Climate Positive Landscape Design: Going Beyond Neutral

Kate Lenahan, CMG Landscape Architecture

Danielle Pieranunzi, GBCI SITES Program

Tuesday, April 13, 2021
9:00am-10:30am

Join the conversation on social media: #WSC2021

Water Conservation Showcase

VIRTUAL EVENT: APRIL 6, 13, 20, 27

PRESENTED BY:

AIA San Francisco Committee on the Environment

EBMUD East Bay Municipal Utility District

PG&E

San Francisco Water Power Sewer

SJW SAN JOSE WATER

NORTHERN CALIFORNIA

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Safety Message

- **Egress**: two paths out in case first is blocked.
- Have **“Go” bag** prepared with essentials.
- Set up and rehearse **convening location** with family.
- **Duck and cover** in case of an earthquake.
- **Take ergonomic breaks**.
- Continue to regularly **wash hands** and where a **face mask** and keep **socially distant** in public.

Event Sponsors

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San Francisco Water Power Sewer

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BAWSCA Bay Area Water Supply & Conservation Agency

gachina landscape management

CONTRA COSTA WATER DISTRICT

Lane Community College

Outreach Partners

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Collect a code word on the Premium Exhibitor pages to be entered to win a raffle prize!

tinyurl.com/WCSexhibitor

Premium Exhibitors

ACWD Alameda County Water District
PG&E
San Francisco Water Power Sewer
RHA delivering solutions
SJW San Jose Water
The Urban Farmer Store
EBMUD East Bay Municipal Utility District

Standard Exhibitors

William J. Worthen Foundation
U.S. Green Building Council
Rain Bird
Gachina Landscape Management
BAWSCA
Lane Community College

Continuing Education Credits

LEED Professionals may self-report 10.5 continuing education hours TOTAL for 2021 WCS.

Log into your usgbc.org profile

Report course number: 0920021655

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Course number: WS0026

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CLIMATE POSITIVE DESIGN

going **beyond** neutral

Kate Lenahan
Designer, CMG Landscape Architecture

Ne[illegible] Center

Kevin Frayer / Getty Images

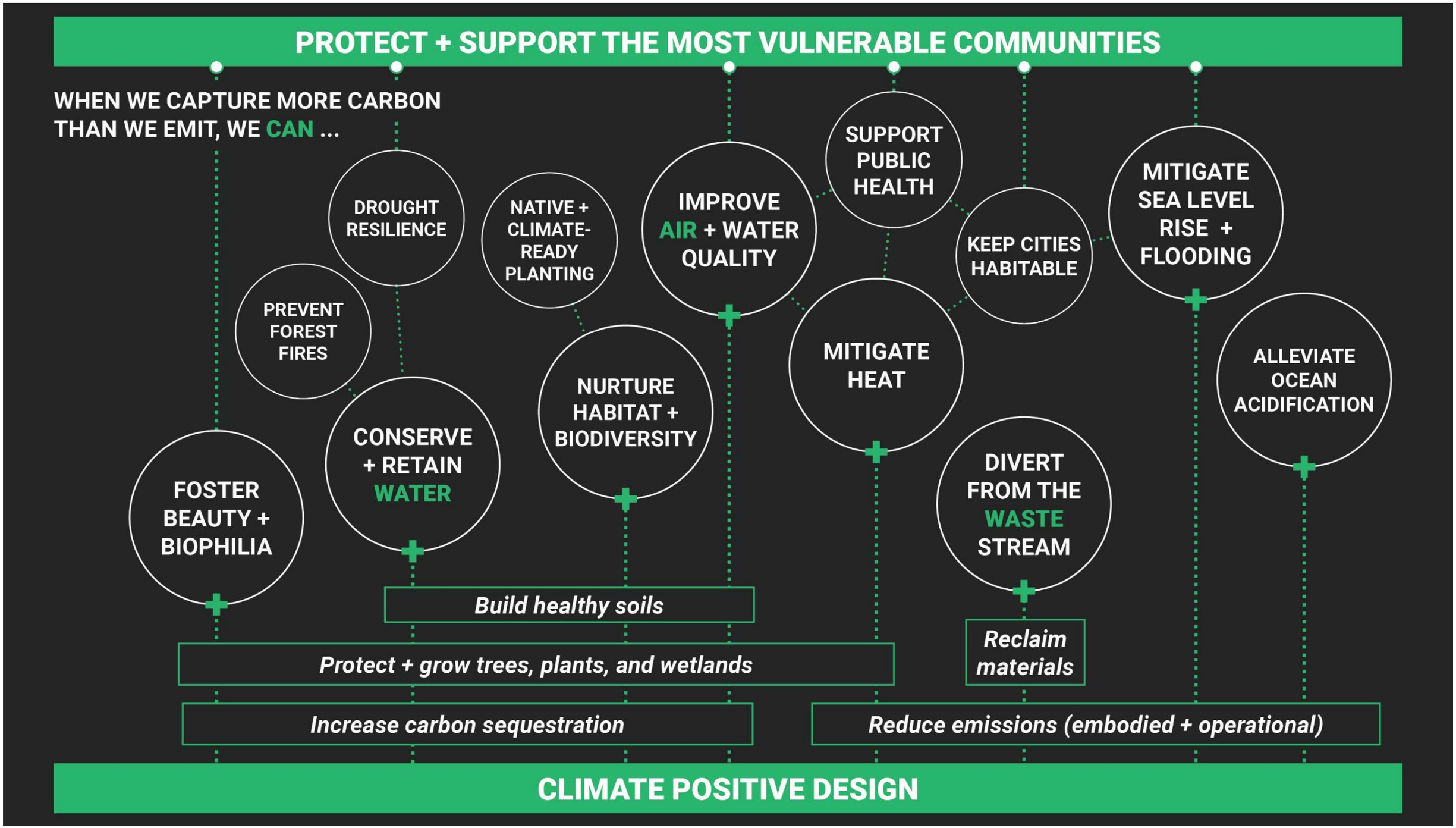
Getty Images

Associated Press

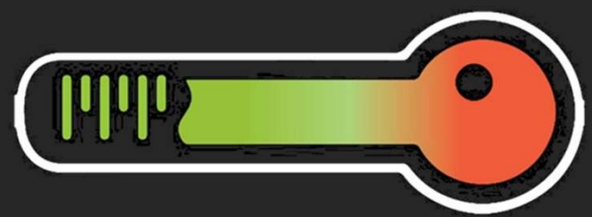
Goals for today:

