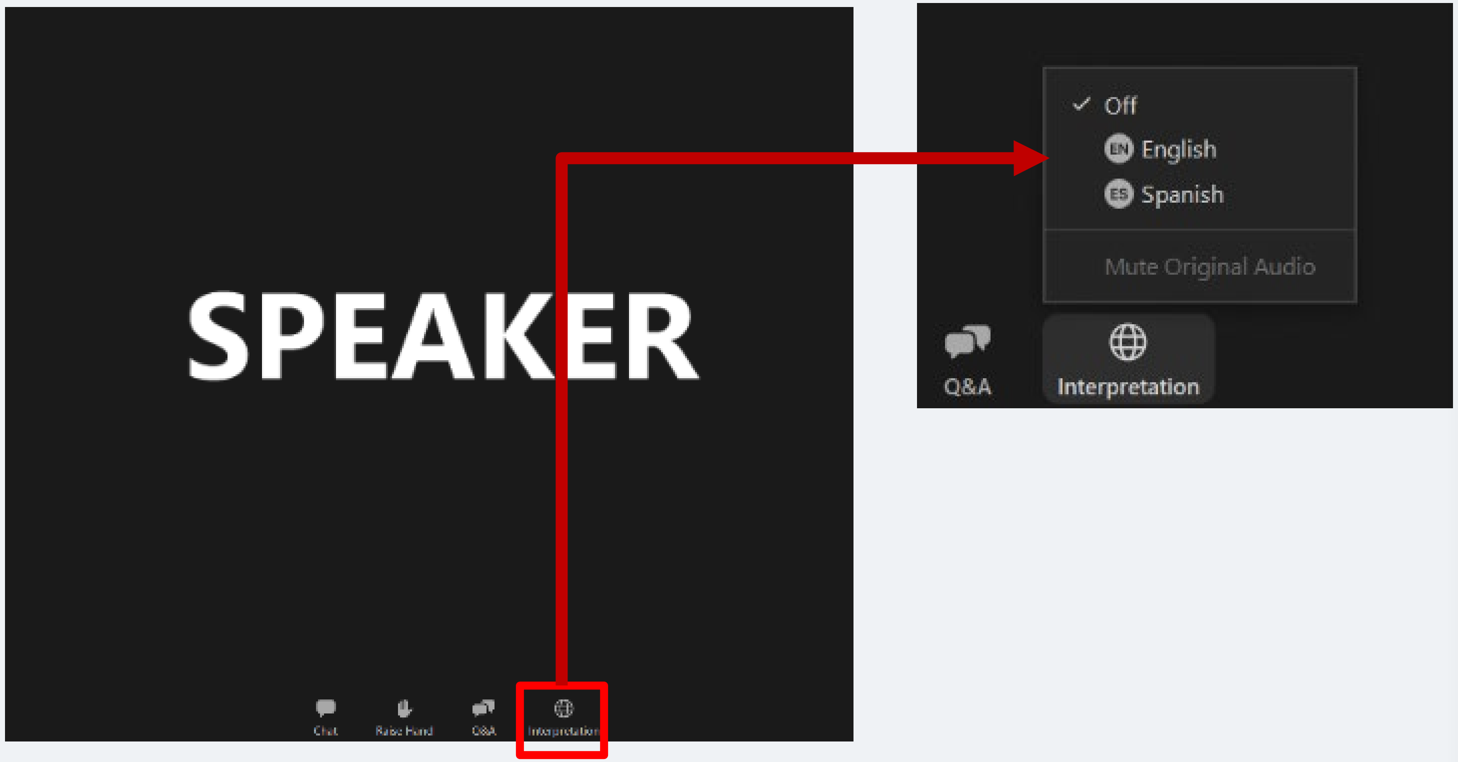
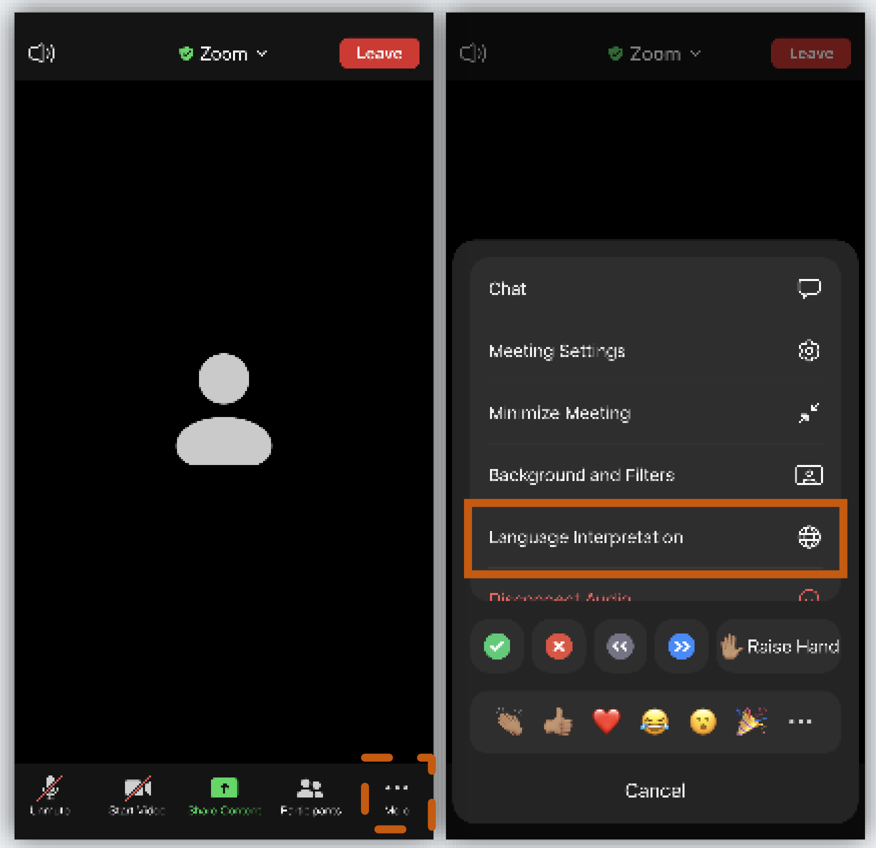
GETTING TO ZERO
SAN DIEGO COUNTY
REGIONAL DECARBONIZATION FRAMEWORK

Land Use and Natural Climate Solutions Working Group

November 3, 2022

How to use Zoom // *Cómo Usar Zoom*

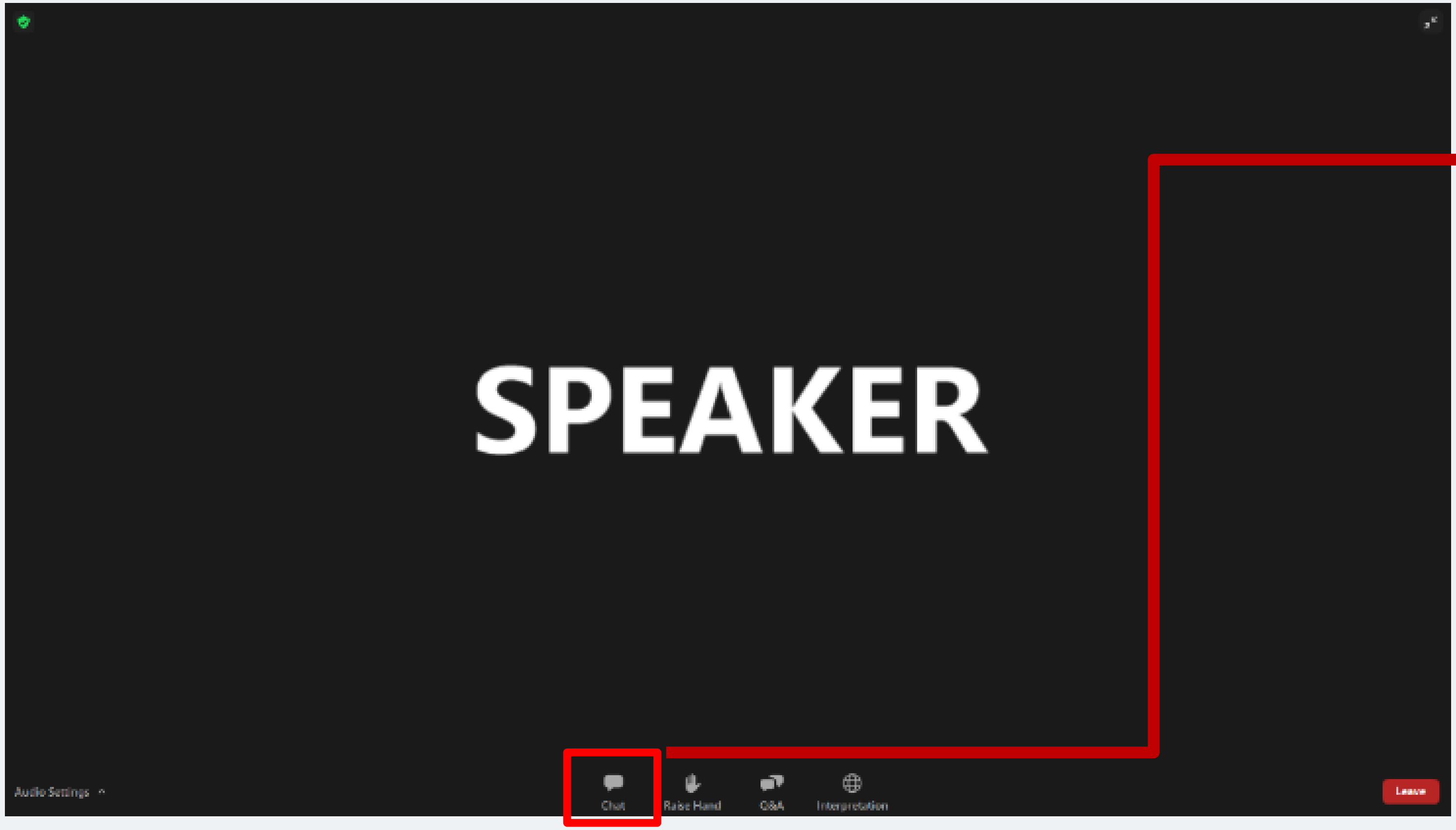


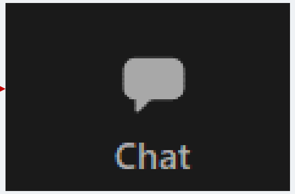


Please select your language of choice (you must select one option)

Debe seleccionar el idioma de su preferencia (Tiene que escoger un idioma)

