

A wide-angle photograph of the San Francisco skyline at dusk. The city's lights are visible against a dark blue sky. In the foreground, the water of the bay is calm, reflecting the city lights. Several ships are visible, including a large cargo ship on the right and a tugboat on the left. The overall mood is serene and professional.

CMANC

Climate Resilience

BURNS  MCDONNELL®

October 13, 2022

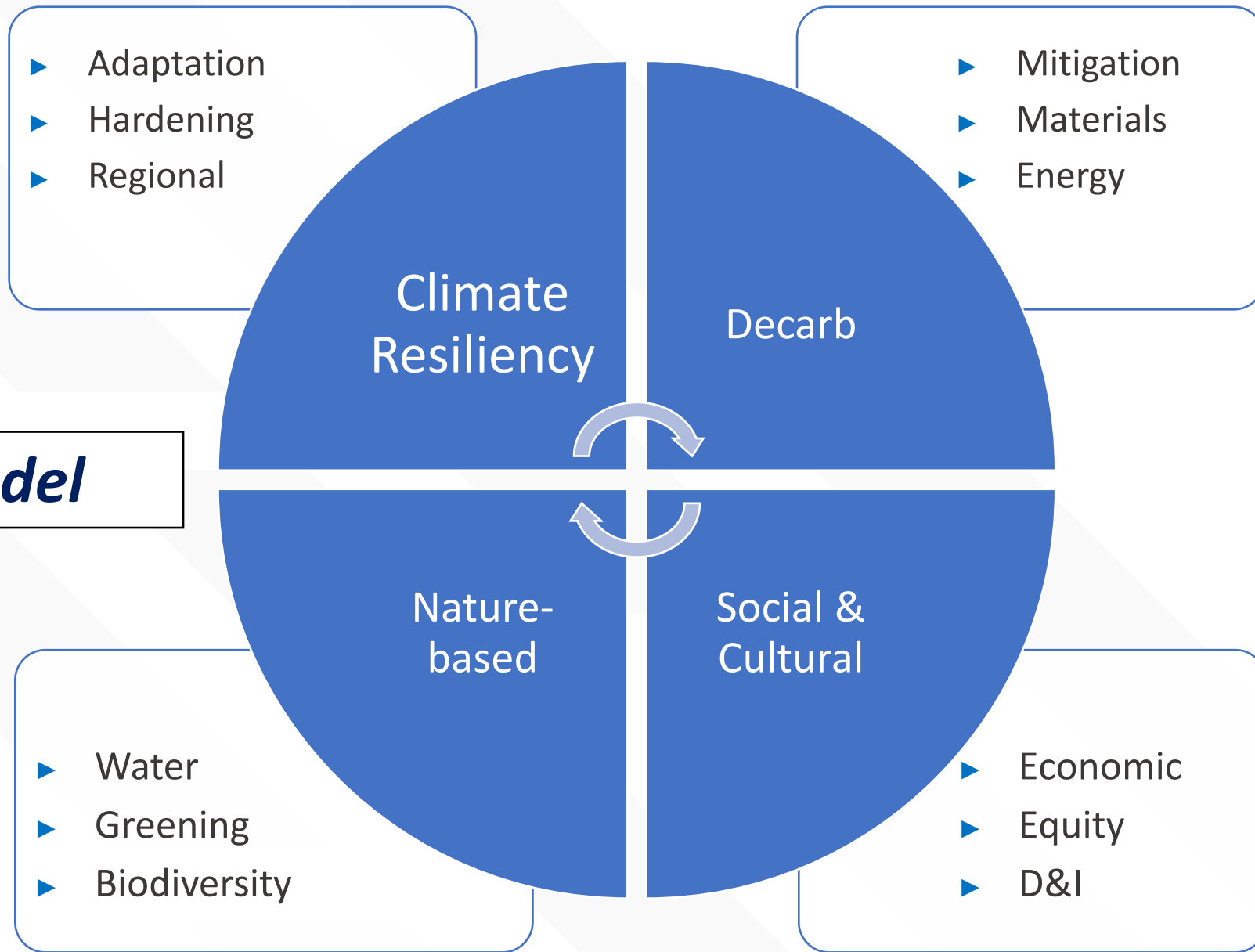
Sustainability & Civil Engineers

Civil Engineers are involved In:

