



County of San Diego



GETTING TO  
**ZERO**

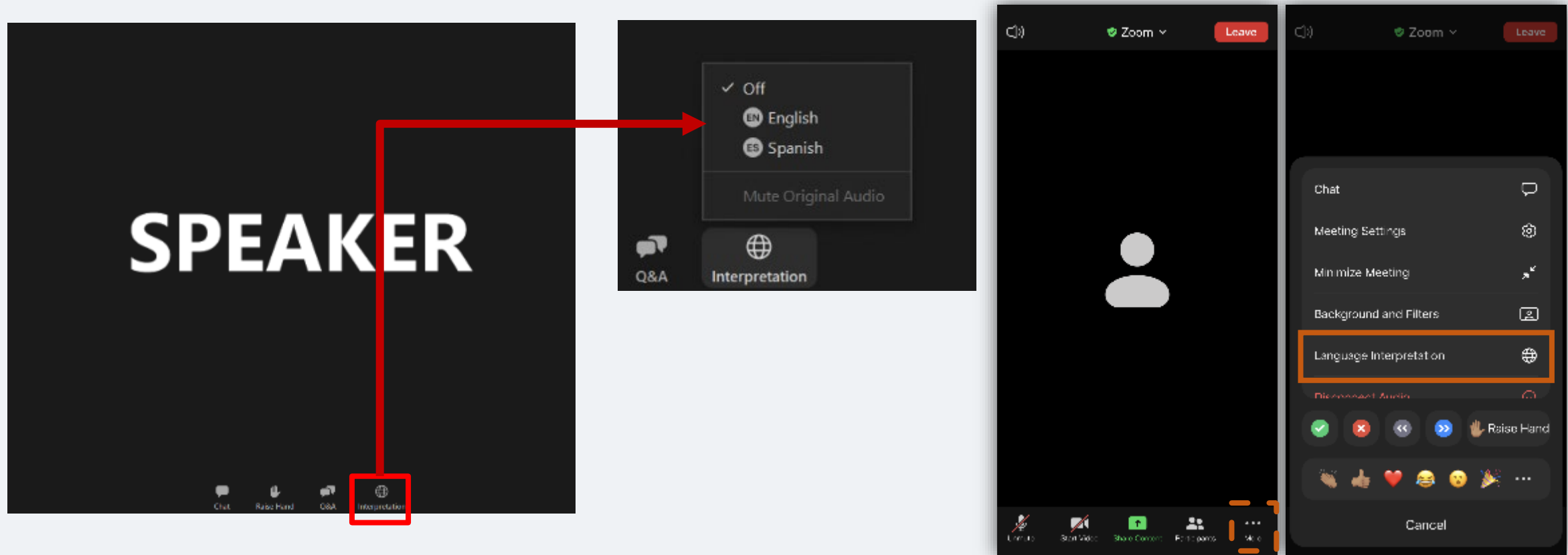
SAN DIEGO COUNTY  
REGIONAL DECARBONIZATION FRAMEWORK

# Electricity Working Group

Decarbonizing Electricity

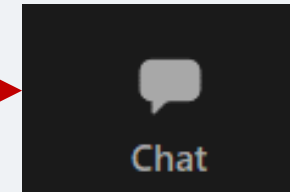
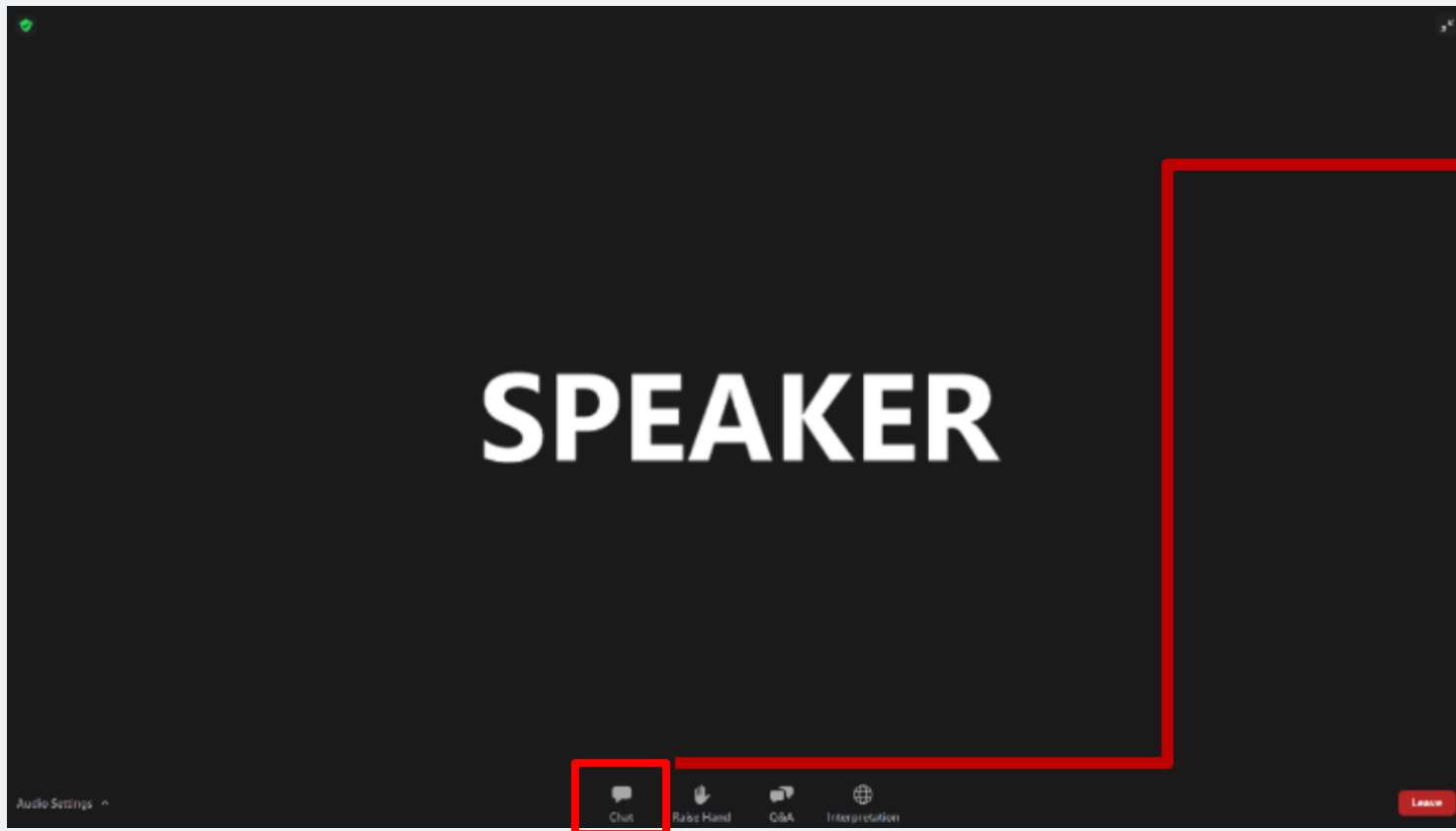
October 20, 2022