How to use Zoom // *Cómo Usar Zoom*

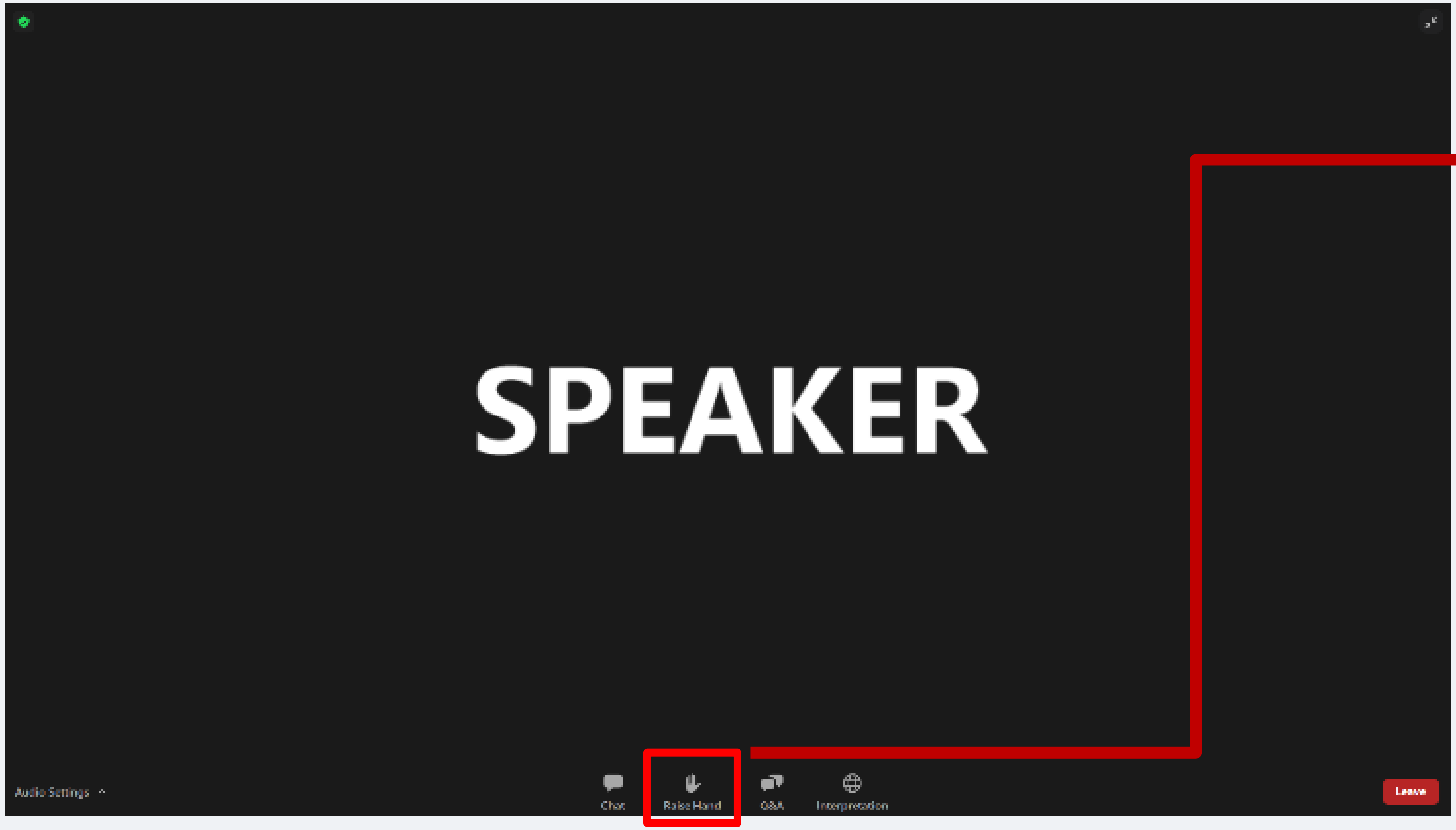




Comments and questions can be submitted through the chat window.

Los comentarios y las preguntas se pueden enviar a través de la ventana de chat.

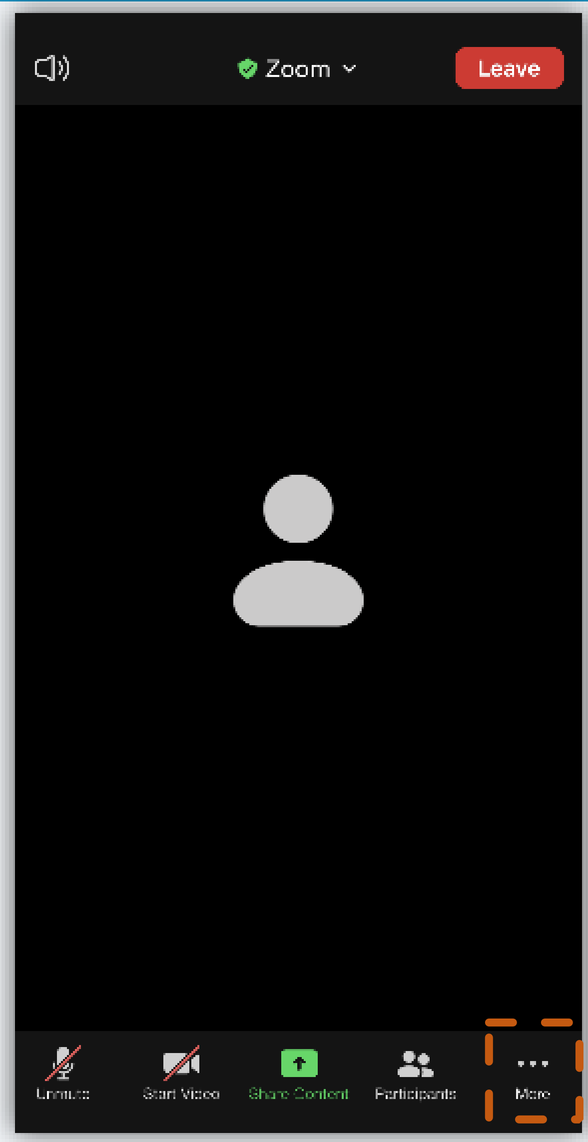
How to use Zoom // *Cómo Usar Zoom*

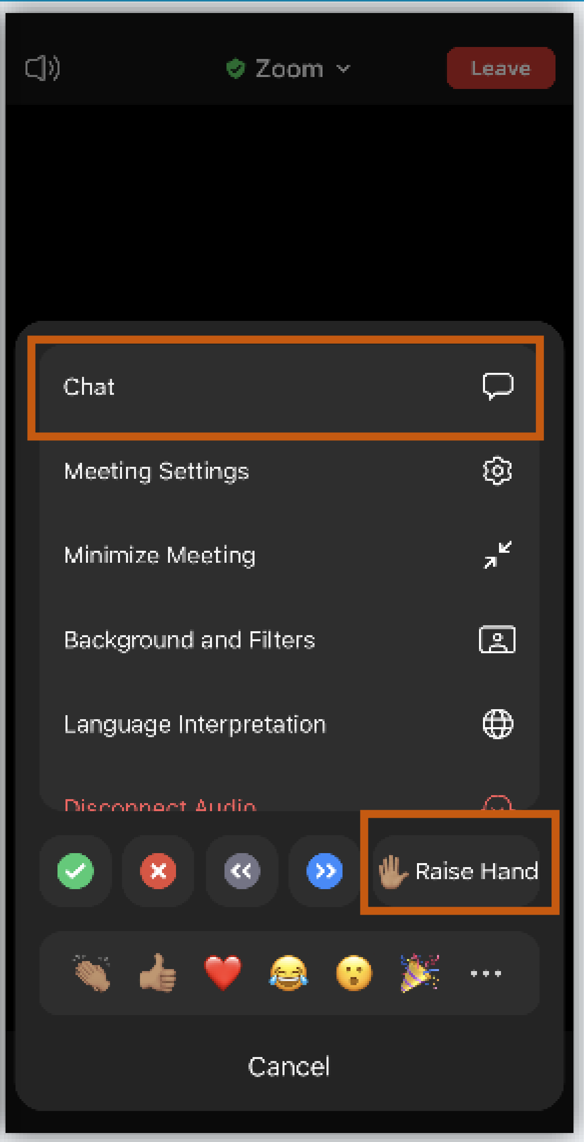


During the discussion, if you would like to speak over the audio, please raise your hand (otherwise questions and comments can be submitted through the Chat window)

Durante el debate, si desea participar de manera oral, por favor, levante la mano (de lo contrario, las preguntas y comentarios pueden presentarse a través de la ventana de Chat)

On your Phone // *En su teléfono móvil*

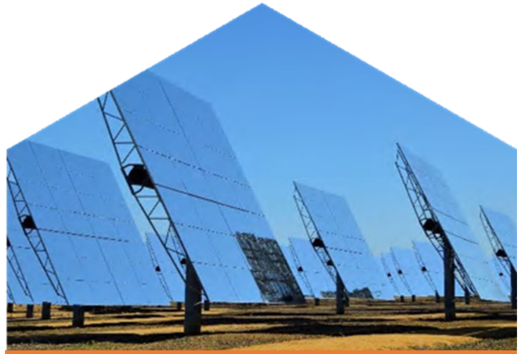







Role of Working Groups

BUILDINGS



ELECTRICITY

FOOD SYSTEMS & CIRCULAR ECONOMY

LAND USE & NATURAL CLIMATE SOLUTIONS

TRANSPORTATION

Today's Agenda

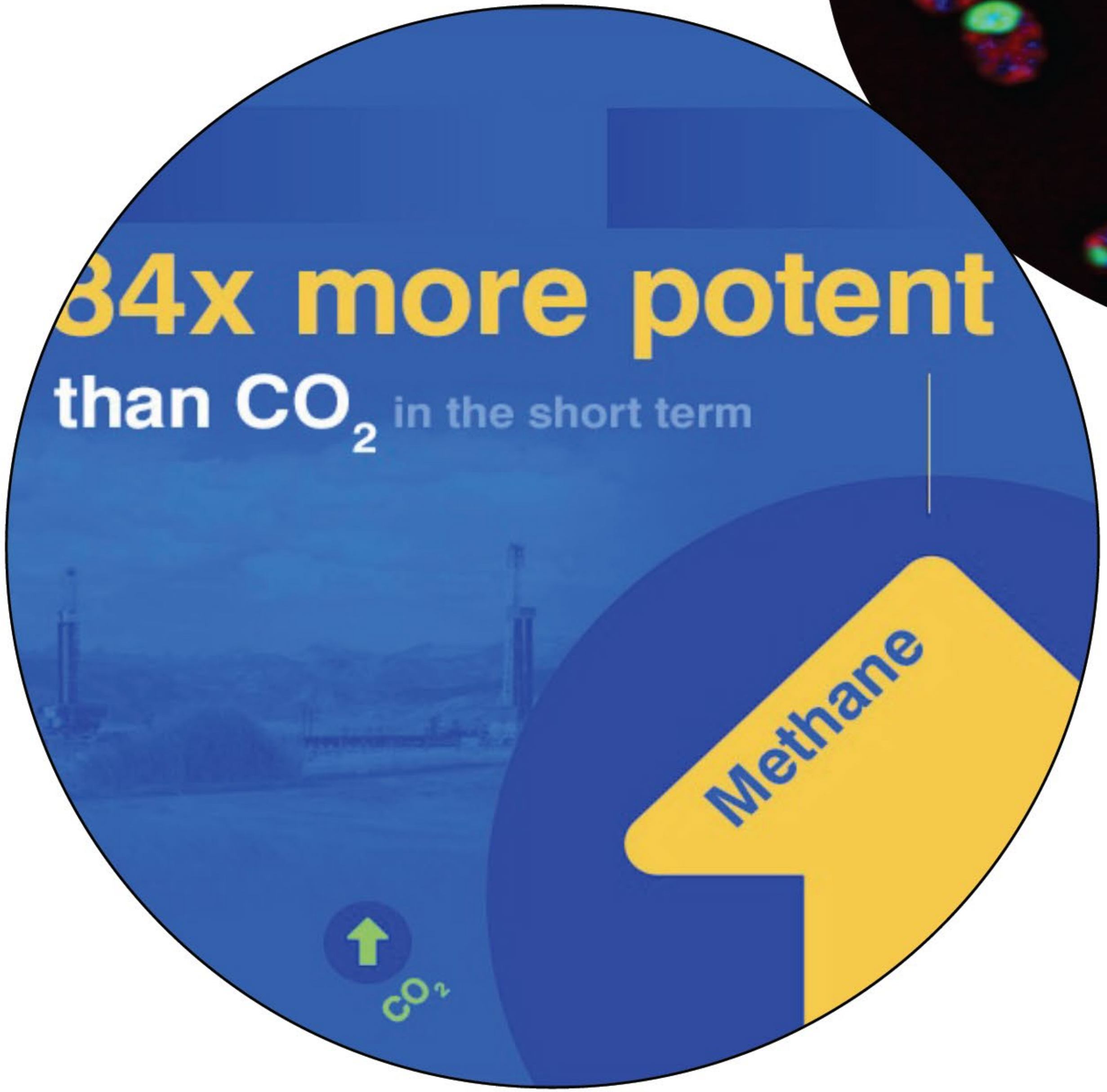
- Welcome
- Stakeholder Presentations
  - Dr. Marina Kalyuzhnaya, San Diego State University and Facilitator Questions
  - Andrew Meyer, San Diego Audubon Society and Facilitator Questions
- Implementation Playbook & Actions Matrix
- Open Discussion
- Closing