- ▶ Climate resiliency
- ▶ Remediation
- ▶ Sustainable development
- ▶ Materials management
- ▶ Energy
- ▶ Greenhouse gas analysis
- ▶ Water resources
- ▶ Stakeholders - **Social Aspects embedded in all!**



STC Model



ASCE Definitions

(ASCE Policy Statements 418 and 518)

Sustainability

“A set of economic, environmental and social conditions in which all of society has the capacity and opportunity to maintain and improve its quality of life indefinitely without degrading the quantity, quality or availability of economic, environmental and social resources.” ASCE Policy Statement 418

Resilience

“The ability to plan, prepare for, mitigate, and adapt to changing conditions from hazards to enable rapid recovery of physical, social, economic, and ecological infrastructure. Improving resilience before or following a hazard event should engage physical infrastructure and social systems with adaptive capacity to ensure rapid return to functionality, accounting for interdependencies within and across all sectors.”

ASCE Policy Statement 518

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Sustainability and Resilience in Civil Engineering Practice: Roundtable Discussions

Adaptation | Mitigation | Management



ASCE

2023
CONFERENCE

INSPIRE

INFRASTRUCTURE INNOVATION & ADAPTATION FOR A SUSTAINABLE & RESILIENT WORLD

ARLINGTON, VIRGINIA | NOV. 16-18, 2023

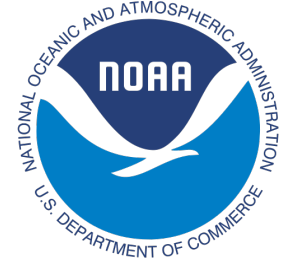
As our world expands through innovation, technology, and in population, civil engineers have a renewed call to action: Ensure that the built environment is safe, dynamically resilient, sustainable, future-ready, and adaptive to changing climate conditions.

ASCE INSPIRE will bring engineers, owners, and operators to discuss emerging ideas and best practices. Hear from government officials, financial investors, climate scientist and others as ASCE works to inspire [sustainability](#), [resilience](#), [climate adaptation](#), & [cutting-edge energy issues](#)!

Call for Abstracts Launches Oct 19

www.inspire.asce.org

ASCE-NOAA Partnering



*LEAD ASCE EFFORTS TO UPDATE
PUBLISHED CONTENT TO REFLECT
CURRENT CLIMATE
INFORMATION*

*PARTNER WITH KEY
STAKEHOLDERS RELATED TO
CLIMATE AND ENGINEERING
PRACTICE
(FOCUS ON PREDICTIVE MODELS
& ADAPTATIVE PROCESSES)*

*ENGAGE ASCE TECHNICAL UNITS
TO ADVANCE ASCE SP GOAL 3 –
SAFE, SUSTAINABLE, CLIMATE
RESILIENT INFRASTRUCTURE*

*PARTNER WITH NOAA & ASCE
TECHNICAL COMMUNITY ON THE
WEATHER, CLIMATE, COASTAL, OCEAN
& PREDICTIVE INFORMATION NEEDED
BY PRACTITIONERS TO DESIGN AND
OPERATE INFRASTRUCTURE.*

*PARTNER WITH NOAA TO
ENGAGE CIVIL ENGINEERS TO
UNDERSTAND HOW TO PROVIDE
INPUT/FEEDBACK TO NOAA
FROM THE CE COMMUNITY.*

*HOST FEBRUARY 2023 SUMMIT –
“MAKING THE NATION’S
INFRASTRUCTURE CLIMATE
RESILIENT: ASCE AND NOAA
WORKING TOGETHER”*

General Climate Resilience to the Engineer

- ▶ Problem of non-stationarity
- ▶ Varying standards – lack of consistency biggest issue
- ▶ ASCE 24 vs ASCE 140 vs ASCE 73 (pending)

Climate Resilience from the Port Perspective

- ▶ Sea Level Rise
- ▶ Wave Run-up
- ▶ Rainfall Intensity
- ▶ High ambient temperature impacts
- ▶ Wind Loading
- ▶ Sediment Movement

