
2023 CMAA WEBINAR SERIES
NORTHERN CALIFORNIA
CHAPTER

CMAA
NORTHERN CALIFORNIA CHAPTER
presents in association with

CMAA
HAWAI'I CHAPTER

ASSOCIATION FOR
LEARNING ENVIRONMENTS
Enhancing the Educational Experience
N. California/Nevada Chapter

Sustainable School Facilities; Meeting State Climate Goals and Mandates in K-12

February 14, 2023

ASSOCIATION FOR
LEARNING ENVIRONMENTS
Enhancing the Educational Experience

An interdisciplinary association of professionals working at the intersection of learning and place to drive the evolution of learning environments.

Join us! We have fun!
www.A4LE.org
Peter@trigroup.us

NorCal/Nevada Chapter Leadership:

President
Peter Parenti
TRiGroup, Inc.

President-Elect
Mary Ruppenthal
HED Design

Past President
Josh Niederman
OneWorkPlace

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multistudio

the evolution of gould evans

multistudio

CMAA NorCal Chapter | Sustainable School Facilities
February 14th, 2022

DESIGN COLLABORATION IN THE PURSUIT OF POSSIBILITY

Who we are.

Multistudio, formerly Gould Evans, collectively design across the practices of **architecture, brand experience, city design, education design,** and **interiors** to think beyond what is asked, into defining what is possible for our clients and communities.

We aim to engage and inspire through design. Our values are built around a culture that seeks diverse perspectives, promotes multidisciplinary collaboration, and utilizes design to **positively impact the communities and clients we serve.**

Lauren Maass

Principal

Lauren is a passionate advocate for prK-12 education and seeks in her work to create facilities which are attuned to 21st century pedagogies. She is active within the Albany community and helped Albany USD's Ocean View Elementary School implement their net zero ready goals.

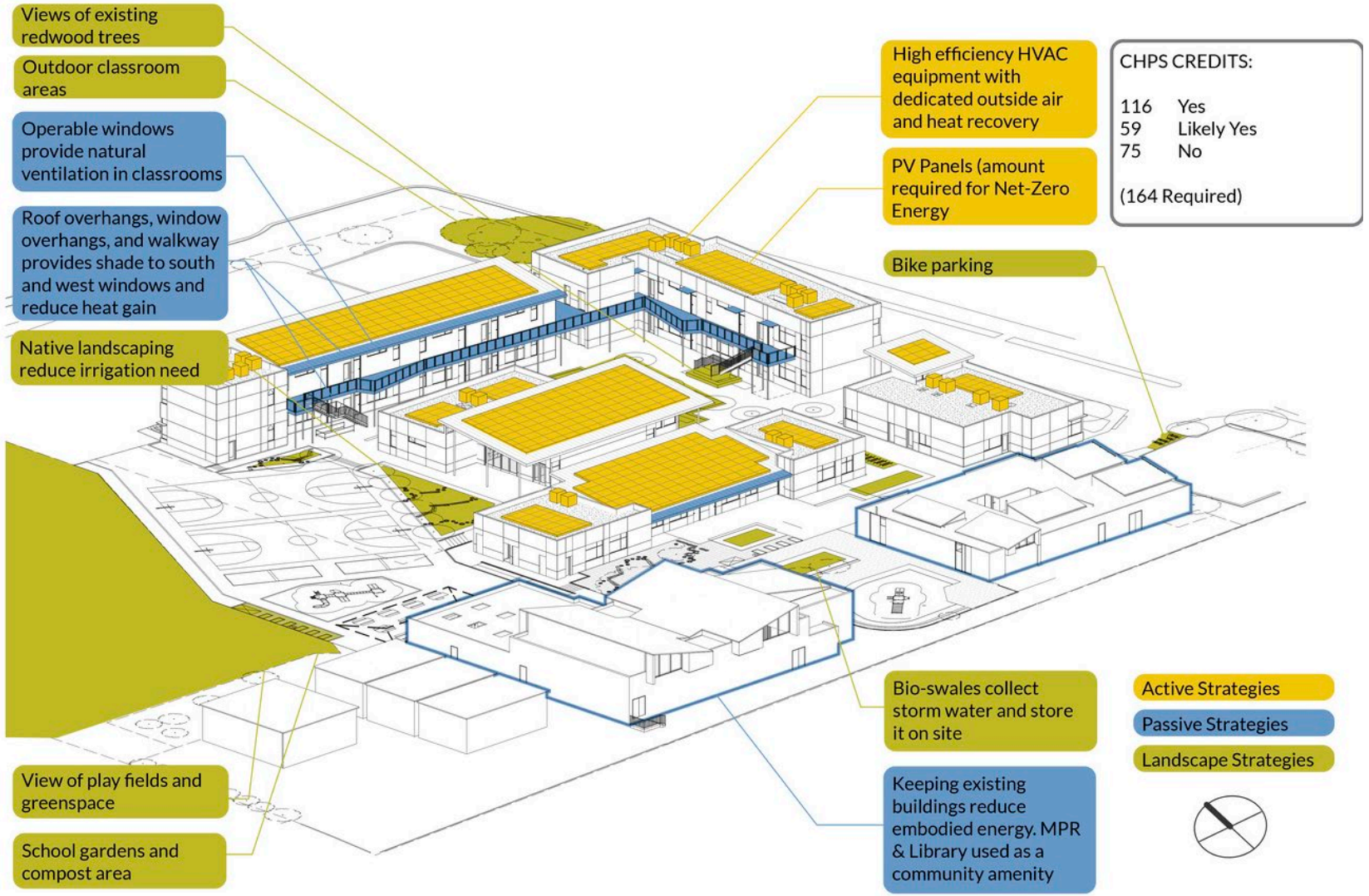
Teresa Jan

Director of Climate Positive Design

Teresa is a passionate designer and driver of climate responsive, financially responsible, and socially supportive architecture. She actively champions each project's climate goals and advocates for integrated project strategies that are climate positive.

Ocean View Elementary School Sustainability Approach

Ocean View Elementary School was designed with sustainability in mind, with a range of passive, active and landscape strategies that work together. It **is Net Zero Ready**, with a new high-efficiency mechanical system, the **elimination of natural gas** and dedicated roof space for a future solar panel installation.



multistudio

We are committed to working towards a carbon-free future.

Through our practice, we work **towards positive impact at all scales**—from site-specific approaches to energy and water use reduction to a rigorous focus on healthy and low carbon materials. In partnership with communities, we work to develop resilient and equitable long-term plans that advance climate justice and reduce our carbon footprint. We proactively focus on health and wellness, **considering the impact of our decisions on people and their habitats.**

multistudio

THANK YOU TO OUR SILVER **SPONSOR**

KLEINFELDER

MEET THE **PANELISTS**

Kim Trutane Ph.D.
Support Services Coordinator
Albany Unified School District

Peter Morris
Americas Practice Leader Program, Cost, Consultancy
AECOM

Russell Driver
Principal
Arc Alternatives

Erik Ring,
Director of Engineering
LPA

Ida Antoniolli Clair, AIA LEED®AP BD+C, CASp
State Architect
DSA


DSA
DIVISION OF THE STATE ARCHITECT
DEPARTMENT OF GENERAL SERVICES

DSA AUTHORITY

Code Development Responsibilities

- Public Schools and Community Colleges
  - California Administrative Code
  - California Building Code
  - California Electrical Code
  - California Mechanical Code
  - California Plumbing Code
  - CALGreen
- State of California
  - CBC Chapter 11B Accessibility
  - California Historical Building Code

Field Act

Public Schools and Community Colleges

- Design and Construction Oversight
  - Structural |FLS |Access |CALGreen

1,084 K-12 Public School Districts

9,292 Campuses

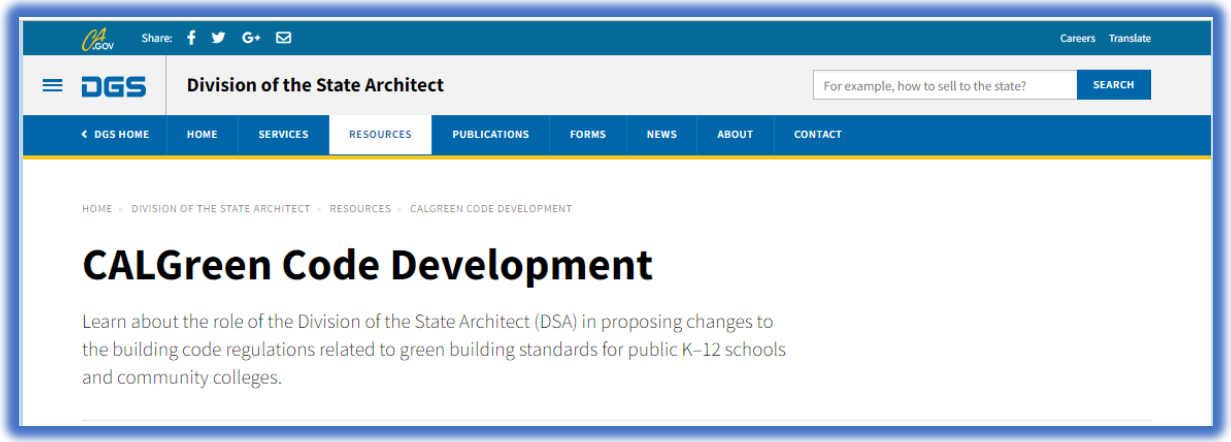
72 Community College Districts

114 Campuses

PUBLIC SCHOOLS AND COMMUNITY COLLEGES

CALGreen Code Development

- **Must meet most nonresidential requirements**
- **Specific School Requirements for:**
  - ✓Electric Vehicle Charging
  - ✓Shade Trees
  - ✓Carbon Dioxide Monitors in Classrooms
  - ✓Outdoor Water Use



