DOCKETED	
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Project Title:	Business Meeting Agendas, Transcripts, Minutes, and Public Comments
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Document Title:	March 17 2021 Business Meeting Presentation
Description:	N/A
Filer:	Dorothy Murimi
Organization:	California Energy Commission
Submitter Role:	Public Advisor
Submission Date:	3/17/2021 8:39:41 AM
Docketed Date:	3/17/2021

California Energy Commission
Business Meeting
March 17, 2021
10:00 a.m.

Pledge of Allegiance

Keep California Healthy

MyTurn.ca.gov

Sign up to get notified when it's your turn to get the COVID-19 vaccine.

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For remote participation instructions visit **CEC's Business Meetings webpage:**

https://www.energy.ca.gov/proceedings/business-meetings

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- **Dial: (669) 900-6833**
- **Meeting ID: 938-6923-0237**

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- **Dial: (888) 823-5065**
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- Comments may be limited:
  - **to 3 minutes** or less
  - **1 representative** per organization

- Any person wishing to comment on information items or reports (non-voting items) shall reserve their comment for the general public comment portion of the meeting agenda.

To comment, dial (888) 823-5065.

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1) Tell Operator: name, organization and item number.
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   - tribal nation or California tribal government;
   - state agency; or
   - county/city government.
3) Spell your first and last name.
4) Do not use speaker phone when talking.
5) Mute Zoom while calling to comment.

Item 1a. – g.: Consent Calendar

a. **MIDWAY SUNSET COGENERATION PROJECT (85-AFC-03C)** Contact: Mary Dyas.
b. **SOUTHERN CALIFORNIA PUBLIC POWER AUTHORITY (21-EPS-01)** Contact: Michael Nyberg.
c. **SOUTHERN CALIFORNIA PUBLIC POWER AUTHORITY (21-EPS-01)** Contact: Michael Nyberg.
d. **RCAM TECHNOLOGIES, INC.** Contact: Rizaldo Aldas.
e. **RCAM TECHNOLOGIES, INC.** Contact: Rizaldo Aldas.
f. **THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION INC.** Contact: Sharon Purewal.
g. **CENTER FOR HYDROGEN SAFETY.** Contact: Sebastian Serrato.

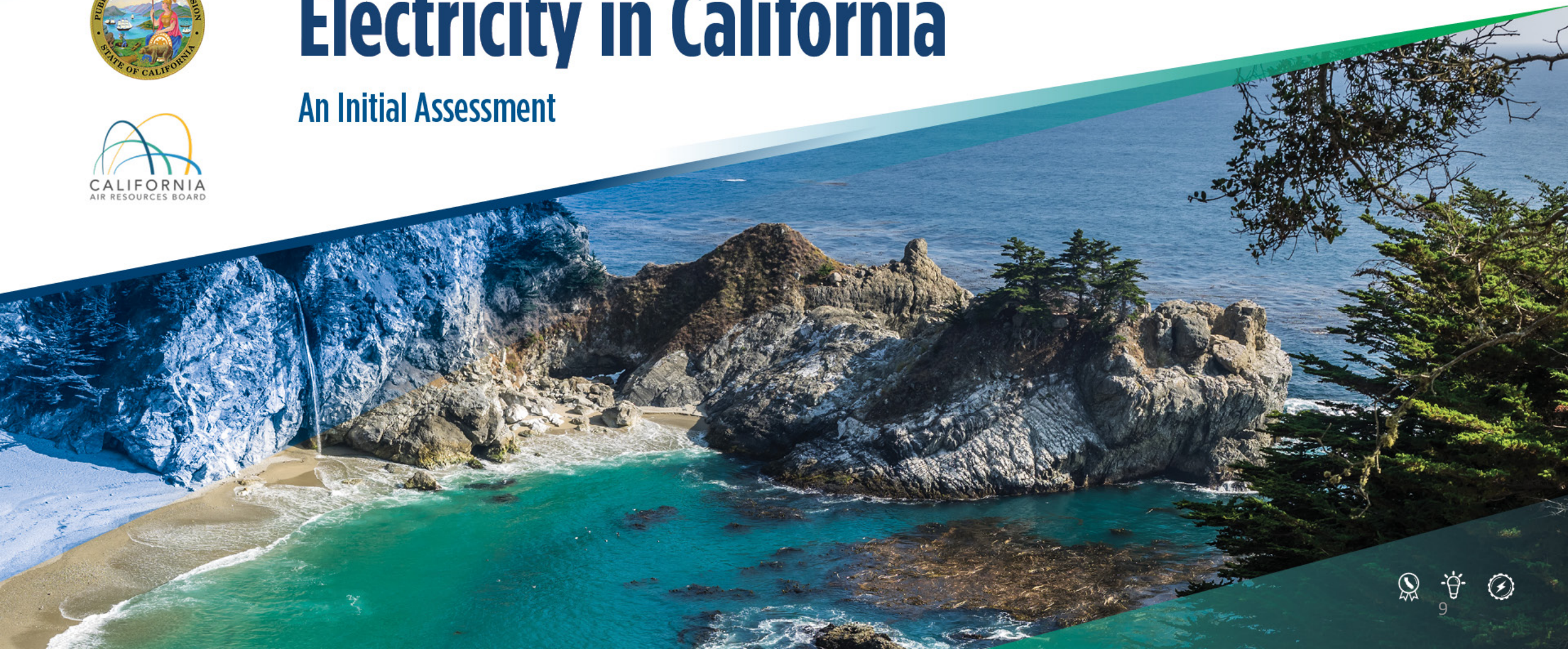
Item 2: SB 100 Joint Agency Report

March 17, 2021 Business Meeting

2021 SB 100 Joint Agency Report Summary

Achieving 100% Clean Electricity in California

An Initial Assessment



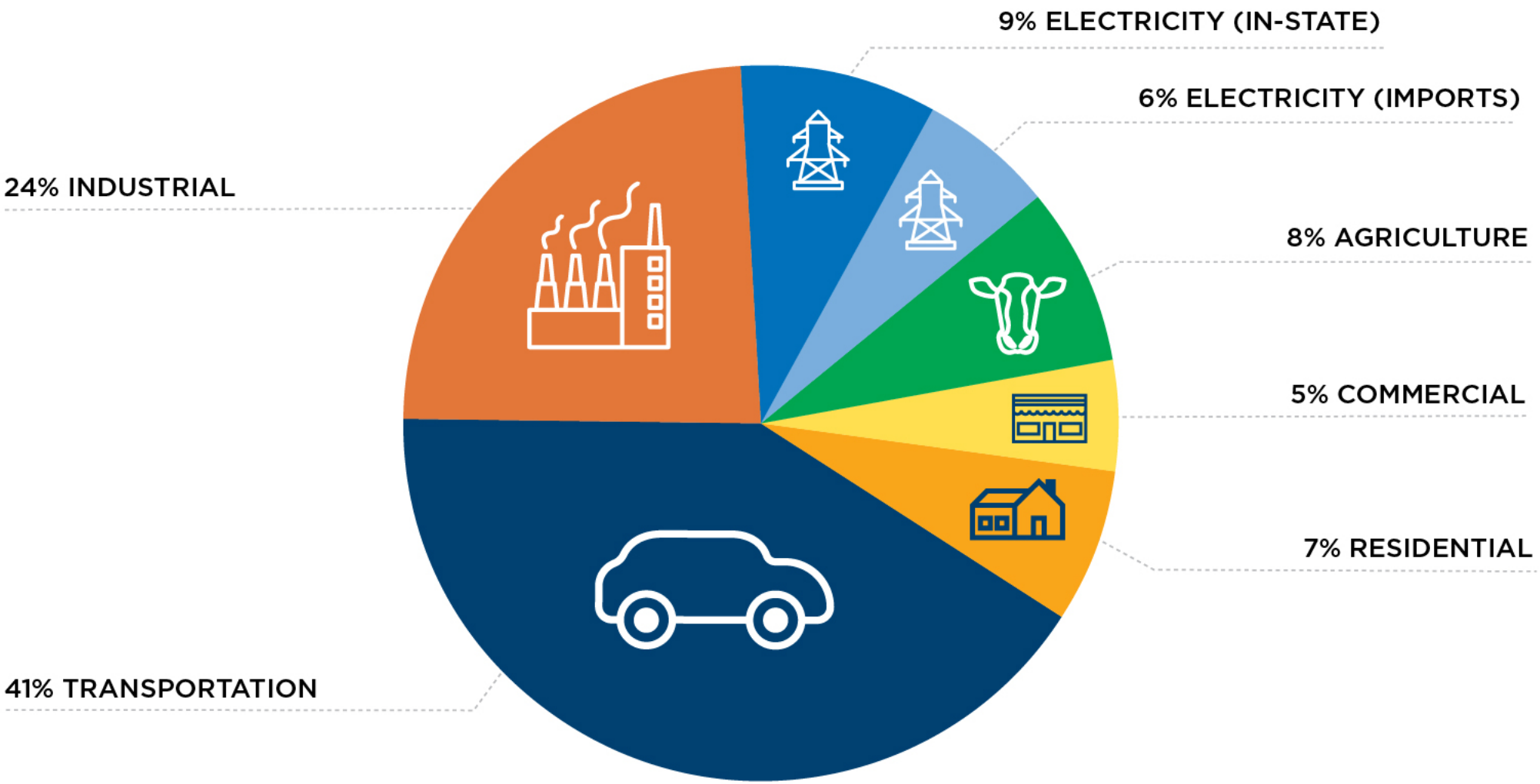
Senate Bill 100

Officially titled “The 100 Percent Clean Energy Act of 2018,” Senate Bill 100 (SB 100, De León):

1. Sets a 2045 goal of powering all retail electricity sold in California and state agency electricity needs with renewable and zero-carbon resources.
2. Updates the state’s Renewables Portfolio Standard to ensure that by 2030 at least 60 percent of California’s electricity is renewable.
3. Requires the CEC, CPUC, and CARB to use programs under existing laws to achieve 100 percent clean electricity and issue a joint policy report on SB 100 by 2021 and every four years thereafter.

California's

2018 Greenhouse Gas Emissions



Source: California Air Resources Board

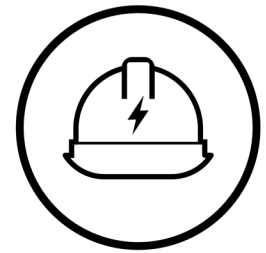
Benefits
of 100% Clean Energy

Improves Public Health

The phaseout of fossil fuel-generated electricity is expected to reduce criteria air pollution and related deaths and illnesses.

Advances Energy Equity

Disadvantaged communities—low-income neighborhoods that have historically suffered poor health, dirty air and other burdens — will reap the highest health benefits from clean electricity.



Restores and Creates Clean Energy Jobs

SB 100-driven growth will restore thousands of clean energy jobs lost during the pandemic and create thousands of new high-quality clean energy jobs.

The 2021 SB 100 Joint Agency Report

The 2021 report is a first step to evaluate the challenges and opportunities in implementing SB 100.

It includes an initial assessment of the additional energy resources and the resource building rates needed to achieve 100 percent clean electricity, along with the associated costs.

The estimates in this report will change over time as additional factors, such as system reliability, land use, energy equity, and workforce needs, are more closely examined.

Public Outreach

A diverse array of interests informed this report through a year-long series of public workshops and comment opportunities. Participants included:

- Community leaders
- Energy experts with utilities, technology companies and trade groups
- University researchers
- Environmental groups
- Environmental justice organizations

The joint agencies also consulted with:

- The California Balancing Authorities
- The Disadvantaged Communities Advisory Group

Renewable/Zero-Carbon Technologies Modeled:

- Solar, photovoltaic and thermal (existing only)
- Wind, onshore and offshore
- Geothermal
- Bioenergy
- Fuels cells
- Hydroelectric, existing large and small operations only
- Nuclear, existing power plants only

California

Clean Electricity Resources

Projected to increase annual costs 6% above a 60% RPS baseline

* Includes in-state

** Includes in-state and out of state capacity

† New hydro and nuclear resources were not candidate technologies for this round of modeling and could not be selected

	Existing Resources	Projected New Resources	
	2019*	2030**	2045**
Solar (Utility-Scale)	12.5 GW	16.9 GW	69.4 GW
Solar (Customer)	8.0 GW	12.5 GW	28.2 GW
Storage (Battery)	0.2 GW	9.5 GW	48.8 GW
Storage (Long Duration)	3.7 GW	0.9 GW	4.0 GW
Wind (Onshore)	6.0 GW	8.2 GW	12.6 GW
Wind (Offshore)	0 GW	0 GW	10.0 GW
Geothermal	2.7 GW	0 GW	0.1 GW
Biomass	1.3 GW	0 GW	0 GW
Hydrogen Fuel Cells	0 GW	0 GW	0 GW
Hydro (Large)	12.3 GW	N/A†	N/A†
Hydro (Small)	1.8 GW	N/A†	N/A†
Nuclear	2.4 GW	N/A†	N/A†

Achieving 100% Clean Electricity in California

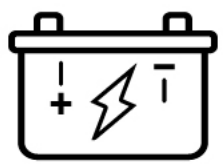
To Achieve Clean Energy

Development Needs
To Rapidly Accelerate

Solar & Wind

3X

Solar and wind build rates need to nearly triple*



Battery

8X

Battery build rates need to increase by nearly eightfold**

*Based on 10-year average | **Based on 2020

Additional Scenarios:
Preliminary Findings

Study Scenarios

The agencies also explored scenarios outside their interpretation of SB 100 to inform broader state planning efforts

High Demand Flexibility:
Increased flexibility may lower overall resource needs and systems costs

No-Combustion:
Reduces criteria air pollution but results in higher costs

Zero-Carbon Firm Resources:
Commercialization of emerging technologies or cost decreases in existing firm resources may lower overall system costs

Accelerated Timeline:
These targets may be achievable but may increase overall costs

Key Takeaways from Modeling

This initial analysis suggests SB 100 is technically achievable through multiple pathways.

Construction of clean electricity generation and storage facilities must be sustained at record-setting rates.

Diversity in energy resources and technologies lowers overall costs.

Retaining some natural gas power capacity may minimize costs while ensuring uninterrupted power supply during the transition to 100 percent clean energy.

Increased energy storage and advancements in zero-carbon technologies can reduce natural gas capacity needs.

Further analysis is needed.

Recommendations for Further Analysis

1. Verify that scenario results satisfy the state's grid reliability requirements.
2. Continue to evaluate the potential effects of emerging resources, such as offshore wind, long-duration energy storage, green hydrogen technologies, and demand flexibility.
3. Assess environmental, social, and economic costs and benefits of the additional clean electricity generation capacity and storage needed to implement SB 100.
4. Hold annual workshops to support alignment among the joint agencies and continuity between SB 100 reports.