Impacts

- ▶ Wharf Maintenance
 - Case of Port of San Francisco
- ▶ Lack of consistent standards
 - Case of Navy Shipyard
- ▶ Methodologies
 - POSF Resilience Form
- ▶ Sediment Impacts
 - Significant bedload movement, navigation
- ▶ Stormwater Management
- ▶ Heat Impacts
 - Case of Transit Agency (rail)

Management

Asset Management:
Case of Port of Honolulu

Resilience vs Recovery

Adaptive Management:
Design life, refurbishment,
climate change

Ports 2022

- ▶ POSF: are we building a wall (high) or a big bathtub we can't drain?
- ▶ Example of sustainable design: ramp where ships pull up to dock. Different ships/barges pull up to dock, the ramp needs to accommodate for safety. As sea level rise happens, the adjustment of the ramp needs to be accounted for.
- ▶ Washington State Ferries – similar, gantries needed for electrification of the ferries, designed for high tidal fluctuations, significant sea level rise would make the min and max inoperable
- ▶ Likelihood of the structure becoming USELESS due to sea level rise is increasing (e.g., wharf deck height)
- ▶ Financial asset managers are looking for people to disclose risks in order to make a decision on holding property or shedding it. The lack of consistency is having an impact
- ▶ Role of the engineer in influencing policy – rank and file design to a goal not set the goal, whereas the technical expertise is needed for the goal setting.
- ▶ POLA: identified vulnerabilities based on Port Assets: Cargo wharves and miscellaneous operations, critical facilities, transportation (rail/roads), community assets, and natural habitats: a full data inventory, sensitivity analysis, and adaptive capacity for each asset.

Sustainability

- ▶ LEED & Risk Implementation
 - Port of Long Beach
- ▶ “LEED® Proven Provider™”
 - 30 projects per year
- ▶ Envision training/advisory
 - LA Metro
- ▶ Envision Certified projects
- ▶ Current 9 solar project
 - Portfolio program implementing Envision