CALGREEN CARBON REDUCTION COLLABORATIVE

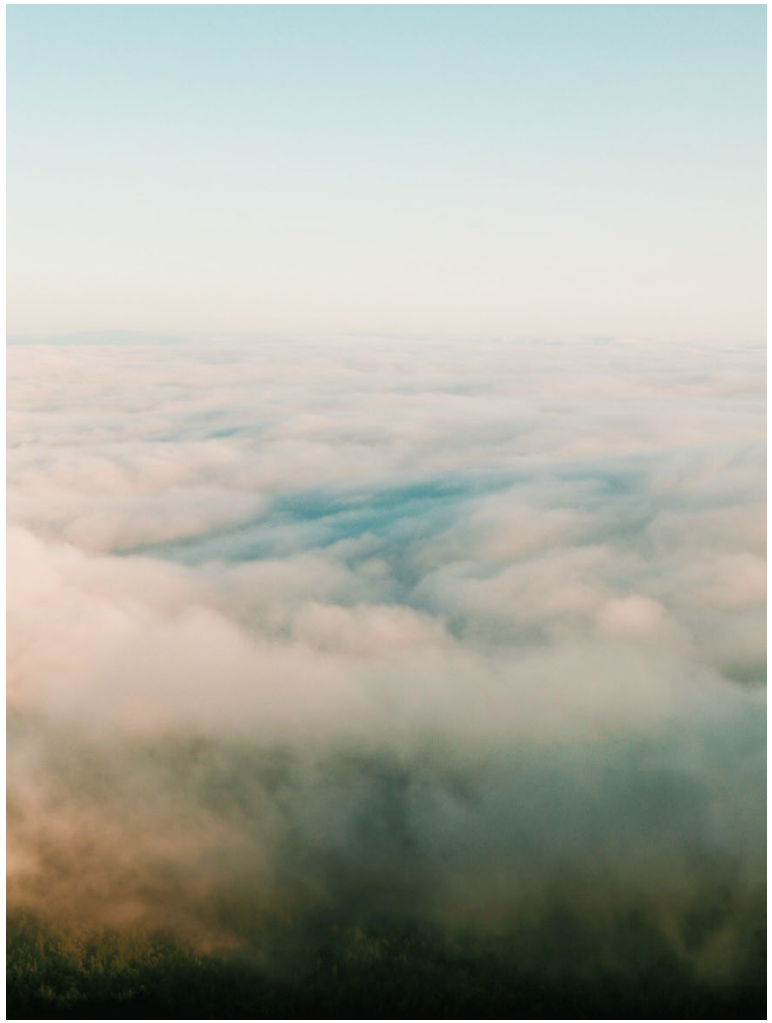


Photo by saira on Unsplash

A collaborative workgroup led by BSC/DSA/HCD and comprised of state and national climate action leaders including:

- Professional Organizations
- Climate Action NGOs
- Industry Stakeholders

Aims for incremental increases in carbon reduction strategies to support and achieve California's climate action goals. If approved, effective July 1, 2024.

Current proposal for buildings 50,000 SF or greater

Choose one option for compliance:

1. Building Reuse
2. WBLCA
3. Prescriptive GWP Limits aligned with Buy Clean CA

CAMPUS ELECTRIC VEHICLE CHARGING

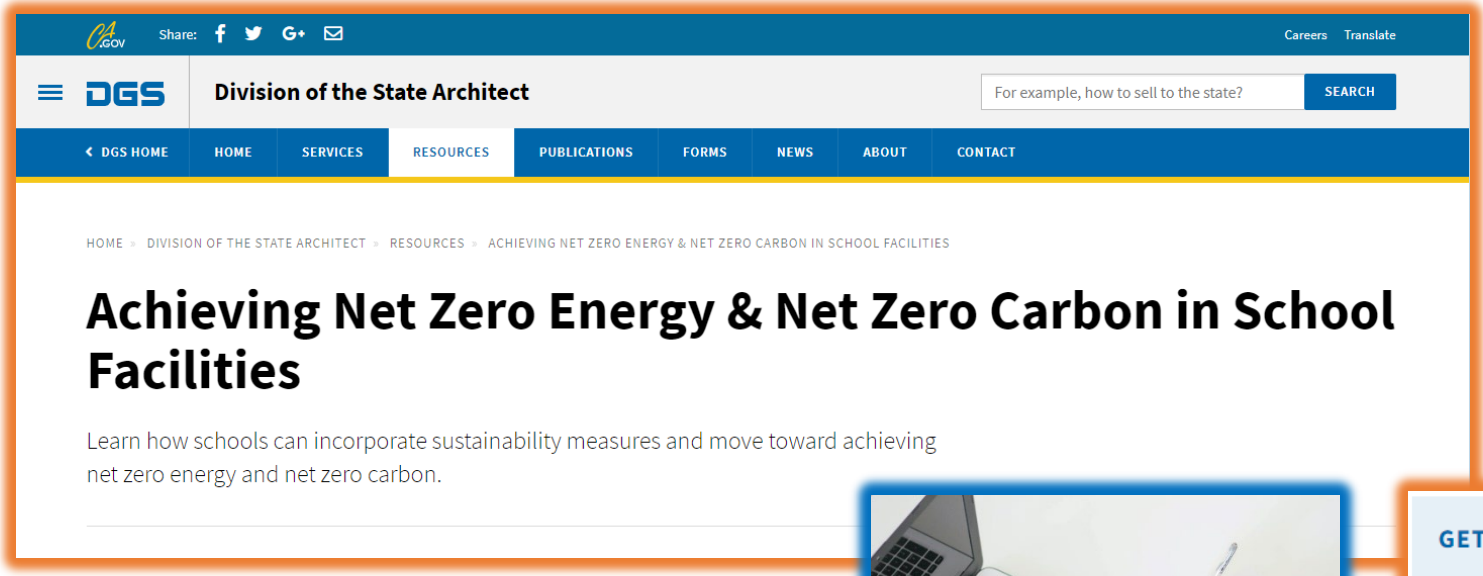
DSA CALGreen for
Schools and Community Colleges
If approved, effective July 1, 2024

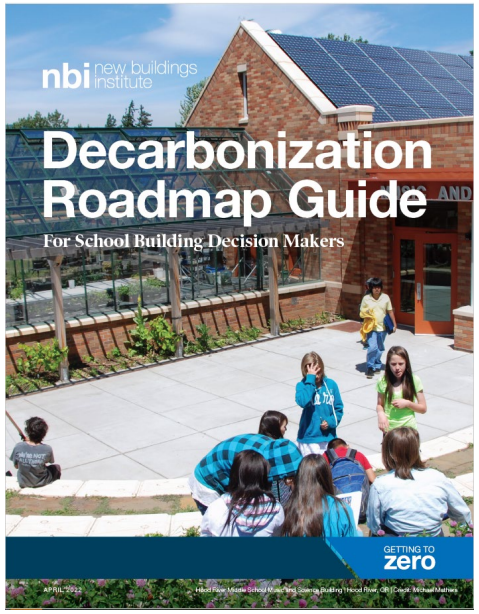
CALGreen Proposed Amendments:

- Alternative compliance option based on power budget of electric vehicle service equipment (EVSE):
  - Low power Level 1 (120v 20-ampere)
  - Low power Level 2 Receptacle (208/240v 20-ampere)
  - Level 2 W/ Charging Cable (208/240v 20-ampere)
- Electric vehicle charging stations (EVCS) for existing facilities:
  - Increase in power supply to an electric service panel serving light fixtures in the parking area
  - Installation of PVs over a parking area
  - If a modernization of a building is submitted for plan approval, the installation of EVSE for existing EV capable spaces to create EVCS

Photo by Ernest Ojeh on Unsplash

DSA SUSTAINABILITY EDUCATION AND OUTREACH





Green Schoolyards

Photo by J. Kelly Brito on Unsplash

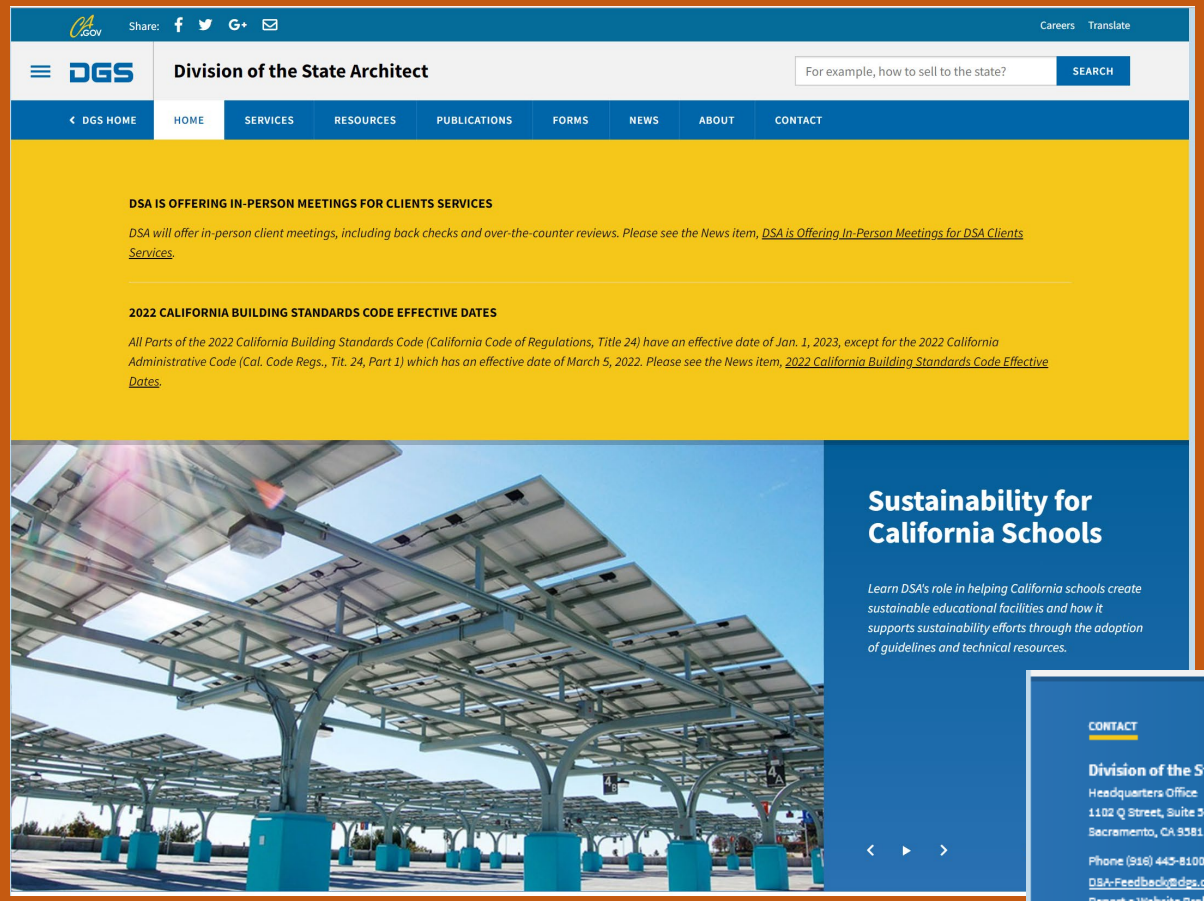
All-Electric California Schools

Kitchen of the Future

Decarbonization Roadmap Guide for School Building Decision Makers

- GETTING TO ZERO OVER TIME COHORT +
- NET ZERO EVENTS +
- CALIFORNIA SUSTAINABLE SCHOOLS SHOWCASE +
- NET ZERO ENERGY AND NET ZERO CARBON RESOURCES +
- CASE STUDIES IN SUSTAINABLE SCHOOL DESIGN: 7X7X7 DESIGN ENERGY WATER +
- WATER CONSERVATION +
- MECHANICAL ACCEPTANCE TEST TRAINING +

STAY INFORMED



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CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS (TITLE-24, PART 6) 2022 UPDATES

Why Did the Energy Code Change?