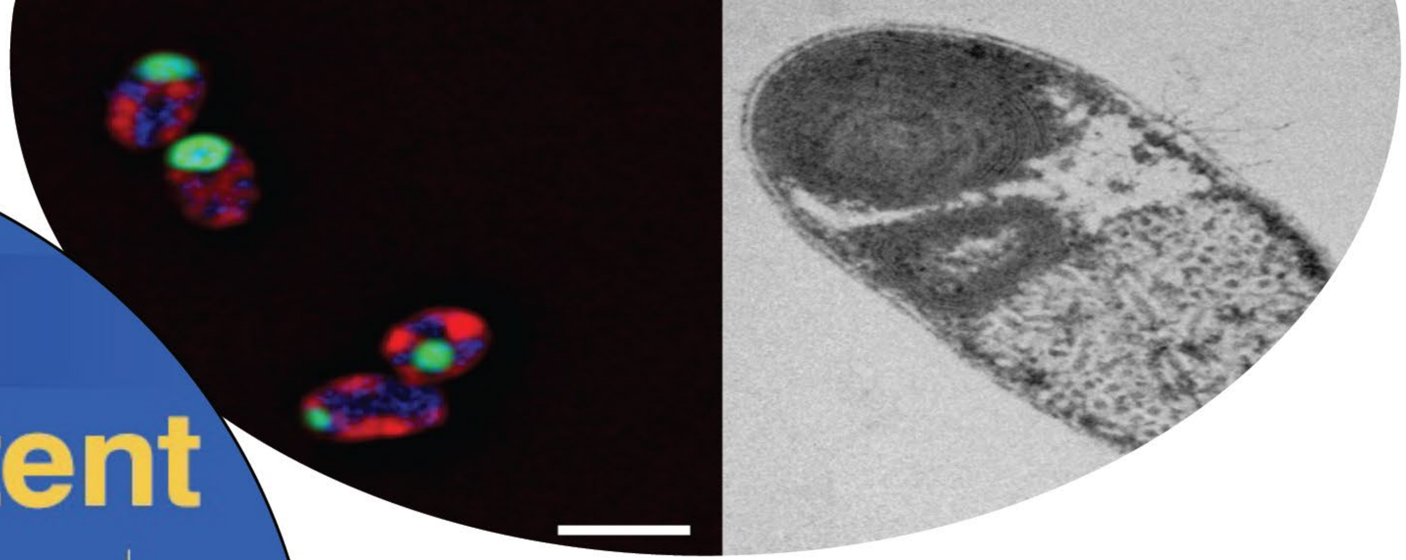
Decarbonizing Land Use and Promoting Natural Climate Solutions

Dr. Marina Kalyuzhnaya

San Diego State University

Idea #1





C_1-biotech

Kalyuzhnaya Marina G.

11/03/2022

SAN DIEGO STATE UNIVERSITY

Methane

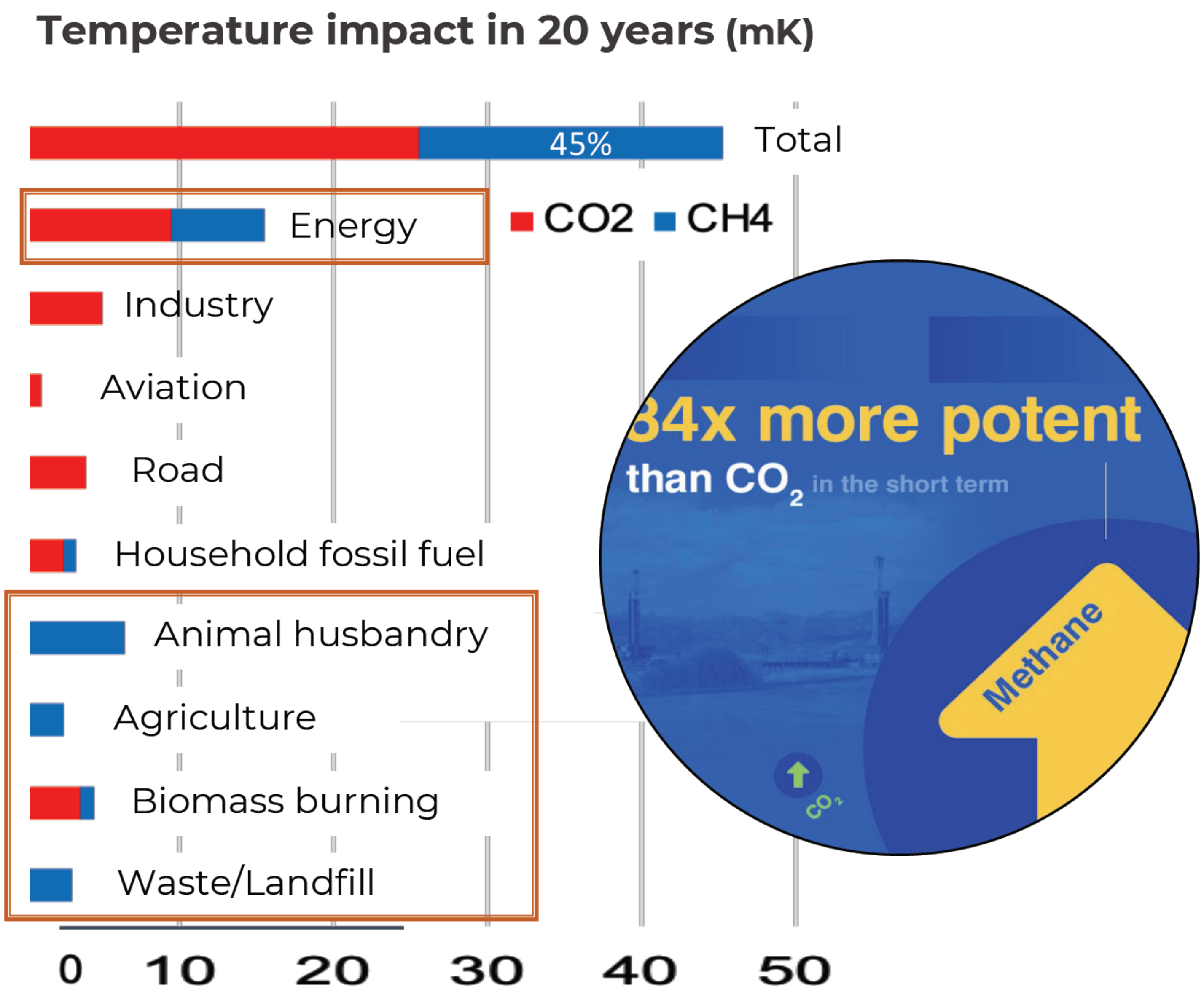
Powerful greenhouse gas

45% of global warming

Comes from fossil energy and food production

Target #1 for climate change mitigation

"the lowest hanging fruit"
"one of the most effective things we can do to reduce near-term global warming."



Scale of the problem

The US-livestock industry accounts 94.4 million cattle and calves (USDA 2021)

33 040 000 000 L CH_4 per day

1166 million cubic ft per day

=

California natural gas residential consumption **per day**

=

Delaware natural gas residential consumption **per month**

Methane pledge

US pledged to reduce methane emissions 30% by 2030
Supported by EU

HOW?

- Reduce venting and flaring
- Tighten nuts and bolts
- Apply biology to reduce emissions from fossil industries, livestock and agriculture

Methane-consuming microbes are everywhere in nature

Methane-consuming microbes are beneficial for animals and plants

Established as animal feed (SCP)

