and ETHZ. CO<sub>2</sub> emissions data from Our World in Data and the Global Carbon Project.



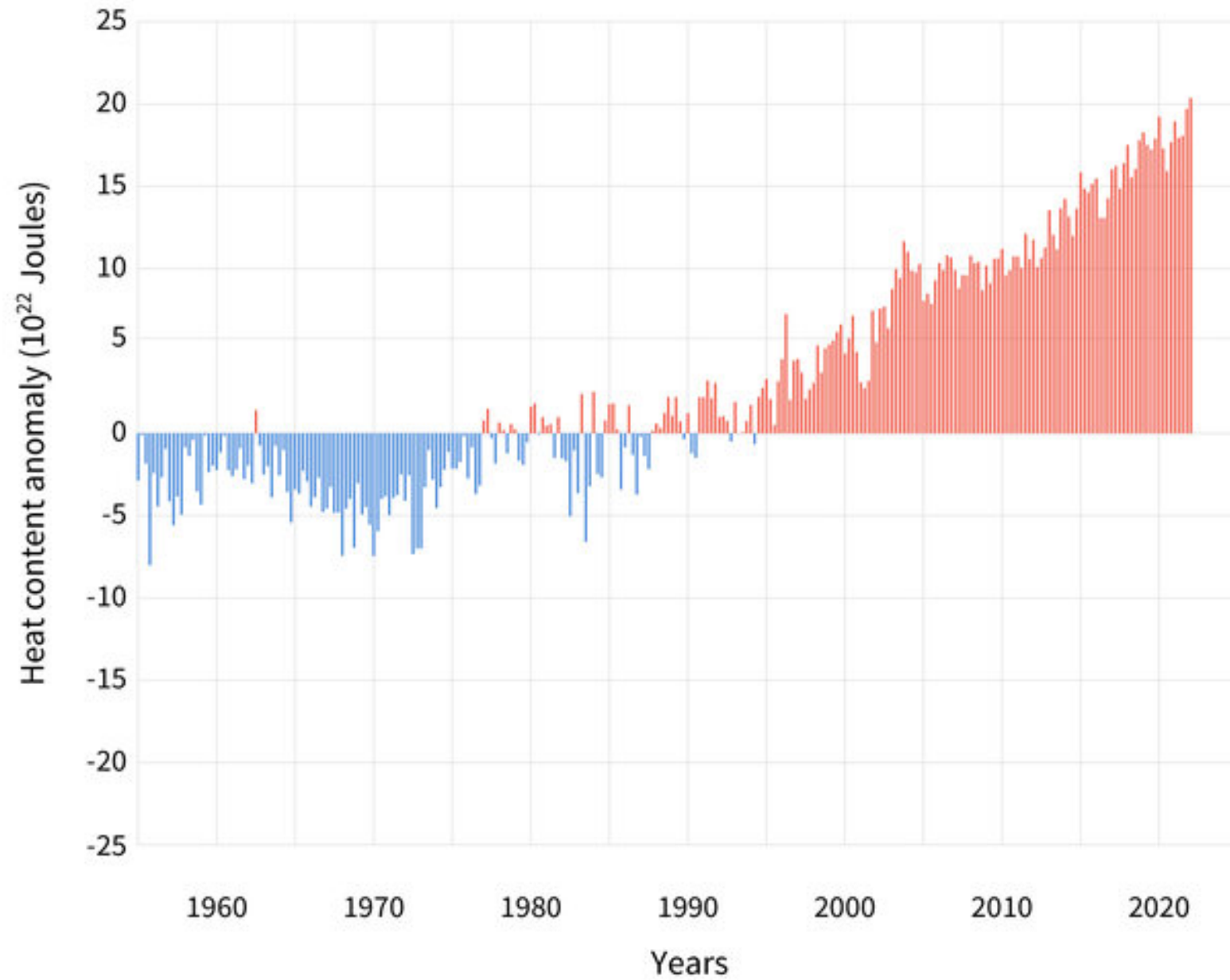


# ATMOSPHERIC CARBON DIOXIDE



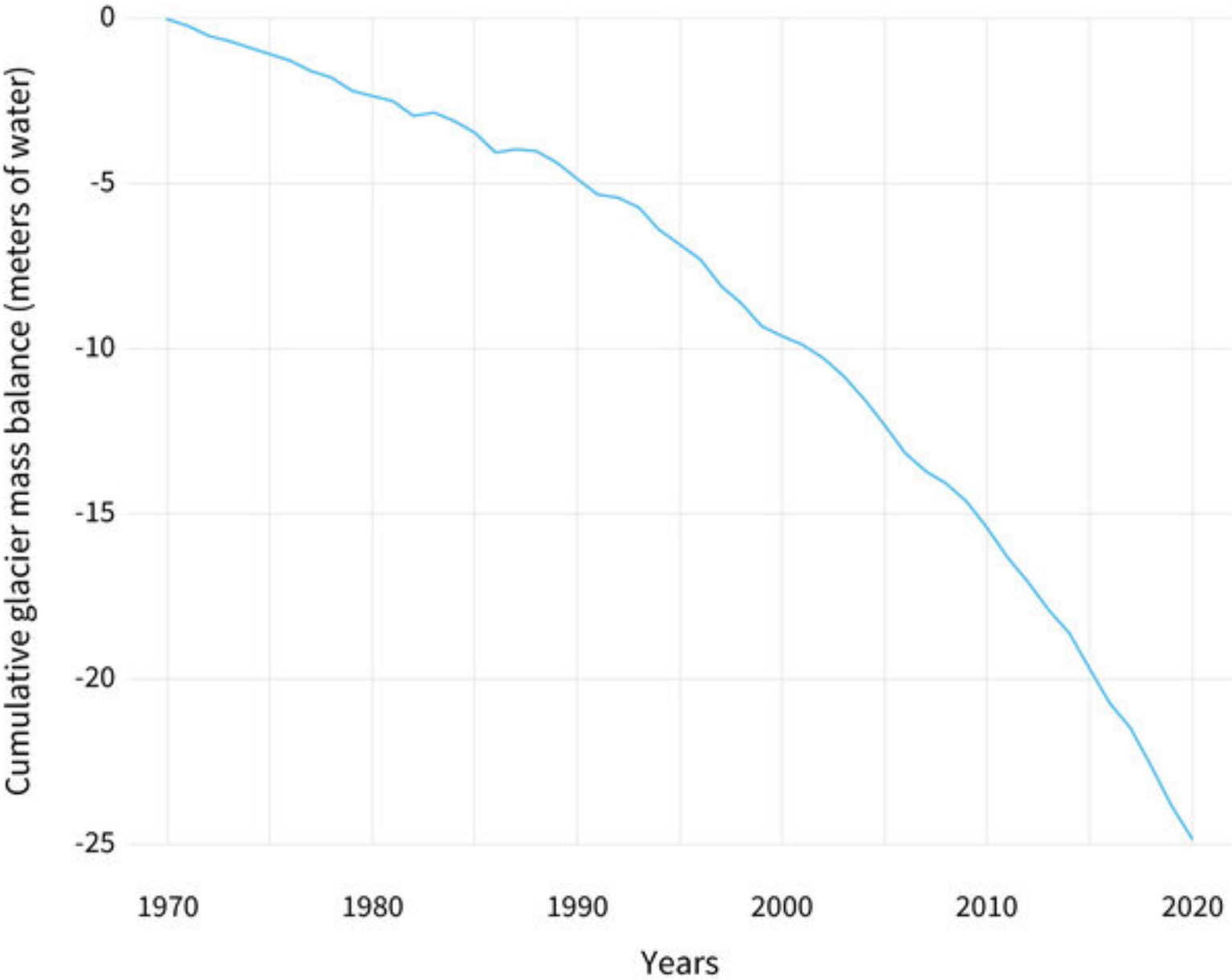
Courtesy of NOAA

# OCEAN HEAT COMPARED TO AVERAGE



Courtesy of NOAA

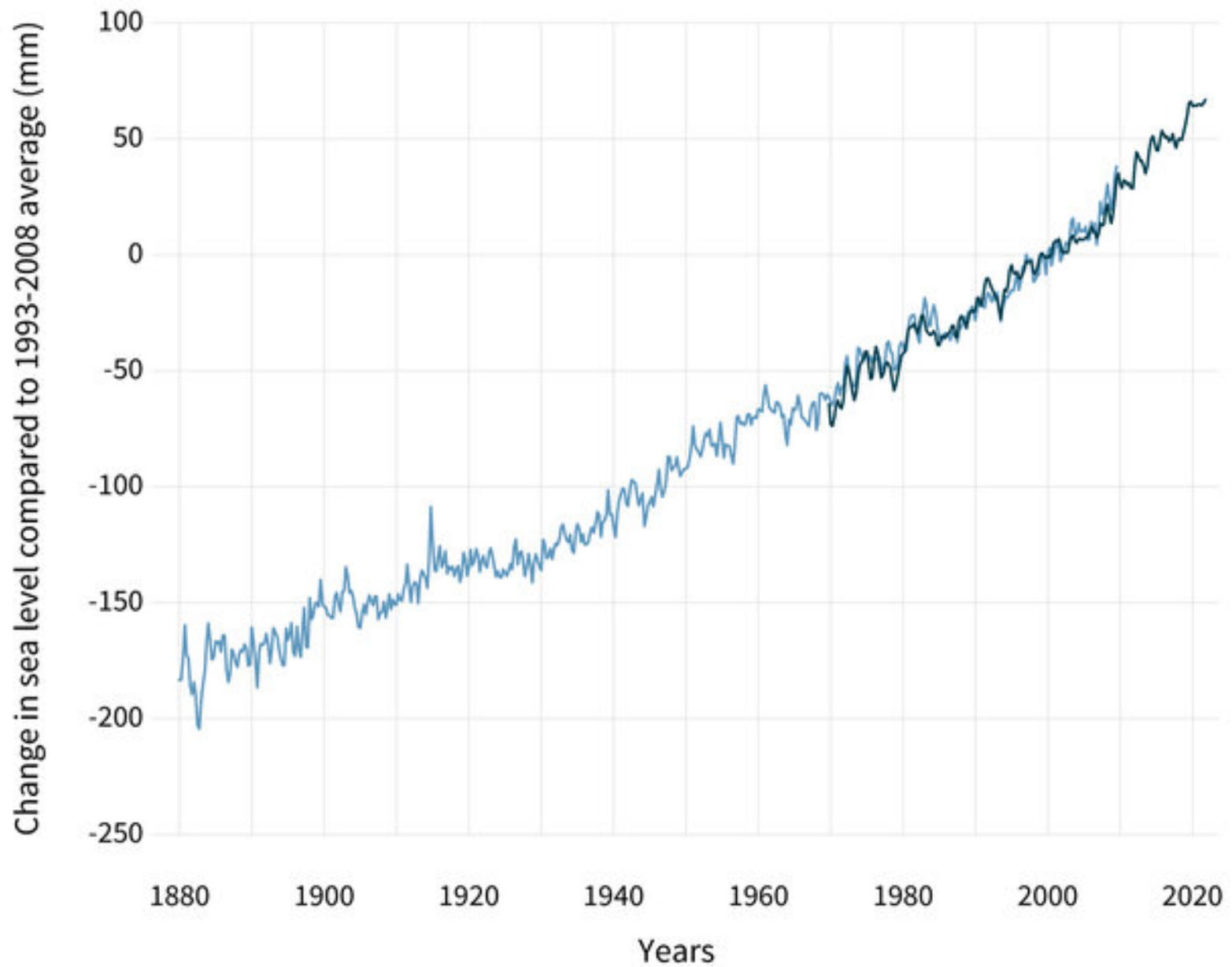
# GLACIER MASS BALANCE (YEARLY)



Courtesy of NOAA



# GLOBAL SEA LEVEL



Courtesy of NOAA



**I.R.A.**

**"Buy Clean"**

A photograph of a massive glacier calving into the ocean. The glacier is a deep, vibrant blue color, with jagged, broken pieces of ice falling into the water. A large plume of white water and ice chunks is visible at the base of the glacier where it meets the sea. The sky is a pale, overcast blue.

**Compliance**

**vs**

**Impact**



# **Panel Discussion Slides**

**Insulated Metal Panel EPDs:  
Plant Specific  
for the same product.**

**Embodied Carbon Emissions (GWP)**

**Florida Plant:  
2,670 kgCO<sub>2</sub>eq/unit**

**California Plant:  
3,610 kgCO<sub>2</sub>eq/unit**

**8% of energy-related  
CO<sub>2</sub> emissions,  
emanate from  
Cement production.**

—

Half of cement's emissions  
are a  
chemical by-product  
of the manufacturing process.

They will not be mitigated  
by decarbonizing  
the energy supply.

"This EPD was calculated using industry average cement data. **Cement LCA impacts can vary** depending upon manufacturing process, efficiency and fuel source by as much as 50% for some environmental impact categories."

ENVIRONMENTAL PRODUCT DECLARATION  
 No. [redacted] Plant [redacted]

LIFE CYCLE ASSESSMENT

SYSTEM BOUNDARY  
 This EPD is a cradle-to-gate EPD covering the product stages (A1-A3) only.