Thank You

The 2021 SB 100 Joint Agency Report and Summary Document can be found at:

https://www.energy.ca.gov/sb100

Item 3: Antelope Valley Water Storage. Demonstrating Long Duration Energy Storage Technologies – GFO-19-306

March 17, 2021 Business Meeting

Joseph Sit, Utilities Engineer
Energy Research and Development Division, Energy Systems Research Office

Benefits of Long Duration Storage to Californians

- Technology benefit over Li-Ion
  - Longer lifecycle
  - No thermal runaway
  - No electronic waste
- Use of excess renewable generation
- Cleaner, cost effective grid resilience

Technology Innovations

- Scalable and rapid implementation
- Seasonal storage

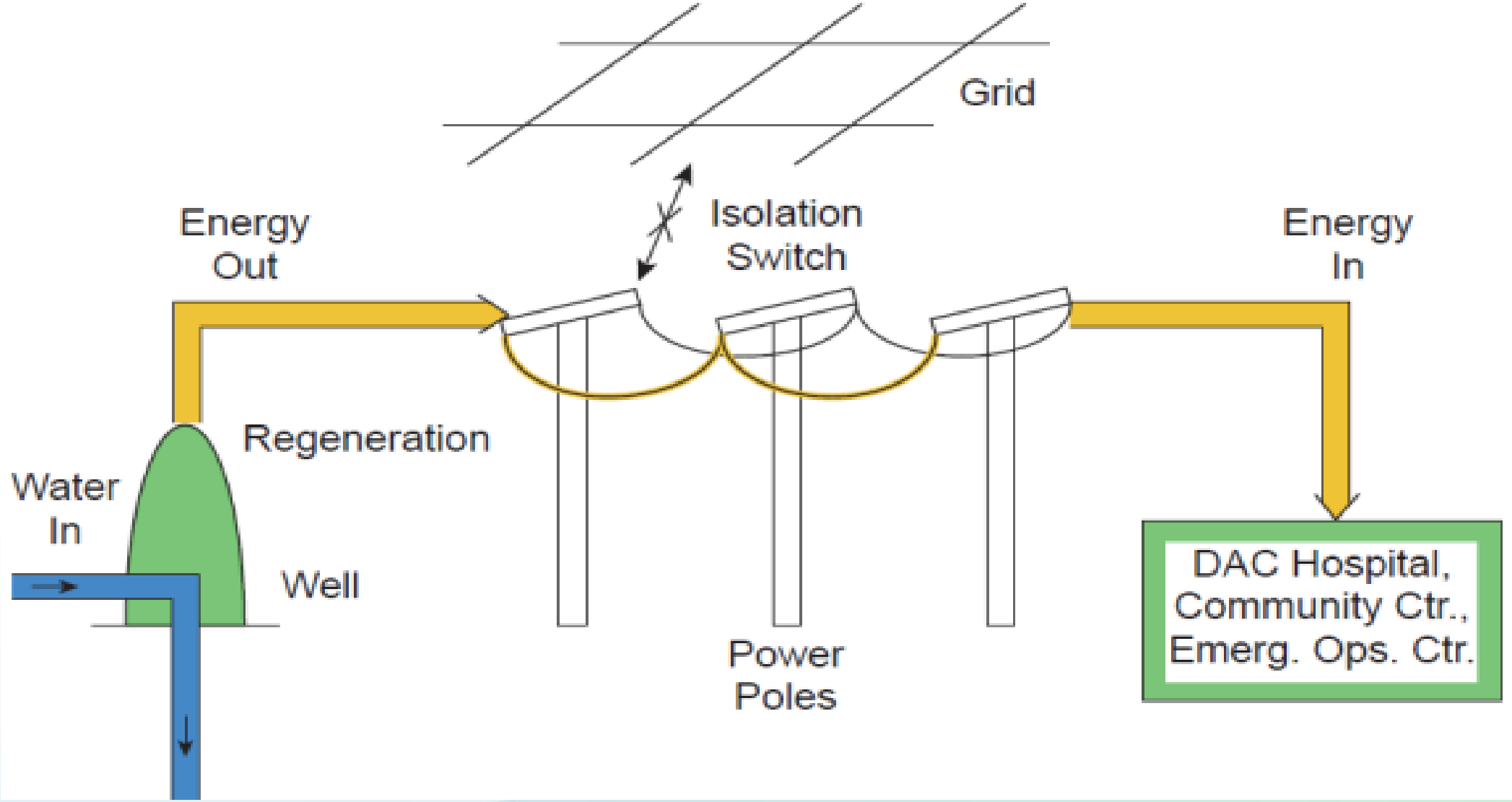
Overview of Antelope Valley Water Storage Agreement

- Funding:
  $6.4M (CEC) + $3.2M (match)

- Technology:
  - Aquifer Pumped Hydro
    - 10-hour minimum energy capability (20 hours possible)
    - Minimum rating of 200 kilowatts

- Purpose:
  Supply power to critical facilities in low-income community

Overview of Demonstration Project



Staff Recommendation

- Adopt CEQA findings
- Approve grant agreement

Item 4: The Regents of the University of California, on behalf of the San Diego Campus

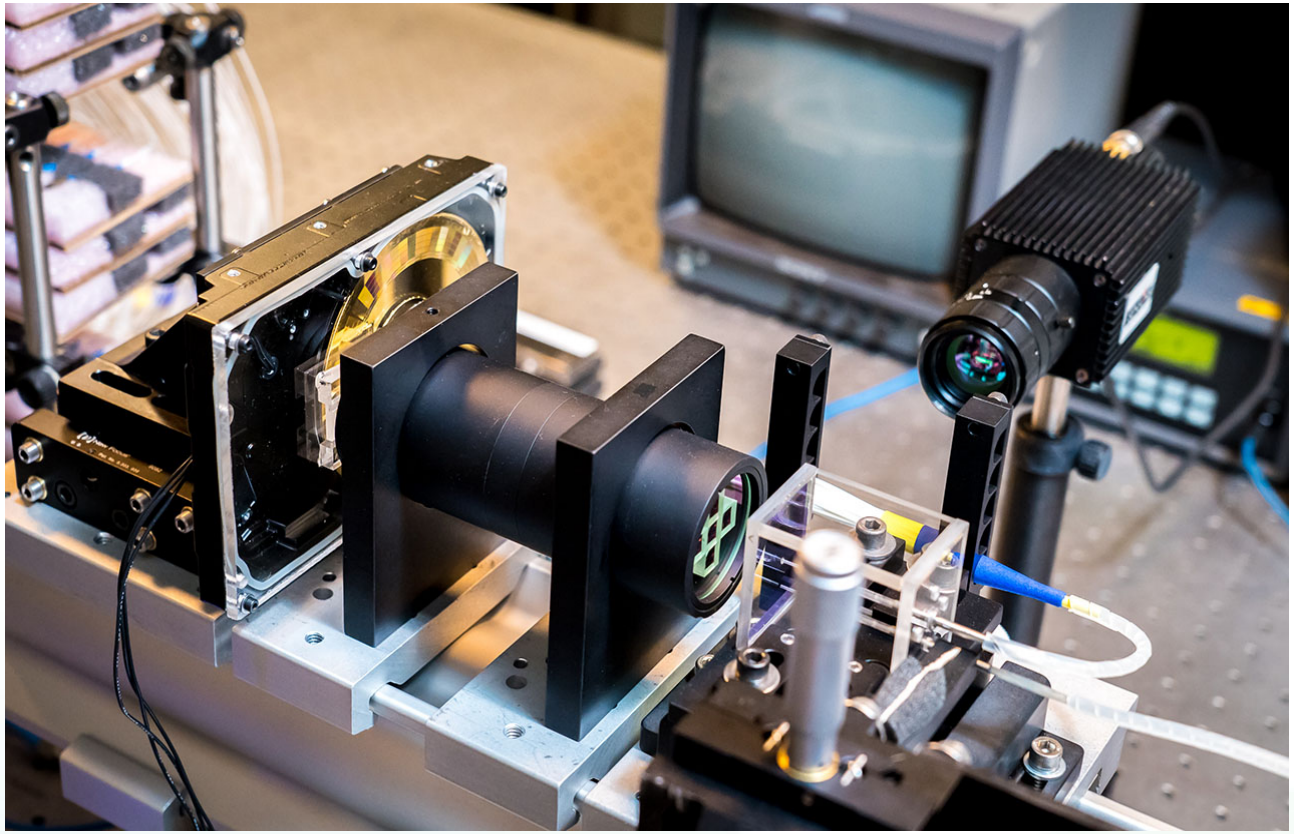
March 17, 2021 Business Meeting

Kevin Mori, Mechanical Engineer
Research and Development, Energy Efficiency Research Office

Benefits to Californians

Lightwave System uses optical rotor switch and light signaling.

- Double energy efficiency for data processing.
- Reduced energy requirements for cooling from reduced heat production.
- Increased internet speeds.



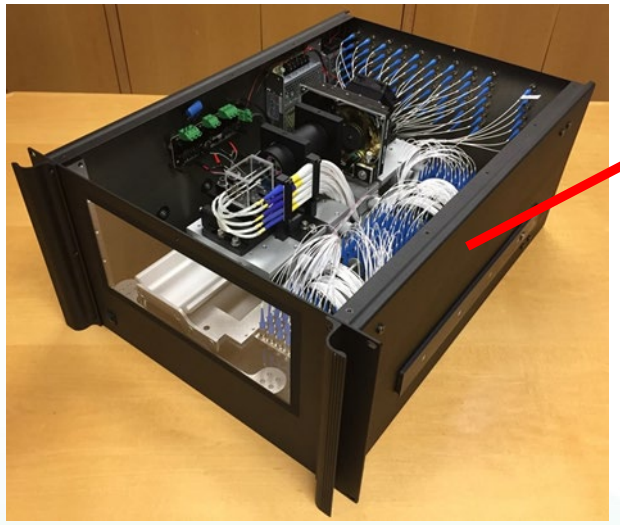
Test setup for a proof-of-concept data center optical switch.
Photo Credit: UC San Diego News Center

Lightwave Energy Efficient Datacenters (LEED)

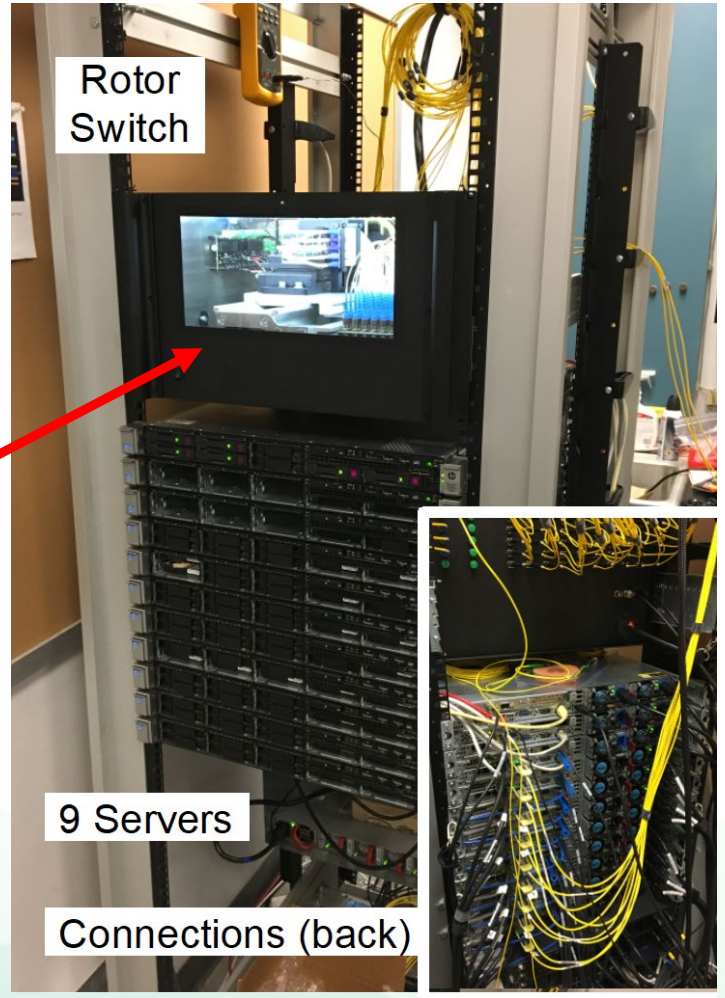
UC San Diego

Novel Lightwave Technology

- Uses optical rotor switch to direct server traffic.
- Testbed will be installed and simulated through real world workloads.
- Technology and coding will be adjusted for scalability.



Optical “Rotor” Switch Developed in Project
Photo credits: UCSD



Optical Rotor Switch in small optical-networking testbed

Federal Grant Background

Phase 1: Developed architecture and optical switch.

Phase 2: Test technology with real-world workloads.

	Phase 1	Phase 2
Start Date	June 2018	April 2021
End Date	Jan. 2020	Mar. 2024
ARPA-E Funding	$ 3,800,000	$ 5,000,000
CEC Funding	$ 475,000	$ 425,000

For more information on the current status of the project:
https://ucsdnews.ucsd.edu/pressrelease/lightening-the-data-center-energy-load

Staff Recommendation

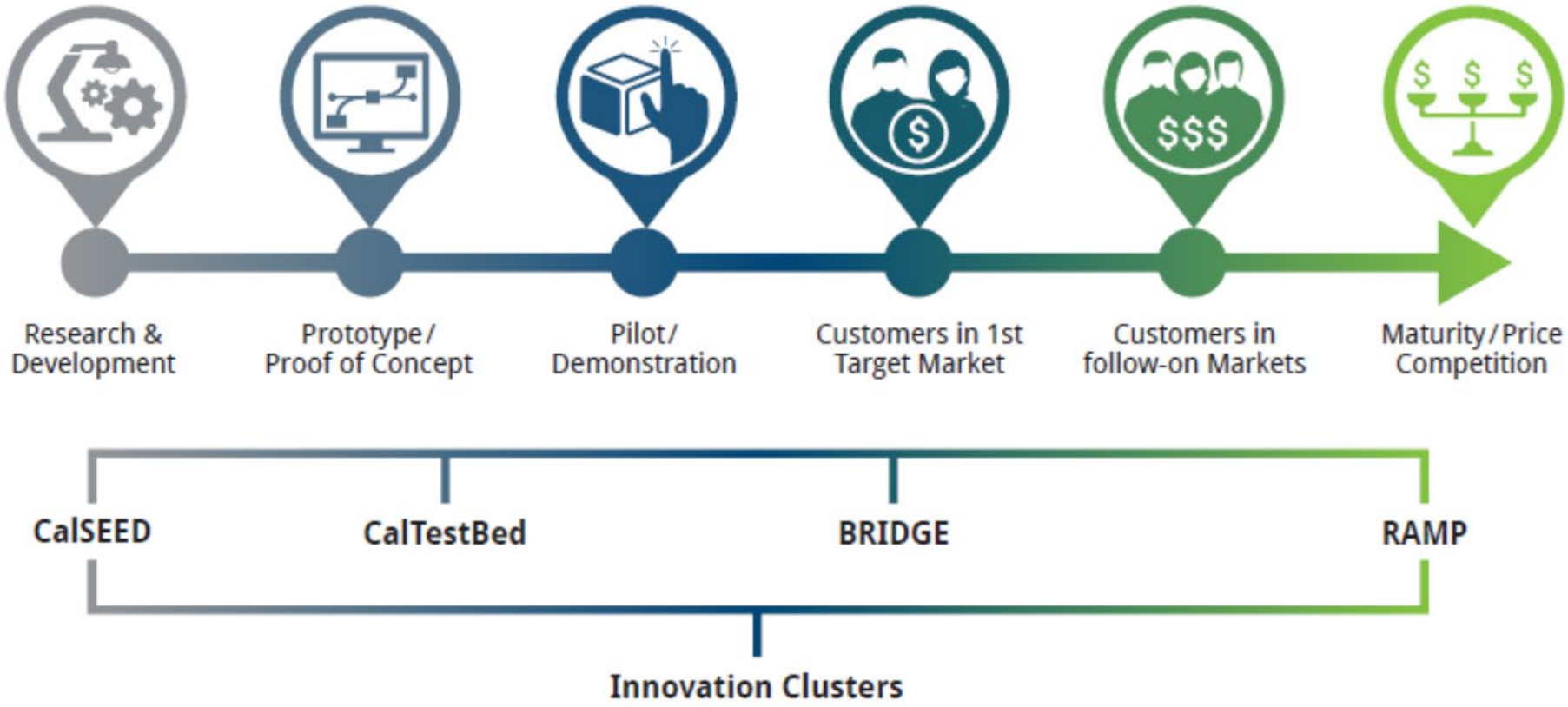
- Approve agreement
- Adopt staff's determination that project is exempt from CEQA

Item 5: Bringing Rapid Innovation Development to Green Energy (BRIDGE) 2020 (GFO-20-301)

March 17, 2021 Business Meeting

Michael Ferreira
Energy Deployment & Market Facilitation Office
Energy Research & Development Division

CEC's Entrepreneurial Ecosystem



Packetized Energy Technologies, Inc.

