

A hand is holding a smartphone. The screen of the phone displays a black and white photograph of wooden planks. Overlaid on the image is the text "Design for Our Future. Be Climate Positive." in a white, sans-serif font.

Design for Our
Future.
Be Climate
Positive.

EBMUD Landscape Advisory Committee Webinar: Climate Positive Design

Organizers:

Kristin Bowman, EBMUD

kristin.bowman@ebmud.com

Kate Lenahan, CMG Landscape
Architecture

klenahan@cmgsite.com

Welcome! As we get ready to begin the presentation, please use the chat box to introduce yourself, and tell us one thing you'd like to learn today.

Landscape Advisory Committee Updates

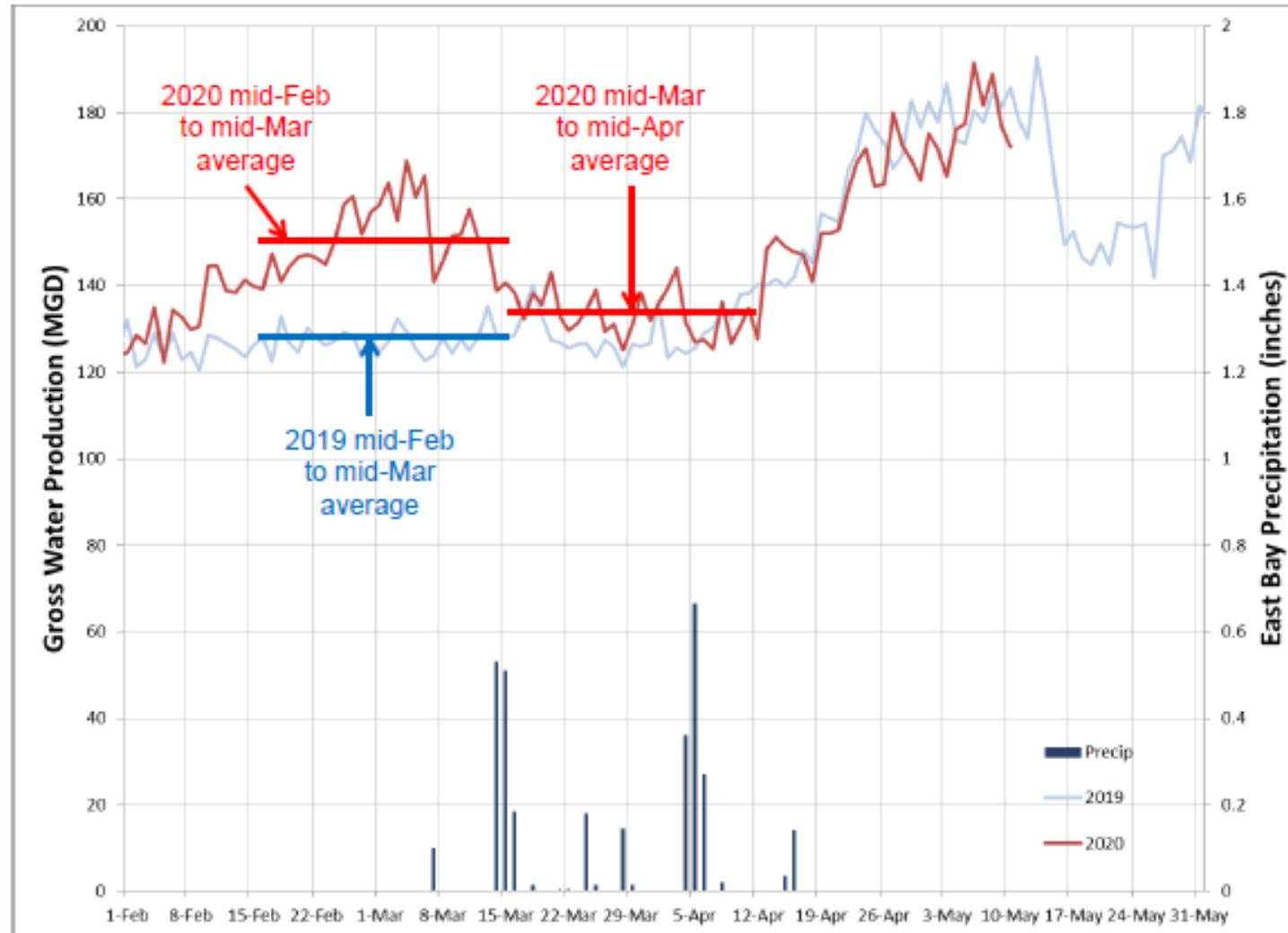


WELCOME

- Landscape Design Assistance Program
- Water Conservation Showcase 7/21-8/25
 - <https://www.waterconservationshowcase.com/>
- ReScape CA On-Line Trainings
- Next LAC meeting TBD – send topics suggestions in survey