# 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)*

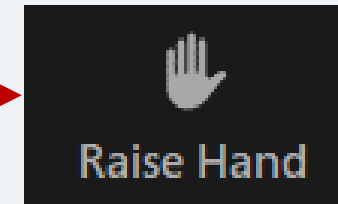
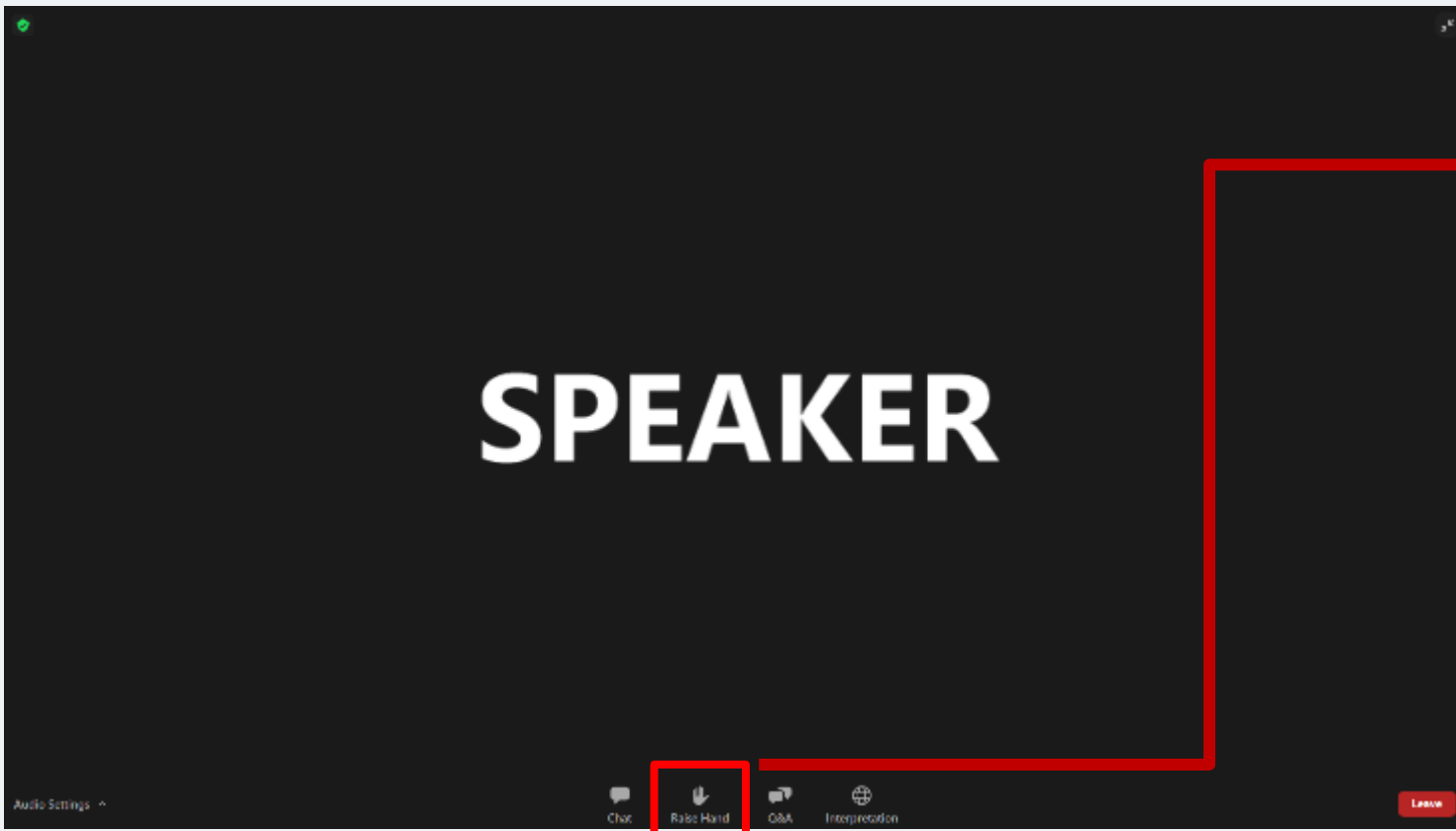
# How to use Zoom // *Cómo Usar Zoom*