EPIC Funding: $2,000,000

Increasing Access to Smart and Affordable Energy for Customers and Resource Adequacy for California Grid

- Grid flexibility software platform
- Cloud-based management of customer electric appliances
- Deploy 7,000 smart devices providing 4 MW of flexible capacity

Noon Energy, Inc.

EPIC Funding: $2,166,000

Pilot Demo of Ultra Low Cost, Long-Duration Energy Storage Coupled to Solar Power

- Carbon-oxygen chemistry utilizes earth abundant materials
- Long duration storage < $20/kWh
- 100 kW, 10 MWh demonstration system coupled to solar

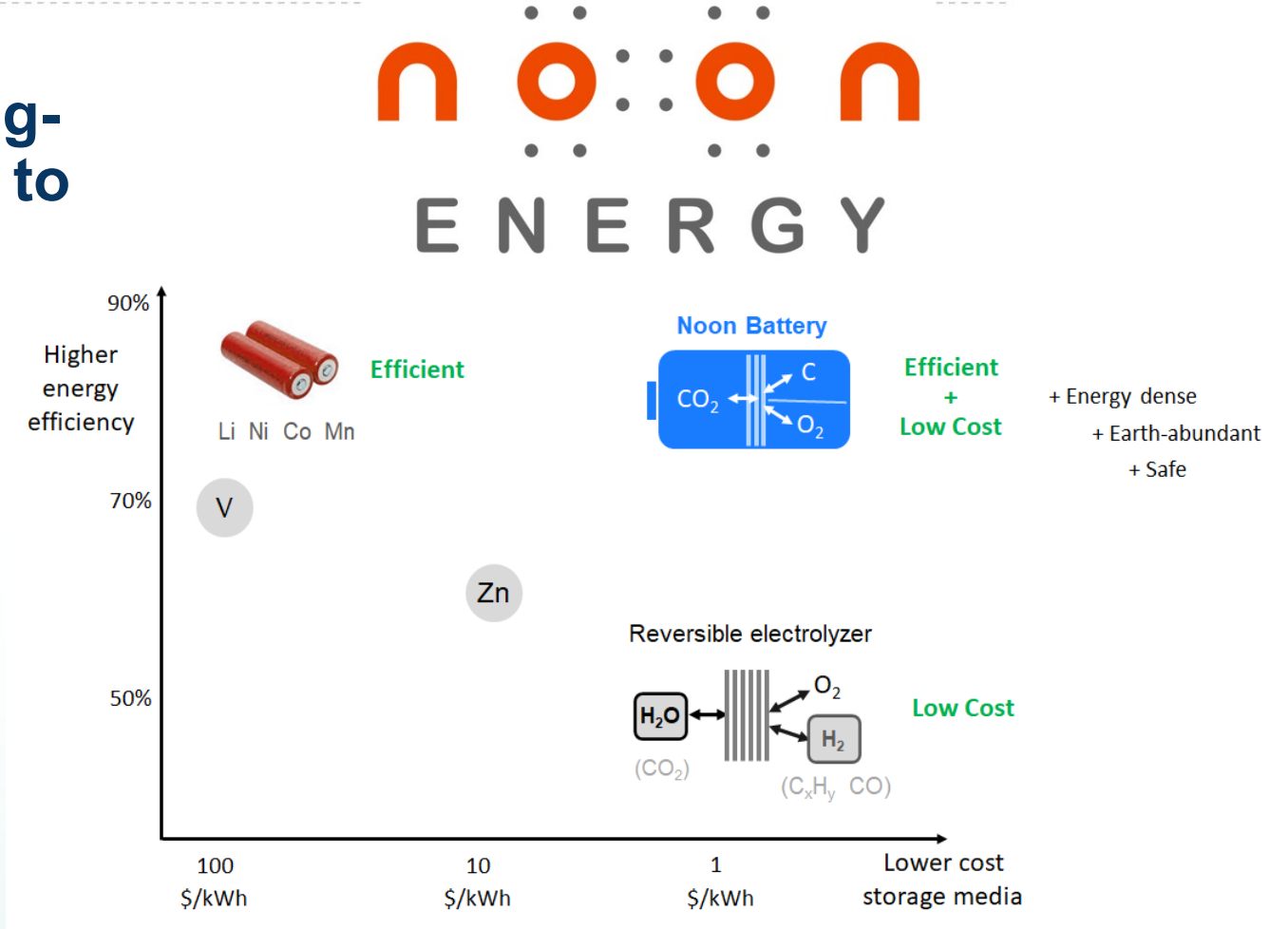


Figure 1. Comparison of Noon Energy's new battery technology with other electrochemical energy storage technologies based on energy efficiency and cost of storage media.

Next Energy Technologies, Inc.

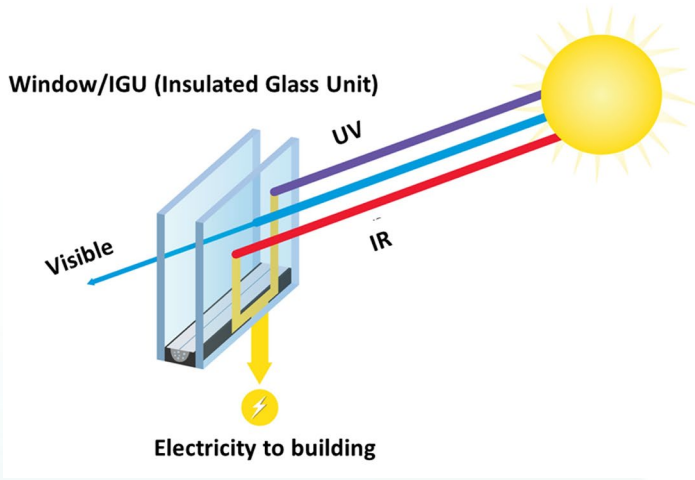
EPIC Funding: $3,000,000

Rapid Innovation Development of Energy Generating Windows for Zero- and Negative-Carbon Emission Buildings

NEXT

NEXT ENERGY TECHNOLOGIES, INC

- Energy-generating windows with transparent solar cells
- Made of inexpensive, abundant raw materials
- Integrate into existing window manufacturing process

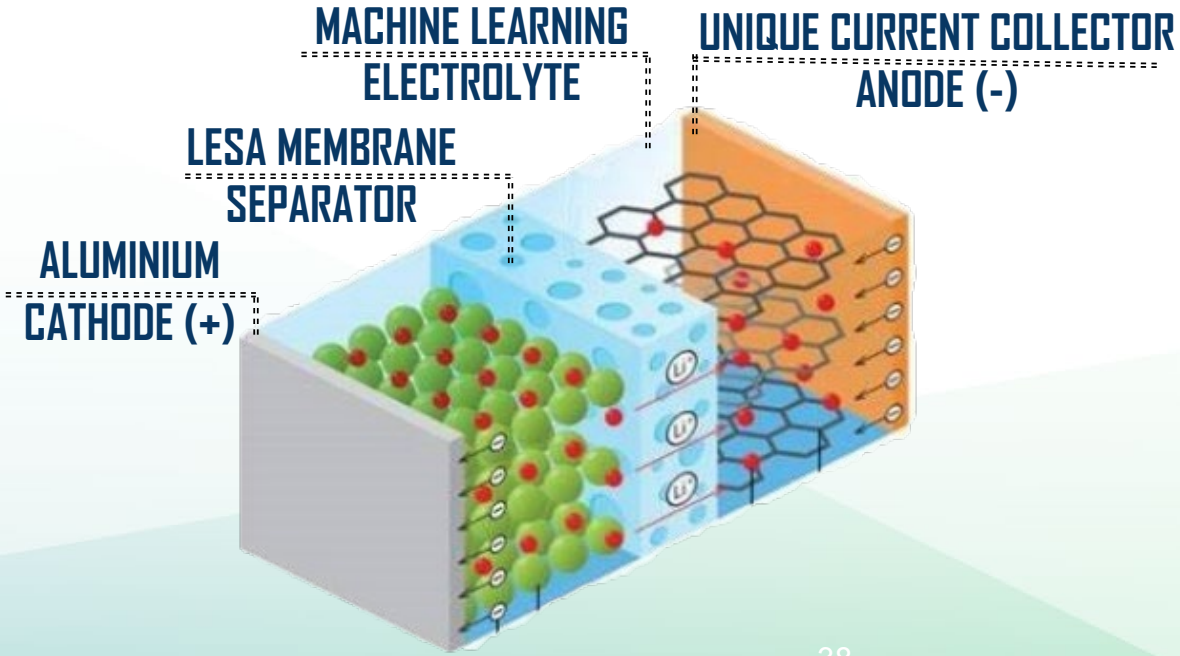


Sepion Technologies

EPIC Funding: $1,400,000

Hybrid Lithium-Metal Batteries for Low-Cost and Long-Range Electric Vehicles

- "Anode-free" hybrid lithium-metal cells for higher energy density
- EV batteries at <$100/kWh
- Optimized electrolyte for fast charging

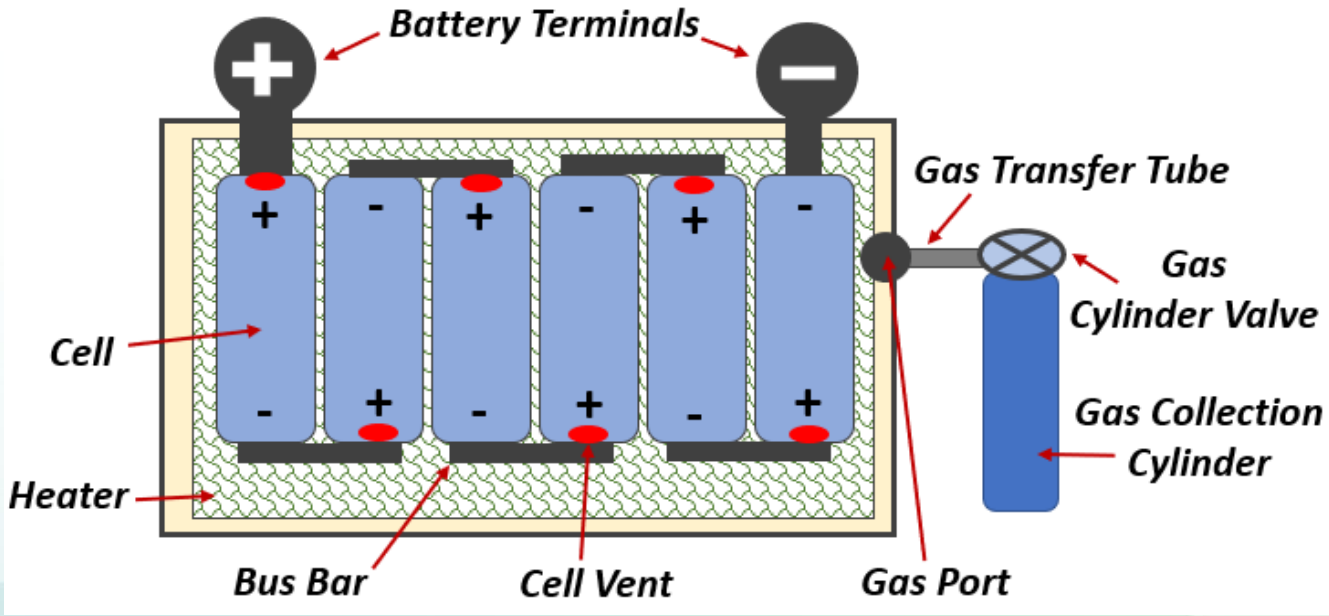


South8 Technologies, Inc.

EPIC Funding: $1,010,227

Advanced Li-ion Chemistry for Safer and Greener Electric Vehicle and Energy Storage Systems

- Non-hazardous liquefied gas electrolyte chemistry
- Operational temp: -60 to +60 °C
- Demonstrate energy density, fire safety and recyclability

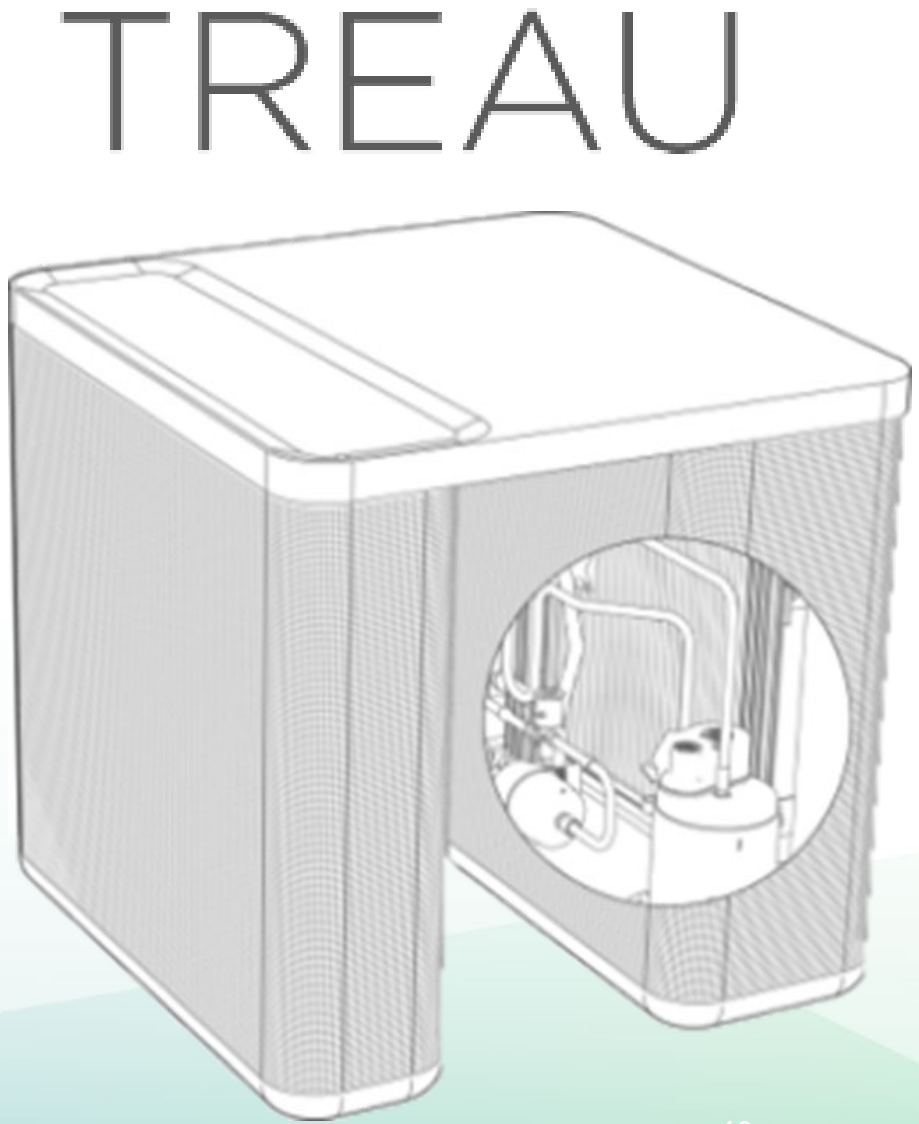


Treau, Inc.