- **Share resources to reduce the landscape carbon footprint**

- Illustrate climate positive **design principles** and co-benefits
- Demonstrate how to use the **Pathfinder** app to evaluate a project's carbon footprint


PROTECT + SUPPORT THE MOST VULNERABLE COMMUNITIES
WHEN WE CAPTURE MORE CARBON THAN WE EMIT, WE CAN ...
DROUGHT RESILIENCE
NATIVE + CLIMATE-READY PLANTING
IMPROVE AIR + WATER QUALITY
SUPPORT PUBLIC HEALTH
KEEP CITIES HABITABLE
MITIGATE SEA LEVEL RISE + FLOODING
PREVENT FOREST FIRES
NURTURE HABITAT + BIODIVERSITY
MITIGATE HEAT
ALLEVIATE OCEAN ACIDIFICATION
FOSTER BEAUTY + BIOPHILIA
CONSERVE + RETAIN WATER
DIVERT FROM THE WASTE STREAM
Build healthy soils
Protect + grow trees, plants, and wetlands
Reclaim materials
Increase carbon sequestration
Reduce emissions (embodied + operational)
CLIMATE POSITIVE DESIGN

1.5°



Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.

Margaret Mead

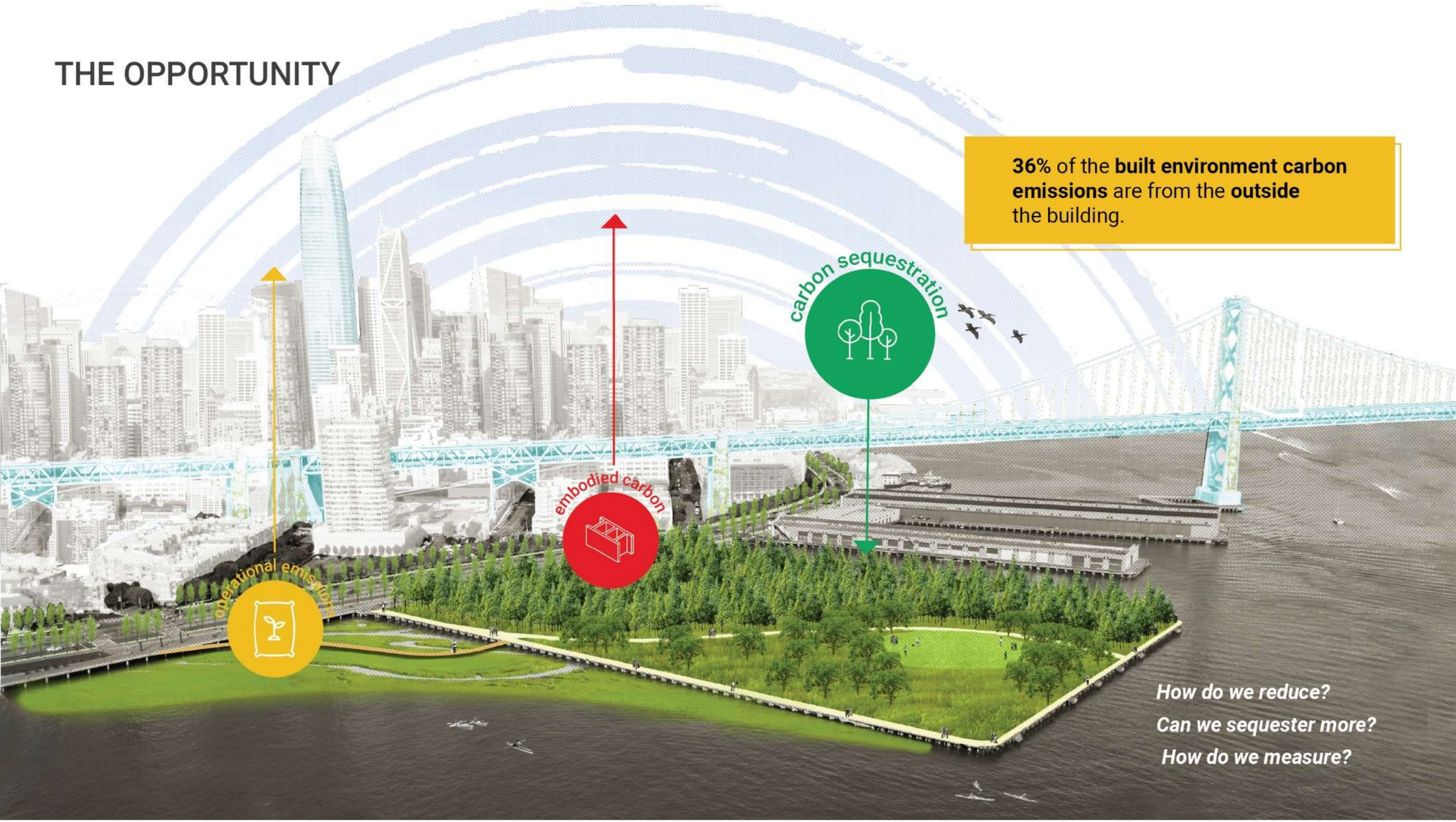
THE CHALLENGE

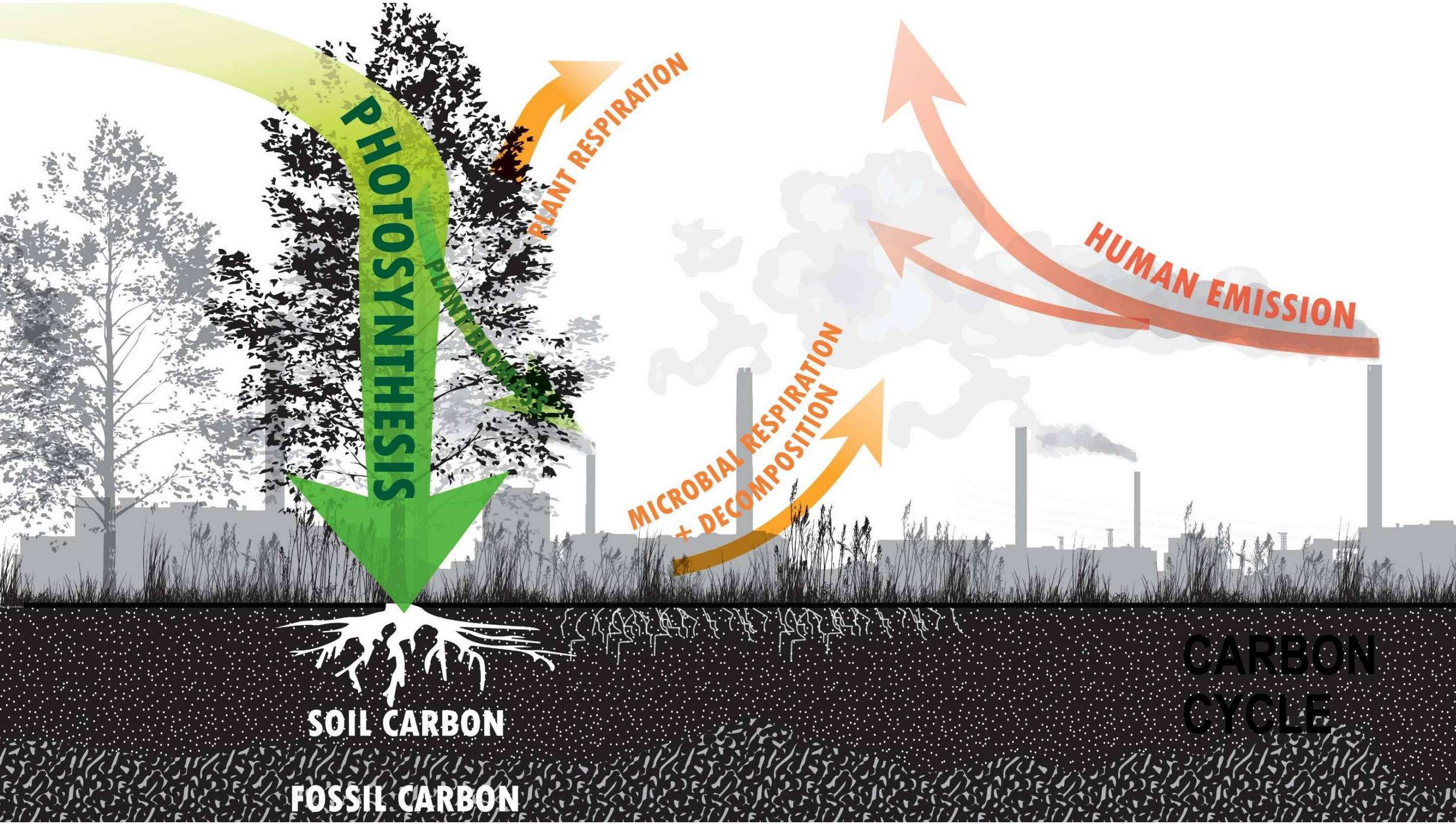
The urban built environment is responsible for **75% of annual GHG emissions.**

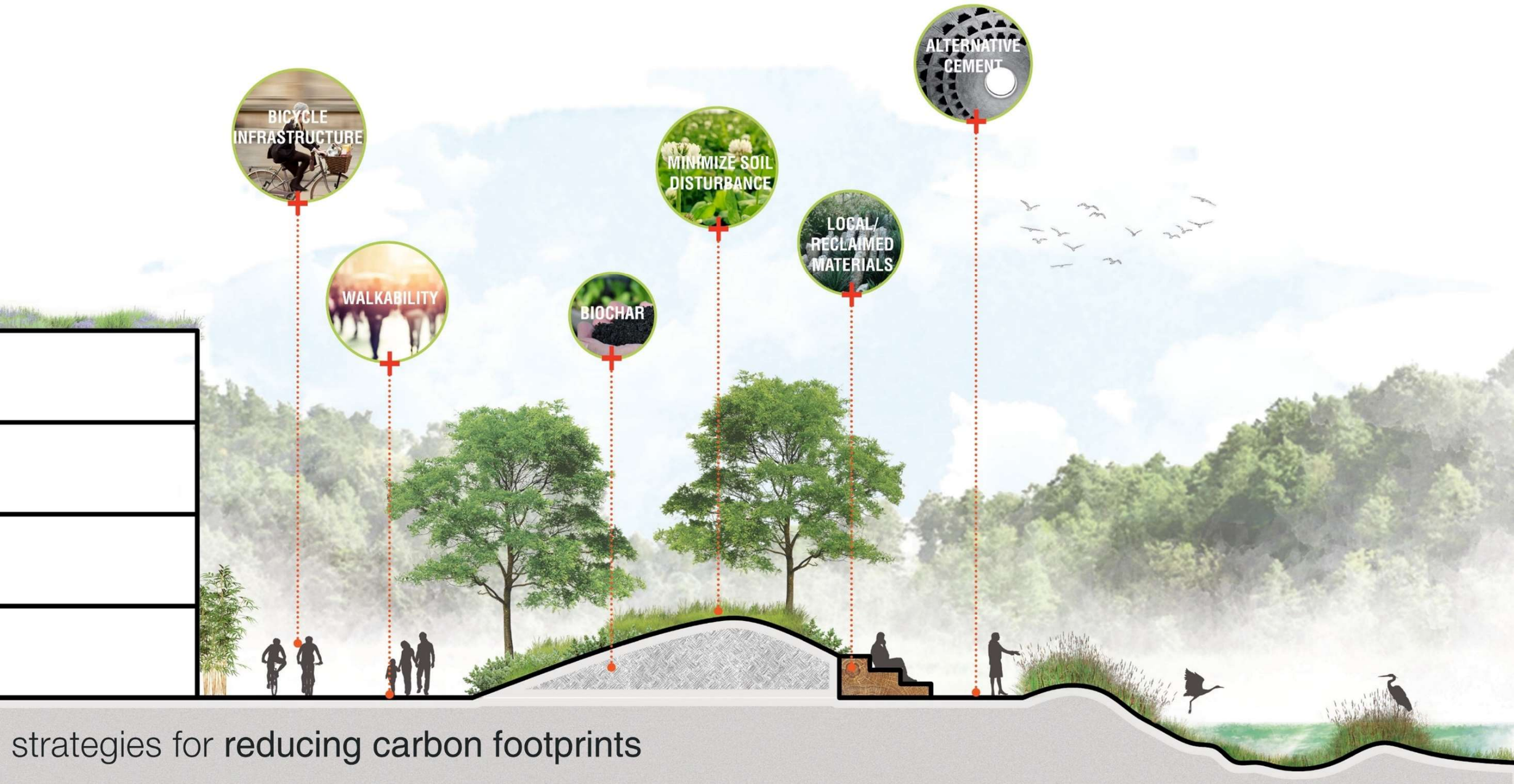
2030, Inc. Architecture 2030

THE OPPORTUNITY

36% of the **built environment carbon emissions** are from the **outside** the building.