Excellent source of protein

Proven large-scale production

Rebuilding human made ecosystems

capturing

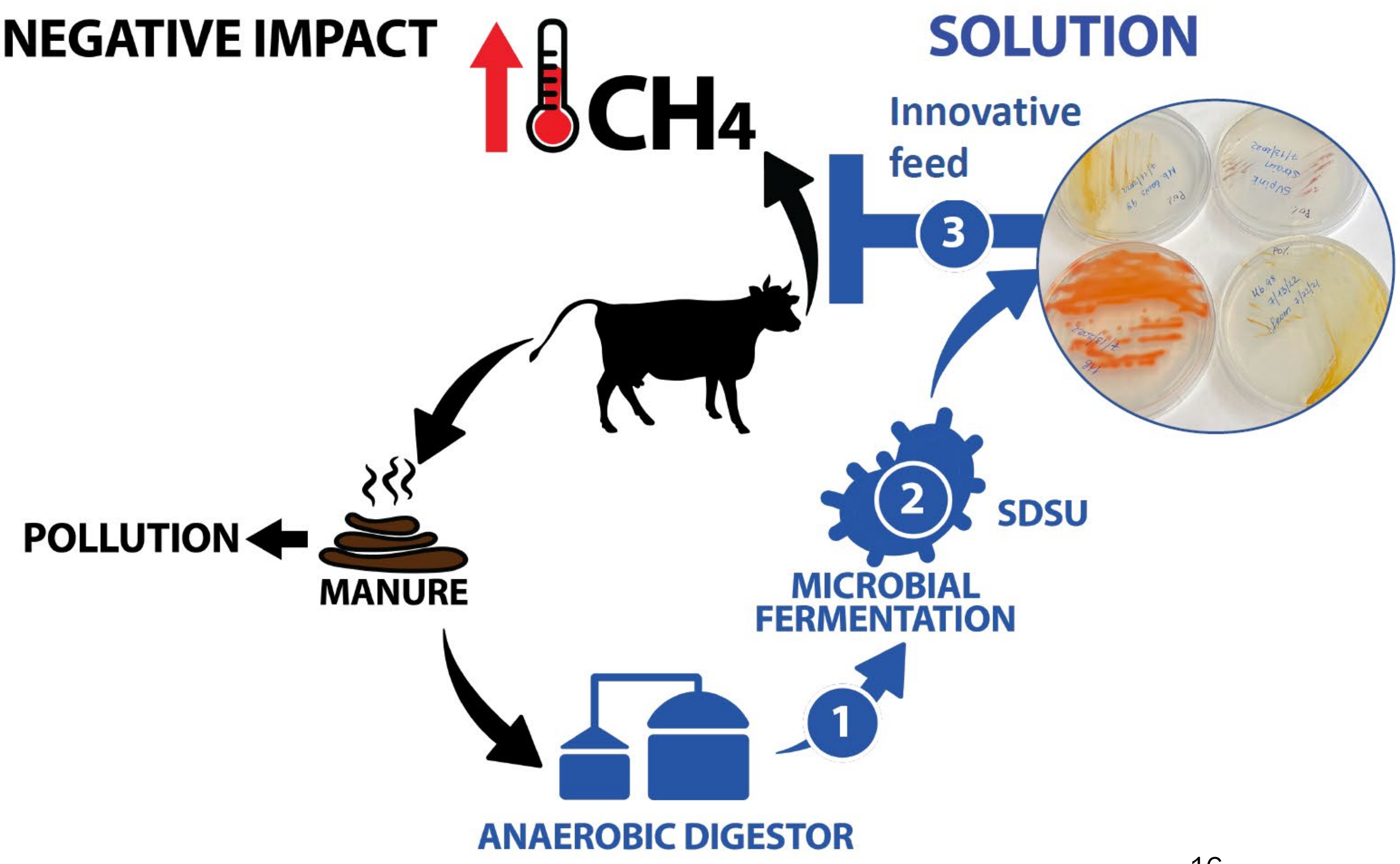
conversions

preserving

Restore balance by developing novel microbial traits based on natural systems

SOLUTION 1

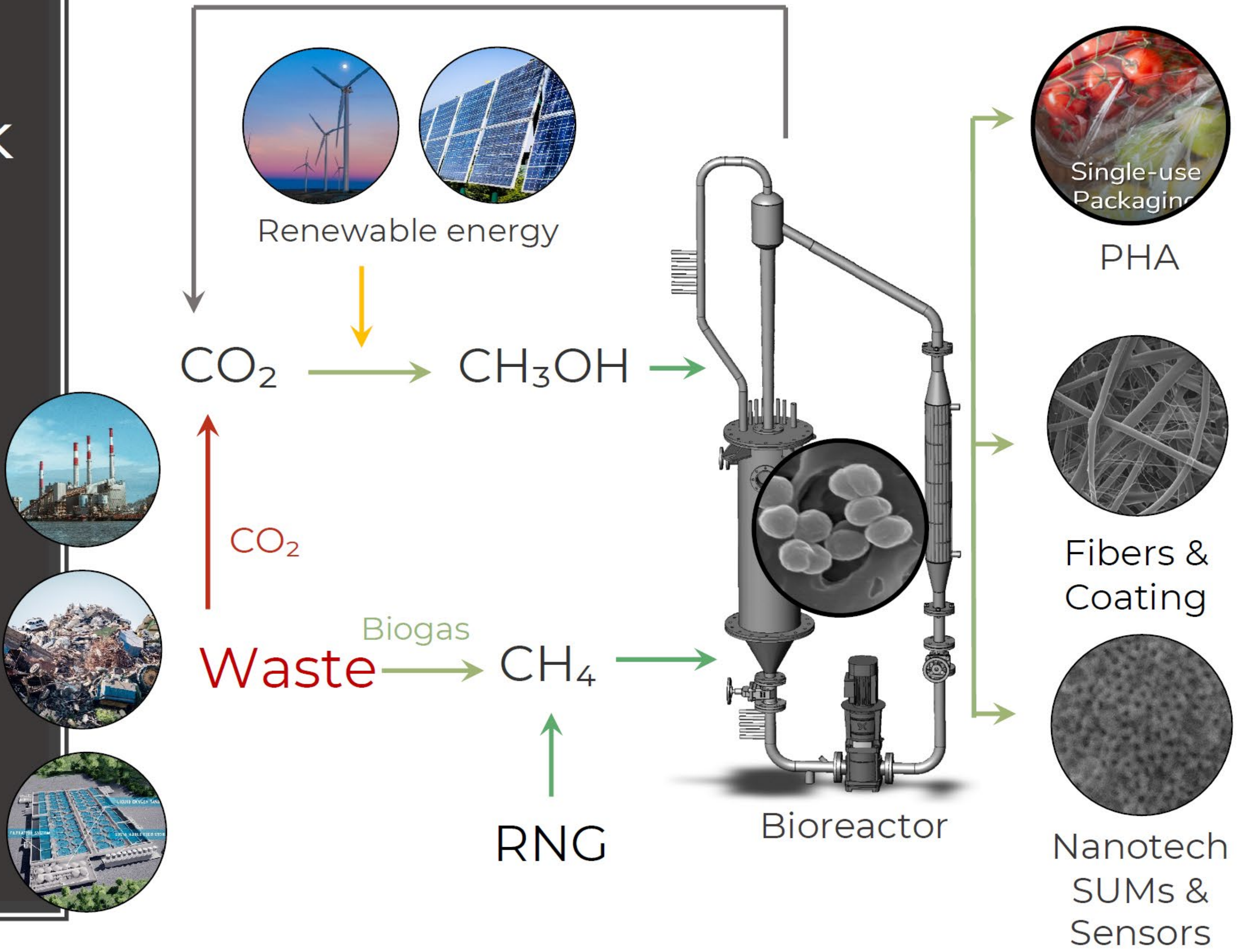
Native microbes as feed to reduce methane emission and stimulate animal growth



SOLUTION 2

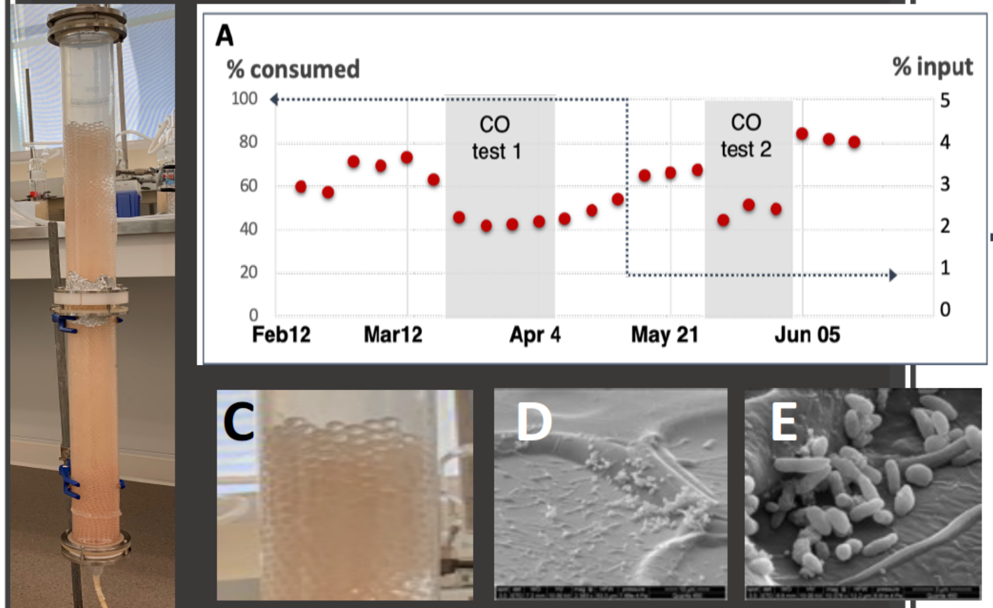
GHG as feedstock

Eliminate anthropogenic emissions



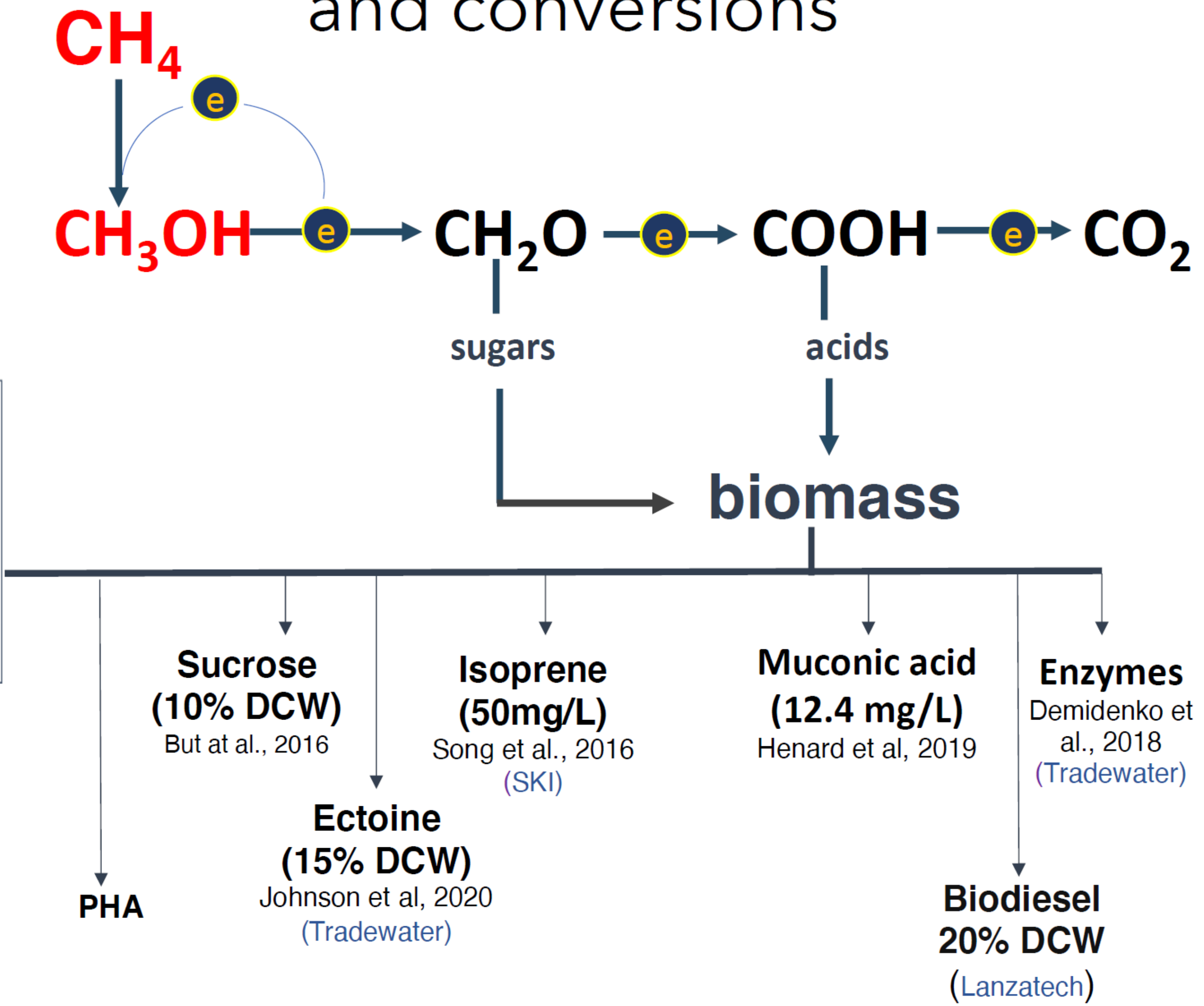
SOLUTION 2

GHG as feedstock



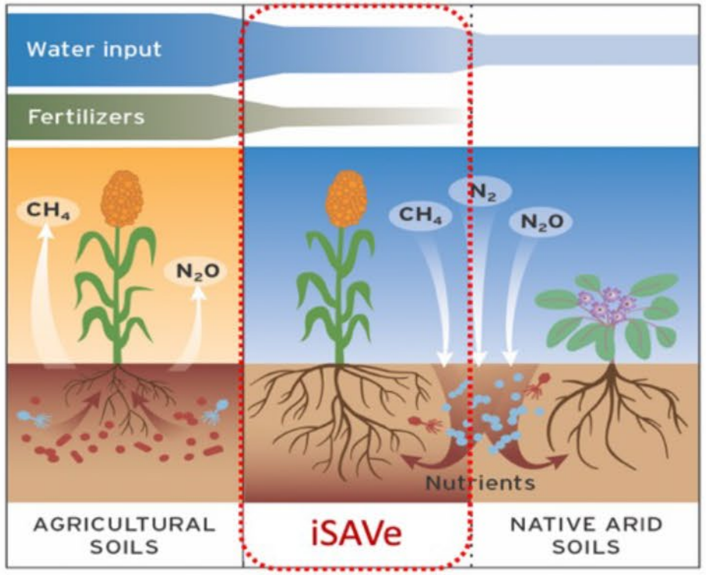
LEAFs
(BHP)

Industrial Chassis for capturing GHG and conversions



SOLUTION 3

iSAVe: Microbial supplements for Sustainable Arid Vegetation



* robust cropping, reduced water input, preserved fluxes, enhanced *in-situ* fertilization

U.S. deserts consume 33 MMT CO_2 eq/yr

Dry land vegetation enhances consumption 10- fold due to unique microbiomes associated with rhizosphere.