The 2022 Energy Code is an important part of California's work to reduce carbon emissions and fight climate change. The Energy Code is updated every three years with the mandate to increase building energy efficiency while staying cost-effective for building owners over the lifespan of a building.

Increases in energy efficiency and on-site generation:

- Reduce utility bills
- Improve indoor comfort and air quality
- Increase market value
- Reduce greenhouse gas emissions (GHG)

The California Energy Commission (CEC) estimates that over 30 years the 2022 Energy Code will provide $1.5 billion in consumer benefits and reduce 10 million metric tons of GHGs – equivalent to taking nearly 2.2 million cars off the road for a year.

The CEC estimates that the 2022 Energy Code improvements in efficiency for new nonresidential buildings and covered processes, plus the move toward all-electric design, will reduce net CO_2 emissions by 142,858 mTon/yr compared to the 2019 Energy Code, the equivalent of taking 32,051 gas cars off the road each year.

BENEFITS OF THE 2022 ENERGY CODE ACROSS ALL BUILDING TYPES

- Increases on-site renewable energy generation from solar
- Increases electric load flexibility to support grid reliability
- Reduces emissions from newly constructed buildings
- Reduces air pollution for improved public health
- Encourages adoption of environmentally beneficial efficient electric technologies

DECARBONIZATION GOALS

California is aiming to reduce its greenhouse gas emissions (GHG) while creating an energy system that is resilient to climate risks, spurring innovation and a low-carbon transition nationally and internationally. California's climate goals are among the most ambitious in the country.

GHG Emission Reduction Goals

Assembly Bill 32:
1990 levels by 2020

Senate Bill 32:
40% below 1990 levels by 2030

Executive Order S-3-05:
80% below 1990 levels by 2050

This can be achieved through a variety of measures, such as incremental steps toward "carbon neutral" buildings, and timely balancing of onsite energy production and consumption in support of a healthy, stable grid. The Energy Code is designed to support reaching these goals.

Learn more here: https://www.energy.ca.gov/data-reports/reports/building-decarbonization-assessment

LPA

CALIFORNIA PROJECTS SUBMITTING FOR PERMIT AFTER 1/1/2023

LPA

Source Total

a score representing the building energy efficiency expressed in terms of an hourly source carbon based metric

Includes energy used by:
- Envelope
- IAQ
- HVAC
- DHW
- Unregulated loads

TDV Efficiency

a score representing the building energy efficiency expressed in terms of TDV energy based metric

Includes energy used by:
- Envelope
- IAQ
- HVAC
- DHW
- Unregulated loads

TDV Total

a score representing the building's Total TDV while also factoring in PV + Flexibility

Includes energy used by:
- Efficiency measures
- Photovoltaics
- Batteries
- Precooling

A building complies ONLY if **all three** compliance scores are met
(**each** Proposed Design score is **lower or equal** to Standard Design score)

EV CHARGING
(5% of parking spaces)

CalGreen:
Electric Vehicle Charging

2019

"facilitate future installation of electric vehicle supply equipment (EVSE)"
5.106.5.3

TABLE 5.106.5.3.3

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CHARGING SPACES
0-9	0
10-25	2
26-50	4
51-75	7
76-100	9
101-150	13
151-200	18
201 and over	10 percent of total

2022

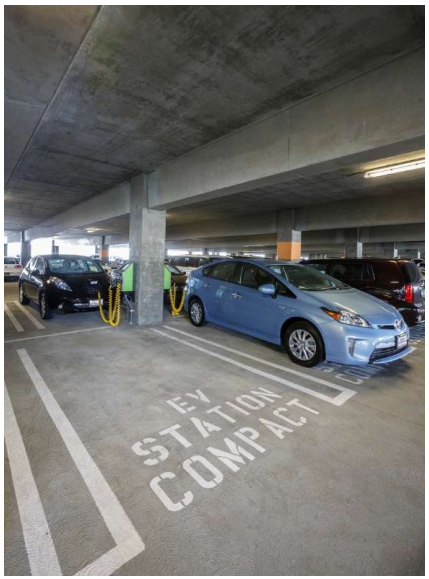
"provide electric vehicle infrastructure and facilitate electric vehicle charging"
5.106.5.3

TABLE 5.106.5.3.1

NUMBER OF REQUIRED EV CAPABLE SPACES	NUMBER OF EVCS (EV CAPABLE SPACES PROVIDED WITH EVSE)
0	0
4	0
8	2
13	3
17	4
25	6
35	9
20 percent of total	25 percent of EV capable spaces

5% OF PARKING SPACES TO HAVE EV CHARGERS!!!

EV Charging Future



PHOTOVOLTAIC + BATTERY SYSTEMS


MULTI-PURPOSE
MULTI-PURPOSE

SECTION 140.10 – PRESCRIPTIVE REQUIREMENTS FOR PHOTOVOLTAIC AND BATTERY STORAGE SYSTEMS

(a) Photovoltaic Requirements. All newly constructed building types specified in Table 140.10-A, or mixed occupancy buildings where one or more of these building types constitute at least 80 percent of the floor area of the building, shall have a photovoltaic (PV) system meeting the minimum qualification requirements of Reference Joint Appendix JA11. The PV size in kW_{dc} shall be not less than the smaller of the PV system size determined by Equation 140.10-A, or the total of all available Solar Access Roof Areas (SARA) multiplied by 14 W/ft^2.

1. SARA include the area of the building's roof space capable of structurally supporting a PV system, and the area of all roof space on covered parking areas, carports, and all other newly constructed structures on the site that are compatible with supporting a PV system per Title 24, Part 2, Section 1511.2.
2. SARA does NOT include:
   A. Any area that has less than 70 percent annual solar access. Annual solar access is determined by dividing the total annual solar insolation (accounting for shading obstructions) by the total annual solar insolation if the same areas were unshaded by those obstructions. For all roofs, all obstructions including those that are external to the building, and obstructions that are part of the building design and elevation features may be considered for the annual solar access calculations.
   B. Occupied roofs as specified by CBC Section 503.1.4.
   C. Roof space that is otherwise not available due to compliance with other building code requirements if confirmed by the Executive Director.

EQUATION 140.10-A PHOTOVOLTAIC DIRECT CURRENT SIZE

$kW_{PVdc} = (CFA \times A)/1000$

WHERE:

kW_{PVdc} = Size of the PV system in kW

CFA = Conditioned floor area in square feet

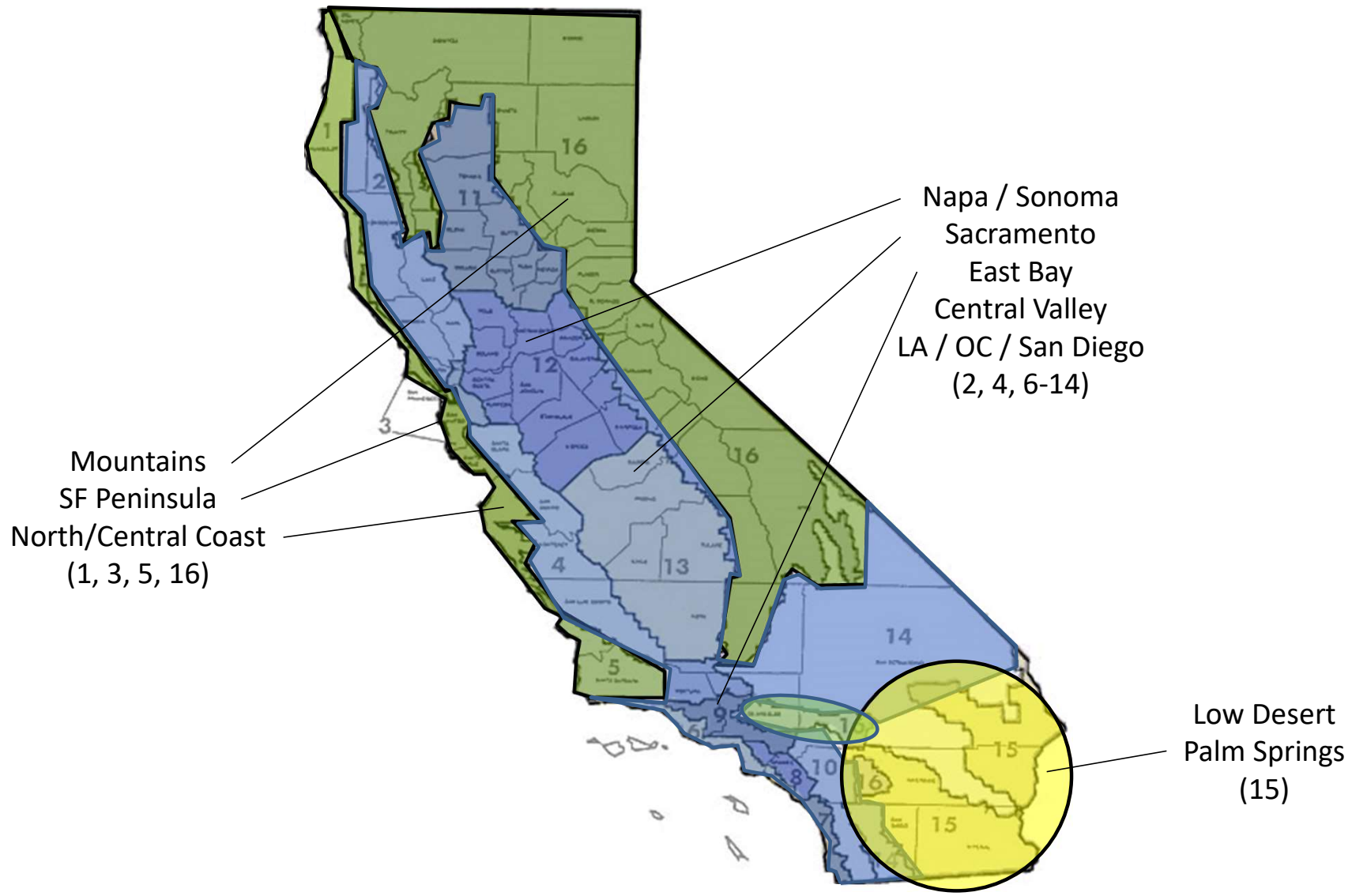
A = PV capacity factor specified in Table 140.10-A for the building type