Water Demand

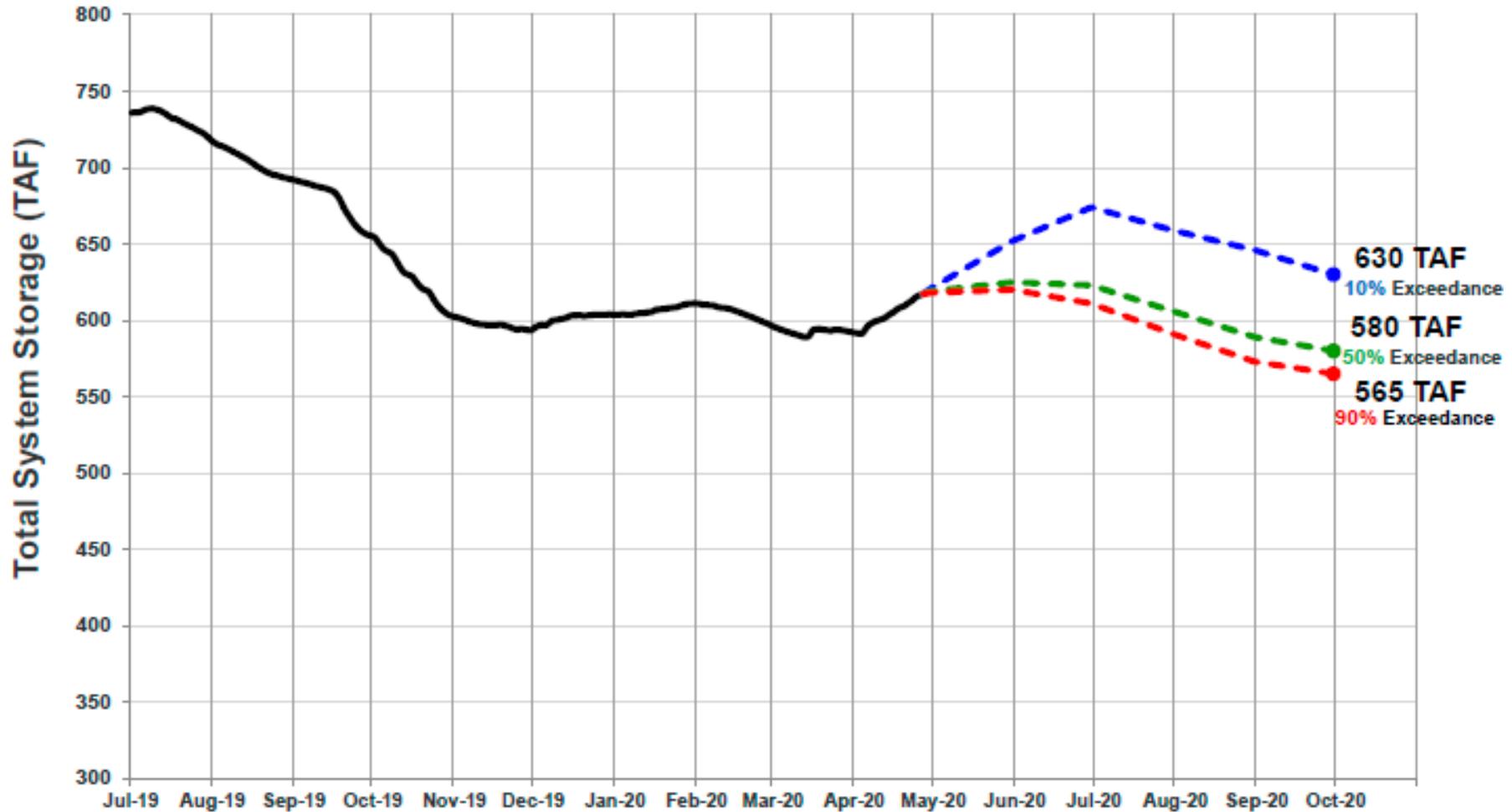


Water Supply Projections

Projected 2020 EBMUD Total System Storage



Total System Storage WY2020





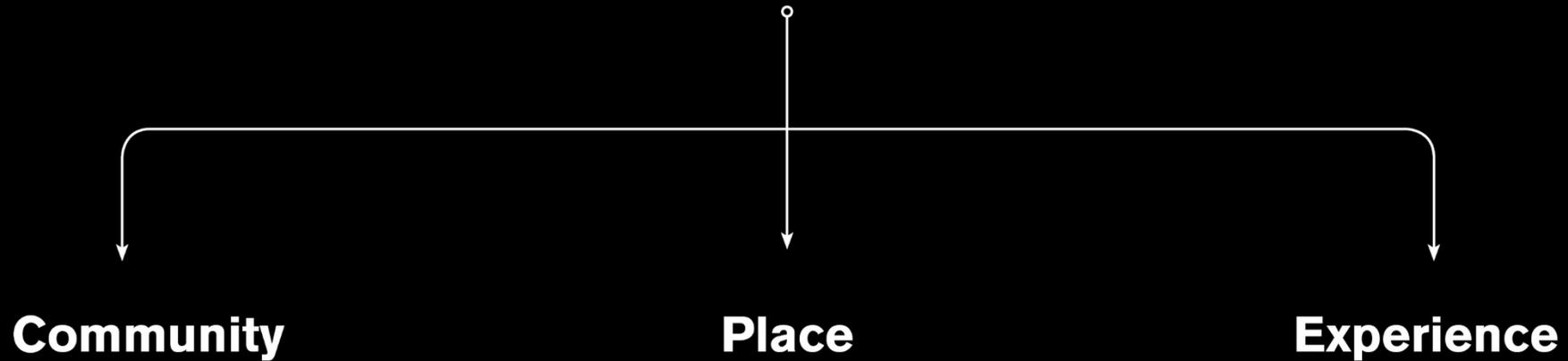
climate positive design

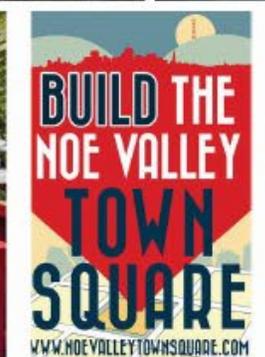
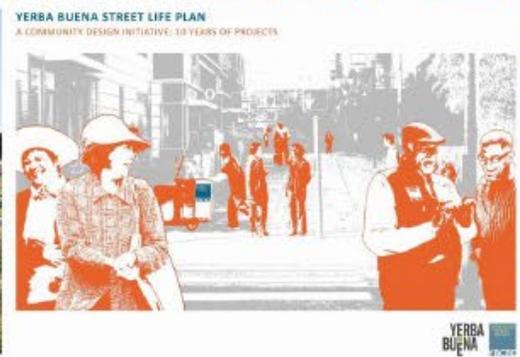
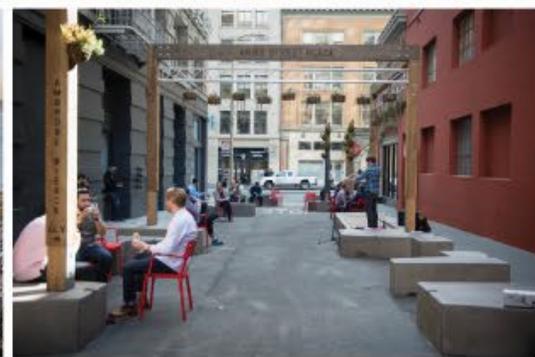
Kate Lenahan
Landscape Designer | CMG Landscape Architecture

What we'll do today:

- Introduction: Why climate positive design?
- Case studies
- Climate Positive Design + Pathfinder demonstration
- Audience activity: create a climate positive landscape
 - Please raise your hands to share your thoughts!
 - Invitation to share ideas for a live test in Pathfinder
 - Discussion + Q&A
- Closing remarks

CMG is a mission-oriented studio working to increase social and ecological wellbeing through artful design.





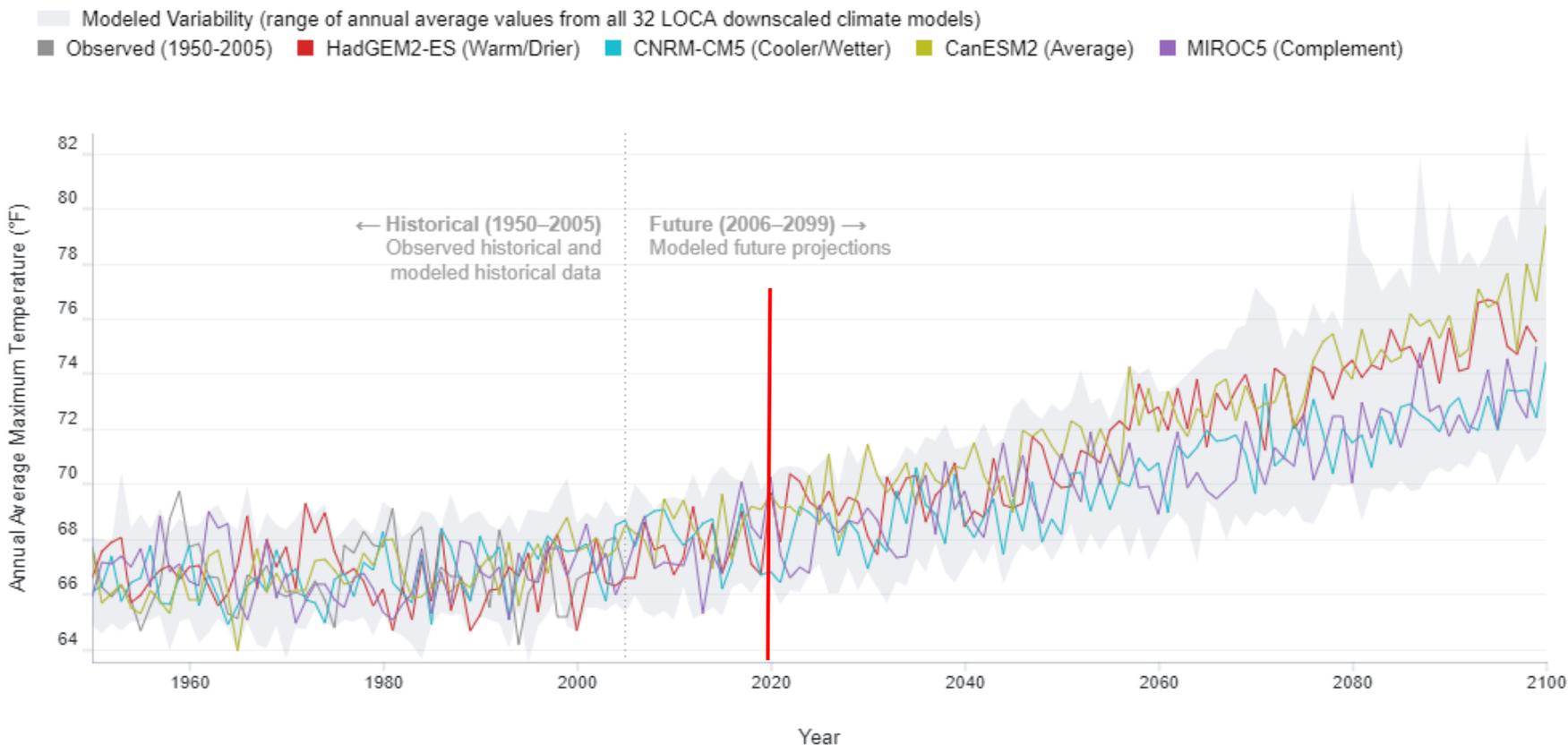
The grin tells the story – playground a success