300

LEED ACCREDITED
PROFESSIONALS

119

ENVISION
SUSTAINABILITY
PROFESSIONALS



**Middle Blue River Green
Infrastructure Project,
Kansas City, Missouri**

2016 Envision Platinum Award,
Institute for Sustainable
Infrastructure

**Burns & McDonnell is a founding
member of Envision**

145

LEED PROJECTS

Revolutionizing Marine Terminal Operations

PROJECT STATS

CLIENT

The Port of Los Angeles

LOCATION

Sand Pedro, Los Angeles,
California

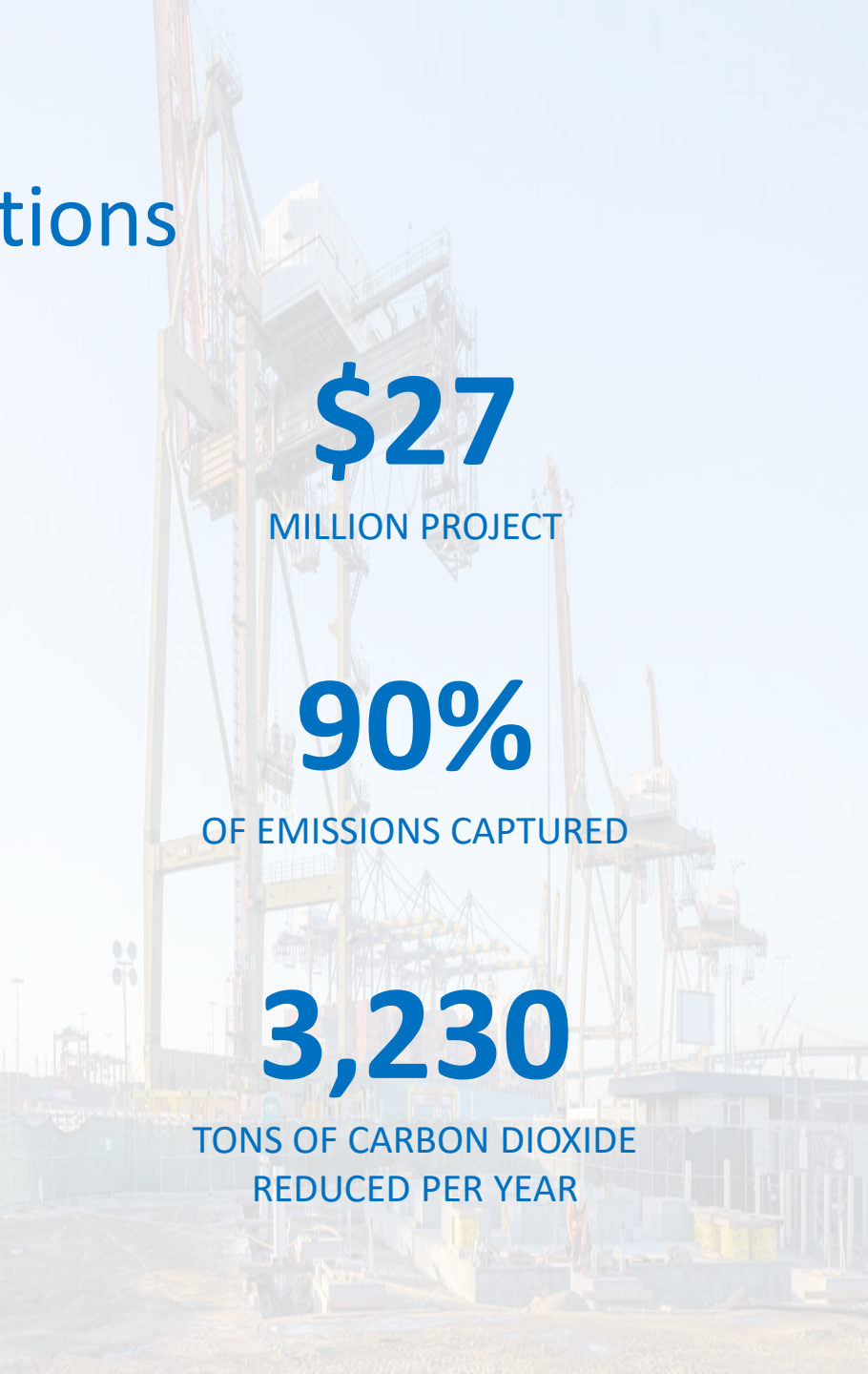
ESTIMATED COMPLETION

2018

Pasha Stevedoring & Terminals (Pasha) and the Port of Los Angeles began to eliminate pollution from port-related operations to help improve the health, quality of life and economy of the local harbor area community. Pasha and the Port of Los Angeles are collaborating to develop new demonstration technologies as scalable solutions for other marine terminals worldwide.

OUTLOOK

All the improvements at the Green Omni Terminal Demonstration Project are expected to reduce carbon dioxide emissions by 3,230 tons per year, diesel particulate matter by 0.6 tons per year, nitrogen oxides by 26 tons per year and reactive organic gases by 1.4 tons per year.



\$27

MILLION PROJECT

90%

OF EMISSIONS CAPTURED

3,230

TONS OF CARBON DIOXIDE
REDUCED PER YEAR

An Electrified Future For Cargo Shipping Services

PROJECT STATS

CLIENT

Port of Oakland

LOCATION

Oakland, California

As part of an overall program aimed at accelerating the adoption of medium- to heavy-duty electric vehicles, the Port of Oakland embarked on a project to provide its depot with the electrical infrastructure needed to support these vehicles.

CHALLENGE

The Port of Oakland serves a massive number of people — 34 million within a seven-hour drive of the facility alone. Always looking for ways to better provide shipping services to its customers, the port embarked on a fast-track program to adopt and put into use a fleet of electric vehicles (EVs).

10

CHARGING STATIONS
INSTALLED

NEW

12-kV

TO

480-kV

UNIT SUBSTATION

NEW

12-kV

SERVICE DROP DESIGN

CREATE AMAZING.

#12

MARINE AND
PORT FACILITIES
(ENR 2021)

#4

INDUSTRIAL SECTOR
ENGINEERING
(BD+C 2020)

#6

TOP 100
DESIGN-BUILD FIRMS
(ENR 2021)

#9

TOP 500
DESIGN FIRMS
(ENR 2021)

#12

TOP 20 FIRMS IN COMBINED
DESIGN AND CM-PM PROFESSIONAL
SERVICES REVENUE (ENR 2021)