PHOTOSYNTHESIS
PLANT BIOMASS
PLANT RESPIRATION
HUMAN EMISSION
MICROBIAL RESPIRATION
+ DECOMPOSITION
SOIL CARBON
FOSSIL CARBON
CARBON
CYCLE



strategies for **reducing carbon footprints**

strategies for **increasing sequestration**

Higher temperatures ➡ drought➡ greater water demand for trees and plants

EBMUD, Pardee Reservoir, 2015

Higher water demand = higher emissions

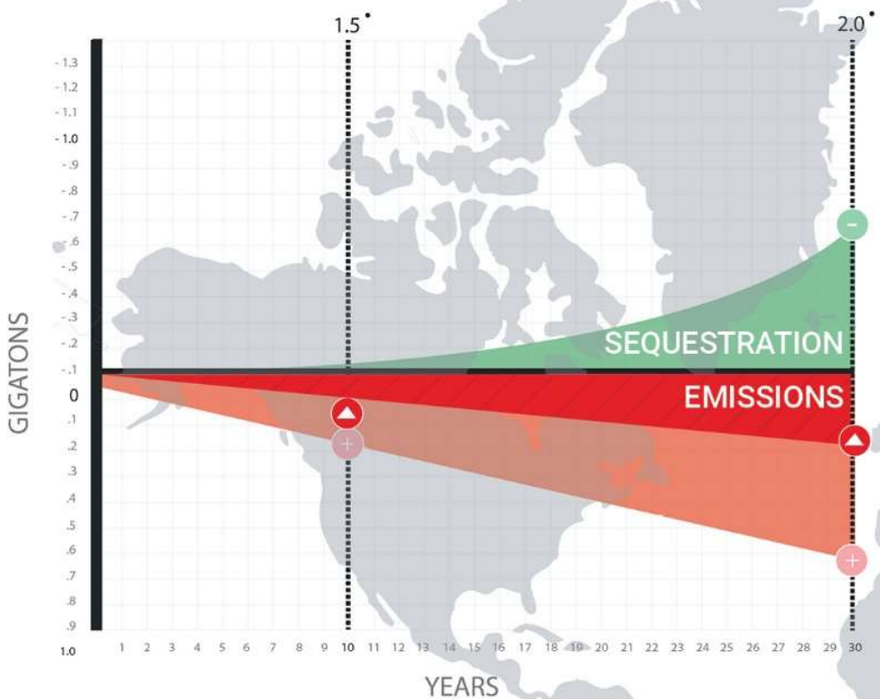
Mokelumne Aqueduct, Mavens Notebook

Sources:

- Pumping
- Treatment + Distribution
- Fleet (vehicles and equipment)
- Buildings + facilities operations