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.*

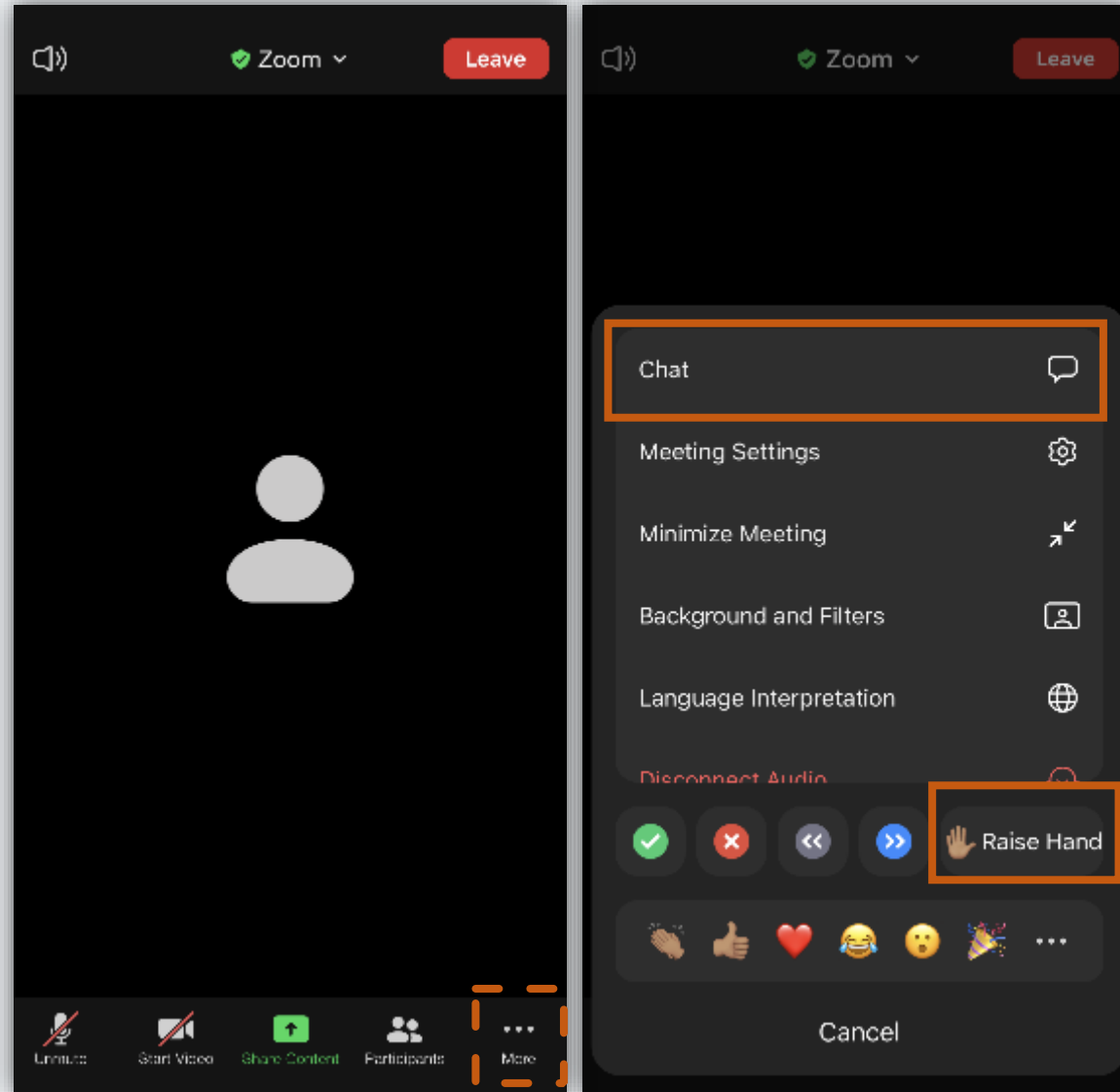
# How to use Zoom // *Cómo Usar Zoom*



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



# Today's Agenda

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- Welcome
- Stakeholder Presentations
  - Saeed Manshadi, San Diego State University and Facilitator Questions
  - Samantha Pate, San Diego Gas & Electric and Facilitator Questions
  - Sebastian Sarria, San Diego Community Power and Facilitator Questions
- Implementation Playbook & Actions Matrix
- Open Discussion
- Closing





# GETTING TO ZERO

SAN DIEGO COUNTY  
REGIONAL DECARBONIZATION FRAMEWORK

# Decarbonizing Electricity

Dr. Saeed Manshadi

San Diego State University

Idea #1



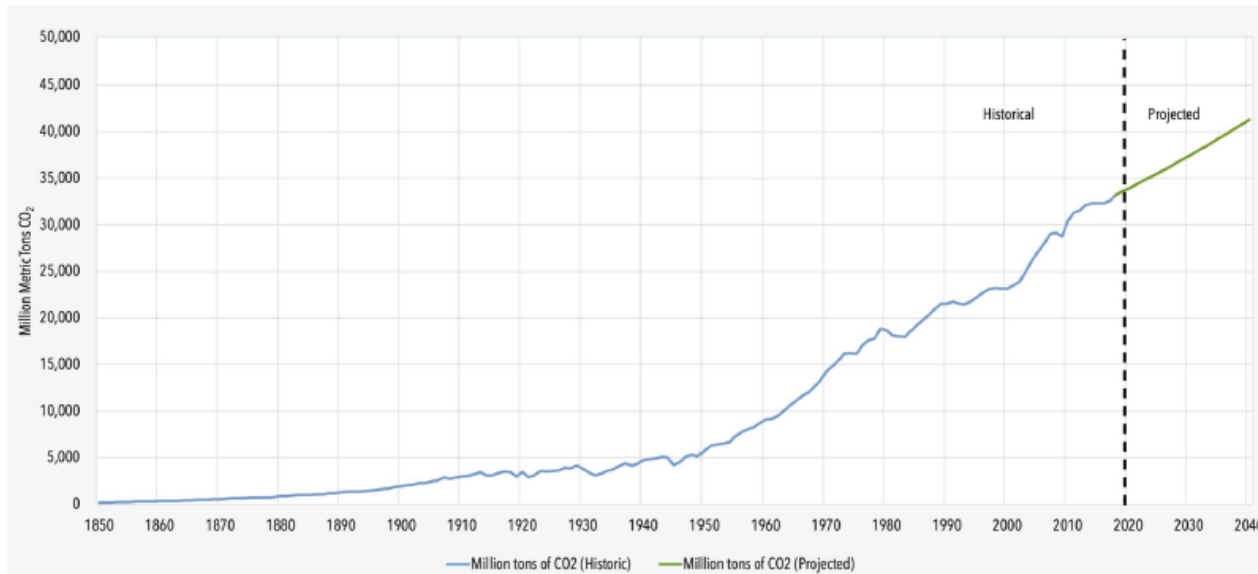
# County of San Diego Regional Decarbonization Framework - Electricity Workshop

Dr. Saeed Manshadi  
San Diego State University

10/20/2022

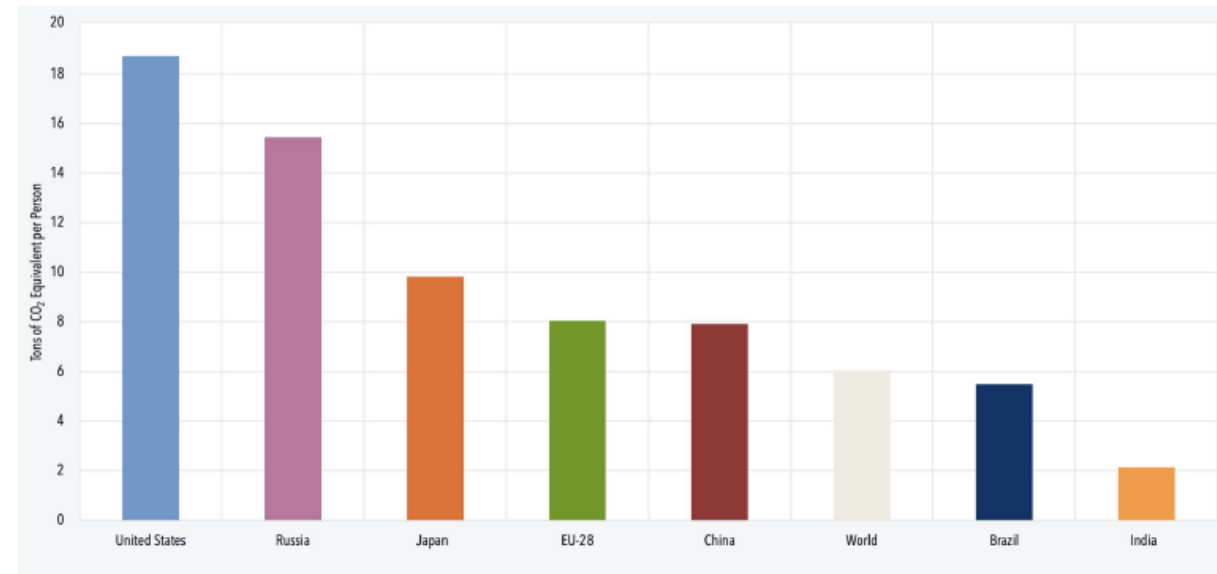
# CO2 Emissions Around the Globe

## Global CO2 Emission, 1850 - 2040



World Energy Outlook (International Energy Agency, 2019).