EPIC Funding: $2,761,606

Increasing the Thermal Range and Efficiency of Affordable User-Installable Room Heat Pumps

- No tools or professionals needed for installation
- Plugs into 120V outlet
- Energy savings of 33% for cooling, 70% for heating



Skyven Technologies, Inc.

EPIC Funding: $1,100,500

Transforming Techno-Economics of Decarbonization in California's Bespoke Industrial Sector with Scalable Front-End Engineering AI

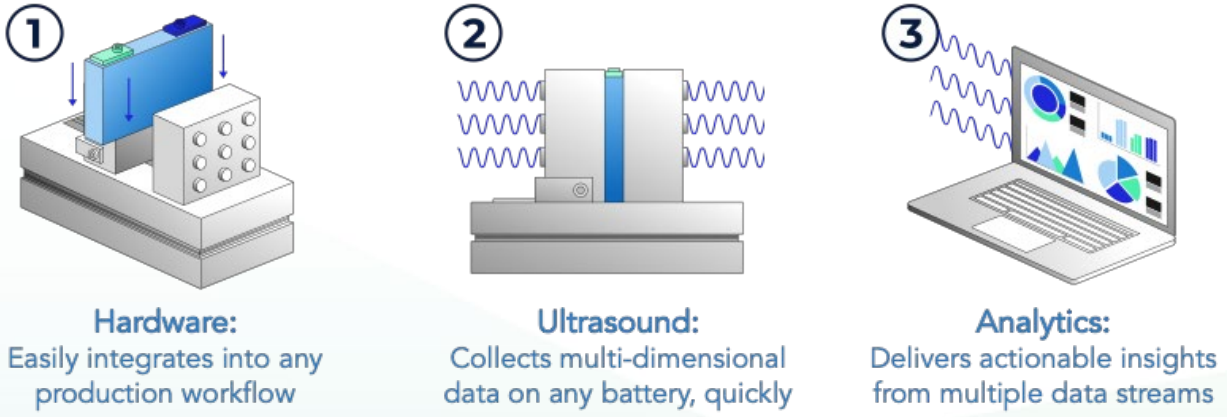
- Decarbonization pathways for unique operations
- 10x reduction in front-end engineering costs
- Pilot test using data from two CA industrial facilities

Feasible, Inc.

EPIC Funding: $1,000,000

Machine Learning Enhanced Acoustic Inspection to Improve Battery Manufacturing

- Battery inspection using ultrasound and data analytics
- Increase battery cell yield by 5%
- Demonstrate techno-economic value on battery pilot line



Staff Recommendation

- Approve projects
- Approve staff's findings that projects are exempt from CEQA

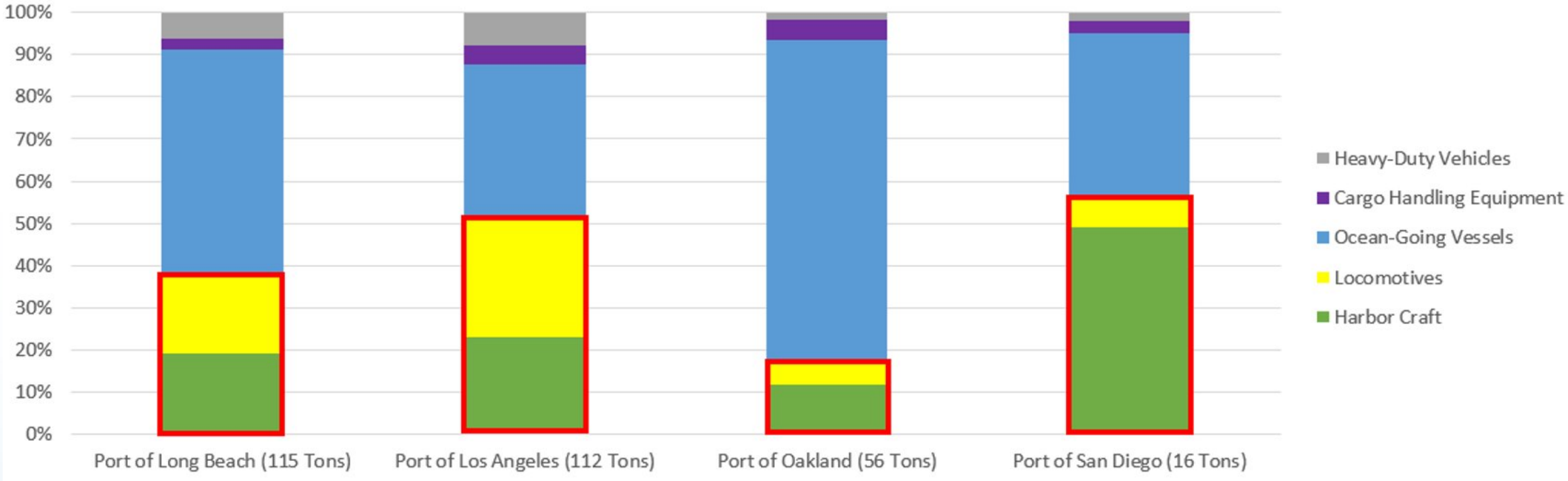
Item 6: Hydrogen Fuel Cell Demonstrations in Rail and Marine Applications at Ports (H2RAM) (GFO-20-604)

March 17, 2021 Business Meeting

Peter Chen, Mechanical Engineer
Energy Research and Development Division
Energy Generation Research Office

Impacts of Locomotives and Harbor Craft

Diesel Particulate Matter Emissions at California Ports



Source: Port Emissions Inventories

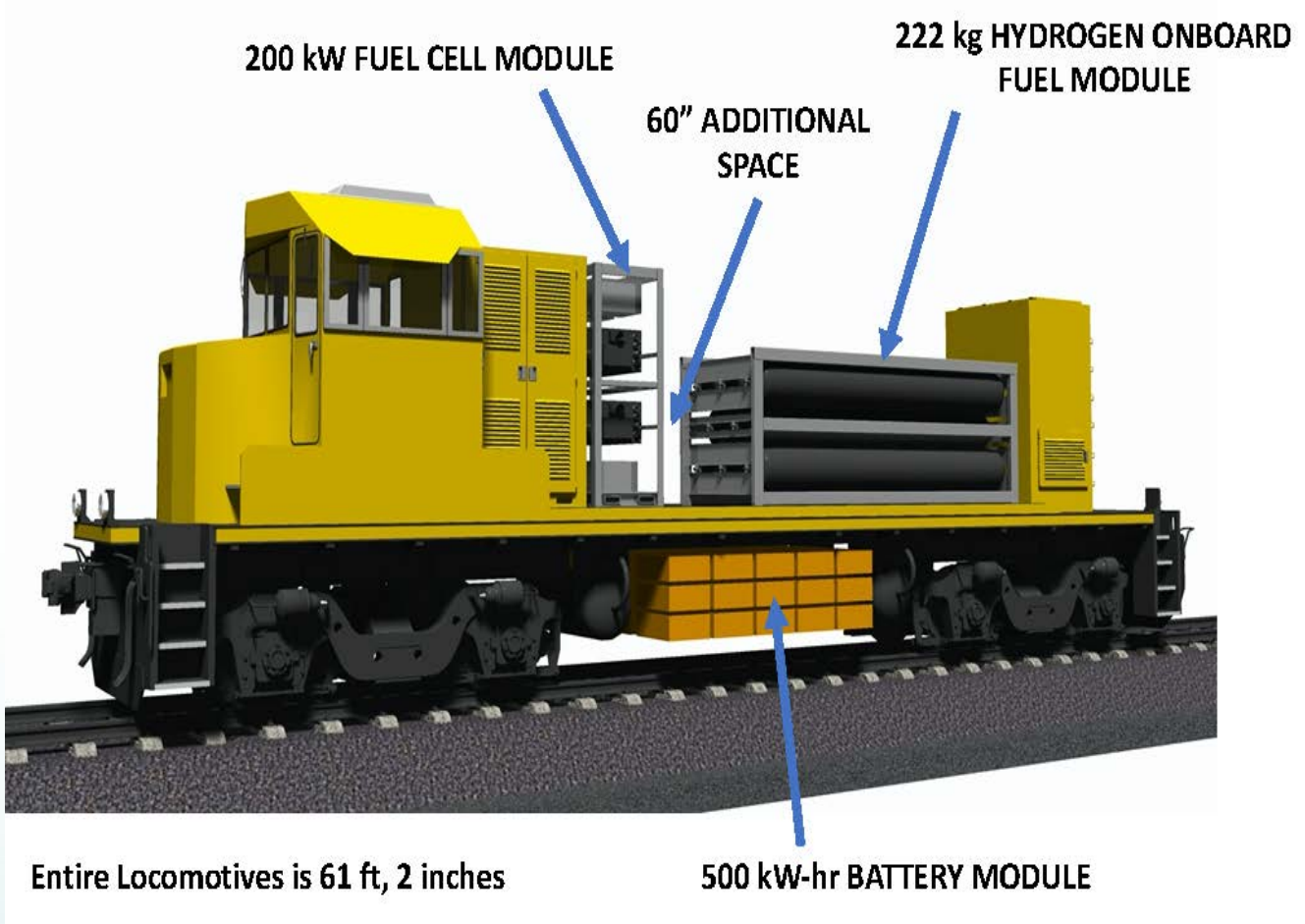
Benefits to Californians

- Reduce emissions from locomotives and harbor craft
- Realize economies of scale for renewable hydrogen
- Inform future regulations and deployment strategies

Gas Technology Institute

Sierra Northern Hydrogen Locomotive Project

- Demonstrate hydrogen switcher locomotive at Port of West Sacramento
- Zero emission alternative for freight rail
- Validate performance and analyze scalability



CALSTART, Inc.

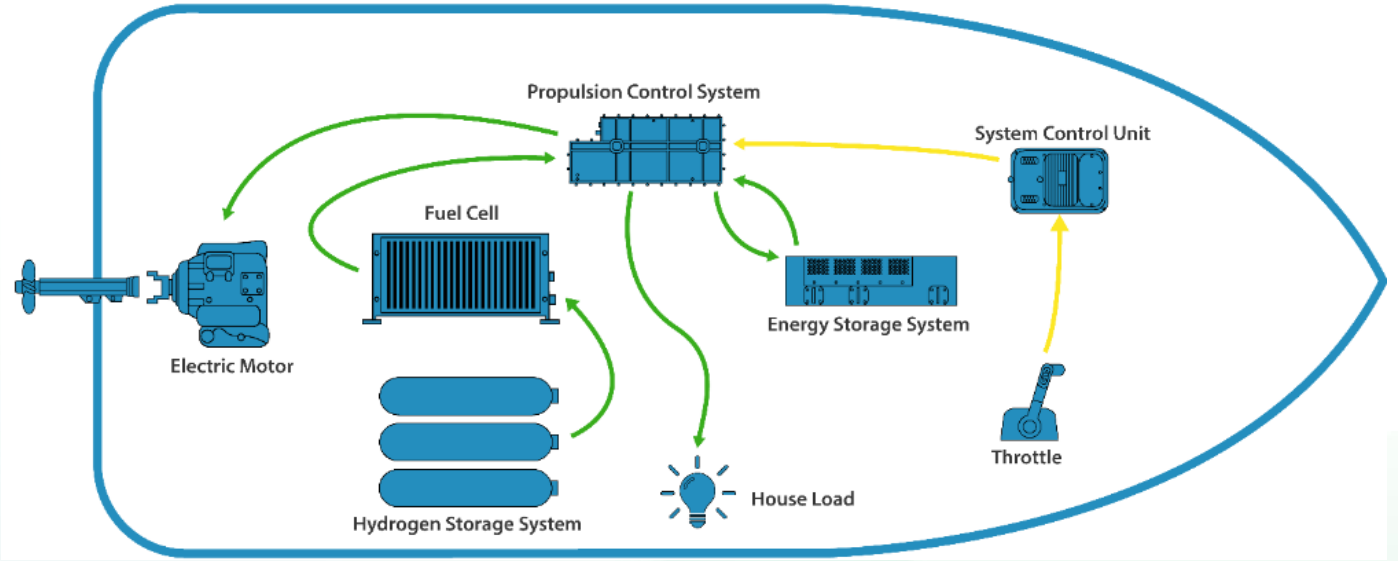
HyZET: Design and Feasibility Study of Fuel Cell-Powered Commercial Harbor Craft

- Feasibility study for hydrogen tugboat
- Design for implementation at Port of Los Angeles
- Evaluate liquid hydrogen fuel systems

Golden Gate Zero Emission Marine, Inc.

Small Fast Multi-Use Hydrogen Fuel Cell Harbor Craft

- Demonstrate hydrogen multi-use vessel at Port of San Francisco and Port of Long Beach
- Compact marine fuel cell powertrain
- Mobile refueling system to leverage existing stations



Staff Recommendation

- Approve grant agreements
- Adopt staff's determination that projects are exempt from CEQA

Item 7: Cerritos Community College District

March 17, 2021

Larry Rillera, Air Pollution Specialist
Fuels and Transportation Division, Transportation Policy and Analysis Office

Benefits to California

- Zero-emission vehicle career pathway for high school students
- Develop potential workers for local ZEV supply chain companies
- Enhance zero-emission automotive/truck skills

Overview

- Augment existing agreement to add $1.5 million
- Extend by 24-months
- Revise Training Plan
- Increase high schools with ZEV auto and truck programs
- Support CEC School Bus Replacement Program participation

Advanced Transportation and Logistics

Results!

HIGH SCHOOLS

Zero Emissions Vehicle High School Pilot Project

$2 Million Total Funding

(with augmentation)

28
28 High Schools Funded

19
19 High Schools Reporting...

1,800
...Students/Year Enrolled in Auto Courses with New EV Curriculum

36
Faculty (High School and Community College) Trained to Date

CALEXICO HIGH SCHOOL
HOME OF THE BULLDOGS
CALEXICO HIGH SCHOOL

Staff Recommendation

- Approve ask to:
  - Augment agreement by $1,500,000
  - Extend agreement by 24 months

REMOVED - Item 8: California Air Resources Board

March 17, 2021 Business Meeting

Pulled from Business Meeting.