San Francisco's urban planning is a success story. The city's Department of Planning and Community Development, in partnership with the city's Department of Public Works, has been instrumental in the city's urban planning success.

Annual Average Maximum temperature, Oakland, CA

Data is shown for Grid Cell (37.78125, -122.21875) under the RCP 8.5 scenario in which emissions continue to rise strongly through 2050 and plateau around 2100.



Temperatures are rising

- Source: Cal-Adapt. Data: LOCA Downscaled Climate Projections (Scripps Institution of Oceanography), Gridded Historical Observed Meteorological Data (University of Colorado, Boulder).
- Four models have been selected by [California's Climate Action Team Research Working Group](#) as [priority models for research](#) contributing to California's Fourth Climate Change Assessment. Projected future climate from these four models can be described as producing:
 - A *warm/dry* simulation (HadGEM2-ES)
 - A *cooler/wetter* simulation (CNRM-CM5)
 - An *average* simulation (CanESM2)
 - The model simulation that is most unlike the first three for the best coverage of different possibilities (MIROC5)

NATURALLY OCCURRING GREENHOUSE EFFECT

SOLAR ENERGY WARMS THE EARTH

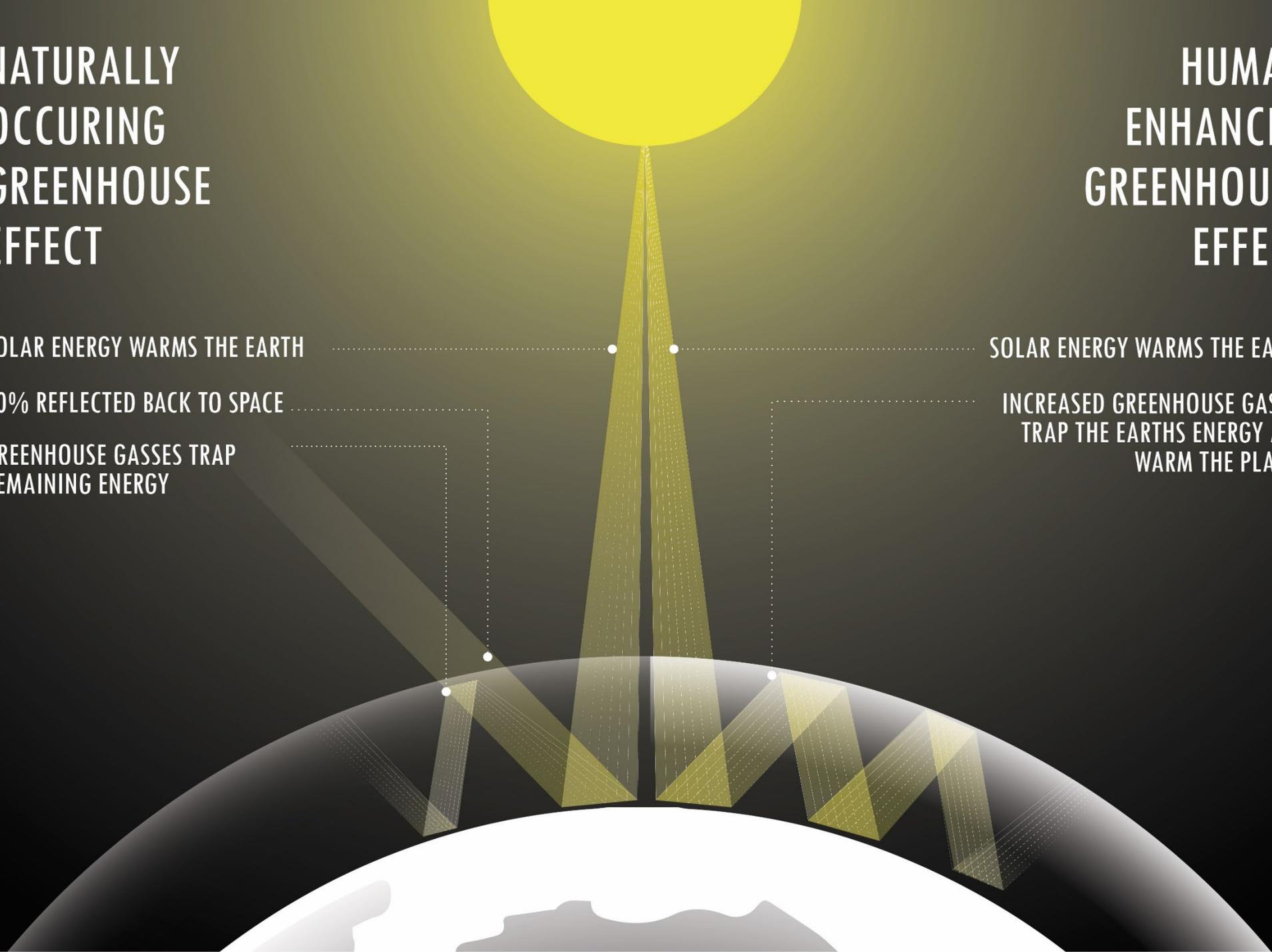
30% REFLECTED BACK TO SPACE

GREENHOUSE GASSES TRAP
REMAINING ENERGY

HUMAN ENHANCED GREENHOUSE EFFECT

SOLAR ENERGY WARMS THE EARTH

INCREASED GREENHOUSE GASSES
TRAP THE EARTH'S ENERGY AND
WARM THE PLANET



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



EBMUD, Pardee Reservoir, 2015

Higher water demand = higher emissions



Mokelumne Aqueduct, Mavens Notebook

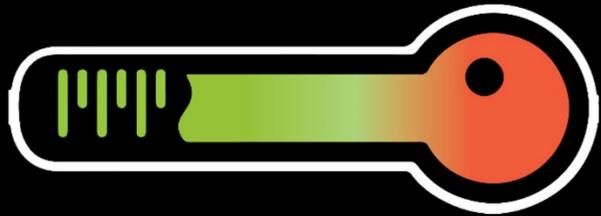
EBMUD Emissions

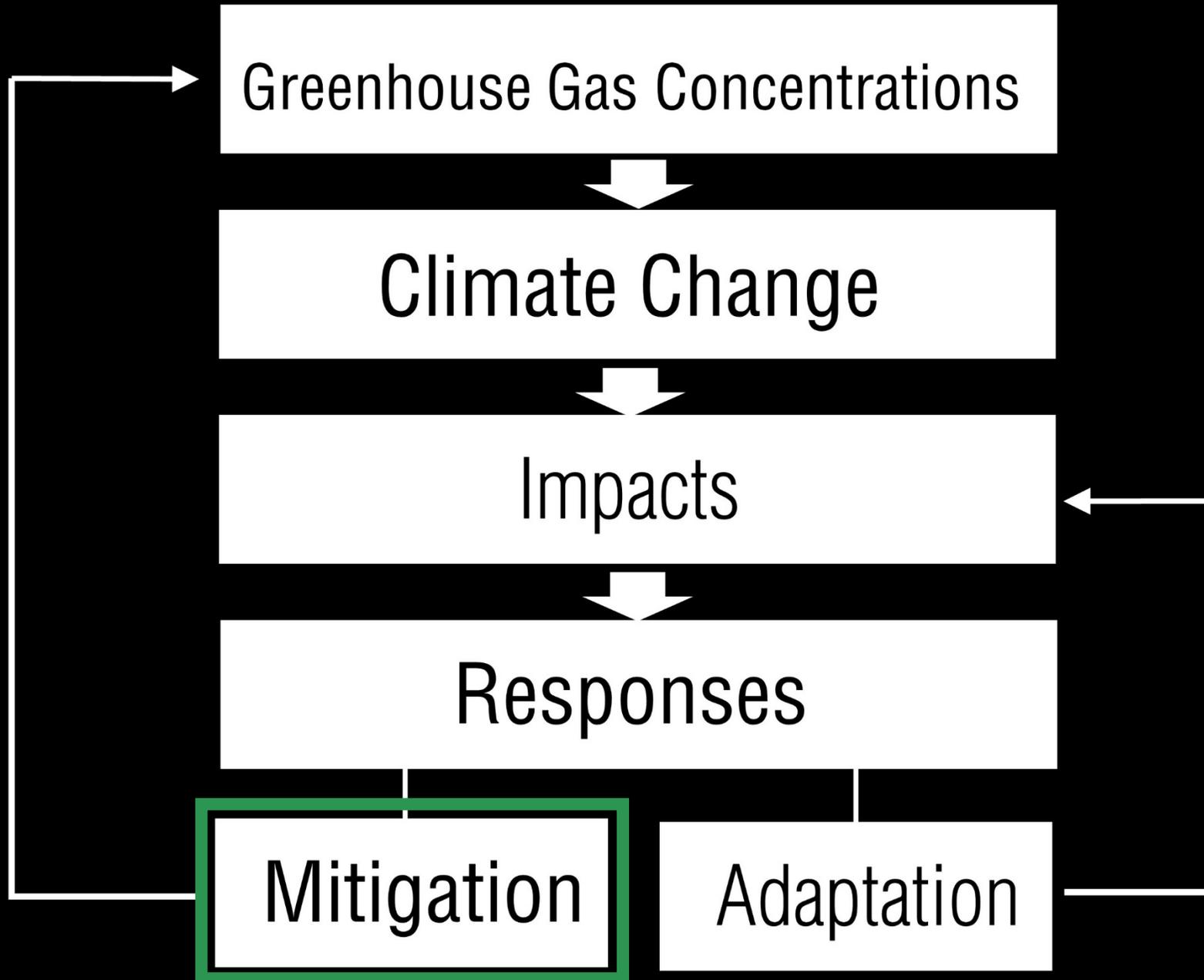
- 2000: 45,000 MT CO₂
- 2018: 21,000 MT CO₂
- 2040: 5000 MT CO₂

Sources:

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

15.0





Poll:

Do you think the landscape industry today has a positive or negative impact on the level of carbon in our atmosphere?

Net positive impact: landscape consumes more carbon than it emits

Net negative impact: landscape consumes less carbon than it emits

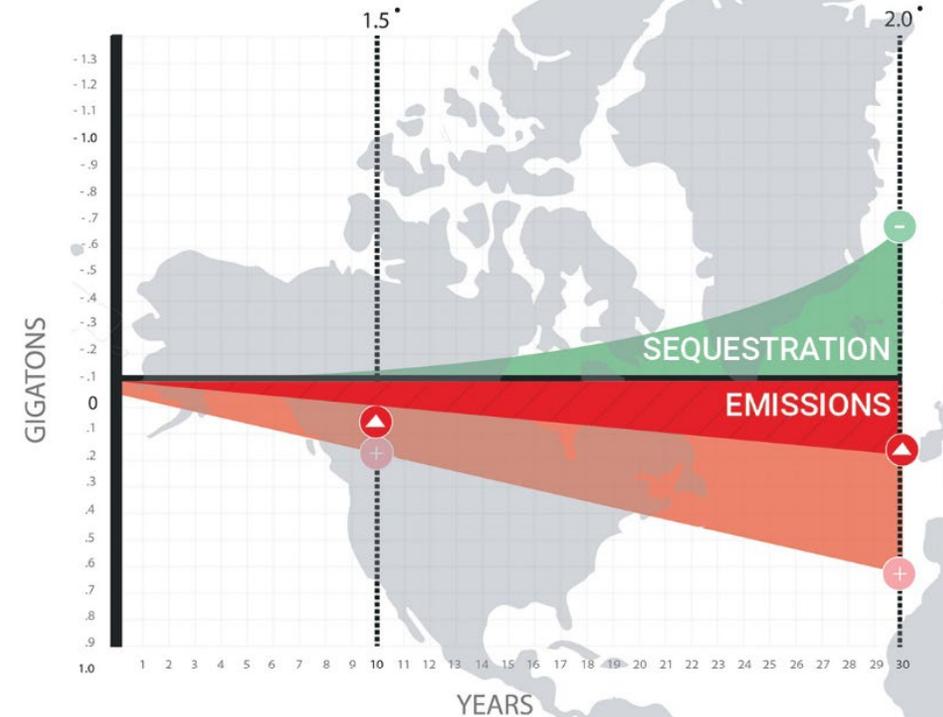
Poll:

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Business As Usual



Shows emissions of 200 million metric tons beyond sequestered by 2050

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.