## Per Capita Greenhouse Gas Emissions, 2017

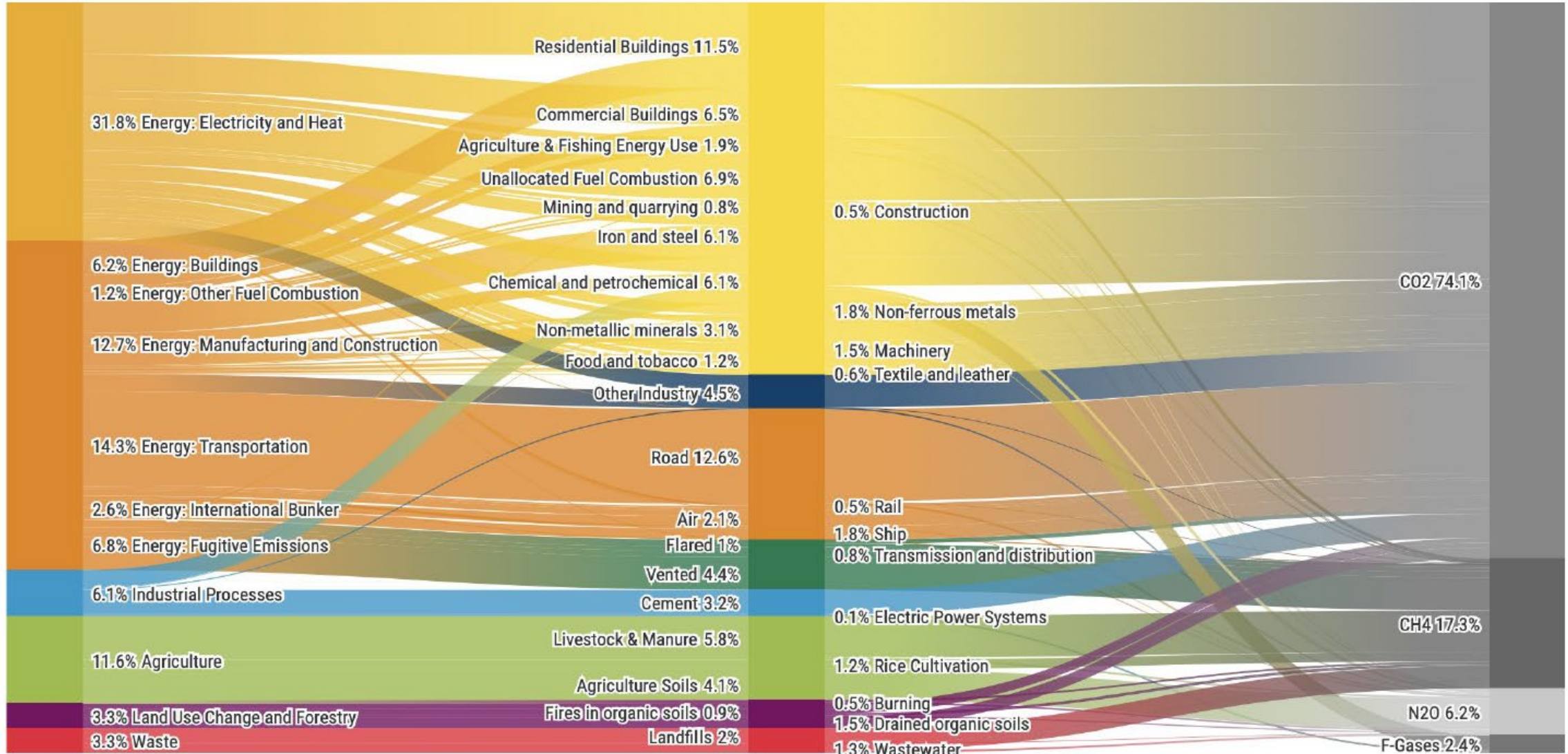


International Non CO2 Projections (Environmental Protection Agency, 2012)

\*San Diego County has a per capita less < 10 MT CO2-e

21' Carbon Footprint of the US Electricity Sector is

32%



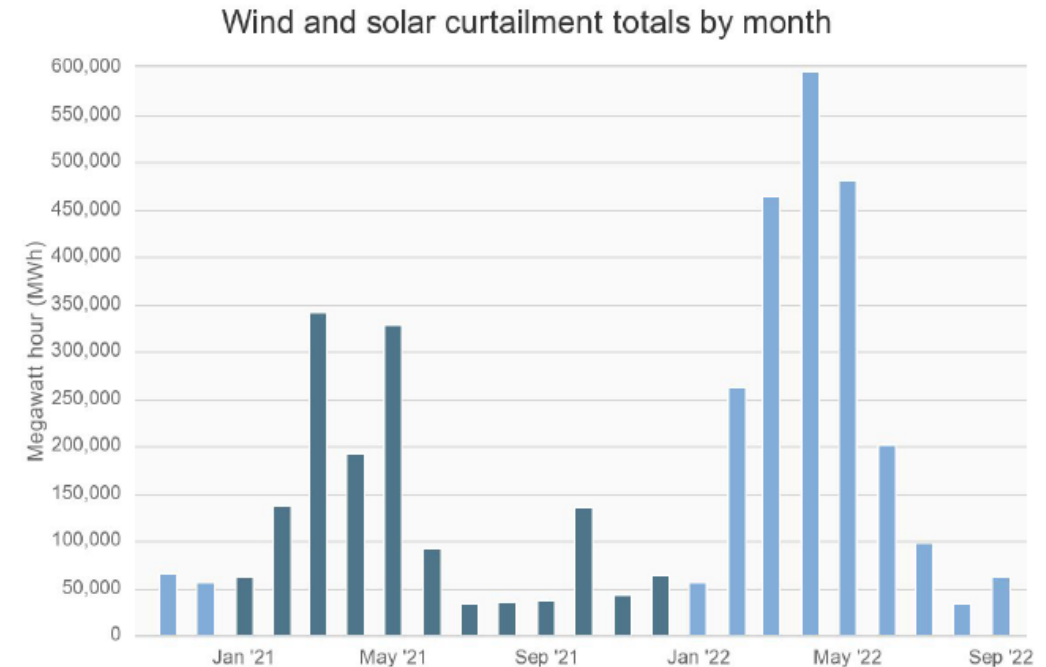
Climate Analysis Indicators Tool (World Resources Institute, 2019).