Item 9: Agreement with CALSTART for a MD/HD Infrastructure Block Grant Project (ARV-20-006)

March 17, 2021 Business Meeting

Matthew Kozuch, Associate Energy Specialist
Fuels and Transportation Division, Freight & Transit Unit

Benefits to California

Enables:

- accessible electric charging and hydrogen refueling options
- progress converting all MD/HD vehicles to ZE
- targeted emission reductions and health benefits

Project Overview

CALSTART will:

- **develop** MD/HD ZEV infrastructure incentive projects
- **create** internal controls and procedures
- **design** user-friendly website
- **implement** equity strategy

Complimenting Vehicles

Staff Recommendation

Approve

- Agreement for $50M block grant with CALSTART

Adopt

- Determination that action is exempt from CEQA

Item 10: GFO-19-603 EV Ready Communities Phase II- Implementation

March 17, 2021 Business Meeting

Sharon Purewal, Associate Energy Specialist
Advanced Vehicle Infrastructure Office, Fuels and Transportation Division

Benefits to California

- **Improve** access to electric vehicle charging infrastructure
- **Reduce** barriers to zero emission transportation
- **Increase** mobility options in disadvantaged communities
- **Support** green job creation

City of Sacramento

Goal: Increase electric vehicle charging station installations to support 75,000 zero emission vehicles by 2025

Contra Costa Transportation Authority

Goal: Deploy electric vehicle charging stations, leverage local funding opportunities, and create workforce development programs

CONTRA COSTA
transportation
authority

Staff Recommendation

Approve:

- City of Sacramento for $1,825,418
- Contra Costa Transportation Authority for $2,467,067

Item 11: *2021 Integrated Energy Policy Report* Natural Gas Demand And Rate Forecasting Forms and Instructions

March 17, 2021 Business Meeting

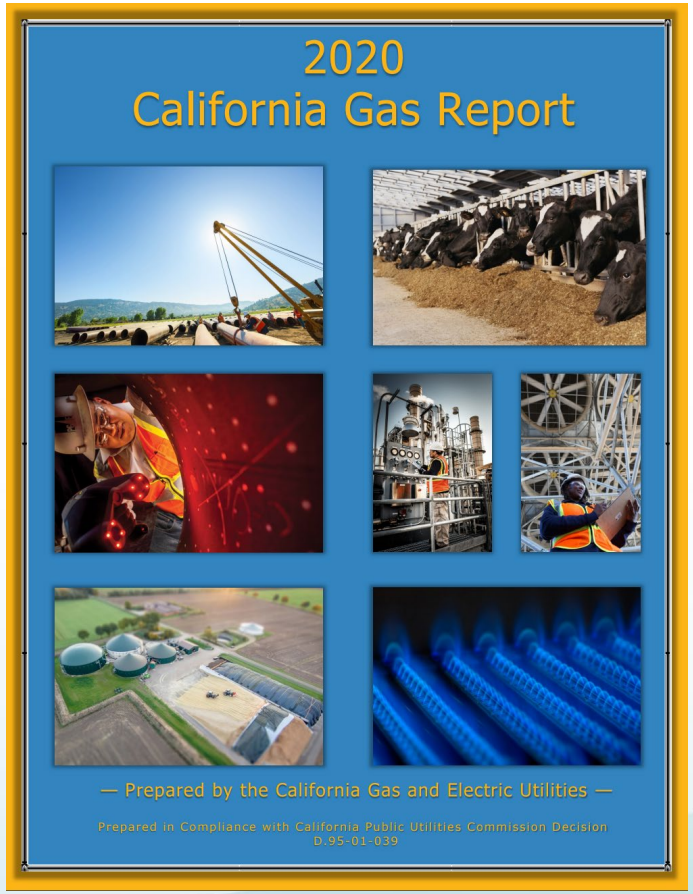
Jason Orta, Lead Hydraulic Modeler
Energy Assessments Division, Supply Analysis Office

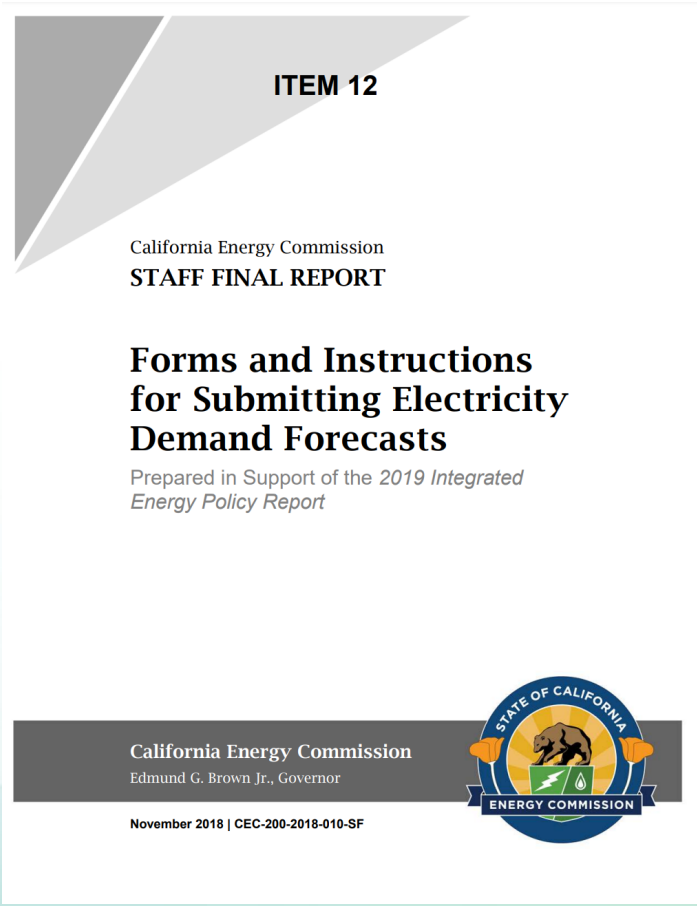
Benefits to California

- Increase knowledge of gas system
- Improve quality of forecasting
- Continue collaboration with gas utilities

Natural Gas Forms and Instructions

- Developed in consultation with gas utilities
- Leverages existing work





Information Requested on Forms

- Sectoral demand forecasts out to 2035
- Forecasting inputs and assumptions
- Impact of electrification, RNG/H_2, etc.
- Rate forecasts
- Supporting data

Recommendation And Next Steps

- Adopt Natural Gas Forms and Instructions
- Continue collaboration with gas utilities and stakeholders
- Apply knowledge to future CEC work

Item 12: Order Instituting Informational Proceeding

March 17, 2021 Business Meeting

Heather Raitt, Assistant Executive Director, Policy Development

Benefits to Californians

- Authority to collect information needed for developing 2021 IEPR
  - Hearings and workshops
  - Data requests

- Information is foundational to good policy development

2021 IEPR Scope

Topics:

- Energy reliability over next 5 years
- Natural gas outlook and assessments
- Building decarbonization and energy efficiency
- Energy demand

Staff Recommendations

- Approve request for Order Instituting Informational Proceeding for 2021 IEPR

Item 13: 2020 IEPR Update, Volume I and Volume III

March 17, 2021 Business Meeting

Heather Raitt, Assistant Executive Director, Policy Development
Quentin Gee, Lead Author for Volume I, Fuels and Transportation Division
Nick Fugate, Lead Author for Volume III, Energy Assessments Division

Benefits to Californians

Volume I:

Blue Skies, Clean Transportation

Volume III:

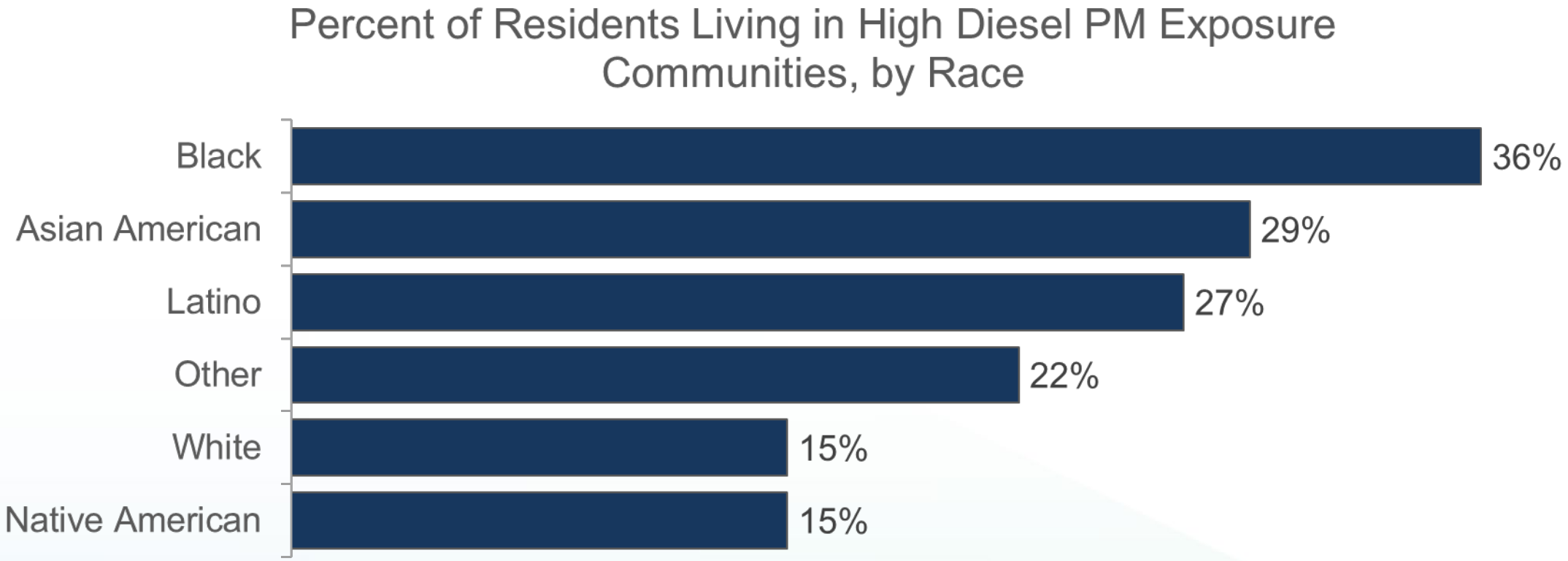
California Energy Demand Forecast Update