operational emission

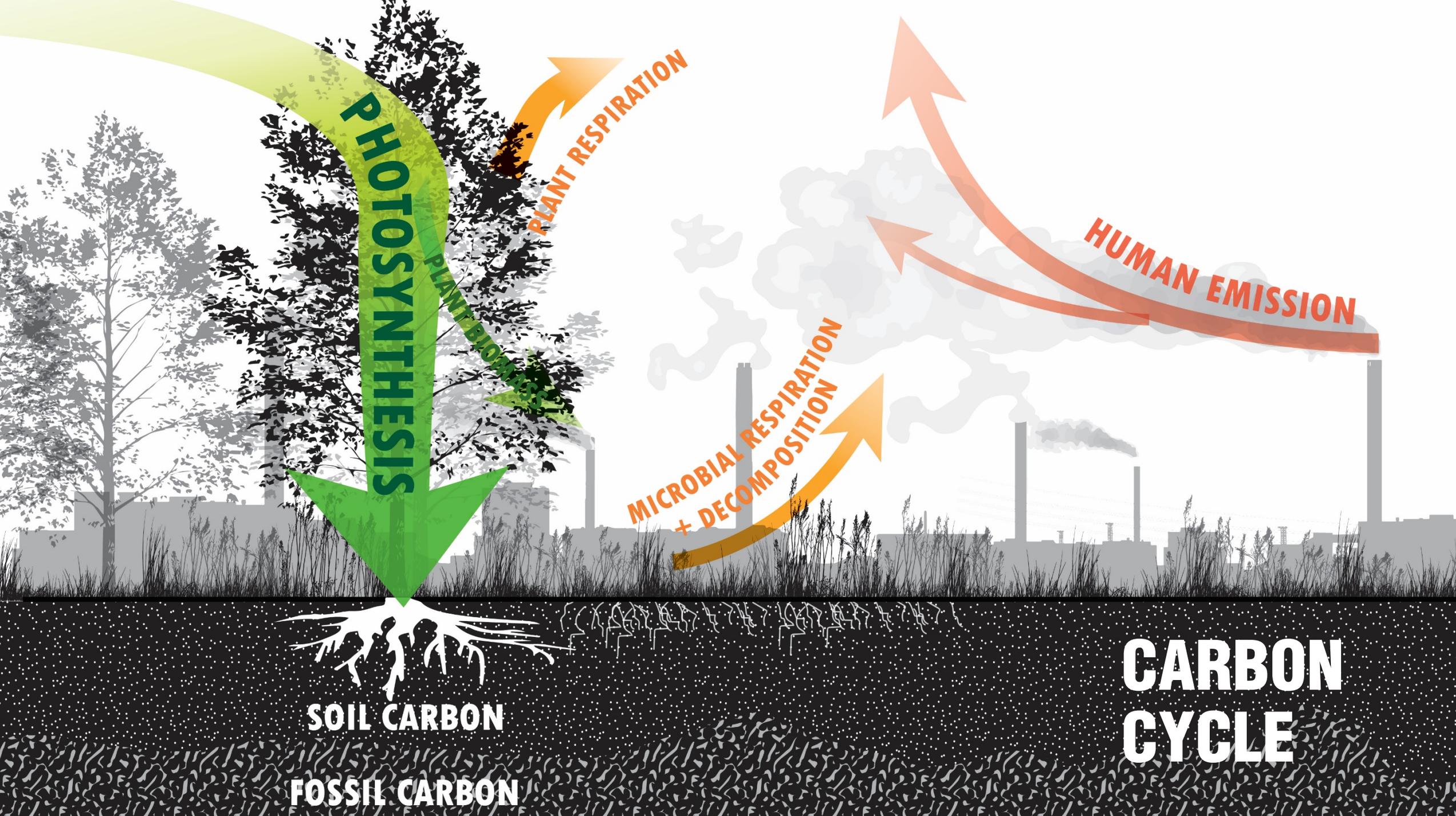


embodied carbon



carbon sequestration

*How do we reduce?
Can we sequester more?
How do we measure?*



PHOTOSYNTHESIS

PLANT RESPIRATION

**MICROBIAL RESPIRATION
+ DECOMPOSITION**

HUMAN EMISSION

SOIL CARBON

FOSSIL CARBON

**CARBON
CYCLE**

Questions?