Reinforcing the natural potential of southern arid land has the potential to cut 25% of annual US methane emissions.

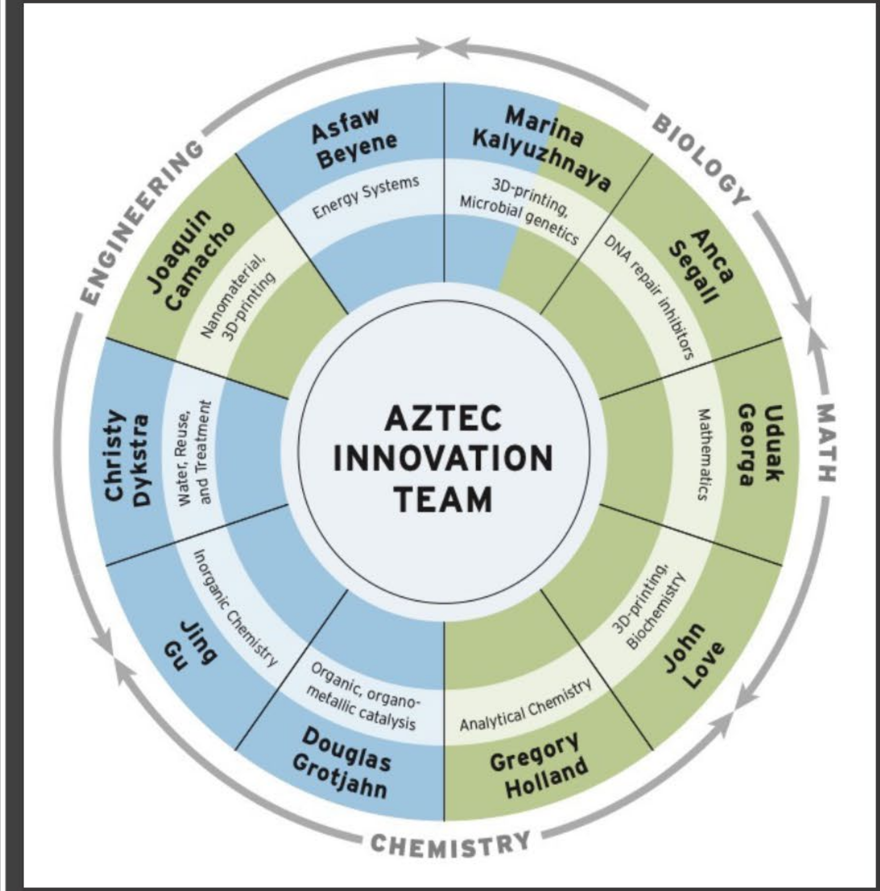
iSAVe: microbial supplement from the desert plant rhizosphere:

maximizes GHG capturing by vegetation,

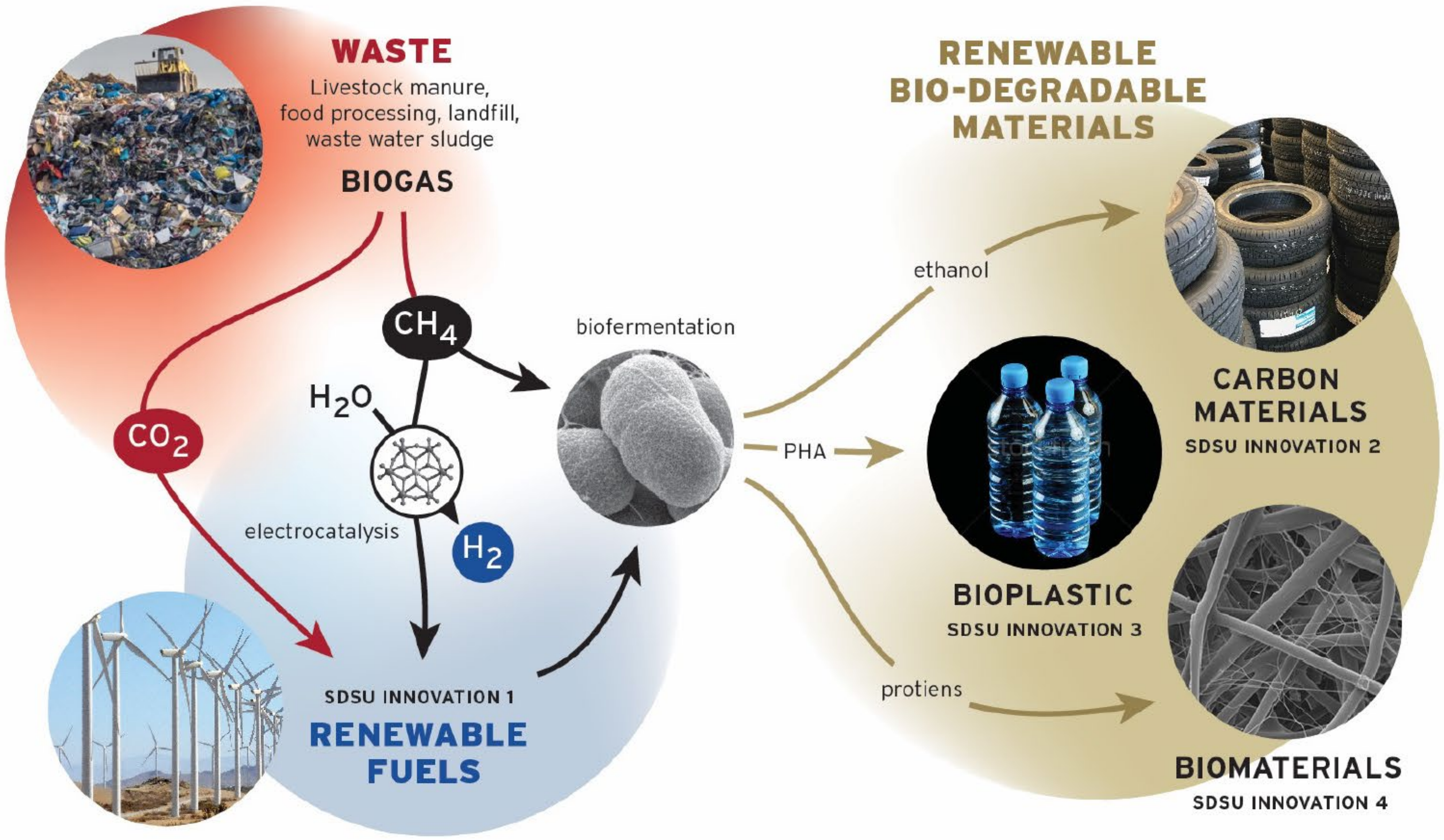
improves plant growth under water scarcity,

can be combined with the production of energy/food relevant crops, such as sorghum.

VISION



https://youtu.be/Cmwh79xdwks



San Diego State University

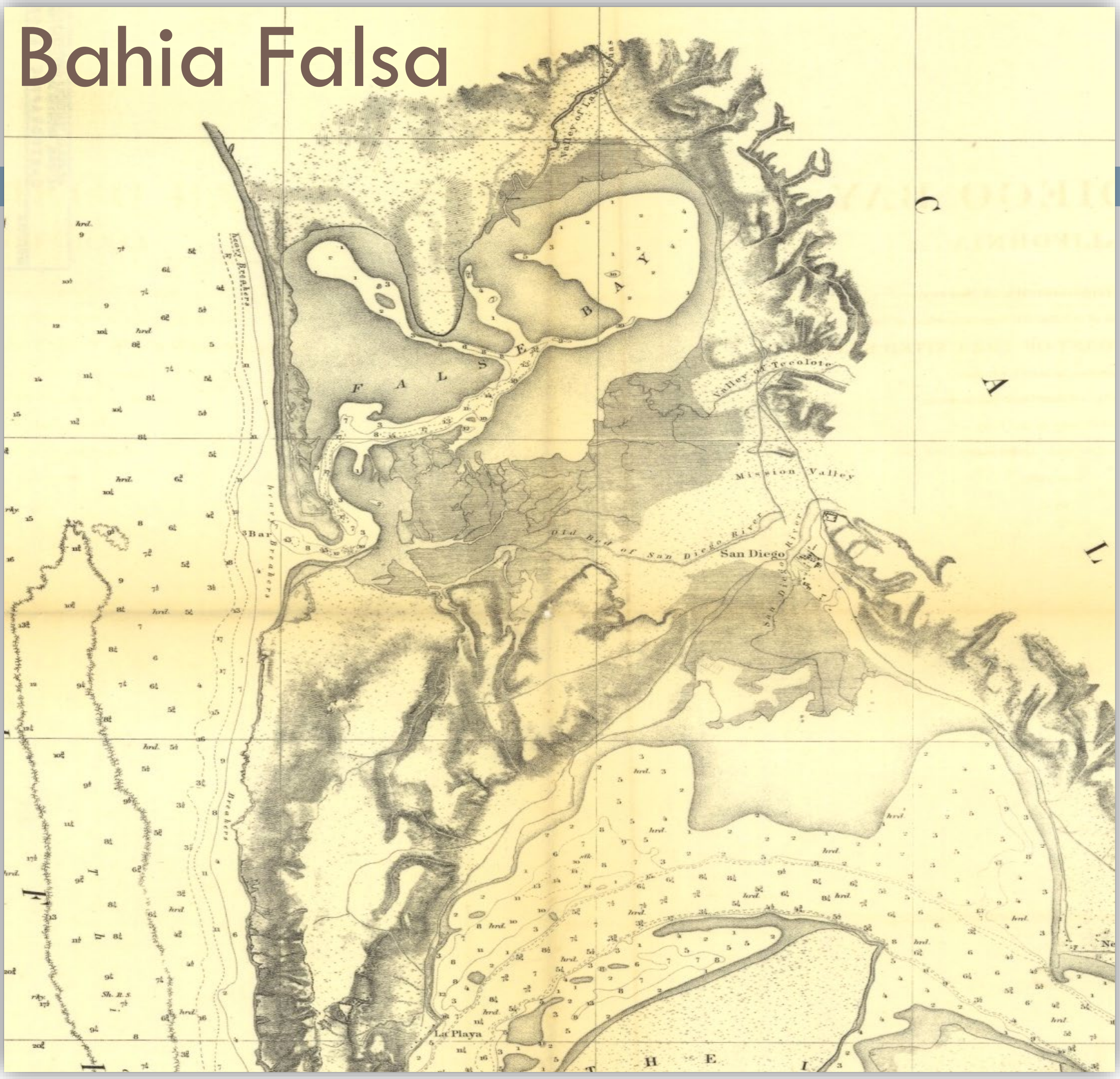
Decarbonizing Land Use and Promoting Natural Climate Solutions