Public Engagement

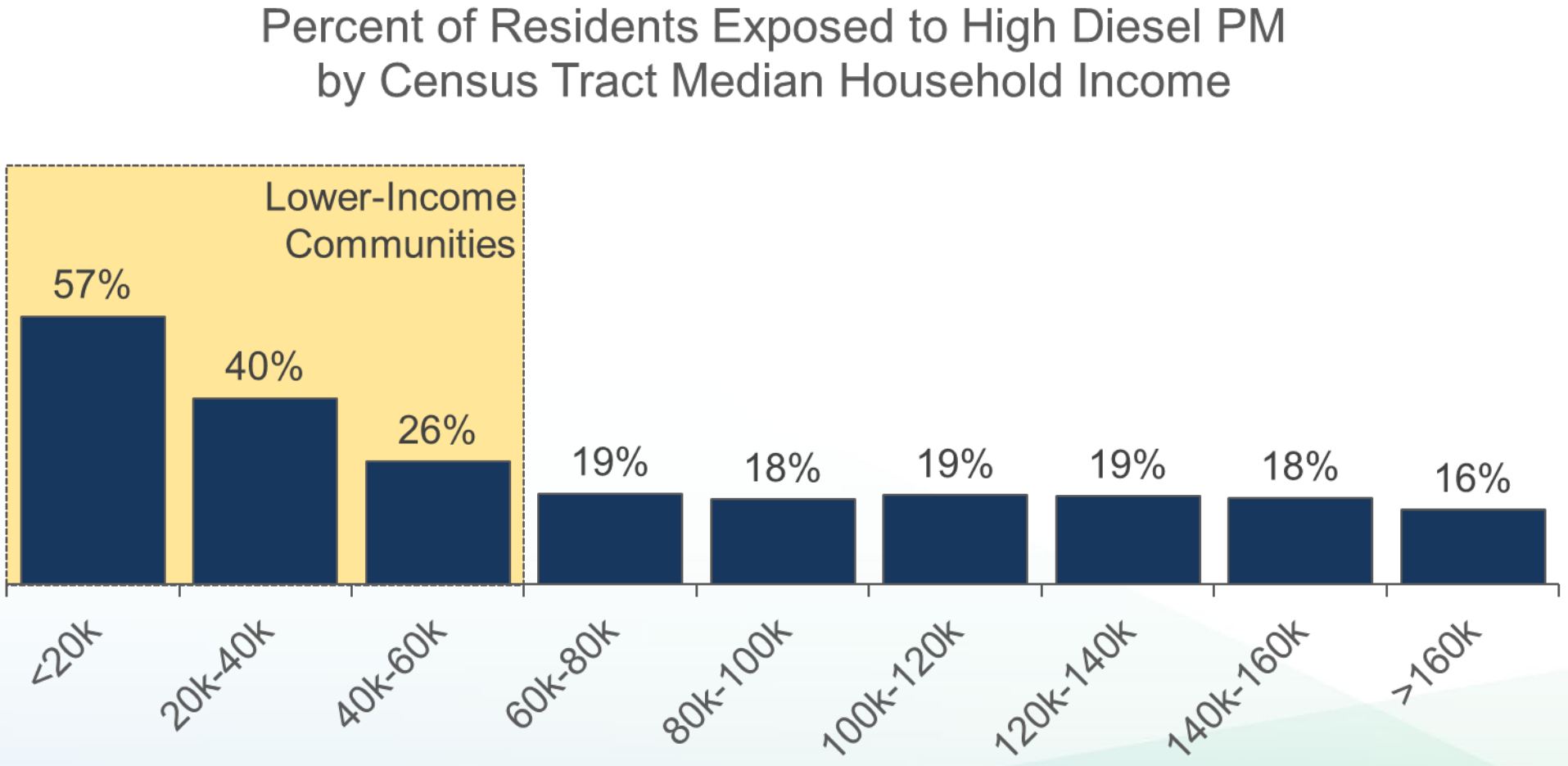
- Opportunities for public comment

- Remote access workshops
  - 9 on transportation
  - 2 on energy demand

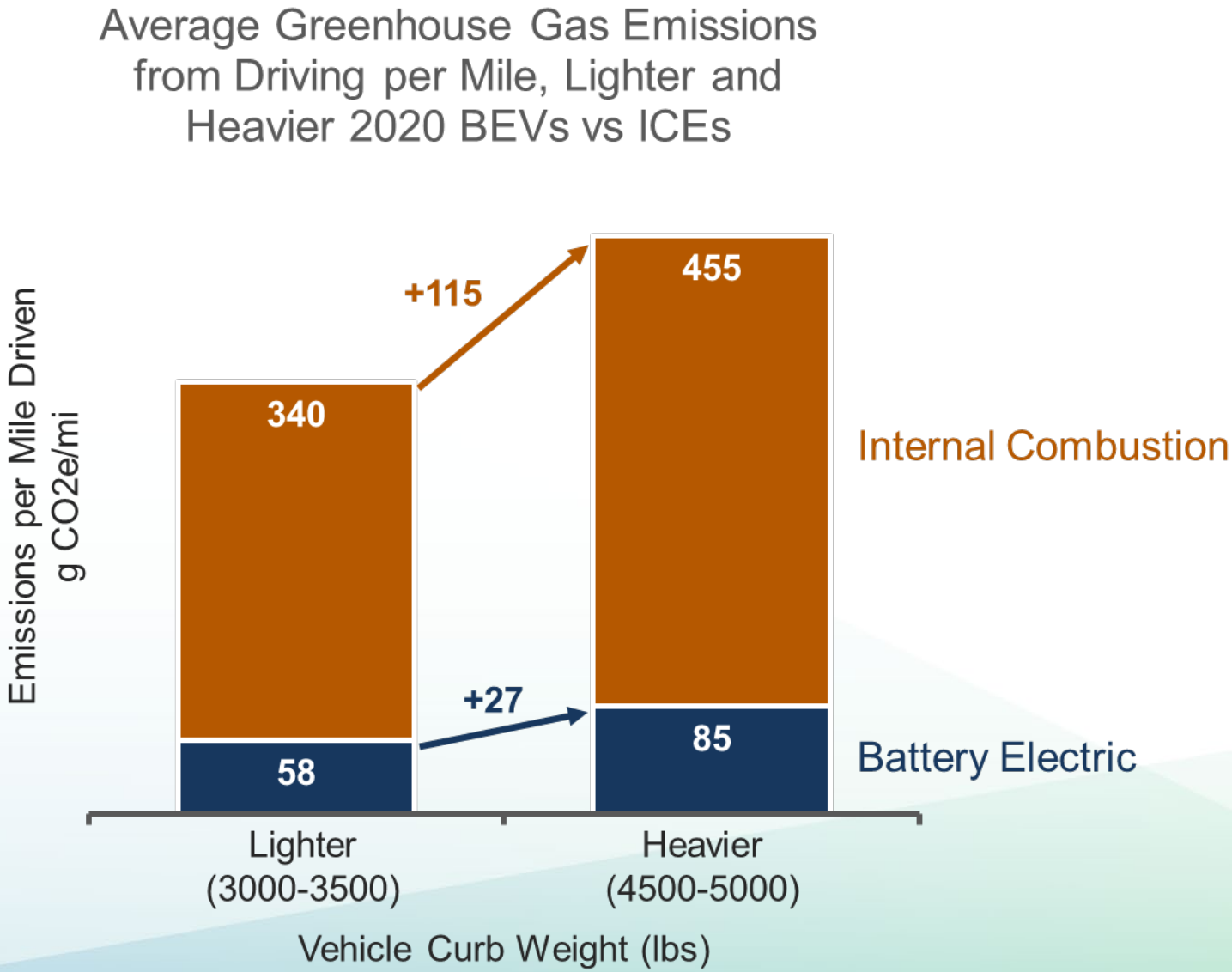
Disproportionate Transportation Impacts



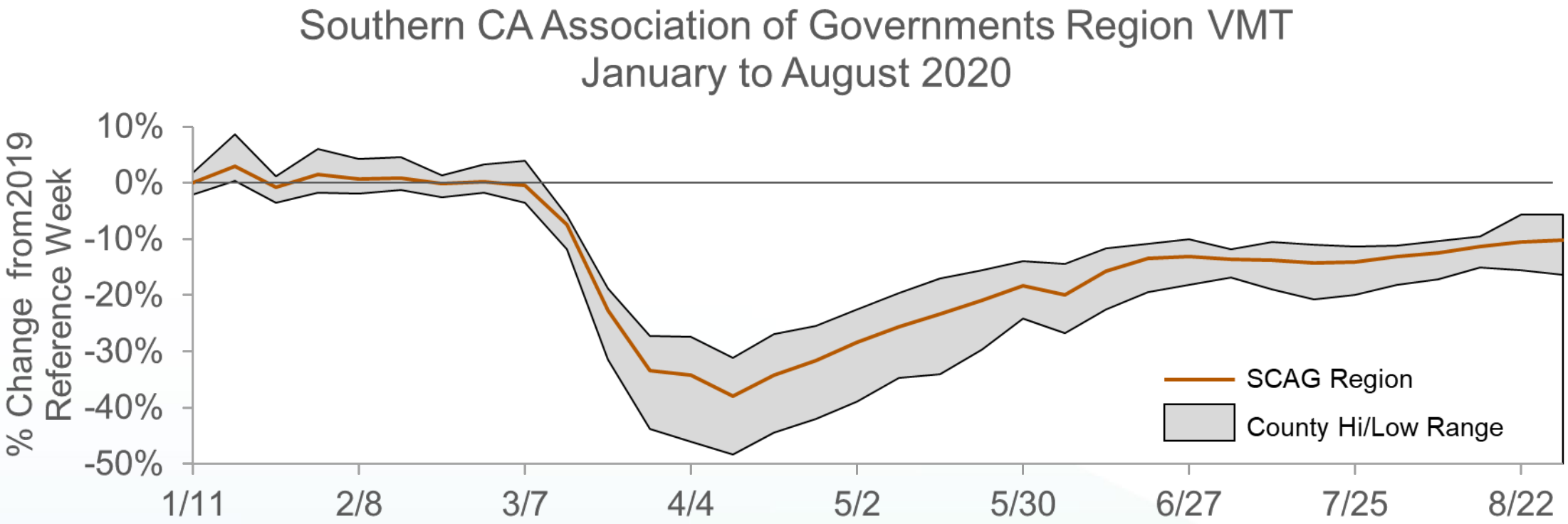
Additional Disproportionate Impacts



Californians are Opting for Larger Vehicles



Decline and Return of VMT



The Three Revolutions

Electrification, Automation, and Shared Mobility Services

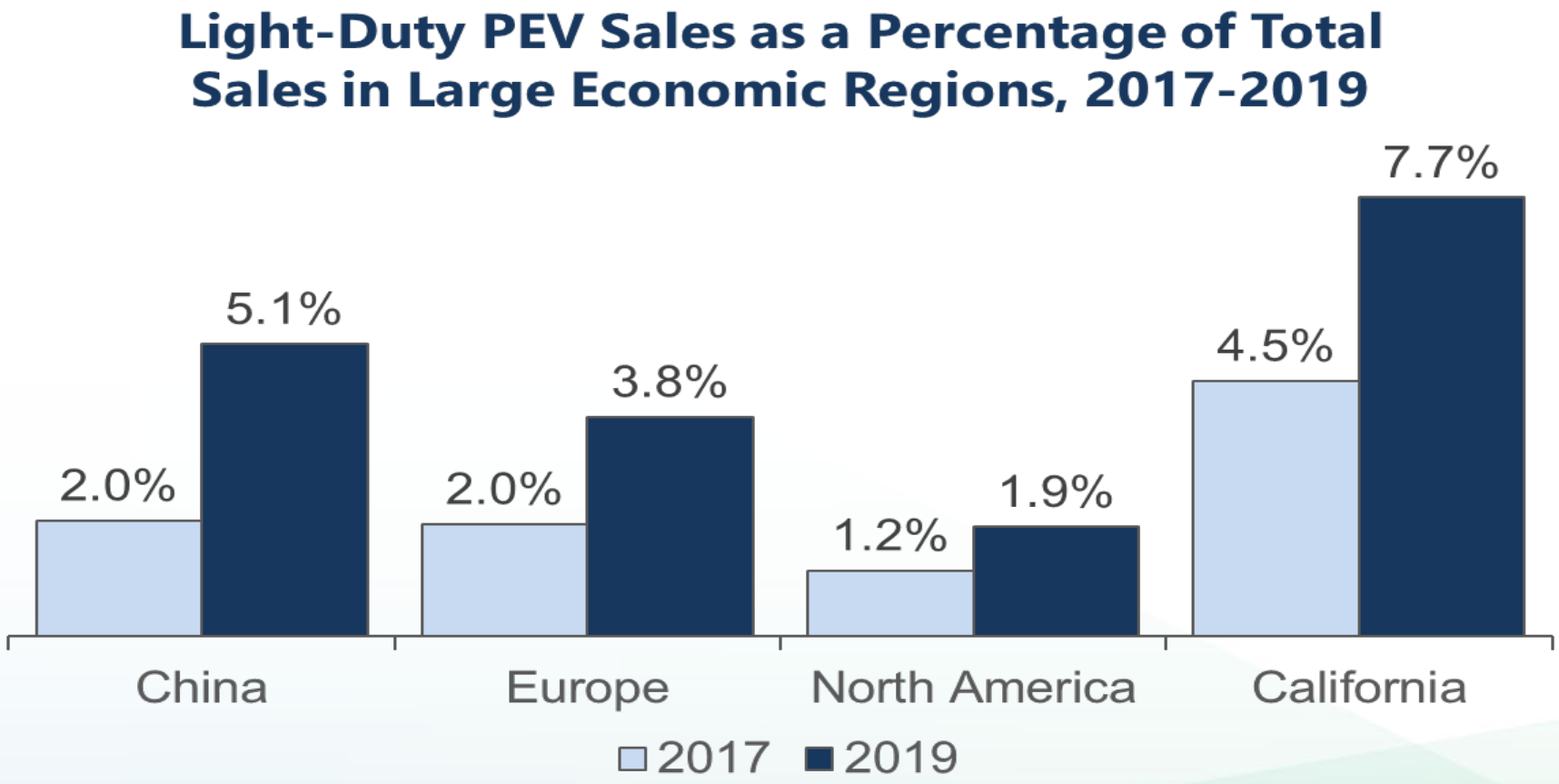
Future Mobility:
"Blue Skies" or "Dirty Skies"?

- ✓ Cars are all electric
- ✓ Energy mix is clean
- ✓ Increased capacity
- ✓ Better livability
- ✓ Integration with public transit
- ✓ Everybody shares intelligent vehicles

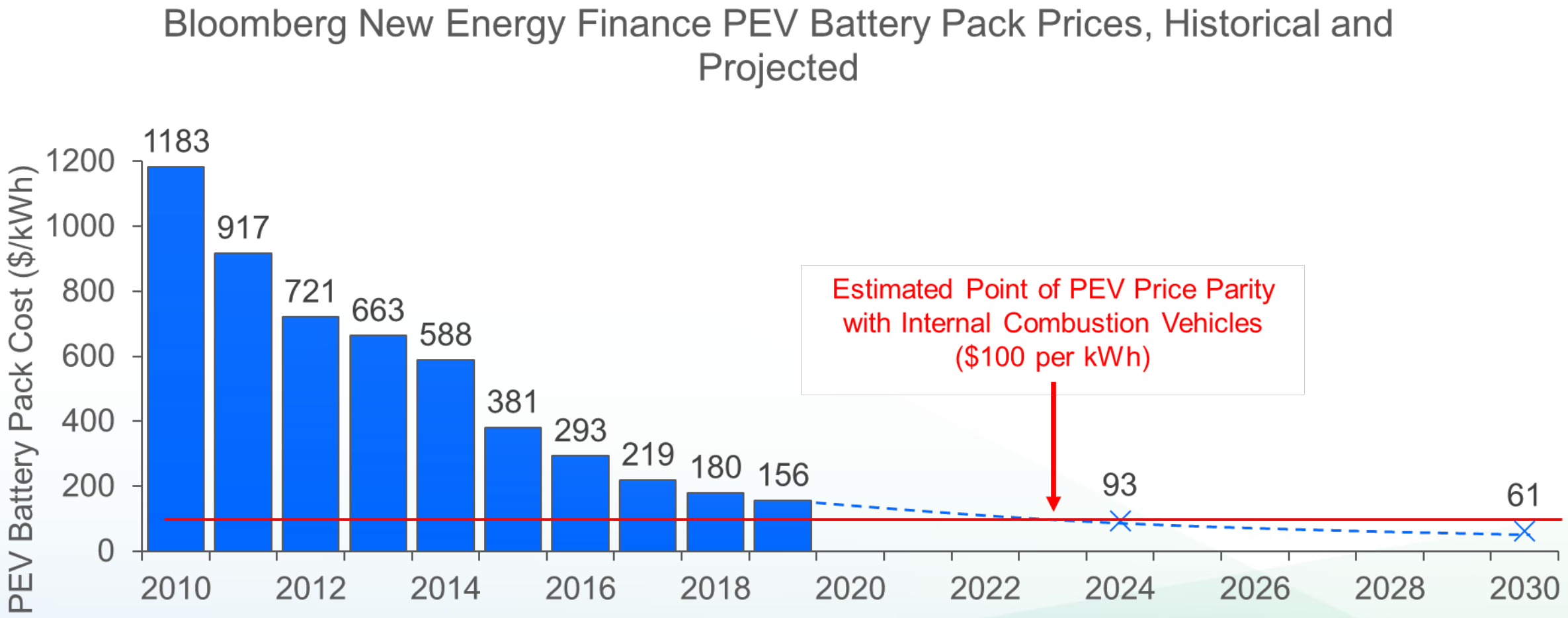
- ✓ Increased congestion
- ✓ Vehicles use fossil fuels
- ✓ Increased travel demand
- ✓ More car-dependence of society
- ✓ Reduced role of transit
- ✓ Robocars increase congestion and VMT

The future will largely be shaped by the policies that are developed today…

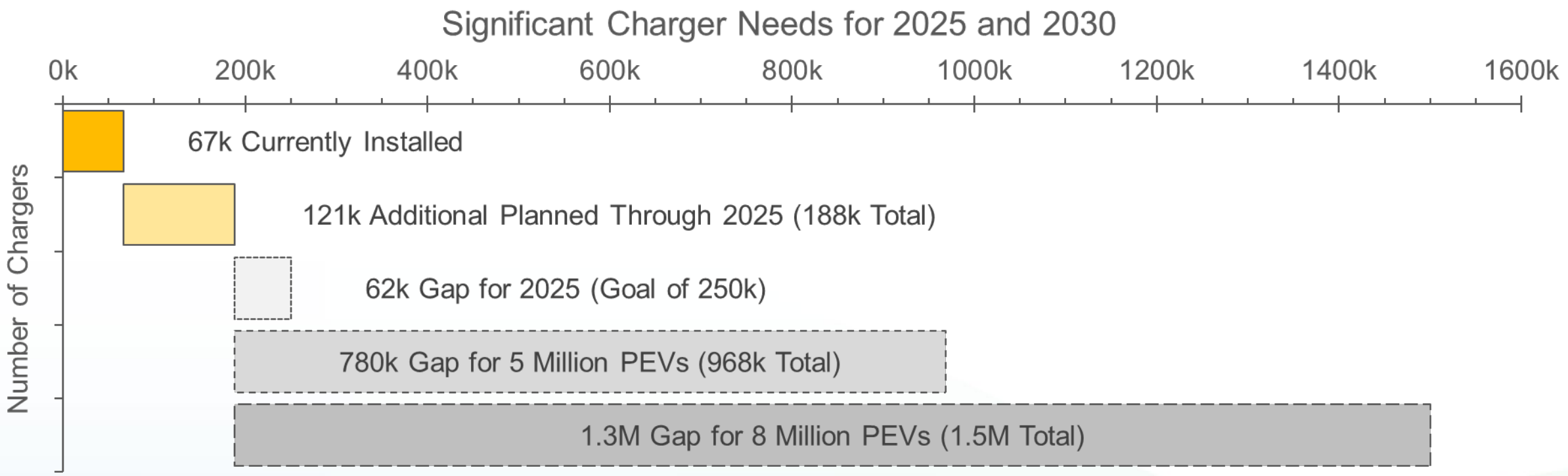
California is a PEV Leader, but EU and China May Catch up Soon