**Please use the chat box*



REDUCE FOOTPRINTS



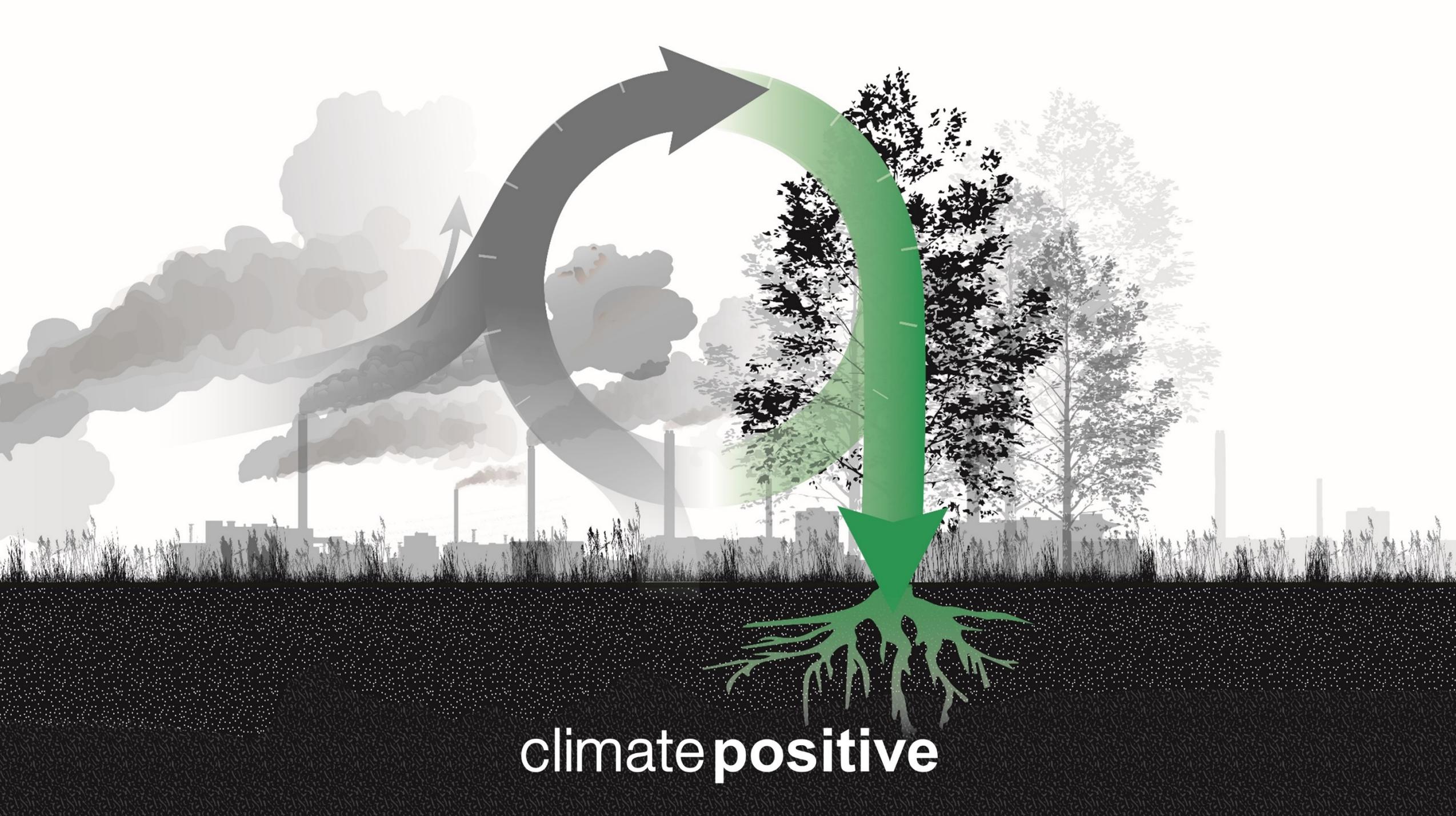
INCREASE SEQUESTRATION



Athena
Impact Estimator
for Buildings



CMG atelier ten



climate positive

CMG



LANDSCAPE
ARCHITECTURE
FOUNDATION



American Society of
Landscape Architects

atelier ten

**LACF
FAPC**



IFLA

INTERNATIONAL FEDERATION
OF LANDSCAPE ARCHITECTS



CSLA AAPC

Materials - Plants + Maintenance =
Landscape Carbon Footprint

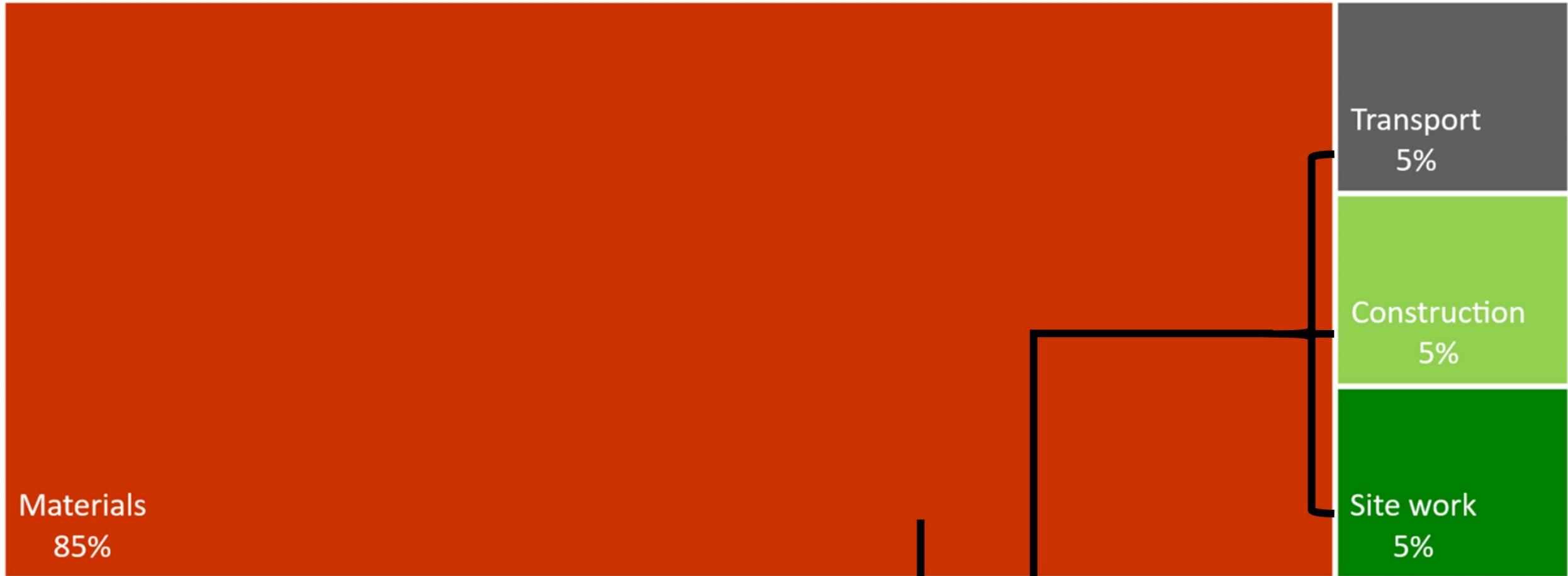


438 mT CO2 emitted

1604 mT CO2 sequestered

TYPICAL LANDSCAPE CARBON SOURCES

■ Transport ■ Construction ■ Site work ■ Materials



atelier ten, CMG 2018

5% + 15% = 20% TOTAL CONTINGENCY

ENVIRONMENTAL PRODUCT DECLARATION (EPD)

ENVIRONMENTAL PRODUCT DECLARATION

Mix 604

This Environmental Product Declaration (EPD) reports the impacts for 1 m³ 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



PLANT



EPD PROGRAM OPERATOR

EarthSure

P O Box 2449
Vashon, WA 98070



DATE OF ISSUE

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

ENVIRONMENTAL IMPACTS

Declared Product:

Mix 604 •
6.0SK 3/4 RECYCLED AD
Compressive strength: 4000 psi at 28 days

Declared Unit: 1 m³ 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 (m³) | 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

5

+ ADD 75 MORE TREES

+ CONVERT 30% OF LAWN AND CONCRETE TO SHRUBS

- SUBSTITUTE ASPHALT WITH STABILIZED CRUSHED STONE PAVING

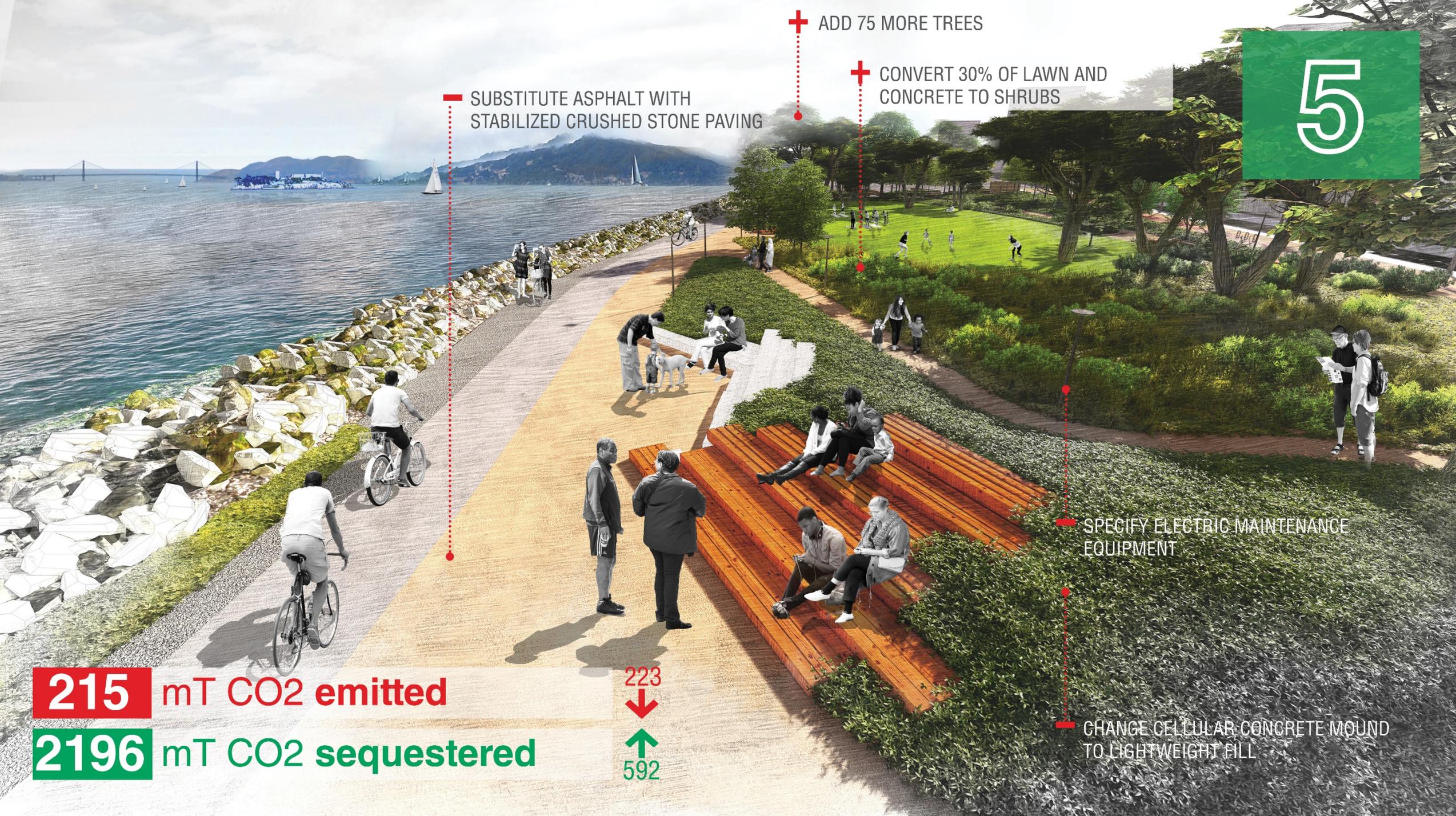
- SPECIFY ELECTRIC MAINTENANCE EQUIPMENT