Andrew Meyer
San Diego Audubon Society
Idea #2

11/3/22
Land Use and Natural Climate Solutions Working Group

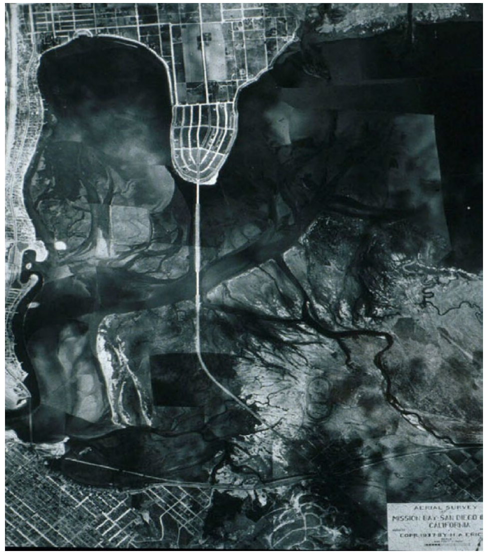
Andrew Meyer
San Diego Audubon Society

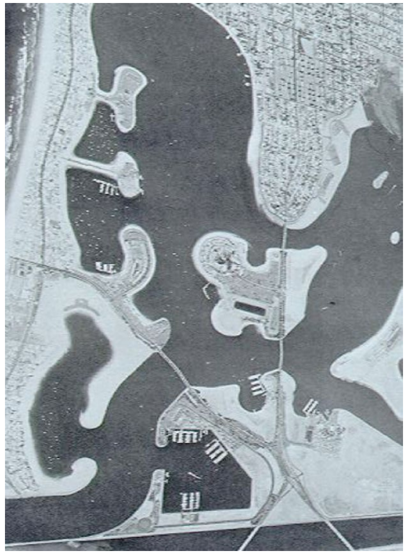
Before Bahia Falsa

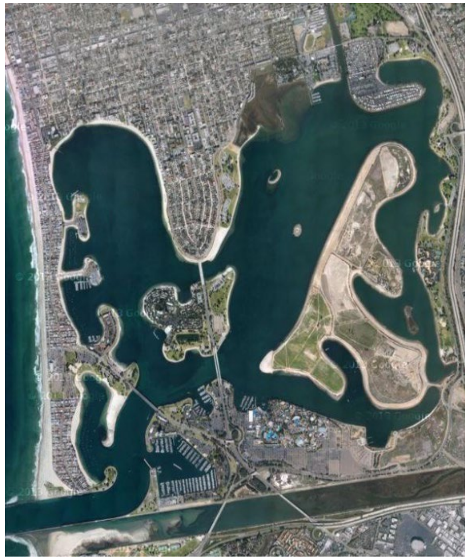


1857 Historical Survey Map of San Diego Bay and Mission (False) Bay (NOAA, 2016)

From Bahia Falsa to Mission Bay Park







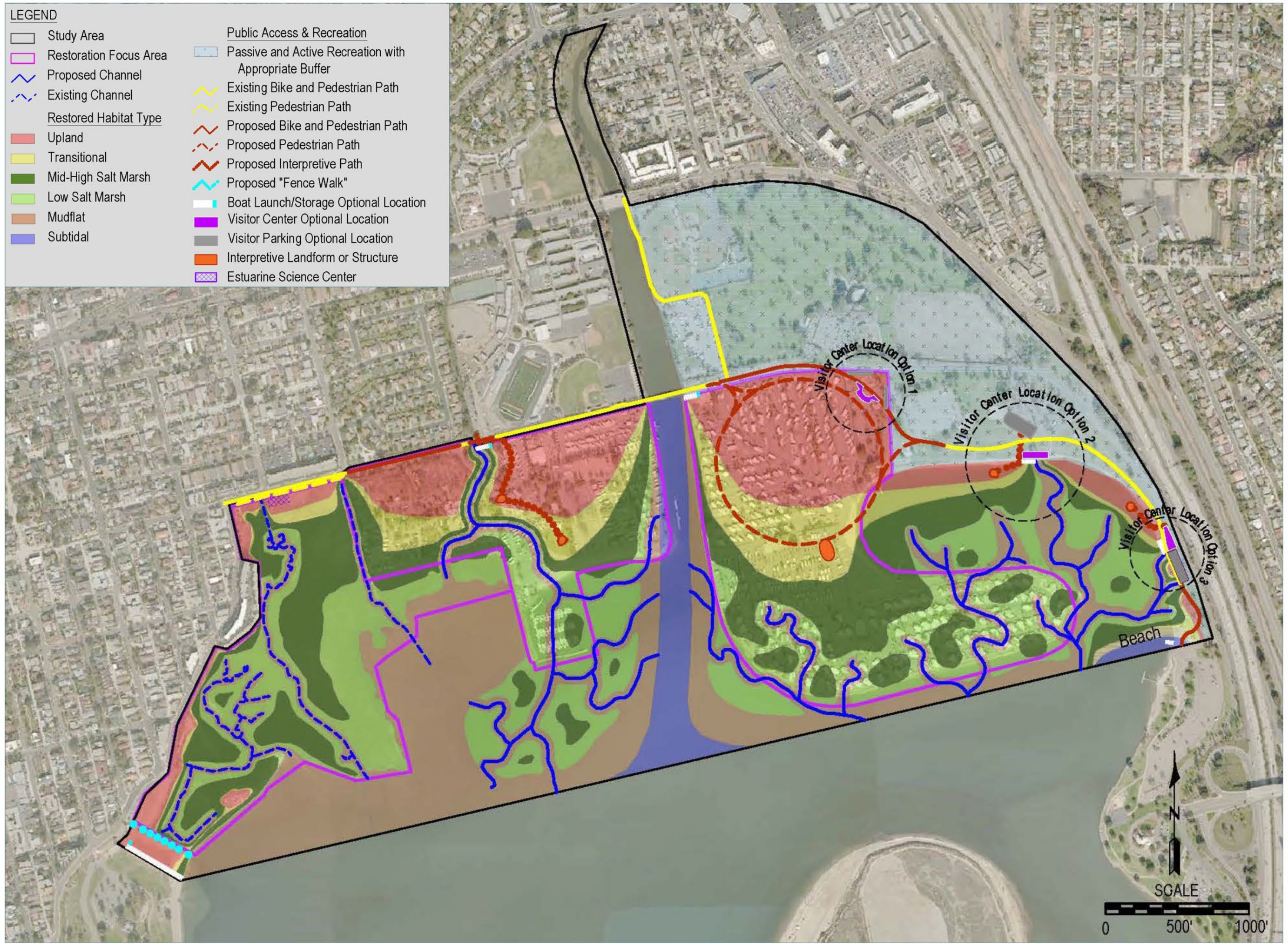
1937 **Late 1940s** **2021**

Photo: B. Struck

Photo: M. Stinnett

Photo: L. Hedlund

ALTERNATIVE 3: WILDEST

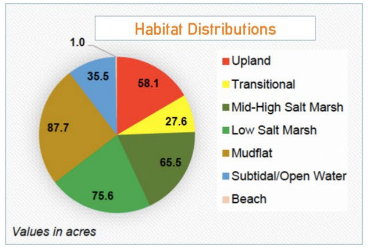


Highlights:

- 227 acres of wetlands* (75 acres by 2100 with 5.5 feet of sea level rise)
- 4,800 feet of trails

Key features:

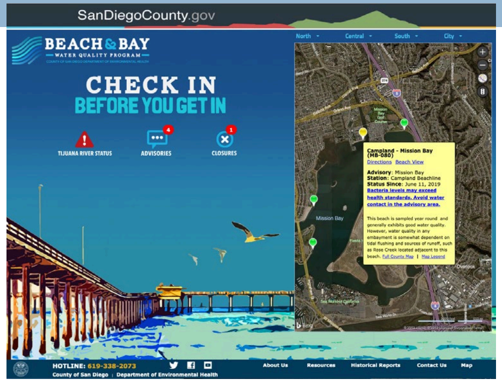
- Best alternatives for water quality improvements, sea level rise resiliency, habitat for wildlife, and access to nature
- Excavated fill added to open water to create mudflat, saltmarsh, transitional, and upland habitat
- No need for offsite disposal, with fewer impacts to traffic and air quality



*Using the Mission Bay Park Master Plan definition of "wetlands", meaning salt marsh, transitional, and upland habitats.