# Decarbonization Overview for the Electricity Sector

- **Generation Side**
  - Solar
    - Rooftop vs. Utility-Scale
      - Import vs. Local
    - Hosting Capacity
  - Wind
    - Import vs. Local
      - Urban concerns
    - Uncertainty
  - Energy Storage
    - Home storage vs. Utility-Scale
    - Vehicle-to-grid
  - Geothermal
    - Import from Imperial Valley
- **Demand Side**
  - **Dynamic Incentive Programs**
    - Carbon-aware vs. price-driven
  - **Time-of-Use**
    - Smart scheduling
  - **Net Energy Metering**
    - Market gap for retailers
    - Return on Investment
    - Adverse impact on ratepayers
  - **Transportation Electrification**
    - EV charging scheduling
  - **Service Continuity**
    - Public safety power shut off

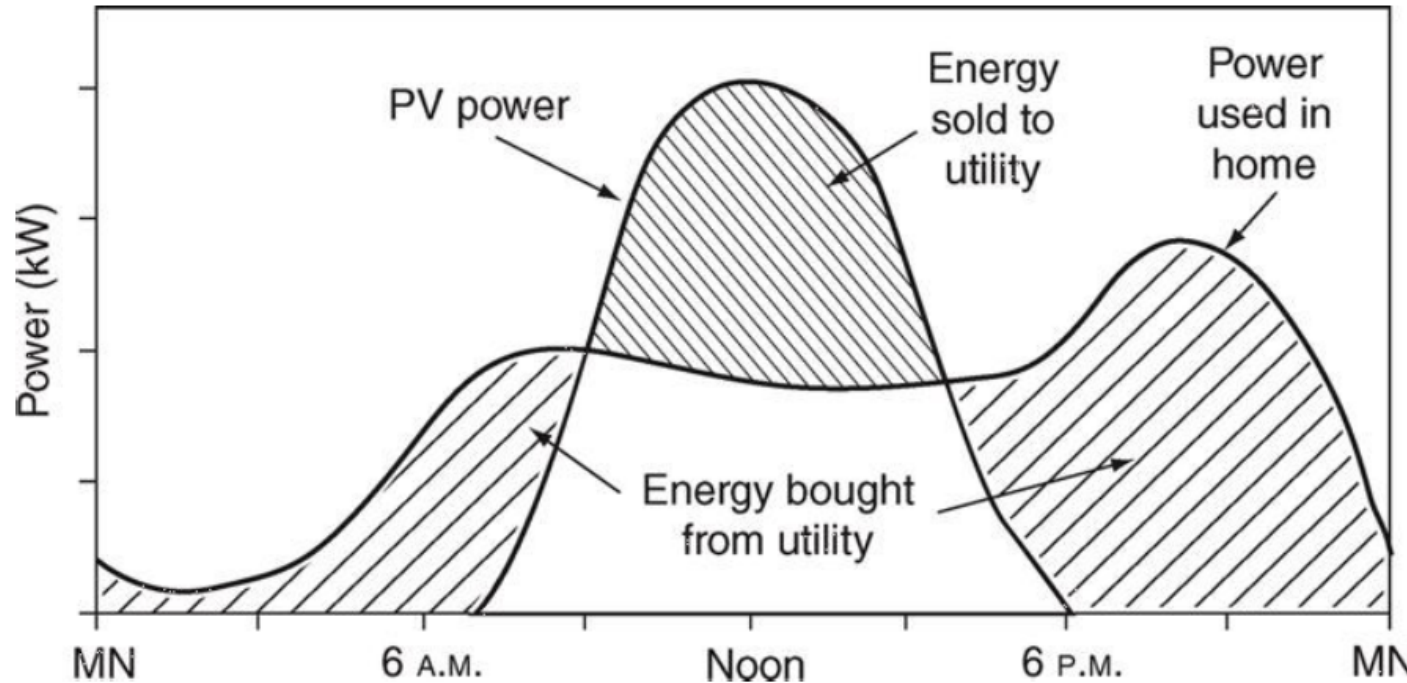
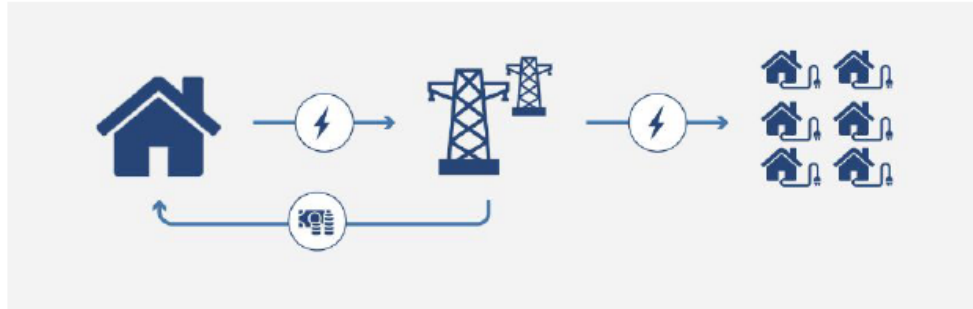
# The Need for Two 100 MW Clean Power Plants

- Which Renewable Energy Resources is the most feasible for SD?
  - Wind vs. Solar vs. others (e.g. geothermal)
- Utility-Scale
  - Local Community Concerns
  - Limited land availability
  - Third-party investment - PPAs
- Consumer owned Asset
  - Hosting Capacity limitations
  - Equality in access to financial resource
    - Delivering the promised ROI
- How to address oversupply?
  - The increasing trend in renewable curtailment
  - Negative Locational Marginal Pricing (LMP)



# Net Metering for Renewables

- Typical residential situation with a single meter
  - Meter runs backwards when PV power produced exceeds local usage



During the day, any excess power from the array is sold to the utility; at night, power is purchased from the utility.