Price Parity is on the Horizon

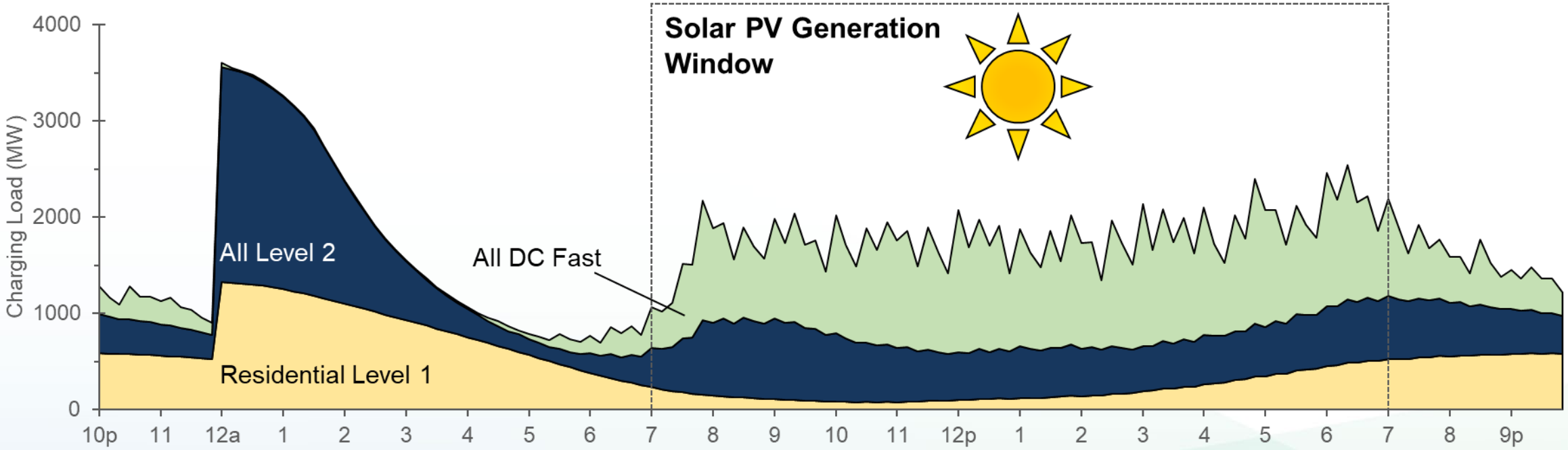


CA Needs More Chargers



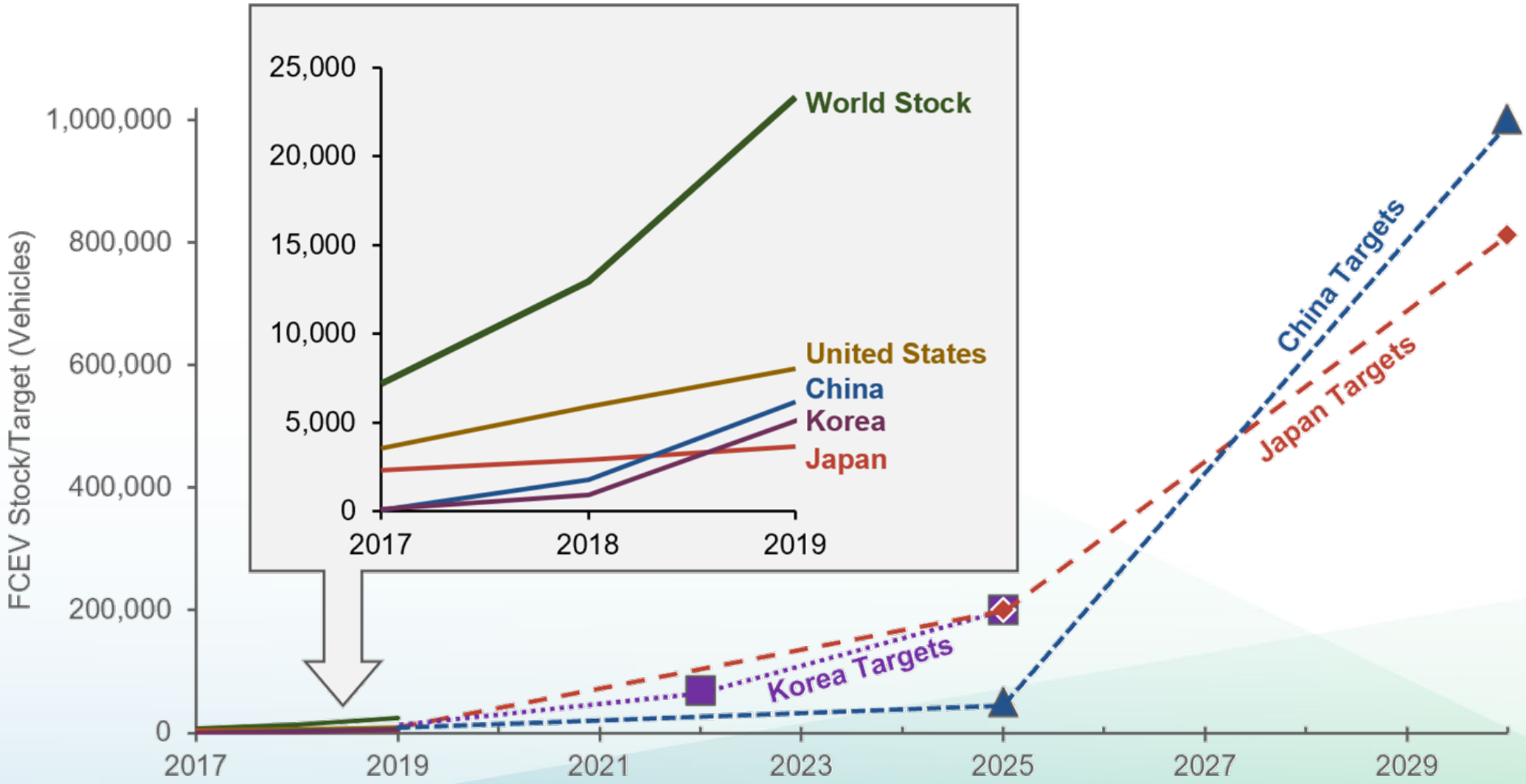
Align Charging with Renewables

Modeled Time of Use Charging Load Curves Suggest Need to Improve Alignment with Renewables



ZEVs Can Contribute to Energy Resiliency

Ambitious Global Fuel Cell Targets



Blue Skies, Clean Transportation

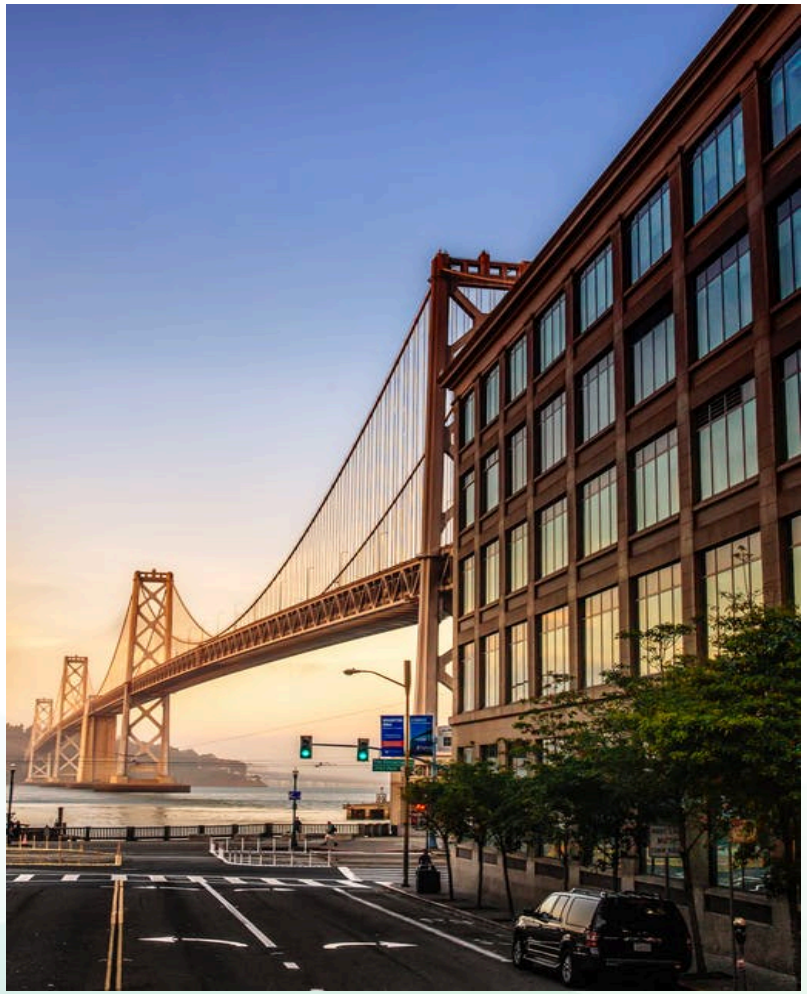
Benefits to California

- Accounts for:
  - Economic and demographic growth
  - Climate change impacts
  - Extreme weather events
  - Distributed resource adoption
  - Transportation electrification

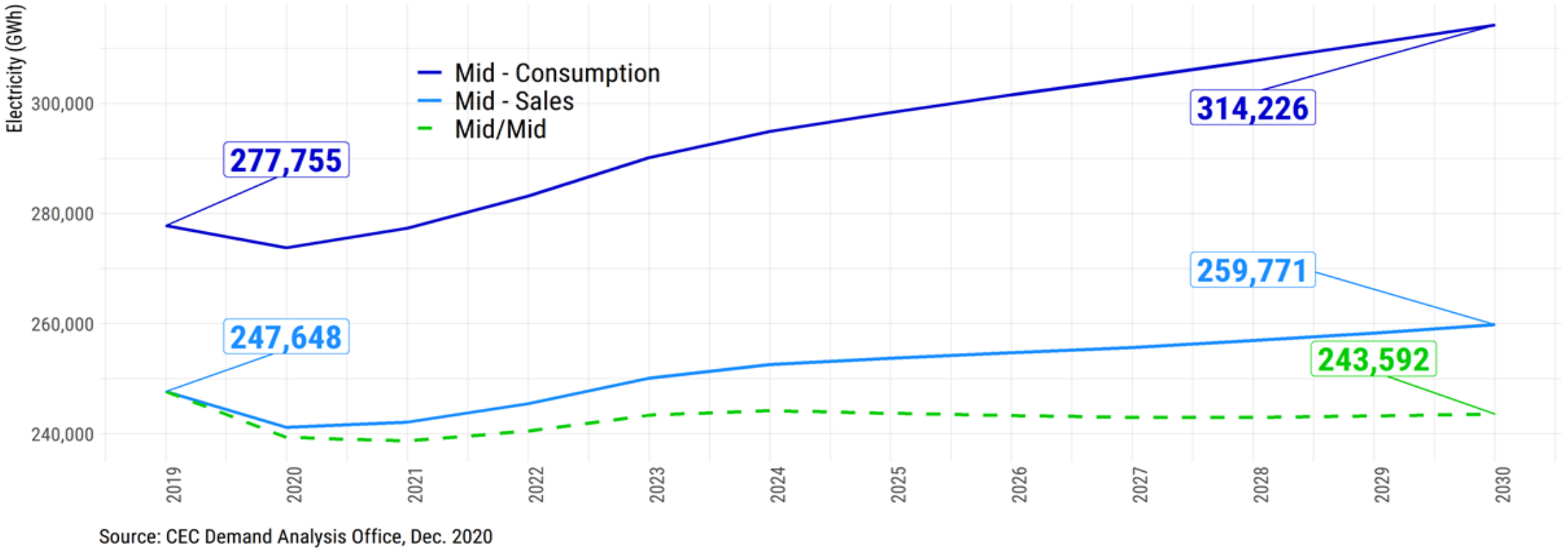
Overview

- Update to 2019 IEPR demand forecast
  - Captures near-term economic downturn and recovery
  - Refreshes PV, battery storage, and ZEV projections

- Includes wide variety of scenarios
  - 3 baseline demand cases
  - 6 additional achievable efficiency scenarios
  - Peak demand variants to account for extreme weather events



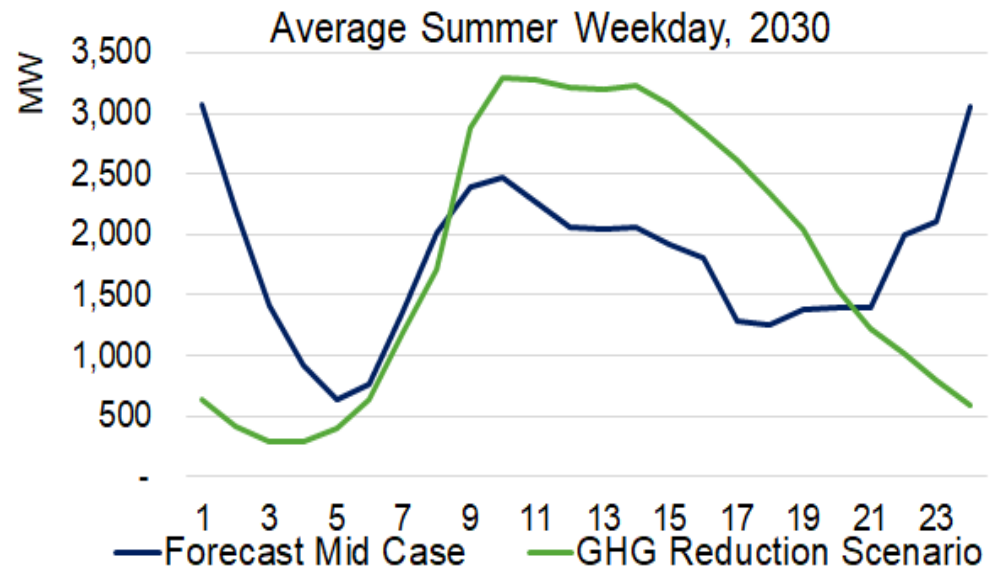
Statewide Sales Forecast



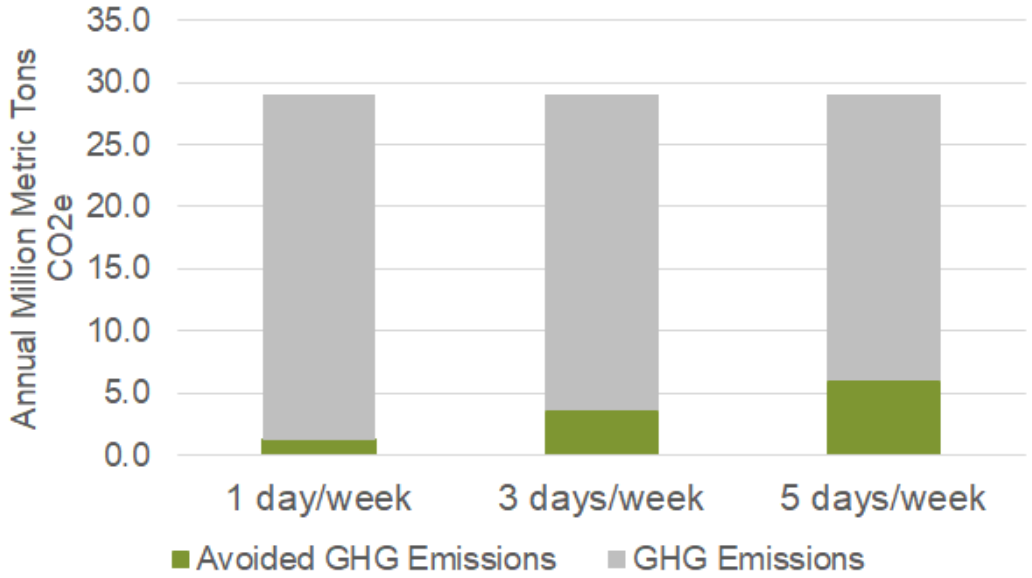
Source: CEC Demand Analysis Office, Dec. 2020

Exploratory Transportation Scenarios

- **Scenario 1:** Charging MD-HD zero-emission vehicles to meet South Coast Air Basin ozone standards
- **Scenario 2:** Shifting EV charging to reduce GHG emissions



- **Scenario 3:** Increased telework up to five days a week



Staff Recommendation

Adopt 2020 IEPR Update:

- Volume I: Blue Skies, Clean Transportation
- Volume III: California Energy Demand Forecast Update

Thank you!