PRODUCTION STEP (environmental impact category)	LIGNITION STAGE			USE STAGE				END-OF-LIFE STAGE					
	Production (Cement)	Transportation (Cement)	Production (Concrete)	Use (Concrete)	Use (Concrete)	Use (Concrete)	Use (Concrete)	Use (Concrete)	Use (Concrete)	Use (Concrete)	Use (Concrete)		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4

CUT-OFF  
 Items excluded from system boundary include: production, manufacture, and construction of manufacturing capital goods and infrastructure; production and manufacture of production equipment, delivery vehicles, and laboratory equipment; personnel-related activities (travel, furniture, and office supplies); and energy and water use related to company management and sales activities that may be located either within the factory site or at another location.  
 A one percent cut-off is considered for renewable and nonrenewable primary energy consumption and the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.

ALLOCATION PROCEDURE  
 Allocation follows the requirements and guidance of ISO 14044.  
 The product category rules for this EPD recognize fly ash, silica fume and slag as waste products recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a concrete material input.  
 [redacted] Plant is a truck (travel) mixing plant. A portion of mixing truck (fuel) energy has been allocated to module A3.

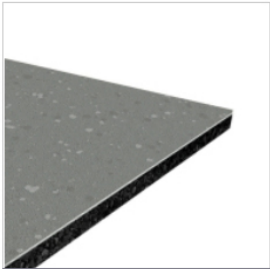
LIFE CYCLE INVENTORY (LCI)  
 This EPD was calculated using industry average cement data. Cement LCA impacts can vary depending upon manufacturing process, efficiency and fuel source by as much as 50% for some environmental impact categories. Cement accounts for as much as 90% of the impacts of the concrete mixes included in this EPD and thus manufacturer specific cement impacts could result in variation as much as 45%.

PRIMARY SOURCES OF LCA DATA

- **Asphalt** (petroleum): EPD4.0, 2015
- **Asphalt** (bitumen): EPD4.0, 2015
- **Aggregate (natural)**: US BR 2005; "Green road" at mna/EP 2001
- **Chemical (cement)**: EC BR 2005; "Green road" at mna/EP 2001
- **Cement (C1, C2, C3)**: "Green" combined in industrial region (NREL, LLC), 2007
- **Electricity (WEG)**: "Green" 2.0; "Electricity, medium voltage" (mna/EP 2015)
- **Fuel (coal)**: "Coal" combined in industrial region (NREL, LLC), 2007
- **Manufacturing (Water)**: US BR 2005; "Tap water" at mna/EP 2005
- **Non-Repairable Solid Waste**: US BR 2005; "Disposal, municipal solid waste, 2006"
- **Oil, Lubricants and Greases**: "Ecochem 1.5" (Lubricants) at OLCI (mna/EP 2011)
- **Portland Cement**: "Portland Cement" (Industrial) (NREL, LLC), 2007
- **Rail Transport**: US, CA "Transport, rail, diesel powered" (NREL, LLC), 2007
- **Truck Transport**: US, CA "Transport, combination truck, long haul, diesel powered" (NREL, LLC), 2010
- **Truck Transport**: US, CA "Transport, combination truck, short haul, diesel powered" (NREL, LLC), 2010

[redacted] AZ

"Cement accounts for as much as 90% of the impacts of the concrete mixes included in this EPD and thus manufacturer specific cement impacts could result in variation of as much as 45%."