# Storage to Enable Renewable Dispatchability

- The main issue with the current NEM
  - Treat the grid as an ultimate “magical storage”
    - Unbalanced purchase/sell translation from consumer perspective
    - SDG&E/SDCP may be forced to purchase electricity higher than wholesale prices
  - Calls for a quantified calculation on saving the infrastructure
    - Distribution network upgrades
  
- Concerns over control, longevity, safety, and cost for storage devices
  - Incentive to gain consumer confidence in storage installation
  - Plug-and-play solutions to enhance consumer experience
    - Optimize the charging/discharging cycles for extended life-span
    - Straightforward interactive interface to learn consumer’s preferences
  - Innovative solutions to aggregate assets for securing add-on benefits for storage/EV owners



# Efficient Alternatives for NEM - Hierarchical Market

- Transactive electricity market in the path toward decarbonization
  - Competition among resources to serve customers
    - Everyone *pays/get paid* for the exact *received/provided* service
    - No obligation for the utility to purchase electricity at a mandated price
    - Avoid unfair curtailments for consumers
- Impossible to allow direct participation of DERs in the wholesale market
  - Lack of technical infrastructure to provide access for small participants
  - Increase in the number of market participants
    - Huge computation burden
  - ISO requirements
    - Minimum capacity and financial obligations

→ A Hierarchical Market Structure with Local Transactive Market

- SDCP/ SDG&E are market makers enabling the transactive energy exchange



# Conclusions

- The path toward 100% decarbonization in the electricity sector calls for innovative solutions on the generation side **and** the demand side
- Incentivizing storage installation both on utility-scale and consumer level is critical to increase in renewable generation dispatchability
- Managing the renewable oversupply is becoming a more challenging task due to grid unpreparedness for a decarbonized grid on both transmission and distribution level
- Net Energy Metering should be revisited for high levels of renewable penetration level



# GETTING TO ZERO

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REGIONAL DECARBONIZATION FRAMEWORK

## Decarbonizing Electricity

Samantha Pate

San Diego Gas and Electric

Idea #2



# The Path to Net Zero

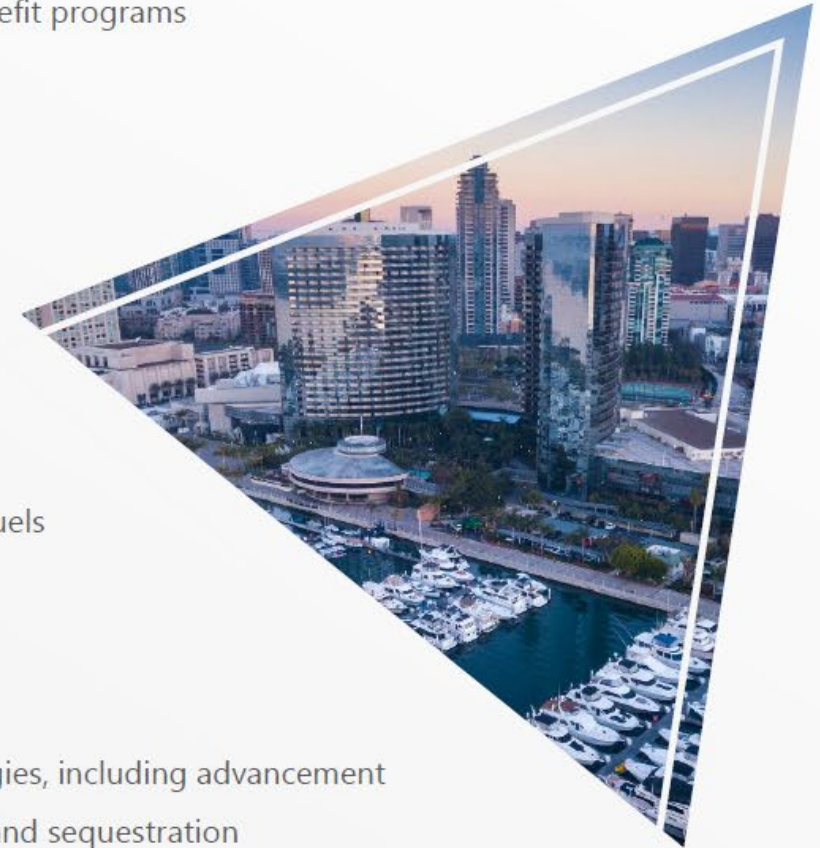
A DECARBONIZATION ROADMAP FOR CALIFORNIA



# POLICY & REGULATORY SUPPORT

The successful implementation of our Roadmap requires the following regulatory and political support:

- 1 Maintain Affordability and Enhance Equity**
  - Reform electric and gas rates and explore alternative funding and recovery mechanisms, including utilizing the state budget for funding state priorities, such as public purpose programs, net energy metering and other societal benefit programs
  - Pursue only the most cost-effective energy efficiency and demand response programs
  - Support low-income households so they can benefit from the clean energy transition
  - Support an equitable transition for affected workforces
- 2 Prioritize Electric System Reliability**
  - Incorporate more robust electric sector reliability into long-term state planning
  - Implement a regional transmission organization
- 3 Enable Deployment of Decarbonization Infrastructure**
  - Enable faster infrastructure development by updating planning efforts for clean electricity and clean fuels
  - Simplify and accelerate regulatory reviews
  - Centrally authorize land use for decarbonization technologies
- 4 Incentivize Innovation and Adaptability**
  - Encourage research, development and demonstration efforts for emerging decarbonization technologies, including advancement of clean hydrogen infrastructure, and developing the policy framework to encourage carbon capture and sequestration





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REGIONAL DECARBONIZATION FRAMEWORK

## Decarbonizing Electricity

Sebastian Sarria

San Diego Community Power

Idea #3



# Community Solar Access Programs

Sebastian Sarria, Policy Manager



# Background

- Assembly Bill 327 (Perea, 2013) directed the CPUC to design alternatives for increased adoption of renewables in disadvantaged communities.
- In 2018, the CPUC created the Disadvantaged Communities Green Tariff (DAC-GT) and Community Solar Green Tariff (CSGT) programs for IOUs and CCAs. This was done via D. 18-06-027 and Resolution E-4999.
- IOUs and CCAs submitted implementation plans to become program administrators via megawatt allocation that they were given. SDCP was not in existence at the time.





# Summary of Programs

|                       | DAC-GT  | CSGT  |
|-----------------------|---|---|
| Eligible Customers:   | CARE/FERA eligible, residential DAC customers   | Residential DAC customers:<br>1) $\geq 50\%$ CARE/FERA eligible<br>2) Remainder to non-income qualified                         |
| Customers receive:    | 100% renewable energy<br>20% off OAT  | 100% renewable energy<br>20% off OAT  |
| Project location:     | In DACs   | In DACs & within 5 miles of DAC(s) where subscribing customers reside   |
| Project size:         | 500 kw – 200 MW   | No minimum – 3 MW   |
| Community sponsor(s): | N/A   | Required, can subscribe to $\leq 25\%$ of project's capacity & receive 20% discount on that subscribed amount                   |
| Cost cap:             | $\leq 200\%$ of max executed contract price in previous PV/RAM as available peaking or GT program | $\leq 200\%$ of max executed contract price in previous PV/RAM as available peaking or GT program                               |
| RFO bids:             | See above.  | Sponsor letter, workforce development required for all projects, prioritize top 5% DACs, projects with other government funding |

# Next Steps

- SDCP separately filed for its allocation request, based on the number of DAC residential customers living within its service territory.
- On October 12, 2022, SDCP filed its implementation advice letter to become a program administrator.
- Approval is expected in the new year, at which point implementation of the program will begin.
- Since new build resources are needed for the program, we anticipate customers to be enrolled in 2025.