- CHANGE CELLULAR CONCRETE MOUND TO LIGHTWEIGHT FILL

215 mT CO2 emitted

2196 mT CO2 sequestered

223 ↓
592 ↑



159 mT CO2 emitted
45 mT CO2 sequestered



20

+ CONVERT 20% OF CONCRETE TO SHRUBS

+ ADD 14 TREES

- CONVERT 10% OF CONCRETE TO STABILIZED DECOMPOSED GRANITE

- CHANGE CONCRETE SITE WALLS TO WOOD

- CHANGE 2,000 SF STONE TO STABILIZED CRUSHED STONE

- ADD CEMENT SUBSTITUTIONS TO SITE CONCRETE

53 mT CO2 emitted

152 mT CO2 sequestered

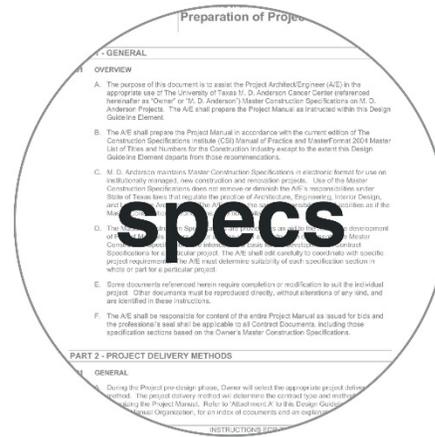
106



107

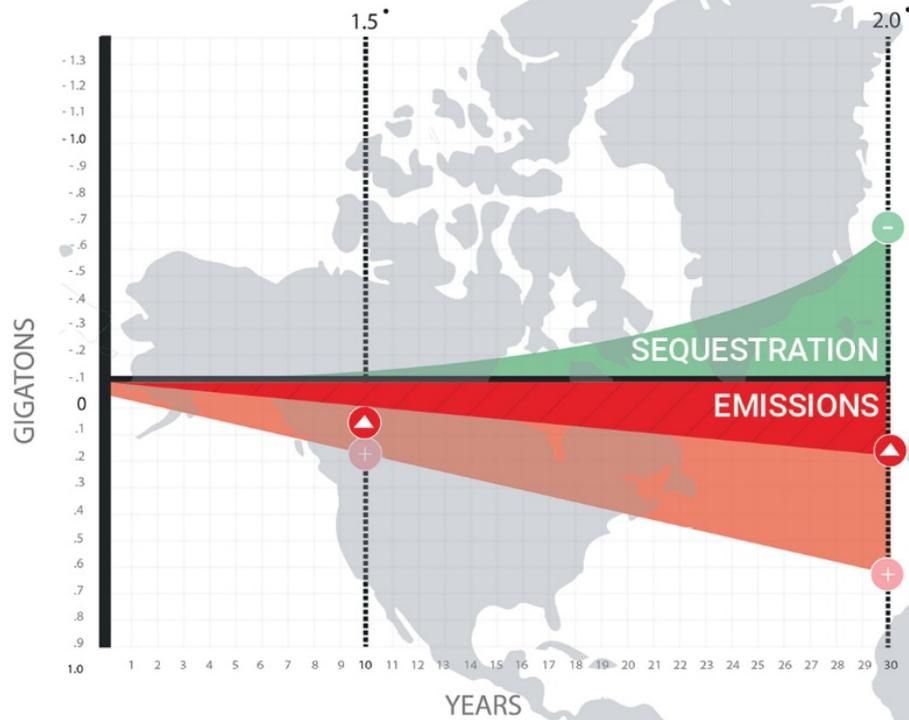


top 5 things **WE can do**



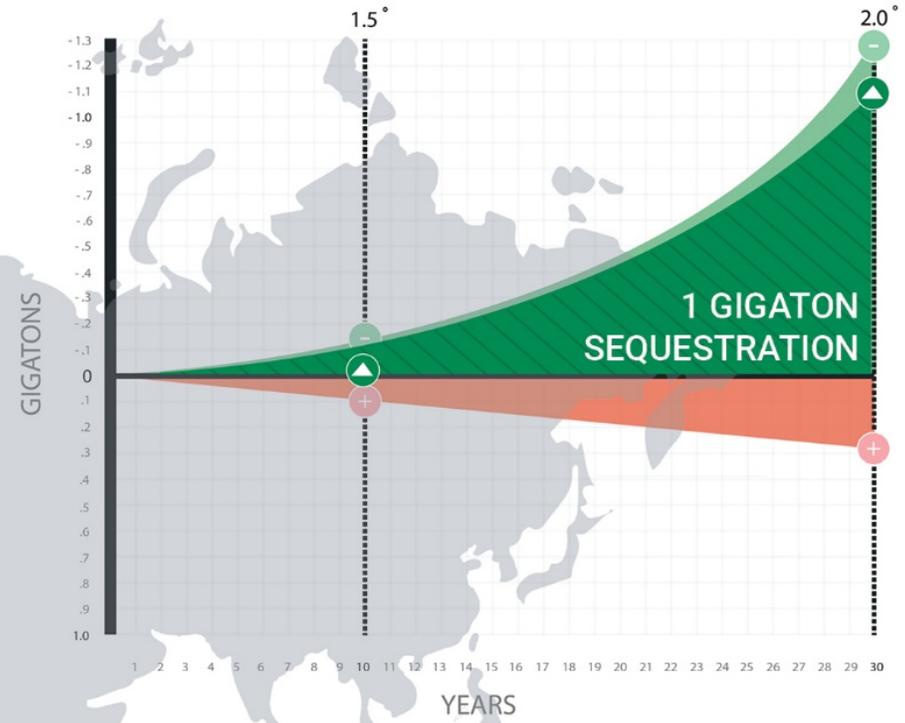
SHIFTING THE PARADIGM

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**



Goal of our projects sequestering more CO2 than they emit **by 2030**

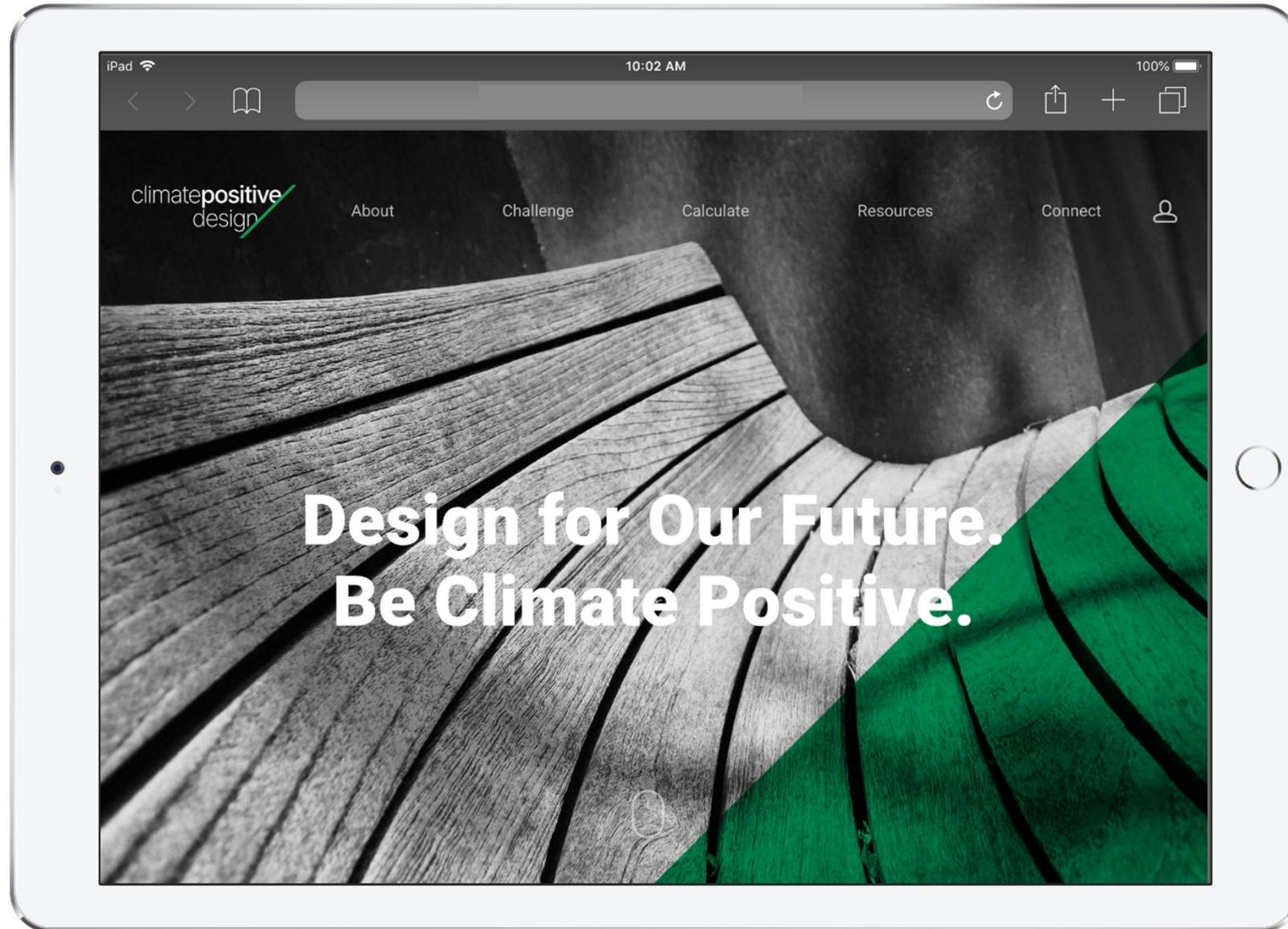
If we meet the **Climate Positive Design** goals through **2050**, our projects could **sequester 1 gigaton** of CO2 beyond their emissions.

HOW YOU CAN CONTRIBUTE

- Incorporate CPD into your work
- Log your projects
- **Provide feedback through the 'Suggestion Box' on the Connect Page**
- Donate (Go Fund Me page on 'Connect' website tab)
- Provide research data
- Ask product manufacturers for EPDs
- **Help get the message out**

Questions?

**Please use the chat box*



LEADERSHIP



EMPOWERMENT



COLLABORATION



EDUCATION

Discussion: BASED ON YOUR EXPERIENCE ...

Are there any **opportunities** to reduce our carbon footprint that we haven't addressed today?

** Please use the chat box to contribute*

Pocket Park Baseline Summary:

50% hardscape /
50% softscape

30% asphalt parking

5000 sq ft concrete pedestrian
paving

315 ft. steel fence

5 medium deciduous trees
8 small deciduous trees
2 large evergreen trees

15,000 sf lawn

5000 sf shrubs

34 years to positive

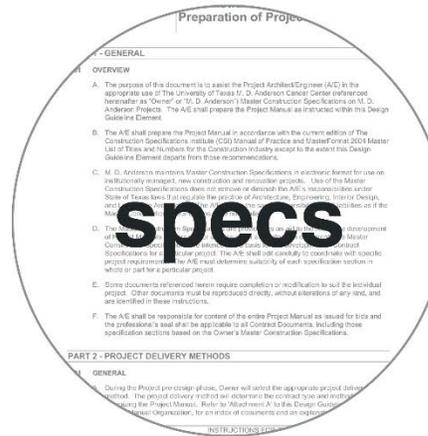