Table 140.10-A – PV Capacity Factors

	Factor A – Minimum PV Capacity (W/ft^2 of conditioned floor area)		
Climate Zone	**1, 3, 5, 16**	**2, 4, 6-14**	**15**
Grocery	2.62	2.91	3.53
Highrise Multifamily	1.82	2.21	2.77
Office, Financial Institutions, Unleased Tenant Space	2.59	3.13	3.80
Retail	2.62	2.91	3.53
School	1.27	1.63	2.46
Warehouse	0.39	0.44	0.58
Auditorium, Convention Center, Hotel/Motel, Library, Medical Office Building/Clinic, Restaurant, Theater	0.39	0.44	0.58

Table 140.10-B – Battery Storage Capacity Factors

	Factor B – Energy Capacity	Factor C – Power Capacity
Storage to PV Ratio	**Wh/W**	**W/W**
Grocery	1.03	0.26
Highrise Multifamily	1.03	0.26
Office, Financial Institutions, Unleased Tenant Space	1.68	0.42
Retail	1.03	0.26
School	1.87	0.46
Warehouse	0.93	0.23
Auditorium, Convention Center, Hotel/Motel, Library, Medical Office Building/Clinic, Restaurant, Theater	0.93	0.23


Napa / Sonoma
Sacramento
East Bay
Central Valley
LA / OC / San Diego
(2, 4, 6-14)
Mountains
SF Peninsula
North/Central Coast
(1, 3, 5, 16)
Low Desert
Palm Springs
(15)

T24 2022:
Photovoltaic System Sizing

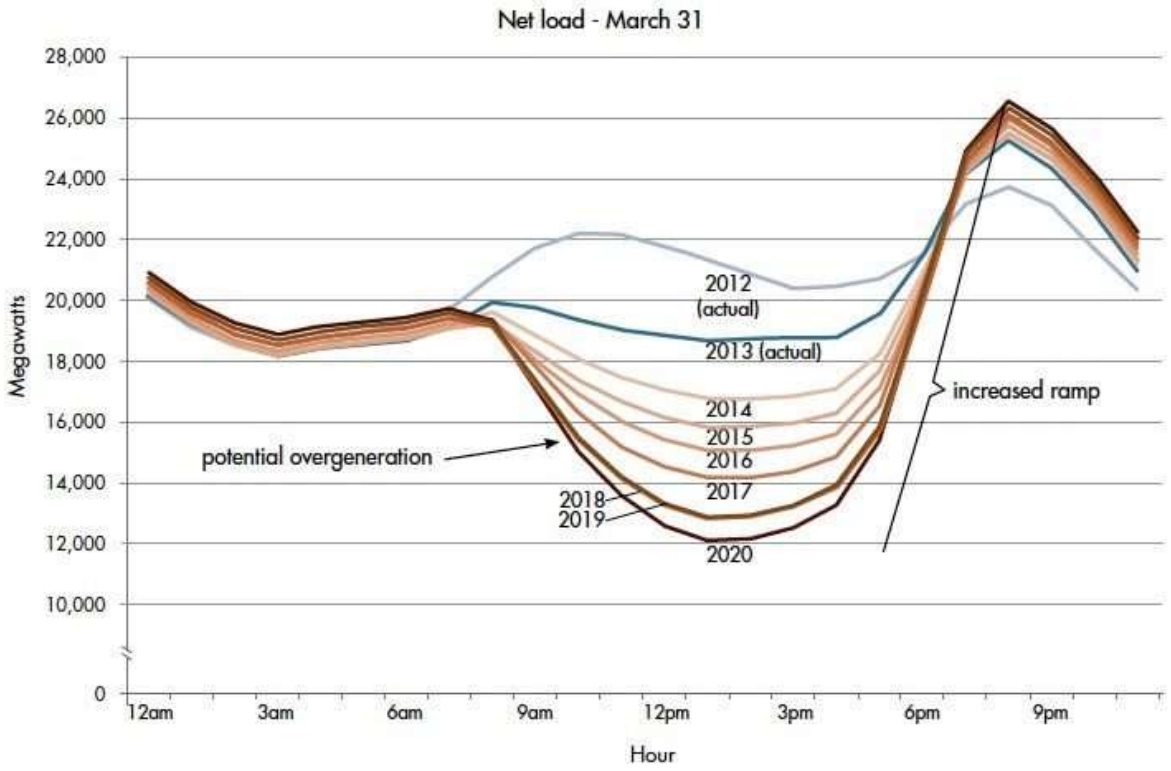
	SoCal Sacramento Central Valley (2, 4, 6-14)	SF Peninsula North/Central Coast Mountains (1, 3, 5, 16)	Low Desert Palm Springs (15)	or	All Locations
Office	3.13	2.59	3.80		Solar Access Roof Area (SARA) sf
Grocery / Retail	2.91	2.62	3.53		
Multi-family	2.21	1.82	2.77		
School	1.63	1.27	2.46		
Warehouse, Auditorium, Convention Center, Library, Medical Office, Clinic, Hotel/Motel, Restaurant, Theater	0.44	0.39	0.58		
	X Conditioned Floor Area (sf)				X 14 w/sf

Photovoltaic System Design
Roof vs. Parking Canopy vs. Site Canopy?

T24 2022:
Battery System Sizing

	Battery Energy Capacity (Wh/W)	Battery Power Capacity (W/W)
Office	1.68	0.42
Grocery / Retail	1.03	0.26
Multi-family	1.03	0.26
School	1.87	0.46
Warehouse, Auditorium, Convention Center, Library, Medical Office, Clinic, Hotel/Motel, Restaurant, Theater	0.93	0.23
	X PV System Capacity	

Energy Demand “Duck Curve”



Battery Energy Storage Systems

Changing Lives by Design™

Energy planning to meet climate goals for k-12 schools

Prepared for:
CMAA

- **ARC Alternatives**

- Firm formed in 2014 to focus on education and local government clients in California. Unique combination of expertise in public sector procurement, program management, energy engineering, and renewables.

- The three founding Principals of ARC Alternatives collectively have over 50 years of experience in solar PV systems, energy efficiency, economic modeling of

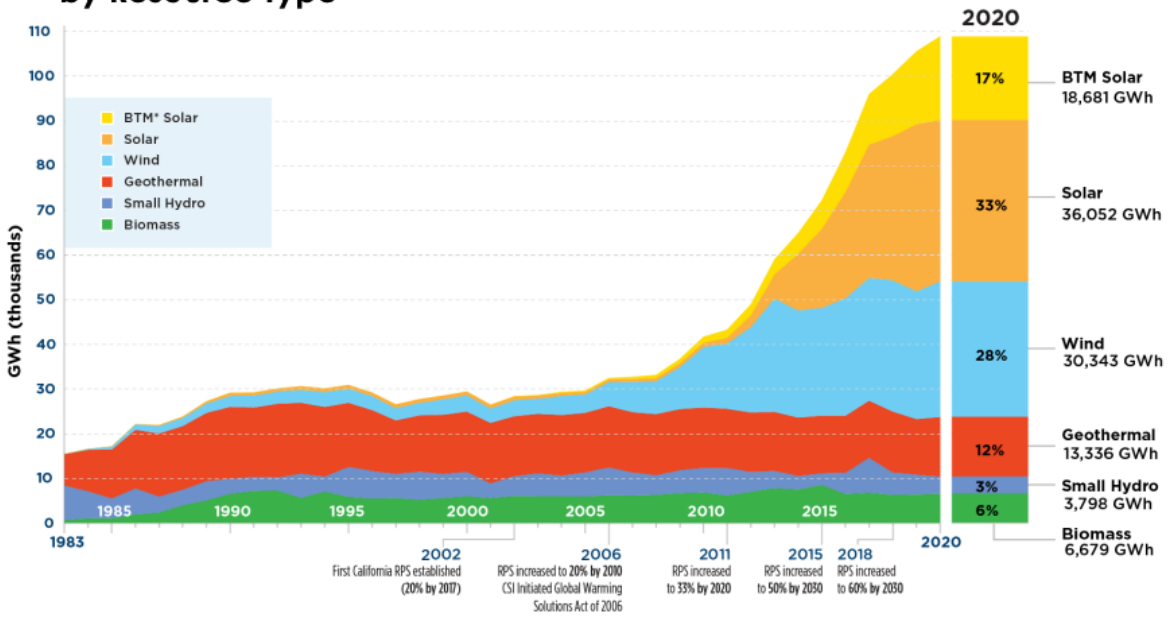
Drivers of Decarbonization and Electrification in California

- Increasing focus on carbon reduction goals in addition to energy savings goals due to climate change
  - Code requirements
  - Public Safety Power Shutoffs
  - Visibility of Wildfires and Drought
- Changing policies that shift focus to decarbonization and resiliency at the expense of distributed generation and traditional energy efficiency
  - CBC and Net Zero requirements
  - NEM changes
  - Electrification legislation – CEC funding and best practices; cities banning gas hookups, etc.
  - Changes to traditional utility efficiency programs
- Different challenges when addressing new construction versus existing infrastructure

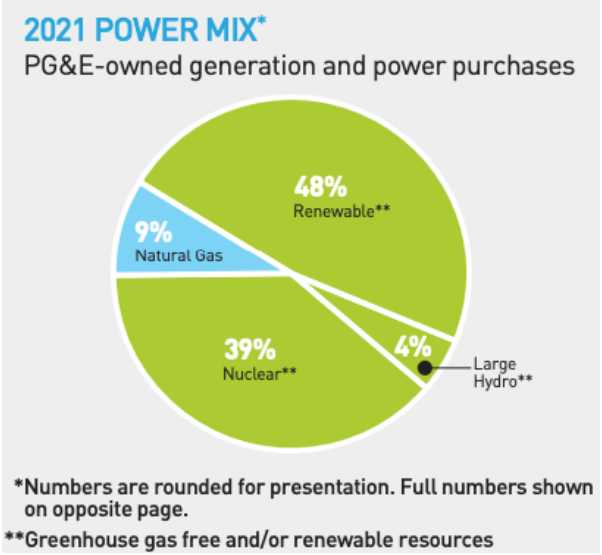
• Incorporation of Environmental Impacts in Energy Plans