Item 17: Public Advisor's Report

March 17th, 2021 Business Meeting

Noemí O. Gallardo
Public Advisor's Office

IDEA Initiative

- Task Force meeting 3/24/21
  - Discuss allyship
  - Review staff recommendations
  - Uplift employee-led activities:
    - Employee Resource/Affinity Groups
    - Celebrations

CEC 2021 Black History Month Celebration

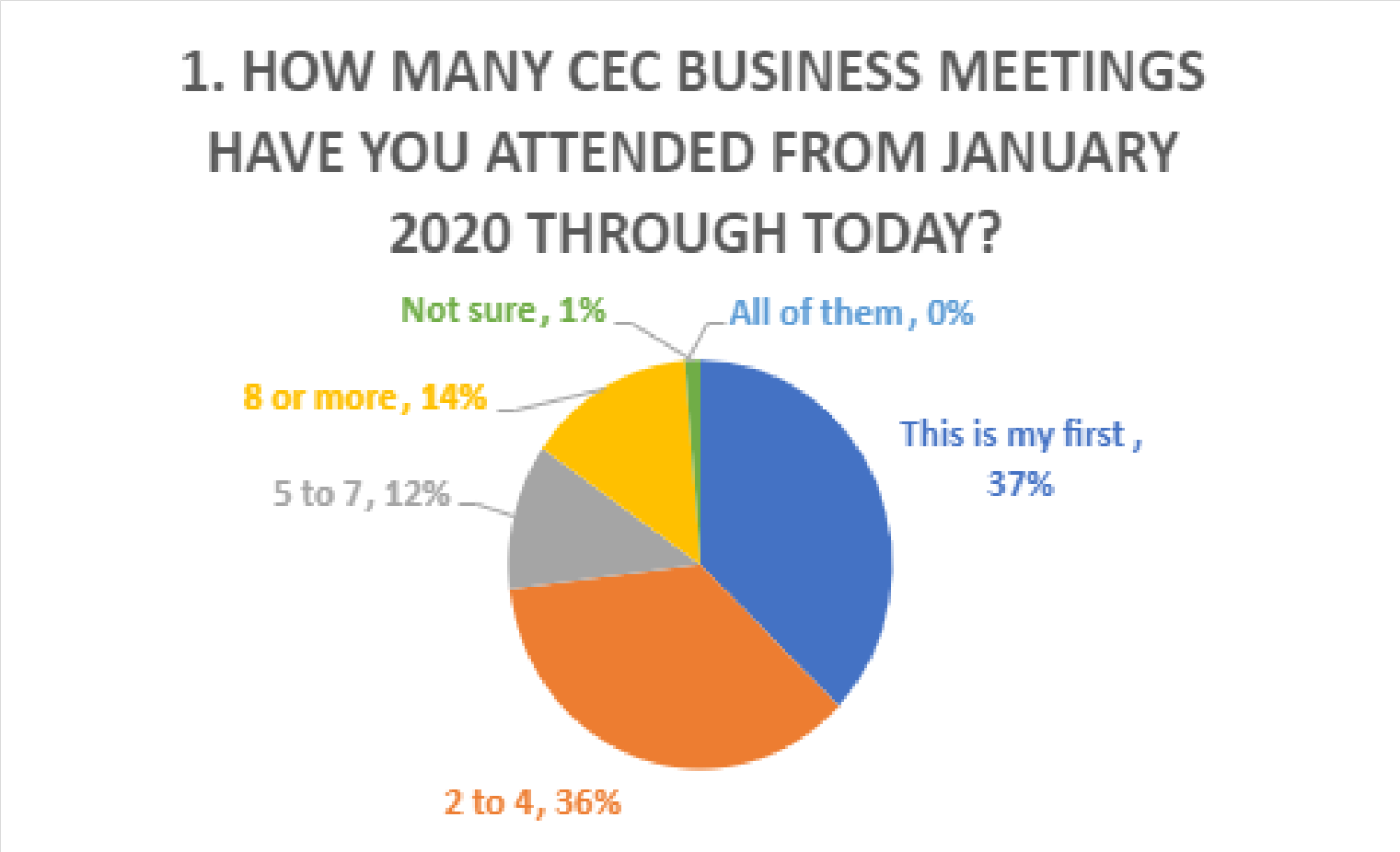
CEC 2021 International Women's Day

Business Meetings Survey: Participation & Engagement

- 78 participants

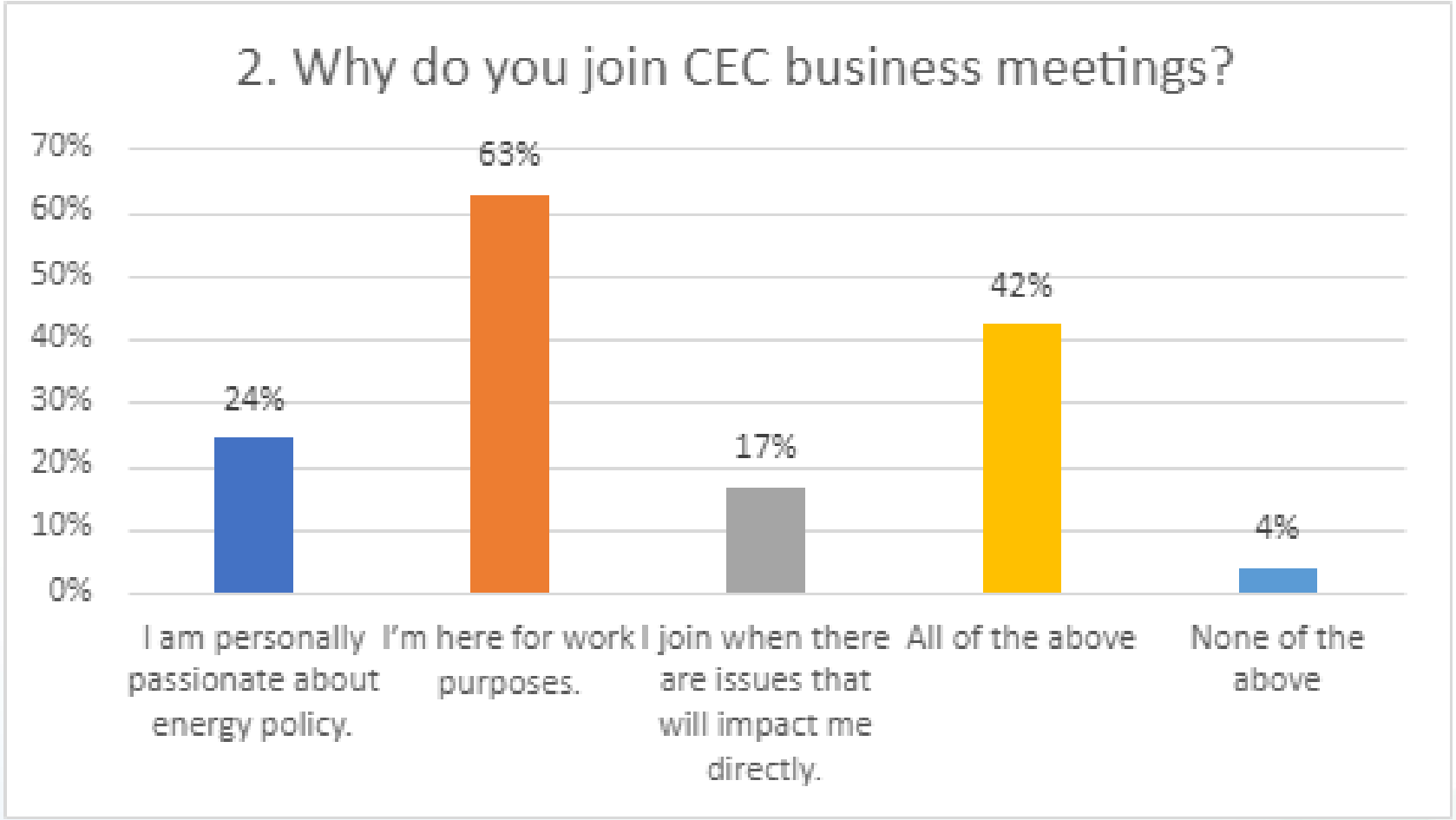
- Available at CEC Business Meetings webpage: https://www.energy.ca.gov/proceedings/business-meetings

Attendance



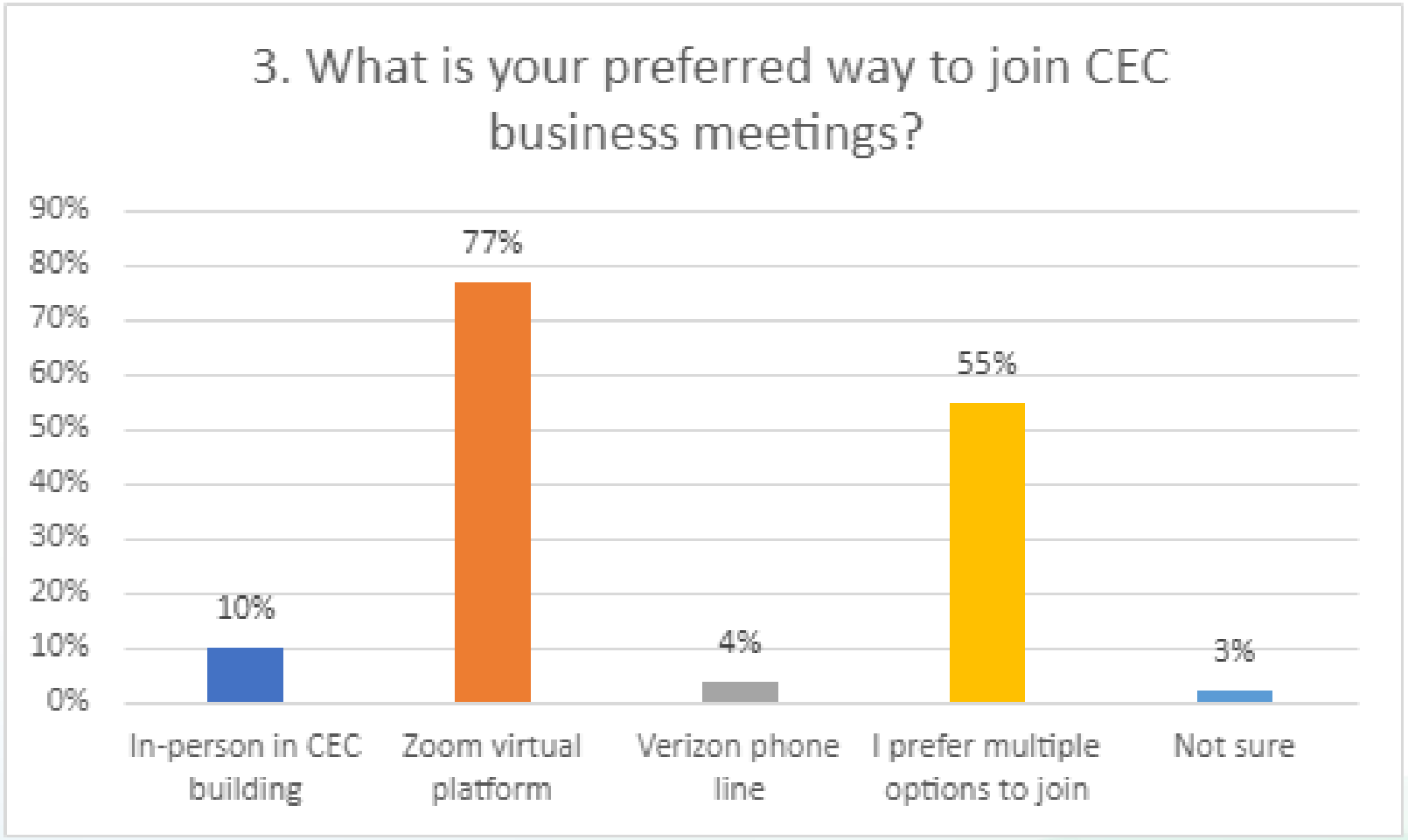
Most are rather new or infrequent participants.

Reason for Joining



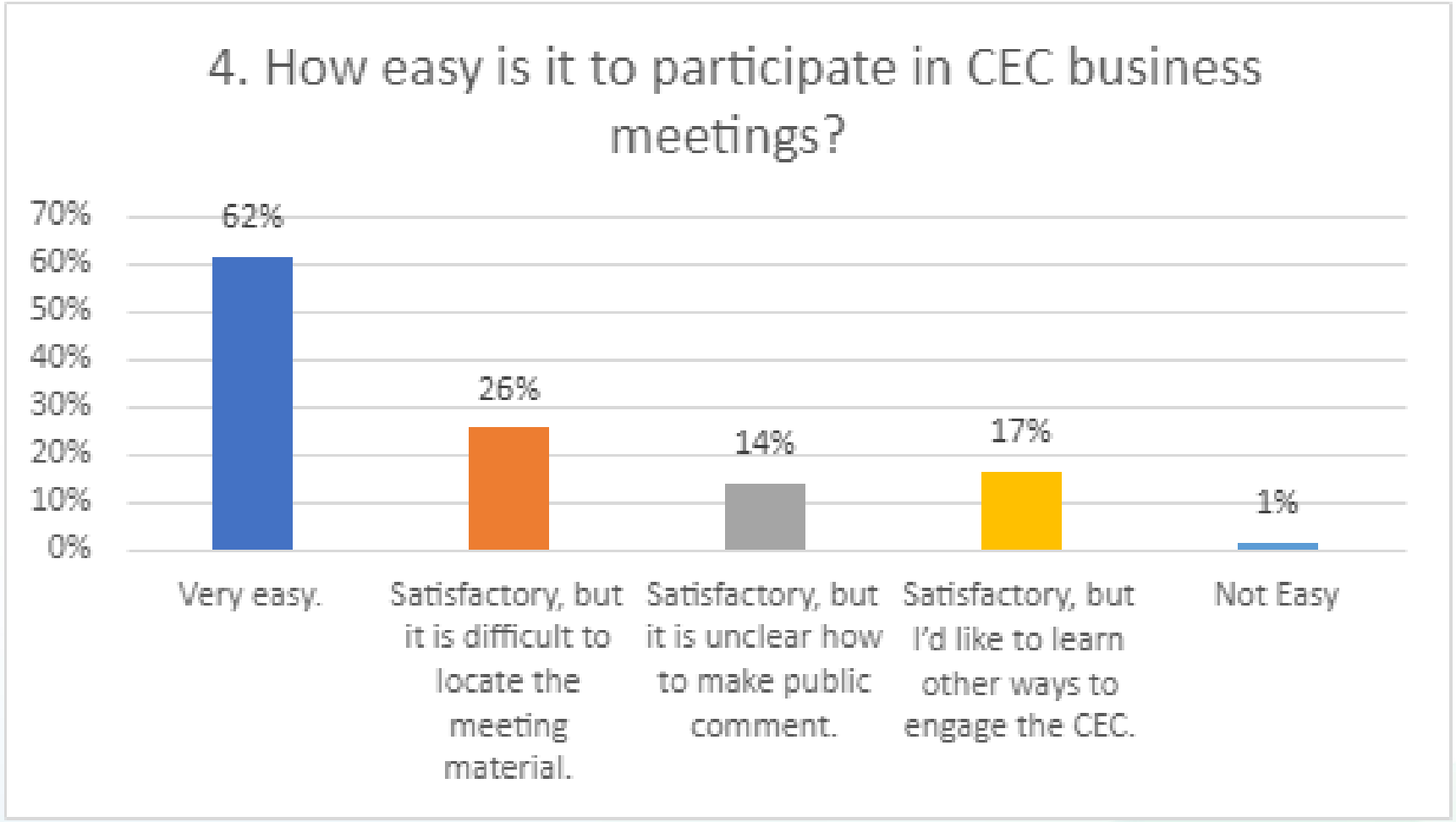
Most attend for work but also feel passionate and see impacts.

Preferences to Join



Most prefer Zoom, but want multiple ways to join.

Ease to Participate



Most find it very easy to participate but there's room to improve.

Takeaways

- Continue enabling various ways to join, including Zoom.
- Determine additional ways for public to access meeting material.
- Share additional ways attendees can participate in CEC efforts.