Discussion: BASED ON YOUR EXPERIENCE ...

A. What are the **obstacles** to implementing these changes?

B. How could we **overcome** these obstacles?

**Please use the chat box to contribute*



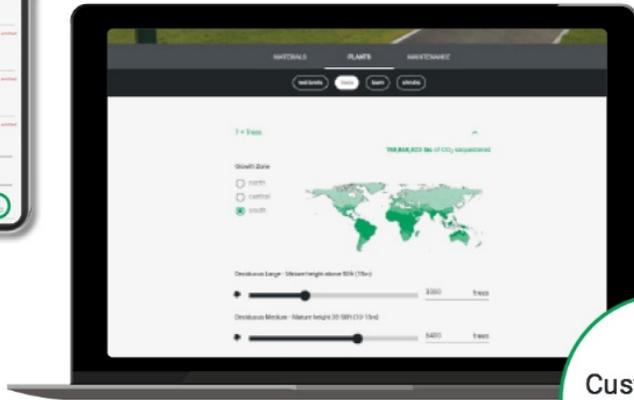
Q+A: Do you have other questions or ideas?

**Please use the chat box*

CONSTANTLY IMPROVING

Since Launch

Metric Version



Custom Data Inputs

Version 2 Coming Soon!



- Compare design alternatives
- Add multiple inputs for 1 type of material



Analyze existing conditions



Understand site impacts

- Grading, cutting down trees, tree/wood reuse, soil amendment/import
- Account for material replacement over time
- Add emissions for planting



Better data

- Add completion date
- Indicate if test/academic project or real
- Live stat dashboard
- New report – more info on data sources/assumptions



Transamerica Pyramid

TATTOOS

Brandy Ho's
Hunan Food

BRANDY HO'S
HUNAN FOOD

Brite Smile
Teeth
Whitening
989-2729

BABSON
COLLEGE

Brandy Ho's
Hunan Food

BRANDY HO'S
HUNAN FOOD
415-785-7537

COLUMBUS AVE. DENTAL

Pa



TATTOOS

TATTOOS

TATTOOS

Pa

Smile

84-2729

COFFEE & DESSERTS

COCKTAILS







climate**positive**
design

www.ClimatePositiveDesign.com

References + Resources

Architecture 2030 Challenge: https://architecture2030.org/2030_challenges/2030-challenge/

CalAdapt: <https://cal-adapt.org/>

California's Fourth Climate Change Assessment and [Regional report](http://www.climateassessment.ca.gov/):
<http://www.climateassessment.ca.gov/>

Climate Positive Design: <https://climatepositivedesign.com/>

[EBMUD Landscape Advisory Committee webpage](#)

EBMUD, *Sustainability Report 2018*: <https://www.ebmud.com/about-us/sustainability/>

Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*:
<https://www.ipcc.ch/sr15/>

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Thanks for listening!