**Hydrogrip Motivate**  
by Ecore International



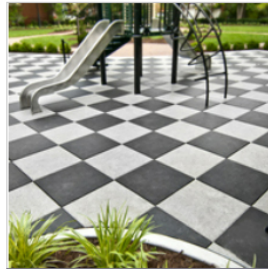
EPD



**Crossings Rx**  
by Ecore International



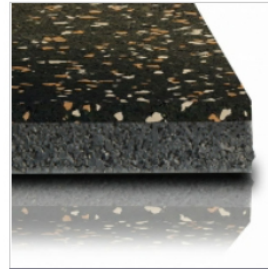
EPD



**ECOdB**  
by Ecore International



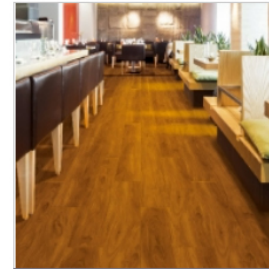
EPD



**ECOfit**  
by Ecore International



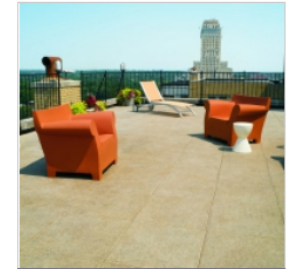
EPD



**Ecolay+**  
by Nox Corporation



EPD



**ECOMax**  
by Ecore International



EPD



**ECOsilence**  
by Ecore International



EPD



**ECOsurfaces**  
by Ecore International



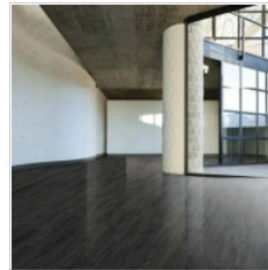
EPD



**Elevations**  
by Raskin Industries



EPD



**Orchid+**  
by Nox Corporation



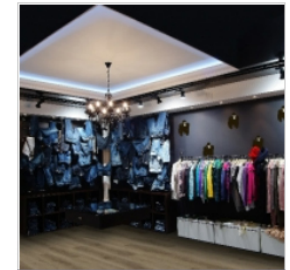
EPD



**OzoGrip®**  
by To Market Global



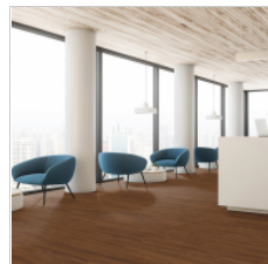
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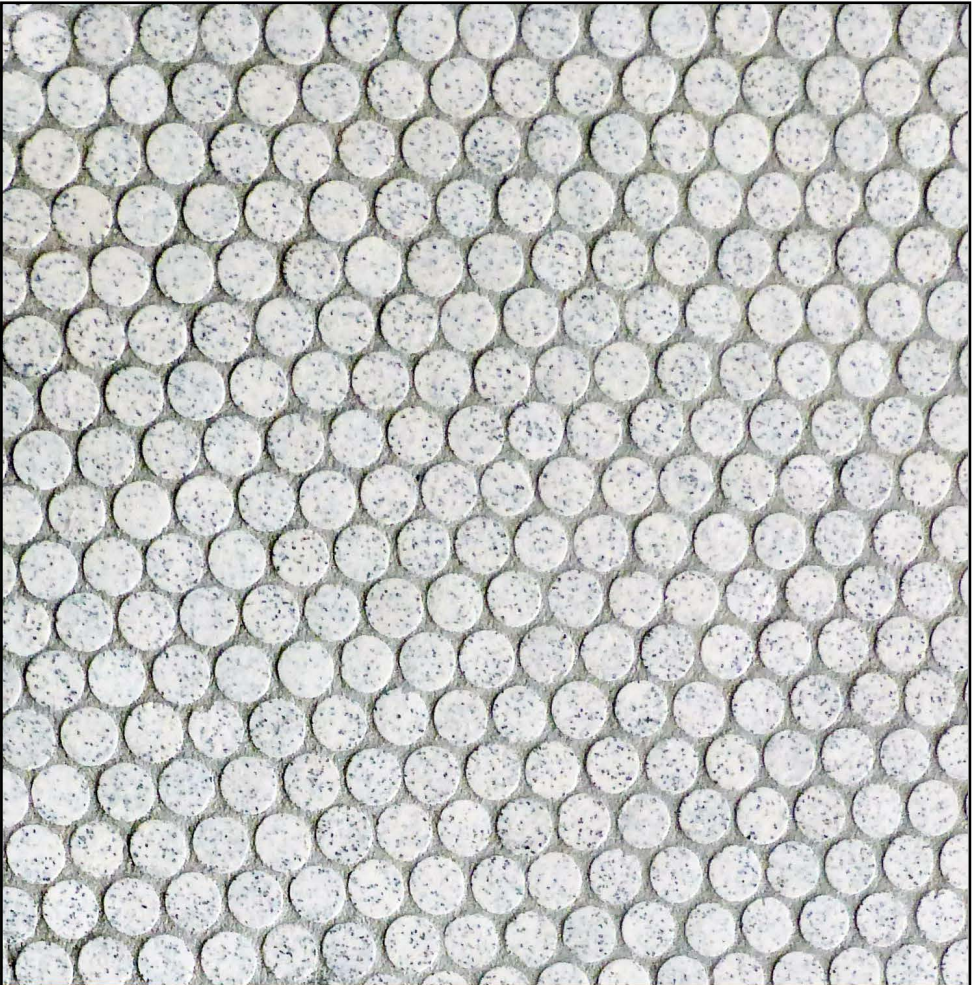
**R-9**  
by Raskin Industries



EPD





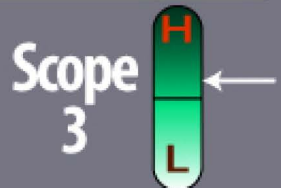


## TILE DOT PATTERN II

by Tiles Supreme

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**EPD**





**NOW,  
means  
2023 to 2027.**