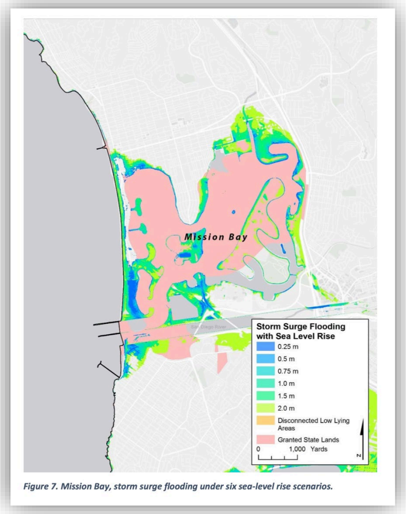
Benefits of Restoration

- Improve Water Quality



- Improve Equitable Access

- Sea Level Rise Resilience



City of San Diego State Lands Sea Level Rise Vulnerability Assessment, July 2019

Increase Our Resiliency

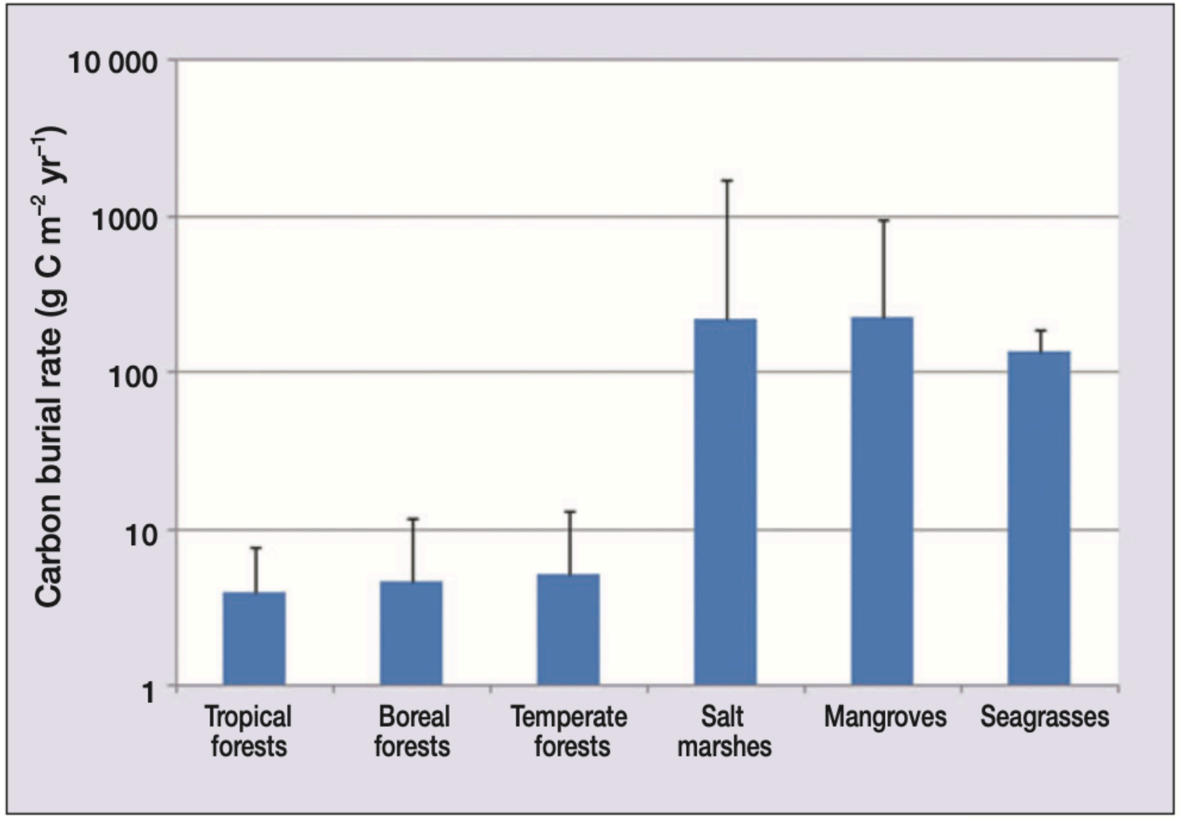
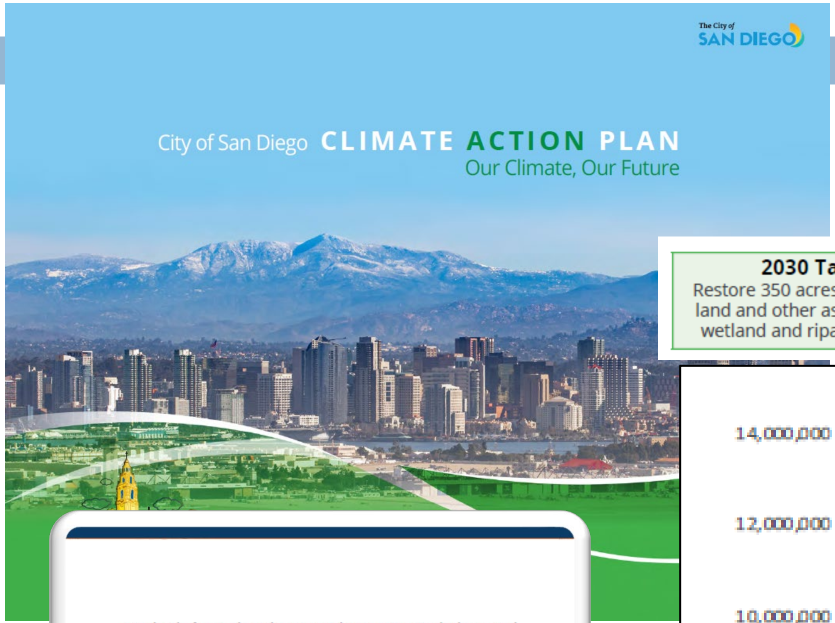
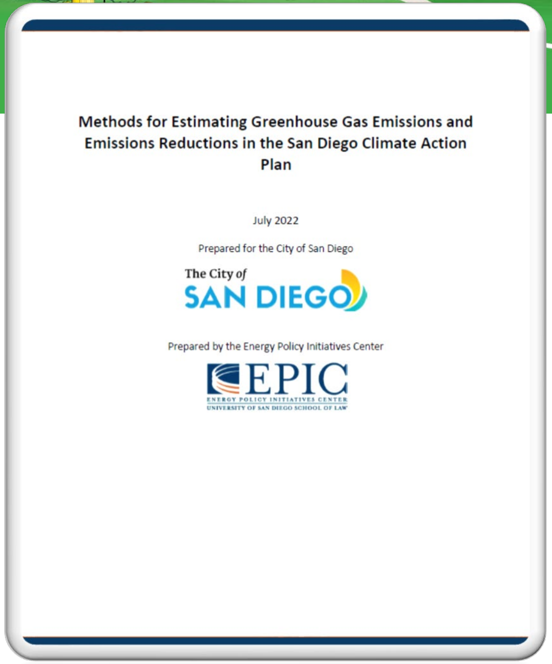


Figure 5. *Mean long-term rates of C sequestration (g C m^{-2} yr^{-1}) in soils in terrestrial forests and sediments in vegetated coastal ecosystems. Error bars indicate maximum rates of accumulation. Note the logarithmic scale of the y axis. Data sources are included in Tables 1 and 2.*

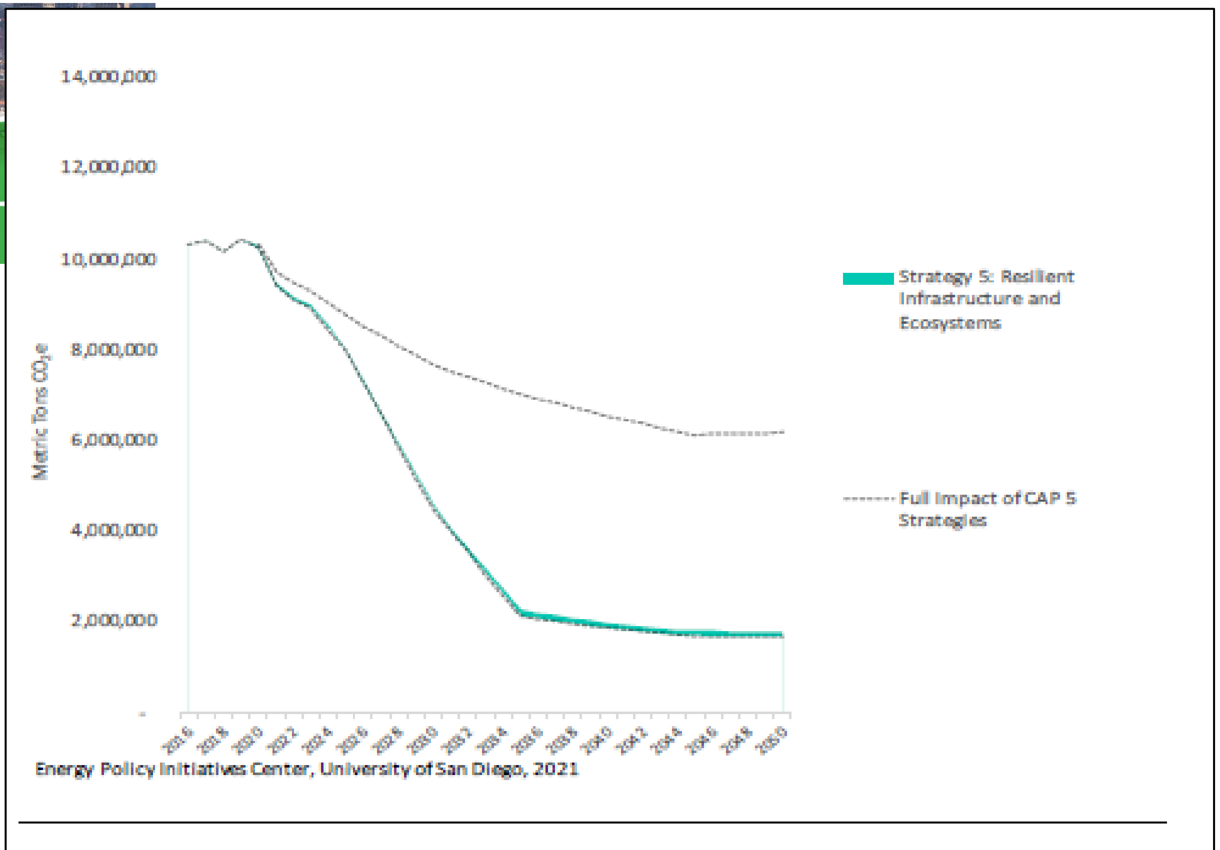
McLeod et al. 2011, A blueprint for blue carbon: toward an improved understanding of the role of vegetation coastal habitats in sequestering CO_2, Frontiers in Ecology and the Environment

Increase Our Resiliency





2030 Target	2030 GHG Reduction	2035 Target	2035 GHG Reduction
Restore 350 acres of salt marsh land and other associated tidal wetland and riparian habitats	(MT CO2e) 410	Restore 700 acres of salt marsh land and other associated tidal wetland and riparian habitats	(MT CO2e) 821



7.6.5.1 Measure 5.1 Carbon Sequestration through Restoration

The goal of Measure 5.1 is to restore salt marsh land in the City, 700 acres total by 2035. The carbon sequestration potential is based on the acreage of salt marsh and the carbon burial rate per acre.[78] Table 59 summarizes the key assumptions and results.

Table 59 Key Assumptions and Results for Measure 5.1 Carbon Sequestration through Restoration

Year	Salt Marsh Land Restored* (Acres)	Carbon Burial Rate** (MT CO_2 per acre)	Carbon Sequestration (MT CO_2)
2030	350	1.17	410
2035	700	1.17	821

*Assume the restoration starts in 2025 **Converted from 79 gram C per m^2 to MT CO_2 per acre
Callaway, et al. 2012, Energy Policy Initiatives Center, University of San Diego 2022

Estuary	Total Intertidal Habitat Area (ha)	Data Source	Habitat Type	Latitude	Longitude	Sample Data	C Stock (Mg/ha)	Seq Rate (Mg C/ha*yr)	Accretion Rate (mm/yr)	SLR Rate (mm/year)
Research in Preparation[i]										
		Costa (in prep.)	Salt marsh	32.83000	-117.23652	2020-21	229.108	8.102 (+/- 4.177)	4.468 (+/- 2.478)	
Mission Bay	16.19	Costa (in prep.)	Mudflat	32.79300	-117.22700	2020	151.527	0.349 (+/- 0.194)		
San Dieguito Lagoon	121.41	Costa (in prep.)	Salt marsh	32.97462	-117.25253	2020	60.029	1.800 (+/- 0.013)	14.057 (+/- 0.276)	
Famosa Slough	14.97	Costa (in prep.)	Salt marsh	32.75085	-117.22862	2021				2.2
Samples from Peer-Reviewed Literature[i]										
Tijuana Estuary	1011.72	Weis et al. (2001)	Salt marsh	32.56948	-117.13034	1998	239.174[ii]	5.123 (+/- 1.357)	9.517 (+/- 3.608)	
		Ward et al. (2021)	Seagrass bed	32.78952	-117.22600	2021[iii]	180.609[iv]			
Mission Bay	16.19	Ward et al. (2021)	Mudflat	32.78918	-117.22600	2021[iii]	259.727[iv]			2.2