- Many customers have already targeted energy savings "low hanging fruit"
- Greening of electricity grid
  - IOUs on the pathway to carbon free
  - CCAs are there now (at an added cost)

Figure: Total Renewable Generation Serving California Load by Resource Type



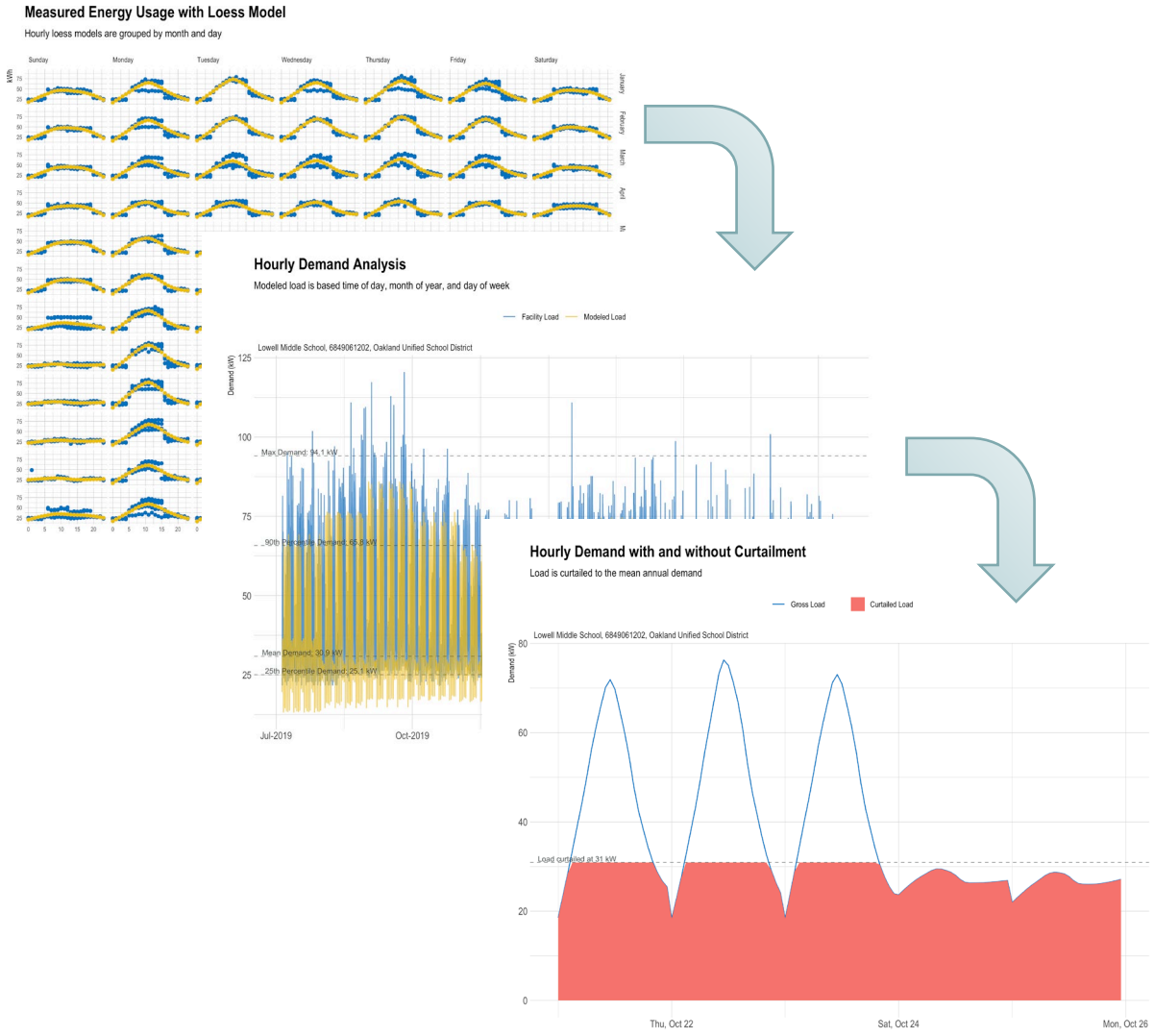
Source: CEC staff analysis, October 2021



Energy Resources	Base Plan	2021 CA Power Mix
Eligible Renewable[1]	**47.7%**	**33.6%**
Biomass & Biowaste	4.2%	2.3%
Geothermal	5.2%	4.8%
Eligible Hydroelectric	1.8%	1.0%
Solar	25.7%	14.2%
Wind	10.9%	11.4%
Coal	**0.0%**	**3.0%**
Large Hydroelectric	**4.0%**	**9.2%**
Natural Gas	**8.9%**	**37.9%**
Nuclear	**39.3%**	**9.3%**
Other	**0.0%**	**0.2%**
Unspecified Power[2]	**0.0%**	**6.8%**
TOTAL	**100.0%**	**100.0%**

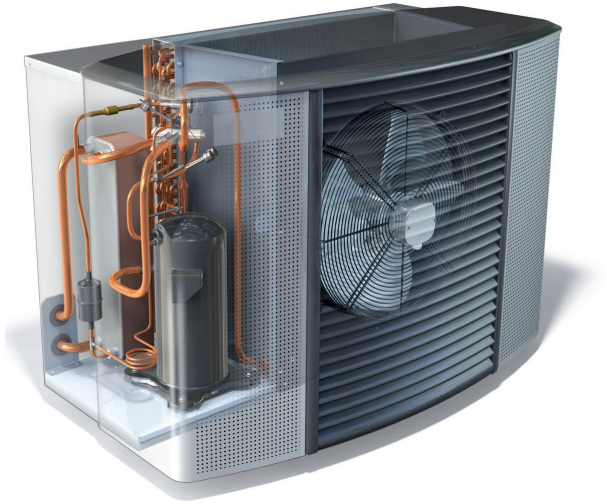
Energy Project Considerations

- Decarbonization and electrification projects add complexity
  - Infrastructure upgrades
  - Operational impacts
  - Can go beyond traditional building systems (e.g., vehicles, charging infrastructure, batteries)
  - Energy procurement considerations
- Project require more comprehensive planning
- Savings can be reduced (or nonexistent) for these projects
- Procurement and contracting approaches affect outcomes
  - Low bid vs. best value
  - Design-bid-build vs. design-build
  - Ownership vs. PPA



Types of Projects and Measures

- Traditional load reduction
  - Electric load to the extent supply isn't carbon free
  - Renewed emphasis on gas load
- Procurement of carbon free electricity supply (DG, IOU, CCA, DA, etc.)
- Electrification (both near term and long term)
  - Heat recovery and heat pumps
  - Gas equipment replacement
  - Full electrification of operations (fleet, buildings, etc.)
- Optimization
  - Thermal storage
  - Economizer controls
  - Central plant



How to plan & fund and deliver . . . Getting it Done

Funding and Financing

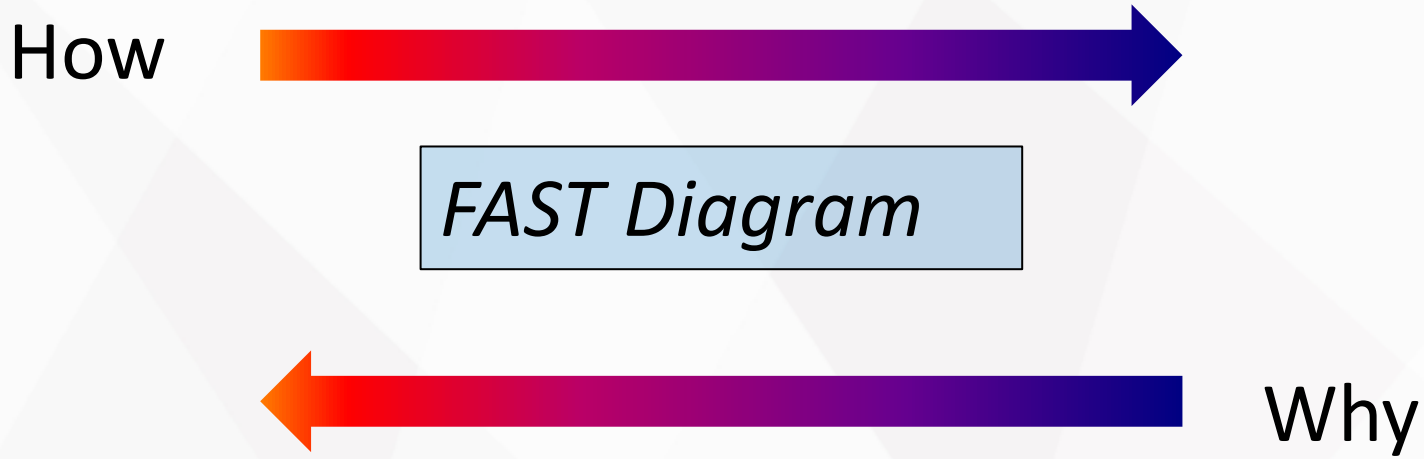
- Funding – Where the money comes from
  - Internal (Project) – revenue, avoided cost
  - External – grants, general fund

- Financing – Organizing the money
  - Monetized cash flow
  - Debt

Getting it Done – Finding the money

Start with the budget – and an open mind

- Options, not solutions



Getting it Done – Finding the money

Start with the budget – and an open mind

- Options, not solutions
- Value based decision-making –
  - possibilities – start without judgment
  - which options deliver the greatest value?
  - which options bring added funding opportunities?
  - what is the life cycle cost/income?