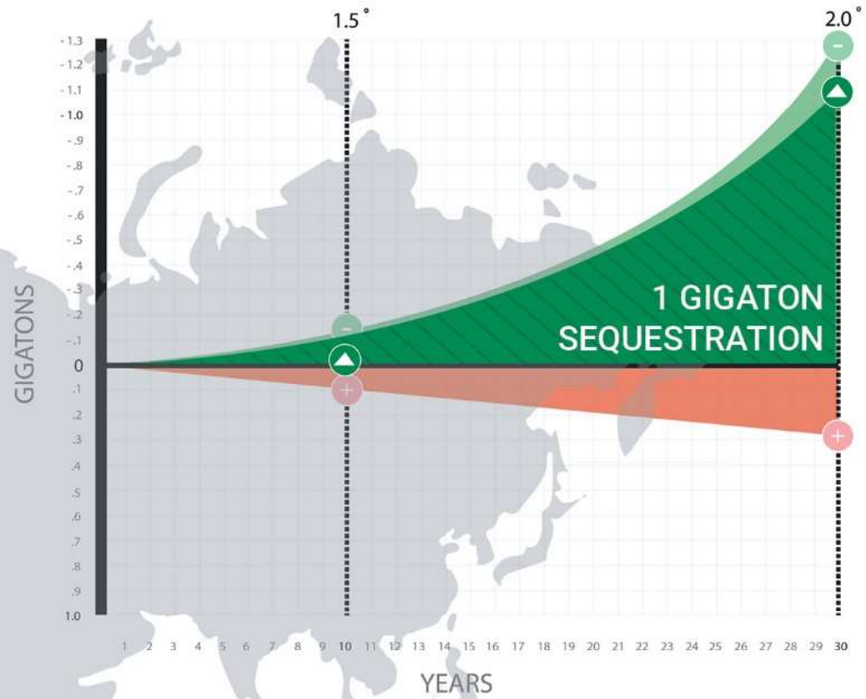
SHIFTING THE PARADIGM

Business As Usual



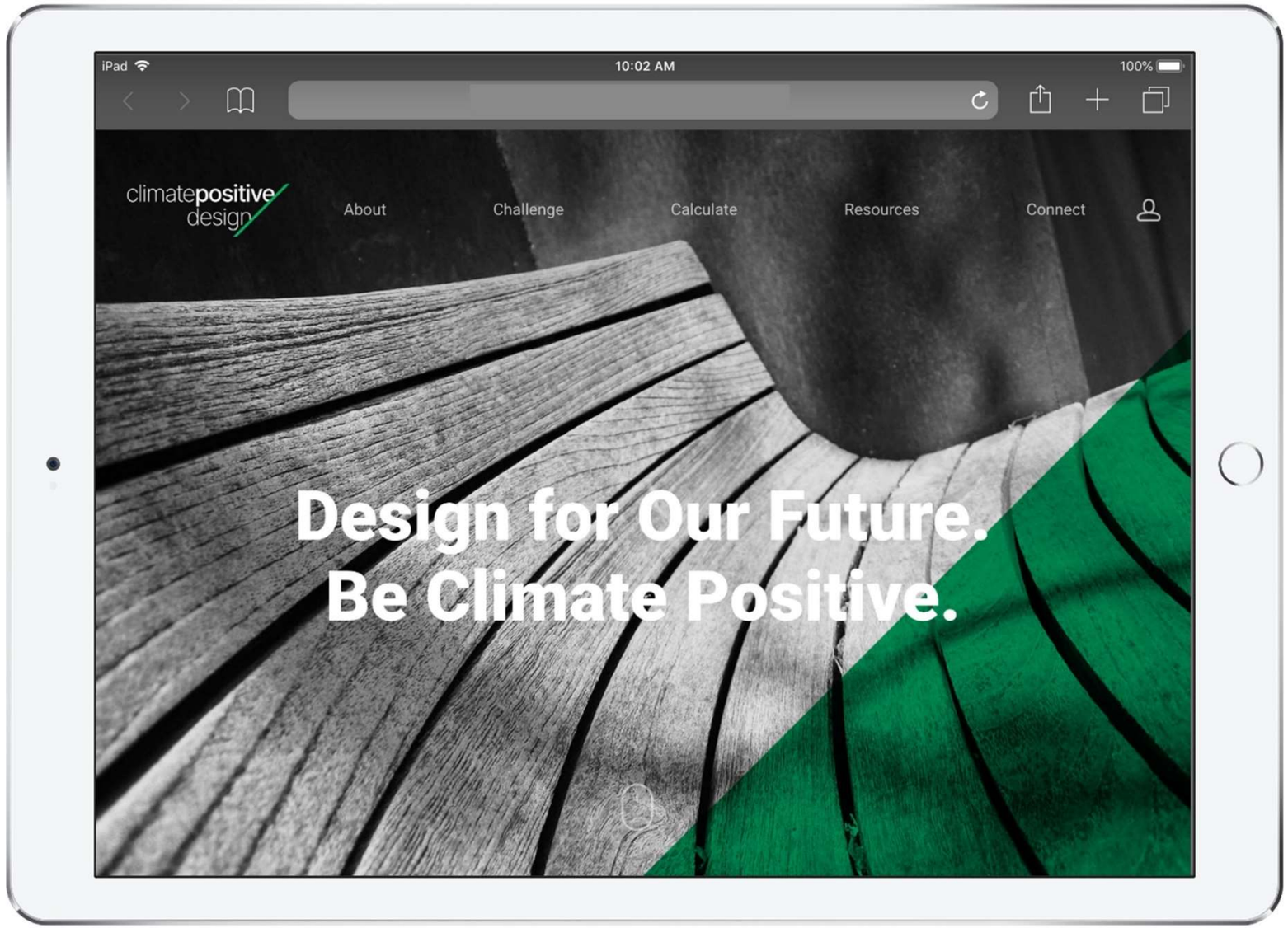
Shows emissions of 200 million metric tons beyond sequestered by 2050

With Climate Positive Design



There is the opportunity to
remove one gigaton of CO2 beyond emissions from the atmosphere by 2050

climatepositive design



- LEADERSHIP
- EMPOWERMENT
- COLLABORATION
- EDUCATION

IMPROVING THE CARBON IMPACT OF THE EXTERIOR BUILT ENVIRONMENT THROUGH COLLECTIVE ACTION

COLLECTIVE ACTION

RESEARCH & DESIGN

Pamela Conrad
CPD Founder, CMG

Kevin Conger
CMG

Chris Guillard
CMG

Willett Moss
CMG

Jamie Phillips
CMG

Rayna deNiord
CMG

Greg Barger
CMG

Eustacia Brossart
CMG

Jamie Yousten
CMG

Kelsey Wakefield
CMG

Wesley Cogan
CMG

Ilia Savin
CMG

Lauren Bergenholtz
CMG

Kate Lenahan
CMG

Kristen diStefano
Atelier Ten

Prateek Jain
Atelier Ten

Nahal Sohbati

Alexandra Zahn

Over **40 individuals** and **23 organizations** from **5 different countries** for **ONE CAUSE**

ADVISORY PARTNERS

Martha Schwartz
Martha Schwartz Partners

Vaughn Rinner
ASLA

Colleen Mercer Clarke
CSLA|IFLA

Barbara Deutsch
LAF

Nancy Sommerville
ASLA

Lucinda Sanders
LAF | OLIN

Laura Solano
LAF | MVVA

2018-2019 LAF
Fellow Cohort

TECHNOLOGY

Edan Weis

Tyler Maisano

Cameron Nimmo

Larry Lague
Google

Antoinette Marty

COMMUNICATIONS/ART DIRECTION

Lauren Peters Lague
Salesforce

Anne Donnard
Emerson Blue

Chris Hepner
CMG

Paulina Tran
CMG

Pooja Desai
CMG

architecture
2030
CMG
Martha
Schwartz
Partners
MSP
LAF
LANDSCAPE
ARCHITECTURE
FOUNDATION
American Society of
Landscape Architects
atelier ten
LACF
FAPC
IFLA
INTERNATIONAL FEDERATION
OF LANDSCAPE ARCHITECTS
CSLA AAPC