# Implementation Playbook: Level of Approach



**Organizational  
Operations**



**Community**



**Region**

# Playbook Implementation Mechanisms

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- 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

| Decarbonize Electric Supply  |                                     |                            |                                 |                             |
|--|-------------------------------------|----------------------------|---------------------------------|-----------------------------|
| Customer Side Supply   |                                     |                            |                                 |                             |
| Activity   | Implementation Mechanism            | Estimated Time to Complete | Estimated Potential GHG Impacts | Estimated Cost to Implement |
| Complete an analysis to identify and evaluate opportunities to install renewable energy generation and energy storage projects at facilities and sites | Analysis                            | 0-2 yrs                    | N/A                             | L                           |
| Evaluate potential for microgrids at facilities and sites  | Analysis                            | 0-2 yrs                    | N/A                             | L                           |
| Install renewable generation and energy storage projects at facilities and sites   | Capital Project                     | 3-5 yrs                    | M                               | H                           |
| Identify and pursue available funding sources for the construction of renewable energy and energy storage projects at facilities and sites             | Education, Outreach, & Coordination | 3-5 yrs                    | N/A                             | L                           |
| Develop an education programs to raise awareness among employees of incentives and financing programs for rooftop solar and energy storage             | Education, Outreach, & Coordination | 0-2 yrs                    | N/A                             | L                           |
| Develop an program to provide financial incentives to municipal employees to install or procure renewable generation and energy storage                | Incentive                           | 0-2 yrs                    | L                               | M                           |
| Develop a net zero emissions strategy for facilities and sites   | Plan                                | 0-2 yrs                    | N/A                             | L                           |
| Develop a plan to install or procure renewable generation and energy storage at facilities and sites   | Plan                                | 0-2 yrs                    | N/A                             | L                           |
| Develop a policy to require all new facilities and sites to include onsite renewable electricity generation  | Requirement/Policy                  | 0-2 yrs                    | L                               | M                           |
| Grid Supply  |                                     |                            |                                 |                             |
| Adopt a policy to purchase 100% carbon-free electricity service plan (e.g., opt up to 100% plan)   | Requirement/Policy                  | 0-2 yrs                    | H                               | L                           |
| Purchase electricity from a community choice aggregation program   | Requirement/Policy                  | 0-2 yrs                    | H                               | L                           |

# Community

| Decarbonize Electric Supply   |                                     |                            |                                 |                             |
|---|-------------------------------------|----------------------------|---------------------------------|-----------------------------|
| Customer Side Supply  |                                     |                            |                                 |                             |
| Activity  | Implementation Mechanism            | Estimated Time to Complete | Estimated Potential GHG Impacts | Estimated Cost to Implement |
| Complete an analysis to evaluate options to provide incentives for projects that include energy storage, particularly in communities of concern                                       | Analysis                            | 3-5 yrs                    | N/A                             | L                           |
| Complete an analysis to determine the role of energy storage and solar PV to increase community resilience, including in communities of concern                                       | Analysis                            | 0-2 yrs                    | N/A                             | L                           |
| Complete an analysis of solar PV installations in the region to determine how to increase projects in communities of concern  | Analysis                            | 0-2 yrs                    | N/A                             | L                           |
| Monitor state policies related to solar PV installations (e.g., NEM 3.0)  | Education, Outreach, & Coordination | 3-5 yrs                    | N/A                             | L                           |
| Partner with SDG&E and CCAs to develop an educational program to raise awareness about clean distributed electricity generation and energy storage options, incentives, and financing | Education, Outreach, & Coordination | 0-2 yrs                    | N/A                             | L                           |
| Develop a program to provide incentives for residential and nonresidential solar PV projects, including for multi-family buildings and projects in communities of concern             | Incentive                           | 3-5 yrs                    | L                               | M                           |
| Increase financing options for customer side renewable generation and energy storage projects   | Incentive                           | 0-2 yrs                    | N/A                             | L                           |
| Adopt a policy to waive or expedite permitting requirements for projects with renewable generation and energy storage   | Incentive                           | 0-2 yrs                    | N/A                             | L                           |
| Develop a method to estimate GHG impacts of renewable and zero-carbon electricity actions that accounts for hourly emissions rates  | Analysis                            | 0-2 yrs                    | N/A                             | L                           |
| Adopt an ordinance to require solar PV in non-residential alterations and additions   | Requirement/Policy                  | 0-2 yrs                    | N/A                             | L                           |

| Grid Supply   |                                     |         |     |   |
|---|-------------------------------------|---------|-----|---|
| Complete an analysis to determine feasibility of and identify opportunities to install solar projects on reservoirs and water channels  | Analysis                            | 0-2 yrs | N/A | L |
| Complete an analysis, including communities of concern, to identify opportunities for community solar projects  | Analysis                            | 0-2 yrs | N/A | L |
| Encourage residents and business to opt-up to 100% renewable or carbon-free service options   | Education, Outreach, & Coordination | 0-2 yrs | N/A | L |
| Develop a program to increase use of 100% renewable or carbon-free service options in communities of concern (e.g., DAC Green Tariff Program and opting up CARE/FERA customers to 100% options) | Incentive                           | 0-2 yrs | N/A | M |
| Join a community choice aggregation program   | Program                             | 0-2 yrs | H   | M |
| Adopt a policy to make 100% renewable or carbon-free service options the communitywide default  | Requirement/Policy                  | 0-2 yrs | H   | L |
| Adopt a policy to commit to achieving 100% carbon-free electric supply before statutory targets   | Requirement/Policy                  | 0-2 yrs | M   | L |