Getting it Done – Finding the money

Start with the budget – and an open mind

- Options, not solutions
- Value based decision-making
- Truth telling – disappoint early

Getting it Done – Life Cycle Cost/Benefit

- What goes into it?
  - Capital Cost
  - Routine operations
  - Annual maintenance
  - Utility (energy)
  - Capital renewal
- Best available information – don’t overthink
- Make uncertainty explicit

Getting it Done – Life Cycle Cost/Benefit

Proposed System: NPV

					Discount Factor	Net Present Value
Capital Cost						
Heat pumps						
Equipment cost		18 EA		$1,026,000		
30.0 TN		18 EA	$57,000	$1,026,000		$1,026,000
Hoisting						
Crane cost per unit		18 EA	$1,000.00	$18,000		$18,000
Installation						
30.0 TN	40 Hr/Unit	720 HR	$85.00	$61,200		$61,200
Associated work - curb, duct connections, etc.						
30.0 TN		18 EA	$9,000.00	$162,000		$162,000
Additional Structural Support Allowance						
30 TN						Not Required
Ductwork						
No change		0 LB	$7.50	$0		$0
Electrical (based on AAON Quote)						
Added primary switchgear & transformer capacity						
Added distribution board						Not Required
Distribution feeders, 480 V, avg 100A		6,300 LF	$90.00	$567,000		$567,000
Subcontractors Markups on above		15% %		$1,834,200		$275,130
GC Markups on above		23% %		$2,109,330		$480,927
						$2,590,257

Getting it Done – Life Cycle Cost/Benefit

OM Costs							
Heat pumps							
Cleaning/snow removal/misc. - annual	24 Hr/Unit	432 Hr	$95.00	$41,040	base	10.29	$422,506
Routine maintenance							
Monthly inspection	64 Hr/Unit	1,152 Hr	$95.00	$109,440	base	10.29	$1,126,683
Supplies	$200 /Unit	18 EA	$200	$3,600	base	10.29	$37,062
							$1,586,251
Utilities							
Electricity		35,070,342 kWh	$0.13	$4,559,144	utility	10.90	$49,688,478
Gas		0	$1.75				NA
Water		0					NA
							$49,688,478
Capital Renewal							
Heat pumps							
Replace units	10	1 LS	$1,105,200.00	$1,105,200	base	0.56	$617,138
Sub Markups on above	10	20% %		$221,040	base	0.56	$123,428
							$740,565
Total Net Present Value		540 TN	$101,121				$54,605,552

Getting it Done – Life Cycle Cost/Benefit

Cost Summary

		Net Present Value of Investment over 15 years
Proposed Action	Rooftop heat pumps to match existing gas	$69,693,774
No Action (Status Quo)	Existing Gas fired System	$76,305,459
Cost Advantage/(Disadvantage)		$6,611,685

Carbon Analysis

Embodied Carbon Change (Proposed - Baseline)	0	Tonnes CO2e	Nominal Cost	$0
Operational Carbon Change - Annual (Proposed - Baseline)	1,500	Tonnes CO2e/Year	Nominal Cost	$67,500

Notes

Replace rooftop gas fired units with heat pumps

Getting it Done – Finding Funding

- Can you monetize (sell) revenue stream?
  - Energy Savings Performance Contract (ESPC)
  - May have more expensive money
  - May reap tax benefits
  - May sit off-balance sheet
- Can you capitalize revenue stream?
  - Bond retirement from avoided cost
- Can you get targeted grants?
- General bonds

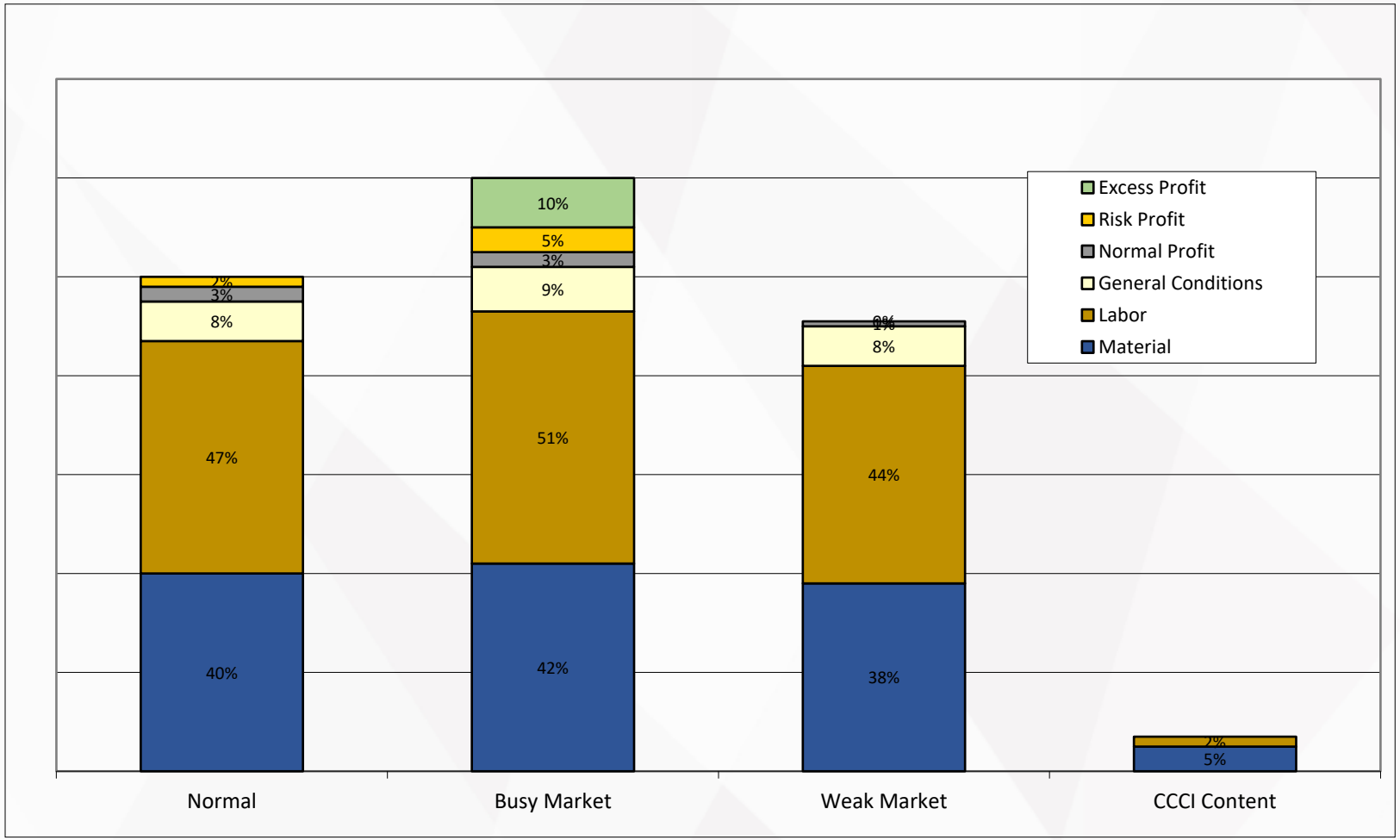
Getting it Done – Finding Funding

- NEM 3.0
  - Chances are that energy measures are not self funding with NEM 3.0 plus batteries (at least for a while)
  - Need to be very careful on sizing to optimize payback on PV and batteries
  - Over time prices will re-balance to create net payback

Getting it Done – Managing uncertainty

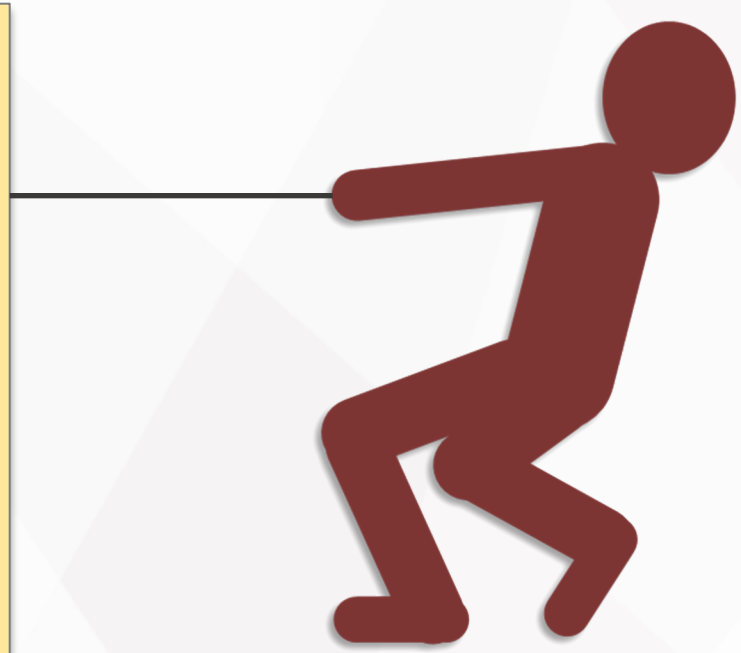
- Markets have been very volatile
  - Rapid and unpredictable price changes
  - Very constrained supply chains
  - Suppliers have not been able to hold prices
  - Bidders have difficulty committing to long term contracts.

Getting it Done – Managing uncertainty



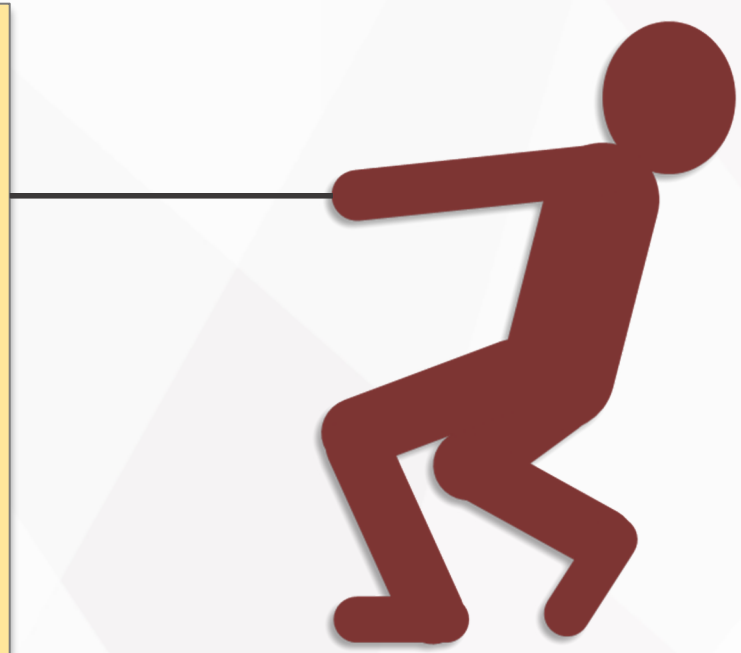
Getting it Done – Managing uncertainty

- Supply/Demand Balance
  - Total Construction Demand
  - Specific Building Capacity
  - Capacity of Individual Trades
- Market Elasticity
  - Size of market
  - Ability to expand/pull in capacity
- Owner Profile
  - Ease of doing business
  - Payment record