path finder

REDUCE FOOTPRINTS

INCREASE SEQUESTRATION

Athena Impact Estimator for Buildings

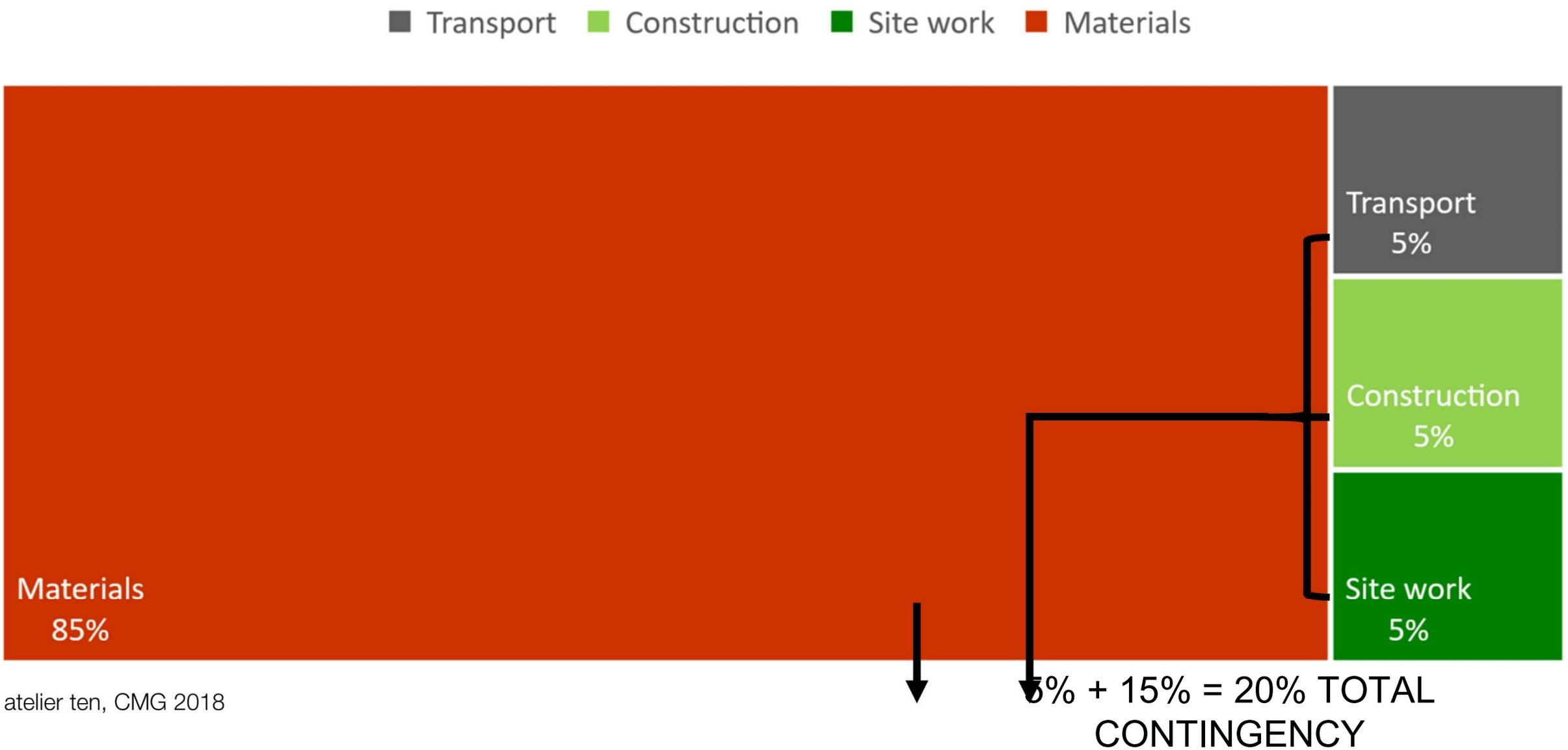
CMG atelier ten

Materials - Plants + Maintenance =

Landscape Carbon Footprint

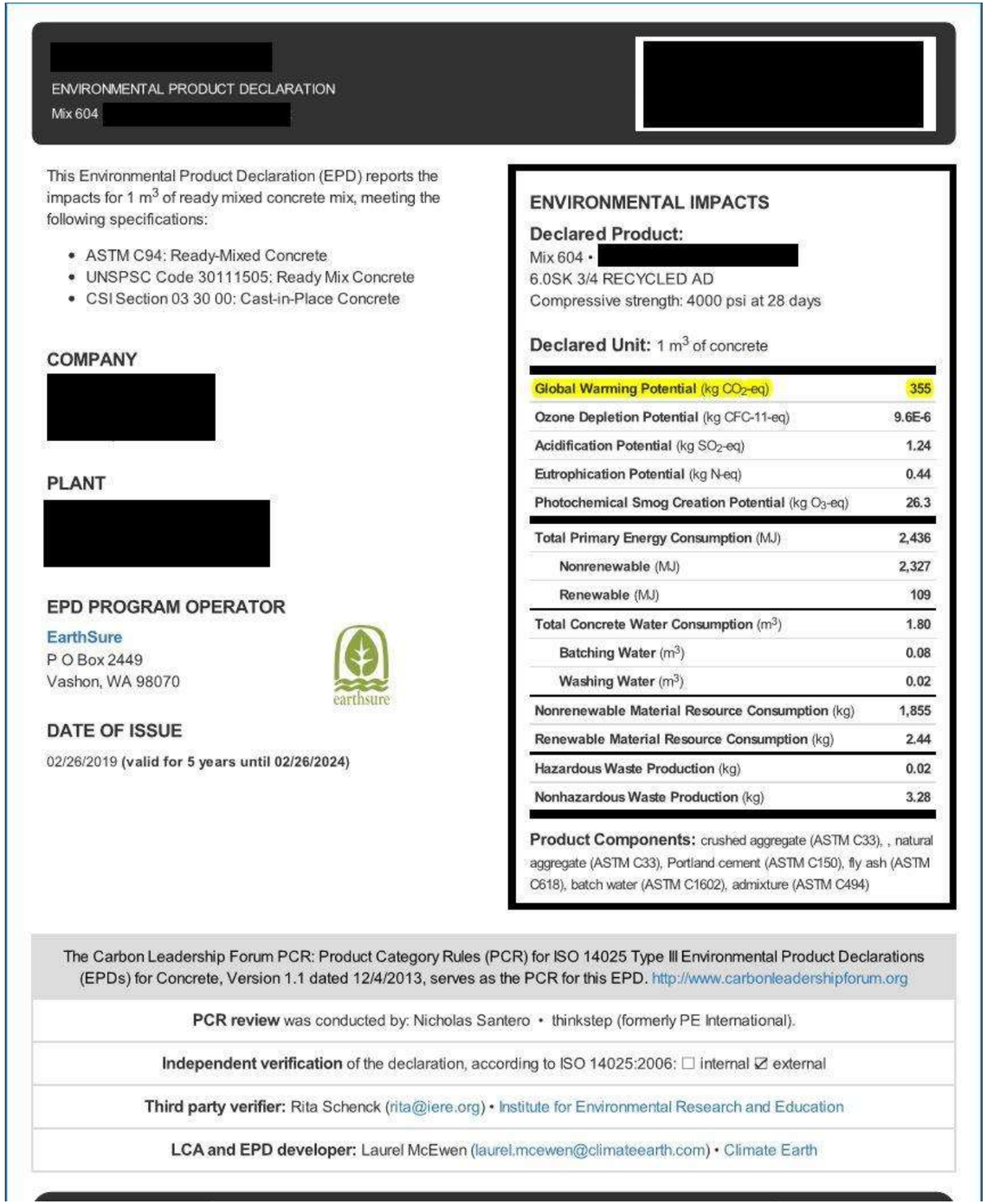
15
438 mT CO2 emitted
1604 mT CO2 sequestered

TYPICAL LANDSCAPE CARBON SOURCES



atelier ten, CMG 2018

ENVIRONMENTAL PRODUCT DECLARATION (EPD)



[redacted]

ENVIRONMENTAL PRODUCT DECLARATION

Mix 604 [redacted]

[redacted]

This Environmental Product Declaration (EPD) reports the impacts for 1 m^3 of ready mixed concrete mix, meeting the following specifications:

- ASTM C94: Ready-Mixed Concrete
- UNSPSC Code 30111505: Ready Mix Concrete
- CSI Section 03 30 00: Cast-in-Place Concrete