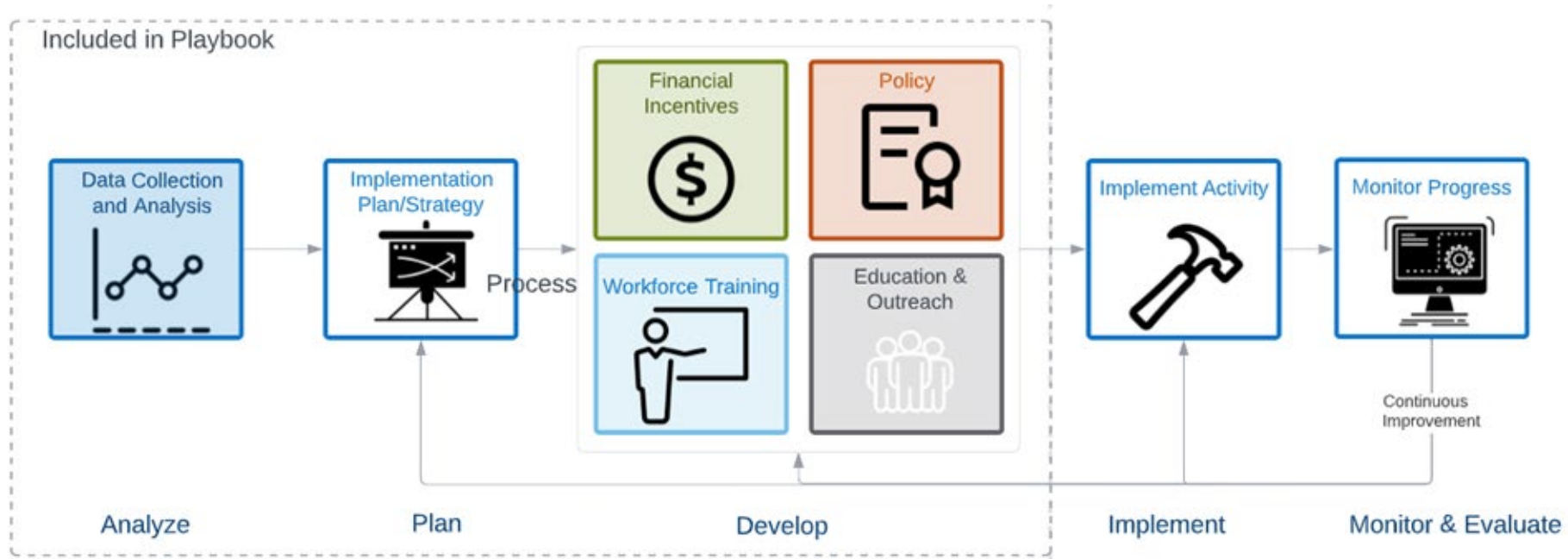


# Region

| Decarbonize Electric Supply   |                          |                            |                                 |                             |
|---|--------------------------|----------------------------|---------------------------------|-----------------------------|
| Customer Side Supply  |                          |                            |                                 |                             |
| Activity  | Implementation Mechanism | Estimated Time to Complete | Estimated Potential GHG Impacts | Estimated Cost to Implement |
| Complete an analysis of equity and other indicators related to renewable electricity to determine whether there are any implications for social equity  | Analysis                 | 0-2 yrs                    | N/A                             | L                           |
| Develop programs to encourage use and generation of clean electricity (e.g., by CCA), with a focus on renters and residents in communities of concern   | Incentive                | 0-2 yrs                    | H                               | M                           |
| Develop a method to estimate GHG impacts that accounts for hourly emissions rates   | Analysis                 | 0-2 yrs                    | N/A                             | L                           |
| Grid Supply   |                          |                            |                                 |                             |
| Complete a regional analysis, including communities of concern, to identify the feasibility and need for microgrids, energy storage, and other equipment to of enhance electricity resilience | Analysis                 | 0-2 yrs                    | N/A                             | L                           |
| Complete a regional analysis, including communities of concern, to identify opportunities for community solar projects  | Analysis                 | 0-2 yrs                    | N/A                             | L                           |

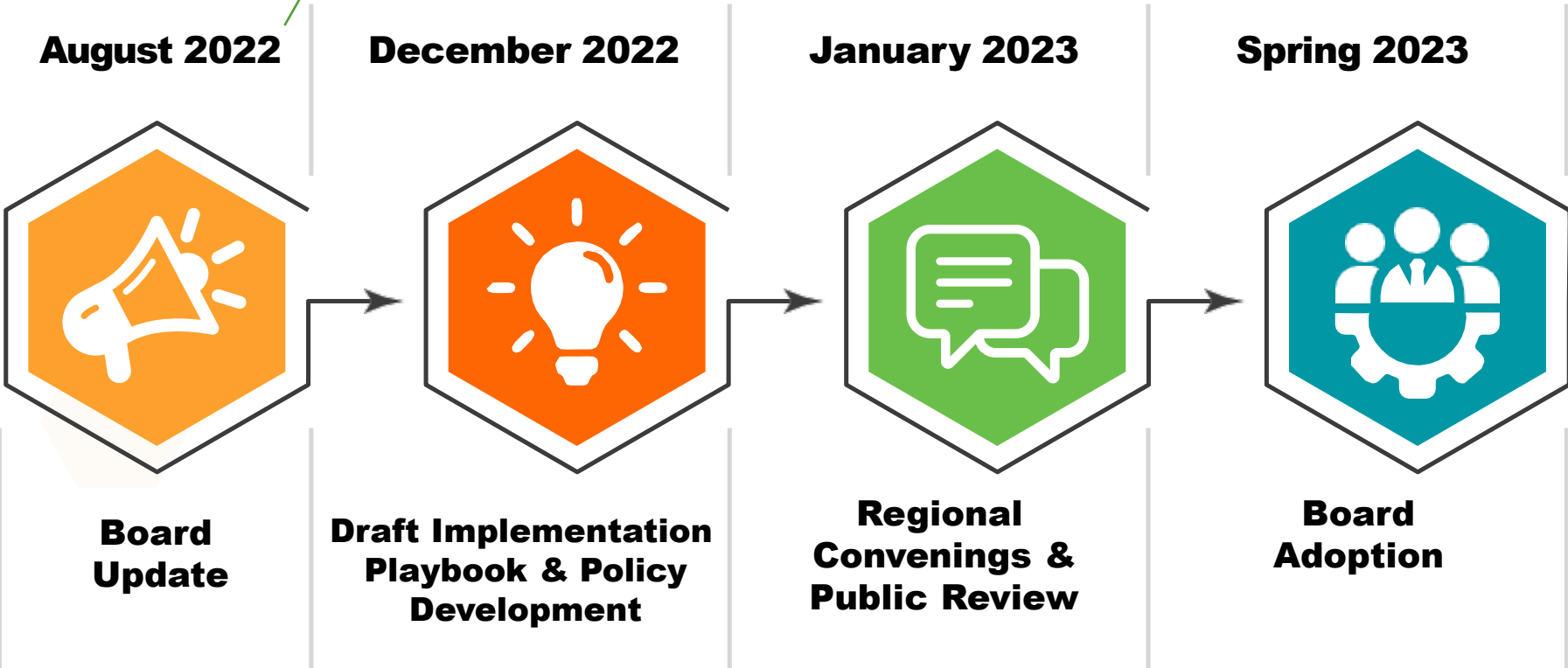
# What we need from you...

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: Electricity matrix of actions is on the Engage site for your feedback!



**PROGRAM DETAILS**

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

**Implementation Playbook & Framework Adoption**



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October 20, 2022