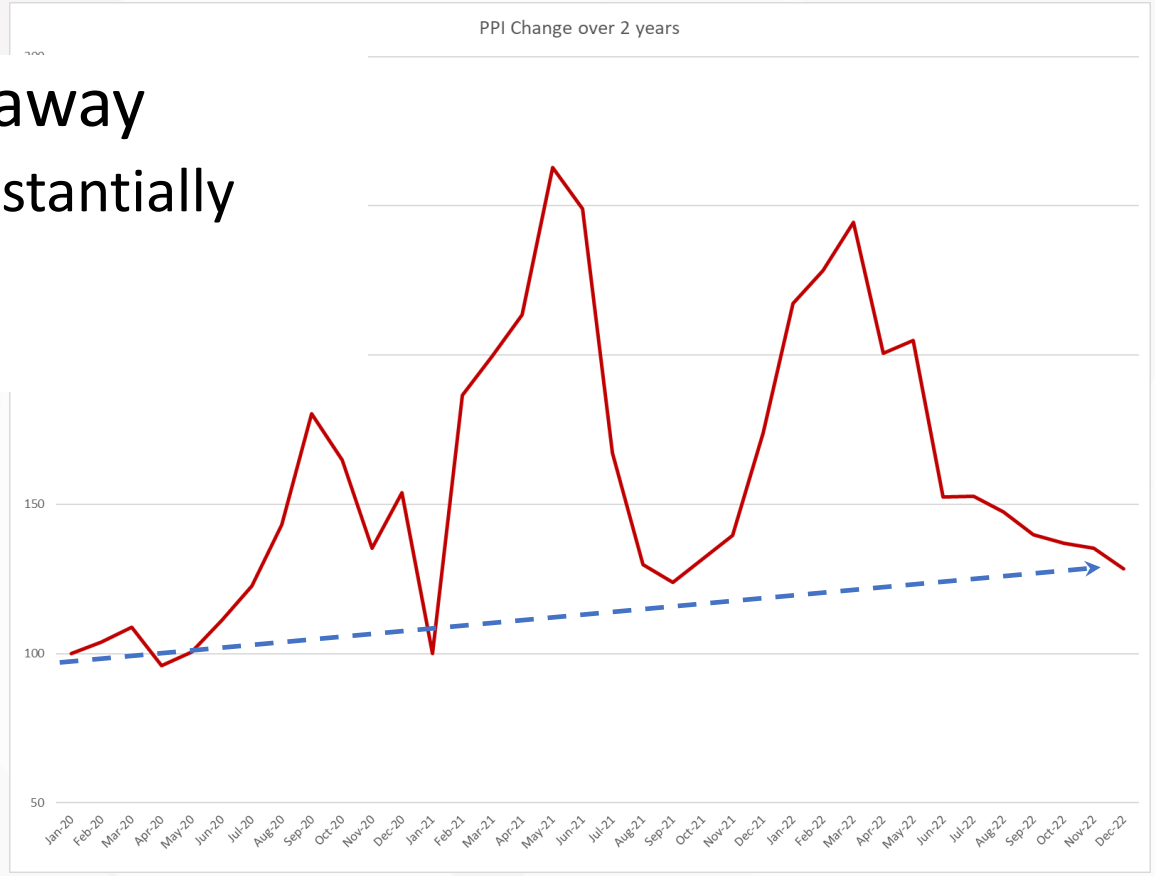
Getting it Done – Managing uncertainty

- "Excess" Inflation
  - Prevails in "stressed" markets
- Driven by demand locally
  - (Think CA in 2004 - 2007)
- Very hard to measure
  - No systematic indexes
- Very volatile/non-linear
- Very un-predictable
- Employment activity a useful proxy



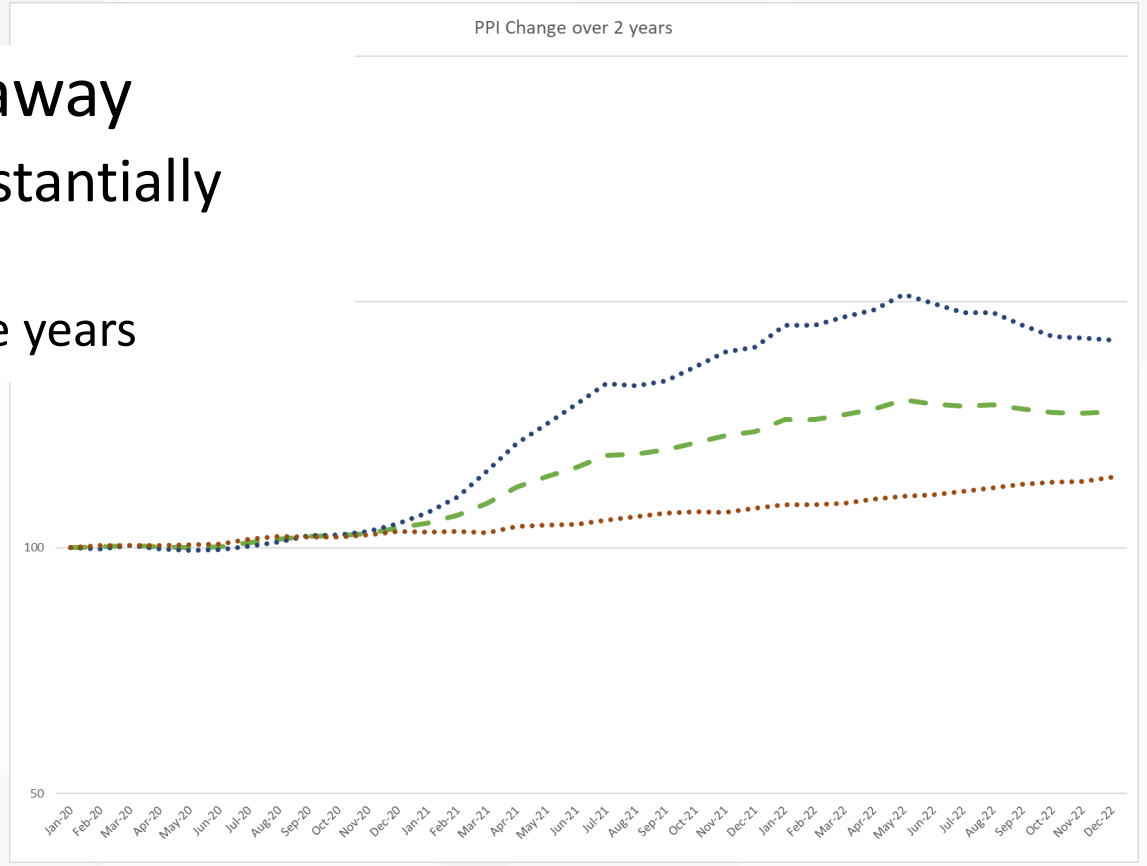
Getting it Done – Managing uncertainty

- Uncertainty is not going away
  - Prices have stabilized substantially
    - Softwood lumber



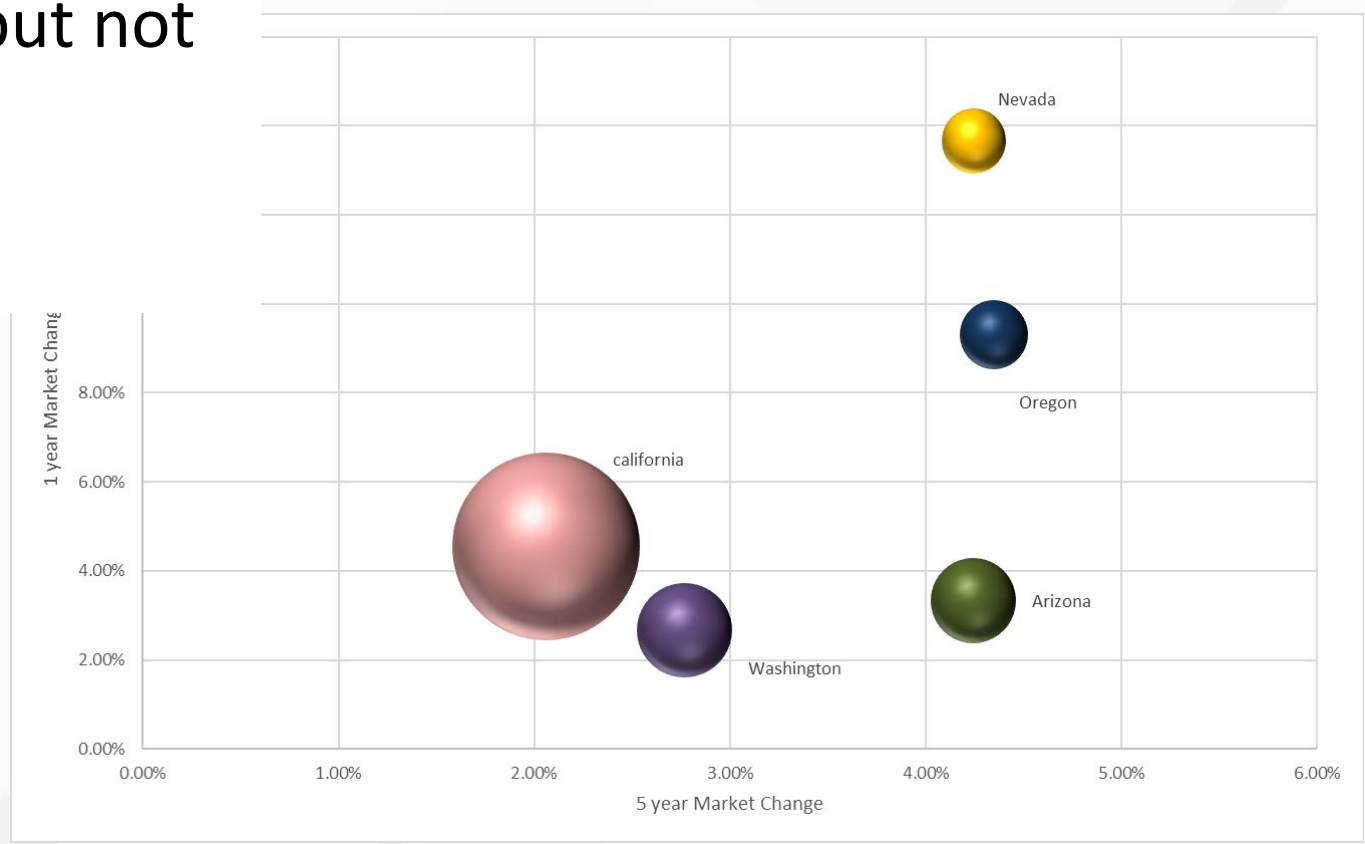
Getting it Done – Managing uncertainty

- Uncertainty is not going away
  - Prices have stabilized substantially
    - All Prices
    - Average 5% p.a. over three years