COMPANY

[redacted]

PLANT

[redacted]

EPD PROGRAM OPERATOR

EarthSure
P O Box 2449
Vashon, WA 98070

earthsure

DATE OF ISSUE

02/26/2019 **(valid for 5 years until 02/26/2024)**

ENVIRONMENTAL IMPACTS

Declared Product:
Mix 604 • [redacted]
6.0SK 3/4 RECYCLED AD
Compressive strength: 4000 psi at 28 days

Declared Unit: 1 m^3 of concrete

Global Warming Potential (kg CO_2-eq)	355
Ozone Depletion Potential (kg CFC-11-eq)	9.6E-6
Acidification Potential (kg SO_2-eq)	1.24
Eutrophication Potential (kg N-eq)	0.44
Photochemical Smog Creation Potential (kg O_3-eq)	26.3
Total Primary Energy Consumption (MJ)	2,436
Nonrenewable (MJ)	2,327
Renewable (MJ)	109
Total Concrete Water Consumption (m^3)	1.80
Batching Water (m^3)	0.08
Washing Water (m^3)	0.02
Nonrenewable Material Resource Consumption (kg)	1,855
Renewable Material Resource Consumption (kg)	2.44
Hazardous Waste Production (kg)	0.02
Nonhazardous Waste Production (kg)	3.28

Product Components: crushed aggregate (ASTM C33), , natural aggregate (ASTM C33), Portland cement (ASTM C150), fly ash (ASTM C618), batch water (ASTM C1602), admixture (ASTM C494)

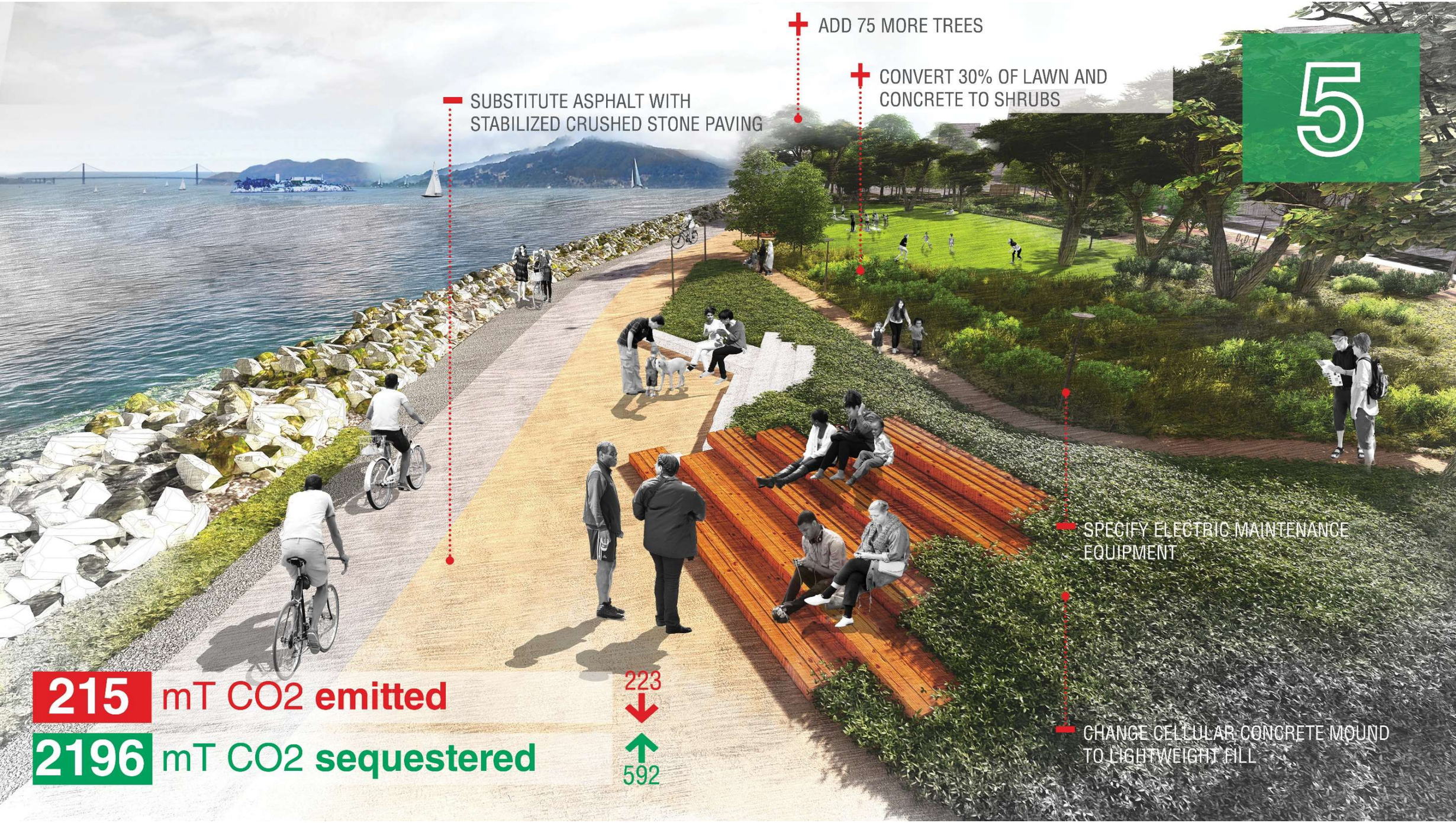
The Carbon Leadership Forum PCR: Product Category Rules (PCR) for ISO 14025 Type III Environmental Product Declarations (EPDs) for Concrete, Version 1.1 dated 12/4/2013, serves as the PCR for this EPD. http://www.carbonleadershipforum.org

PCR review was conducted by: Nicholas Santero • thinkstep (formerly PE International).