Herrera 2022

Ou


Raise Your Voice NOT THE SEA LEVEL
CLIMATE CHANGE


© Surfgrass Productions

References

- City of San Diego, 2022; Climate Action Plan Our Climate Our Future. 238 pp.
- Herrera, 2022; Catching Carbon: A Blue Carbon Assessment of San Diego Wetlands for Equitable Climate Action Planning, UCSD/Scripps Institution of Oceanography Masters Thesis
- McLeod et al. 2011, A blueprint for blue carbon: toward an improved understanding of the role of vegetation coastal habitats in sequestering $C0_2$, Frontiers in Ecology and the Environment
- Southern California Wetlands Recovery Plan, 2018; Wetlands on the Edge, The Future of Southern California's Wetlands

Implementation Playbook: Level of Approach

Organizational Operations

Community

Region

Playbook Implementation Mechanisms

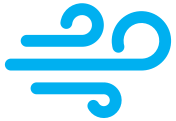
- Analysis/Research
- Capital Project
- Education
- Incentive
- Partner/Collaborate
- Plan
- Program
- Requirement/Policy

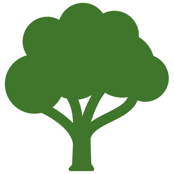
Playbook Criteria

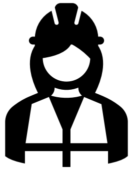
- GHG Reduction Potential
  - Relative GHG reduction compared to other actions
  - Some actions have no direct reduction (e.g., education)
    - Difficult to estimate GHG impact of an education webpage
    - Methods to estimate GHG impact of adding bike lanes
- Time to Complete
  - Relative time it would take to complete an action
  - Quicker to add a page to a website than to build bike lanes
- Cost to Implement
  - Relative cost to implement an action
  - Cheaper to add a page to a website than build bike lanes

Playbook Criteria

- Preliminary Estimates
  - “Average” of the category of actions
  - Not possible to comment on all potential actions
    - Education could be: page of a website or a TV commercials
  - Intended to provide initial screening for decision making
- Other Considerations
  - Co-benefits of actions (e.g., air pollution, environmental quality, and public health)
    - Primary concern of RDF is GHG emissions
  - Workforce and equity







Organization (more actions in the online document)

Land Use and Natural Climate Solutions				
Carbon Removal and Storage				
Activity	**Implementation Mechanism**	**Estimated Time to Complete**	**Estimated Potential GHG Impacts**	**Estimated Cost to Implement**
Develop a street tree inventory that identifies all trees in public rights-of-way (municipal operations)	Analysis/Research	3-5 yrs	N/A	L-M
Increase tree planting at facilities	Capital Project	3-5 yrs	L	M-H
Increase tree planting in public rights of way (municipal operations)	Capital Project	3-5 yrs	L	M-H
Implement and support polices outlined in Tree Policy Manual, including landscaping requirements for new municipal facilities, parking lots, and public rights-of-way (municipal facilities)	Capital Project	3-5 yrs	L	M-H
Manage parks, open space, and other natural areas to ensure long-term health and viability of trees and other vegetation	Capital Project	3-5 yrs	L	M-H
Install new street trees in street capital improvement projects, where feasible, and where redesign or reconstruction of the street is proposed (municipal operations)	Capital Project	0-2 yrs	L	M-H
Apply for recognition as "Tree City USA" and implement the program's requirements of forming a Tree Board consisting of staff members involved in managing the urban forest (municipal operations)	Education	0-2 yrs	N/A	L-M
Identify and secure grant or other funding to plant additional trees on municipal properties (municipal operations)	Education	0-2 yrs	N/A	L-M
Develop and implement a program to educate employees about the benefits of planting trees	Education	0-2 yrs	N/A	L-M
Develop and implement a program to provide financial incentives to employees to purchase and plant trees	Incentive	0-2 yrs	N/A	M-H
Develop an urban forest master plan (municipal operations)	Plan	3-5 yrs	N/A	L
Develop, adopt, and implement a tree protection and maintenance guidance plan for street trees (municipal operations)	Plan	3-5 yrs	N/A	L
Develop and implement an urban forestry policy to maintain the municipal tree inventory (municipal operations)	Requirement/Policy	5 yrs +	L	L
Develop a tree policy and associated manual (municipal operations)	Requirement/Policy	3-5 yrs	L	L
Develop turf management practices which specify the top-dressing of compost to increase carbon sequestration at relevant sites	Requirement/Policy	0-2 yrs	L	L

Community (more actions in the online document online document)

Land Use and Natural Climate Solutions				
Carbon Removal and Storage				
Activity	**Implementation Mechanism**	**Estimated Time to Complete**	**Estimated Potential GHG Impacts**	**Estimated Cost to Implement**
Conduct an analysis of tree cover to determine areas that need additional trees, with an emphasis on communities of concern	Analysis/Research	0-2 yrs	N/A	L-M
Conduct an inventory to assess tree cover (e.g.,. area covered, number of trees) in a local jurisdiction	Analysis/Research	0-2 yrs	N/A	L-M
Develop a process to track trees planted and replaced annually	Analysis/Research	0-2 yrs	N/A	L-M
Develop an urban forestry master plan or strategy	Plan	3-5 yrs	N/A	L
Develop/expand urban forestry program	Program	3-5 yrs	N/A	L
Hire an urban forest program manager (e.g., arborist)	Program	0-2 yrs	N/A	L
Implement a tree management program to optimize tree life	Program		N/A	L
Implement management practices to improve the health and function of natural and working lands	Requirement/Policy	3-5 yrs	L	L
Adopt an ordinance to require to require shade trees in parking lots	Requirement/Policy	0-2 yrs	L	L
Adopt an ordinance to require tree planting in new residential and non-residential development projects, including alterations and additions	Requirement/Policy	0-2 yrs	L	L
Develop a tree preservation or replanting ordinance intended to preserve large canopy shade trees	Requirement/Policy	0-2 yrs	L	L

Preserve Existing Carbon Stocks				
Activity	**Implementation Mechanism**	**Estimated Time to Complete**	**Estimated Potential GHG Impacts**	**Estimated Cost to Implement**
Conduct a communitywide analysis of land that could be conserved to determine potential for carbon removal and storage	Analysis/Research	0-2 yrs	N/A	L-M
Develop a program to acquire open space conservation land	Capital Project	3-5 yrs	L	M-H

37

Region (more actions in the online document)

Land Use and Natural Climate Solutions

Carbon Removal and Storage

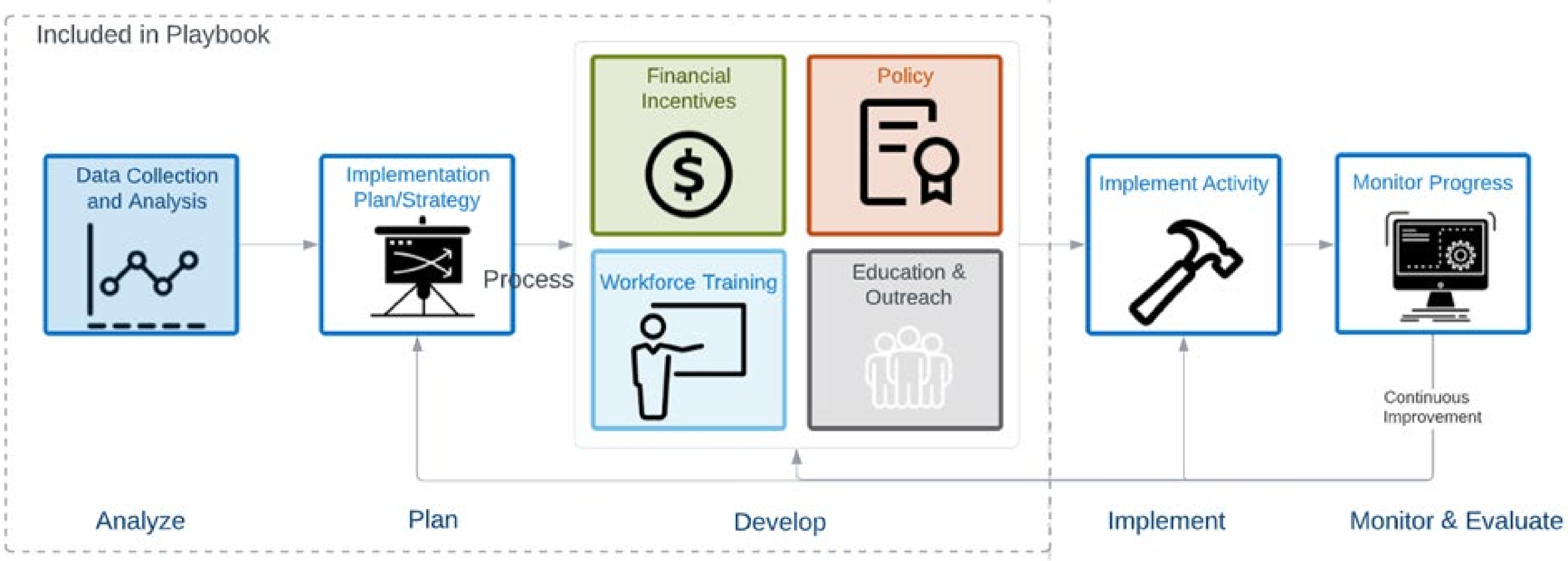
Activity	Implementation Mechanism	Estimated Time to Complete	Estimated Potential GHG Impacts	Estimated Cost to Implement
Complete a regional urban tree canopy assessment	Analysis/Research	3-5 yrs	N/A	L-M
Conduct an analysis of all natural and working lands (including coastal wetlands) in the region to determine the potential for carbon removal and storage	Analysis/Research	0-2 yrs	N/A	L-M
Conduct an analysis to determine the feasibility of implementing and potential GHG impacts of blue carbon strategies in the region	Analysis/Research	0-2 yrs	N/A	L-M

Preserve Existing Carbon Stocks

Activity	Implementation Mechanism	Estimated Time to Complete	Estimated Potential GHG Impacts	Estimated Cost to Implement
Conduct a regional analysis of land that could be conserved to determine potential for carbon removal and storage	Analysis/Research	0-2 yrs	N/A	L-M
Partner with SANDAG, other agencies, and local jurisdictions to identify opportunities for funding for acquisition and management of lands conserved for habitat protection and/or agricultural use	Partner/Collaborate	0-2 yrs	N/A	L
Locate new facilities in urbanized areas with existing infrastructure near public transit	Requirement/Policy	5 yrs +	L	L

What we need from you…

1. In your experience what has worked or not worked in terms of existing policies?
2. What programs could benefit underserved communities or have adverse impacts?
3. What are solutions that are not in the database?



Timeline

Also: Land Use and Natural Climate Solutions matrix of actions is on the Engage site for your feedback!

August 2022	December 2022	January 2023	Spring 2023
Board Update	**Draft Implementation Playbook & Policy Development**	**Regional Convenings & Public Review**	**Board Adoption**

PROGRAM DETAILS

- Public Workshop
- Completion of Technical Report & Workforce Development Reports
- Special Topic Working Groups
- Implementation Playbook 1st Draft Released
- Draft Sustainable Agriculture & Food Systems Policy Report
- Final Implementation Playbook

Implementation Playbook & Framework Adoption

County of San Diego

GETTING TO ZERO
SAN DIEGO COUNTY
REGIONAL DECARBONIZATION FRAMEWORK

Land Use and Natural Climate Solutions Working Group

November 3, 2022