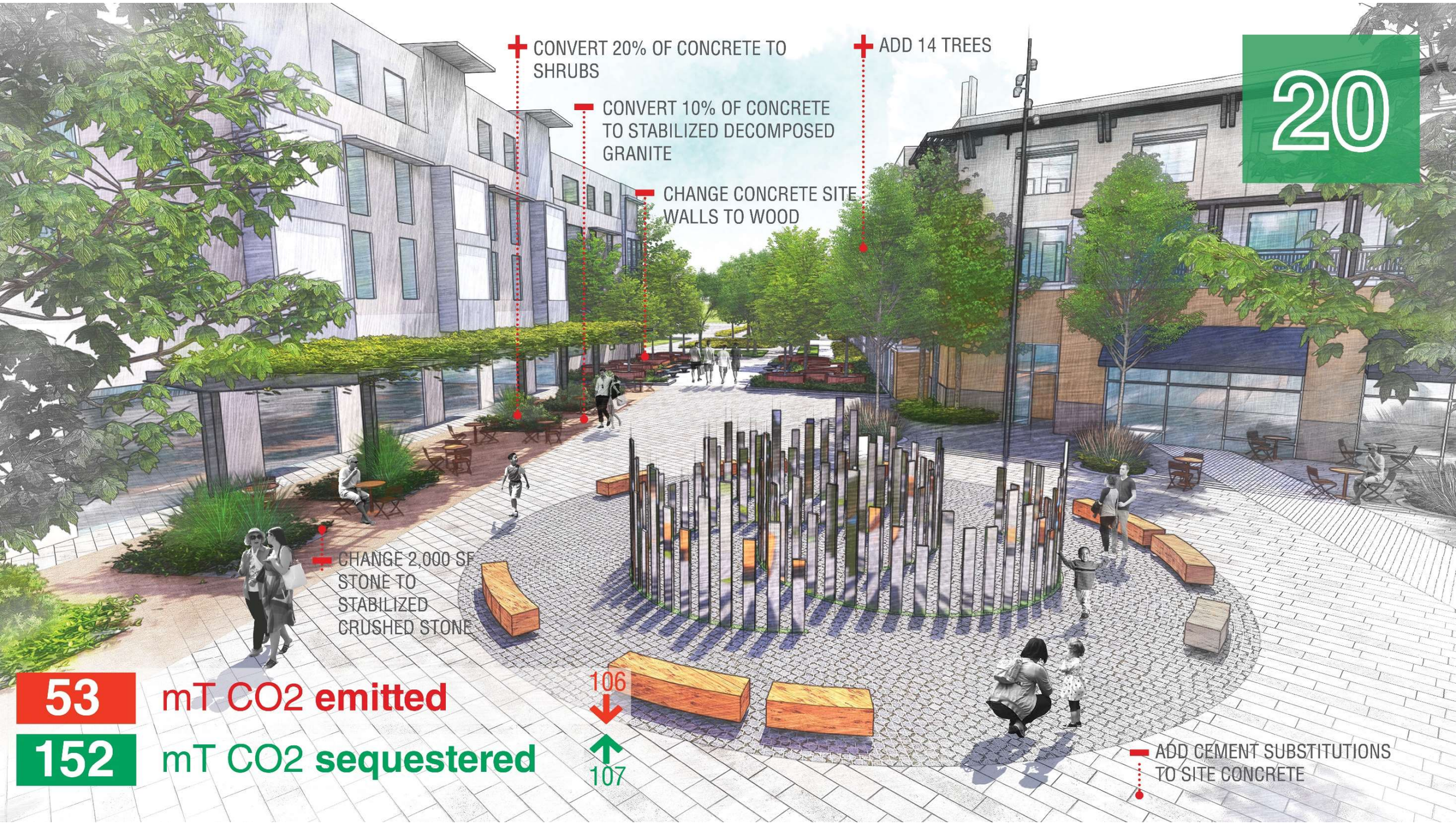
Independent verification of the declaration, according to ISO 14025:2006: ☐ internal ☑ external

Third party verifier: Rita Schenck (rita@iere.org) • Institute for Environmental Research and Education

LCA and EPD developer: Laurel McEwen (laurel.mcewen@climateearth.com) • Climate Earth


ADD 75 MORE TREES
CONVERT 30% OF LAWN AND CONCRETE TO SHRUBS
SUBSTITUTE ASPHALT WITH STABILIZED CRUSHED STONE PAVING
5
SPECIFY ELECTRIC MAINTENANCE EQUIPMENT
CHANGE CELLULAR CONCRETE MOUND TO LIGHTWEIGHT FILL
215 mT CO2 emitted
2196 mT CO2 sequestered
223
592

194
159 mT CO2 emitted
45 mT CO2 sequestered


20
CONVERT 20% OF CONCRETE TO SHRUBS
CONVERT 10% OF CONCRETE TO STABILIZED DECOMPOSED GRANITE
CHANGE CONCRETE SITE WALLS TO WOOD
ADD 14 TREES
CHANGE 2,000 SF STONE TO STABILIZED CRUSHED STONE
53 mT CO2 emitted
152 mT CO2 sequestered
106
107
ADD CEMENT SUBSTITUTIONS TO SITE CONCRETE

+ Maximize the carbon stored in plants and soil

+ Fast-growing
+ Long-lived
+ Long growing season
+ Low maintenance

- Minimize hardscape

- Concrete & metals
+ Low impact to soils
- Less piping, more natural drainage
+ Cement substitutes
+ Recycled materials & content

- Minimize & recycle carbon embodied in materials

+ Reduce embodied carbon
+ Reuse & recycle (wood, stone, asphalt, concrete)
+ Locally sourced

- Minimize day 1 & day-to-day emissions + keep carbon stored longer

+ Electric/hand-powered equipment
+ Organic v. chemical
+ Build & protect soil carbon
+ Tree/plant litter management & recycling
+ Protect existing trees
- Low water

top 5 things **WE can do**

specs

WHAT COULD CLIMATE POSITIVE DESIGN LOOK LIKE?
LET'S DESIGN our cities to SEQUESTER MORE CARBON

WHAT YOU CAN DO

Landscape and Building Professionals/Horticulturalists/Home Gardeners

- Log your projects in Pathfinder app – learn from it!
- Provide feedback/requests via website
- Utilize online toolkit
- Ask for Environmental Product Declarations (EPDs) from product manufacturers
- Update your specifications / operations and maintenance regimes (fertilizers, tilling etc.)

Growers and Manufacturers

- Evaluate your current business practices
- Develop and provide EPDs

Scientists/Ecologists

- Continued research and sharing on ecosystem sequestration and emissions/embodied carbon (e.g., water use)

Donate!

climatepositive
design
www.ClimatePositiveDesign.com

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Showcase Raffle: Two Ways to Win!

Complete our post-event survey to be entered to win a $50 gift card! Survey will be sent to all registrants at the end of the Showcase.

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tinyurl.com/WCSexhibitor

Next Session

Plant Talk

Cielo Sichi, Landfour Landscape Architecture
Sarah Sutton, EcosDesign Studio
Stewart Winchester, Merritt College/Devil Mountain Nursery

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