Getting it Done – Managing uncertainty

- California market is strong, but not overstressed



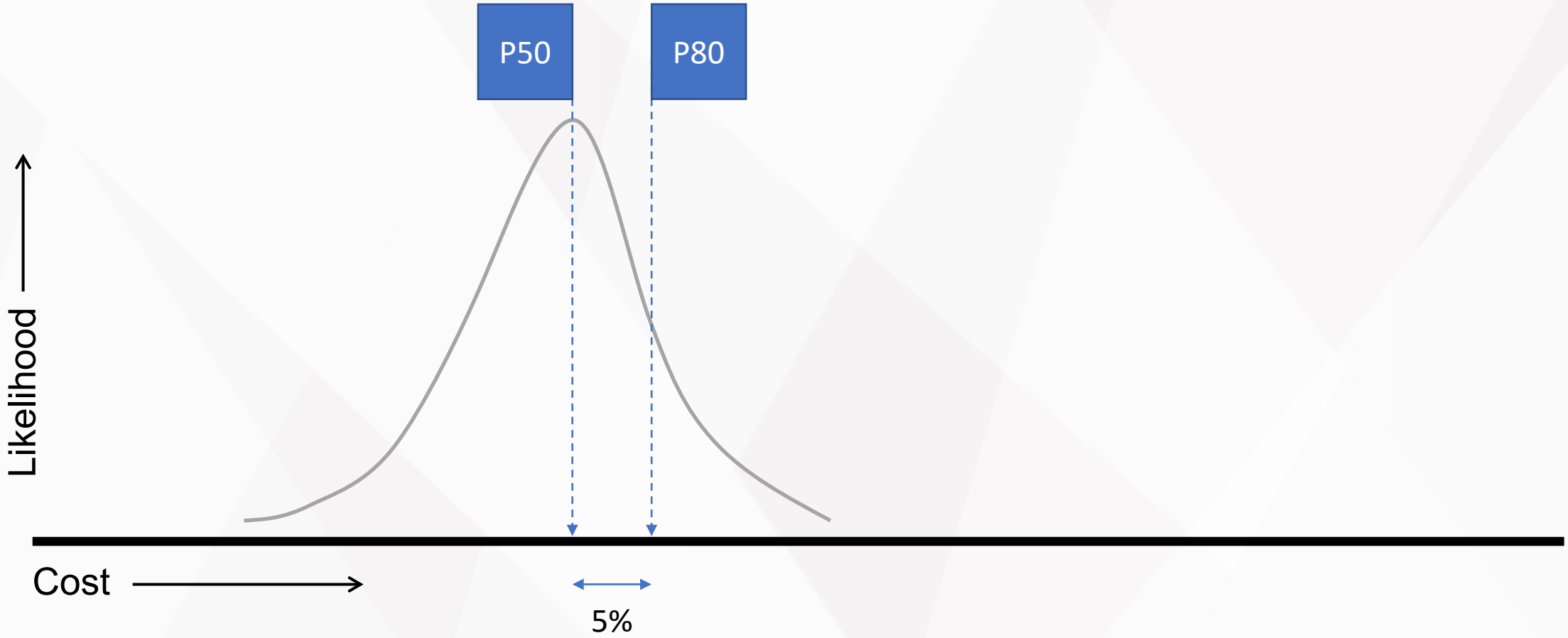
Getting it Done – Managing uncertainty

- Supply chains are easing, but still substantial backlogs
- Still potential for disruption
  - Shipping rates down almost 80% since peak
  - Transit times down 30%
  - Ports are still clogged

Getting it Done – Managing uncertainty

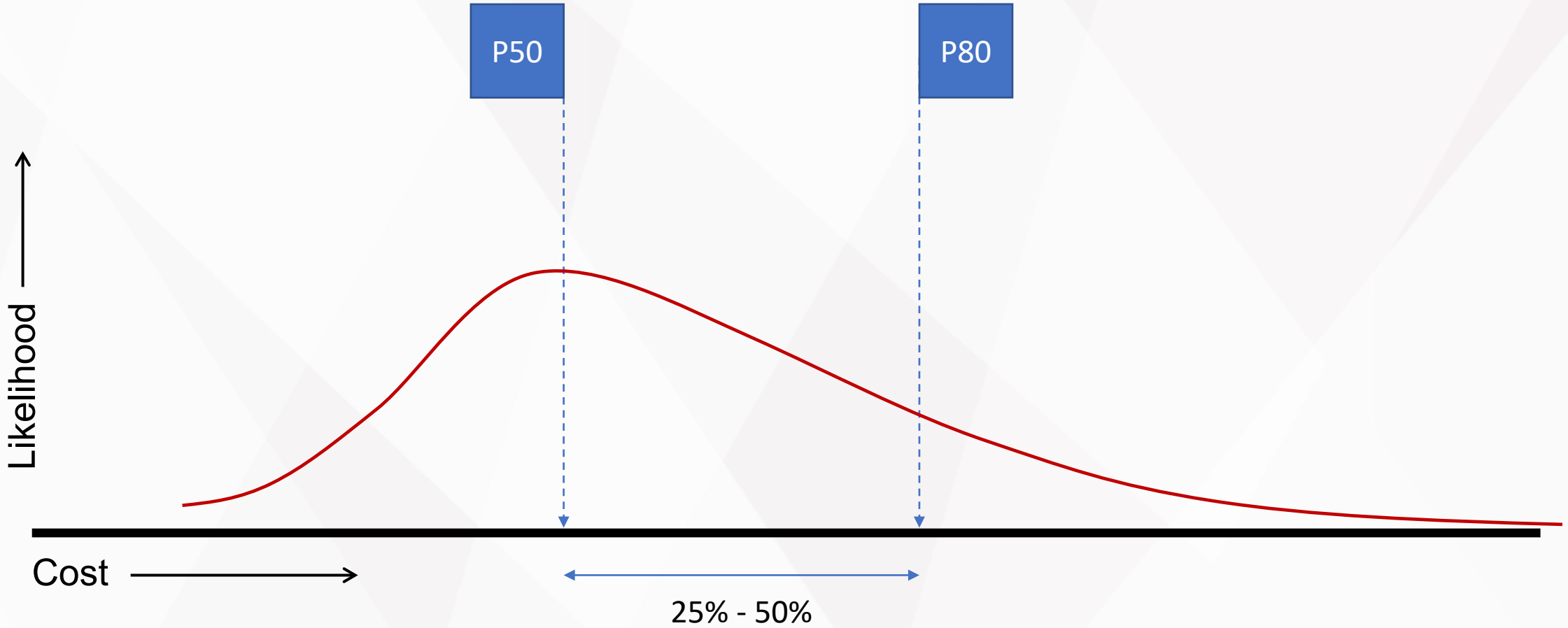
- Uncertainty is not going away
  - Prices have stabilized substantially
  - Fear has not
- We have to manage to the uncertainty
- To do this, we need to change the approach

Getting it Done – Managing uncertainty



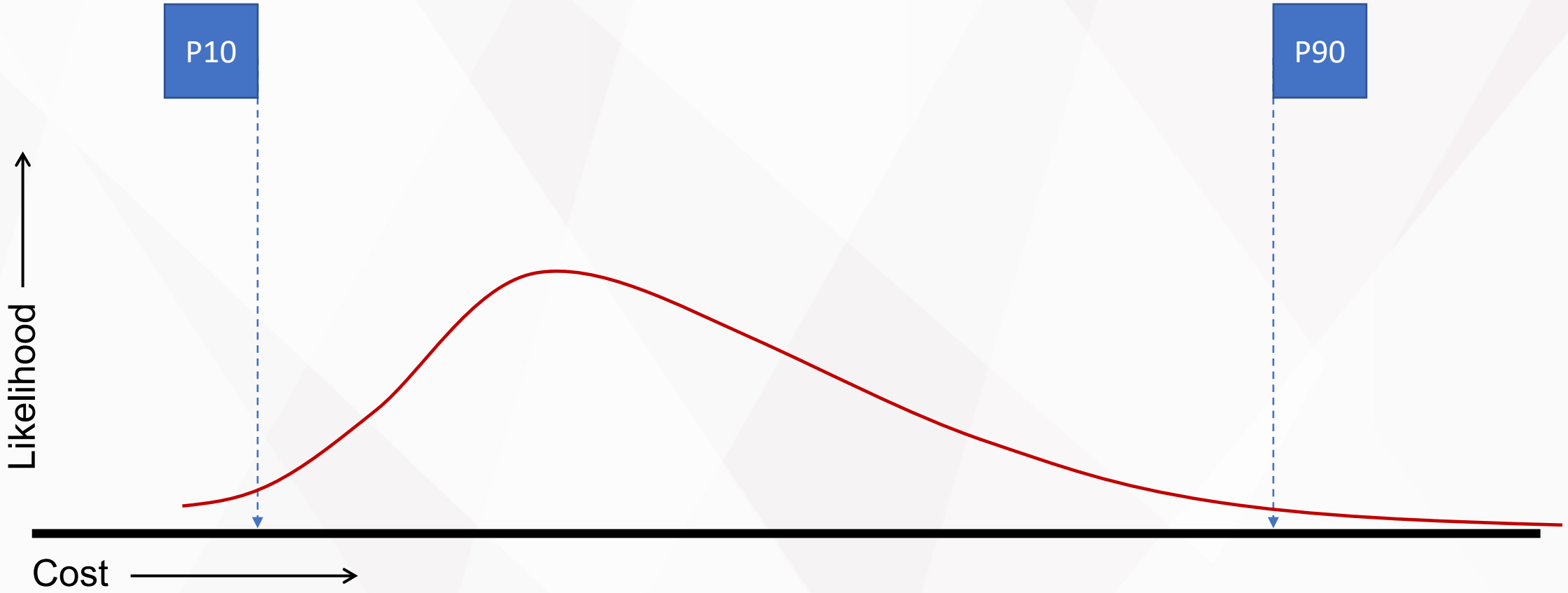
"Normal" Market

Getting it Done – Managing uncertainty

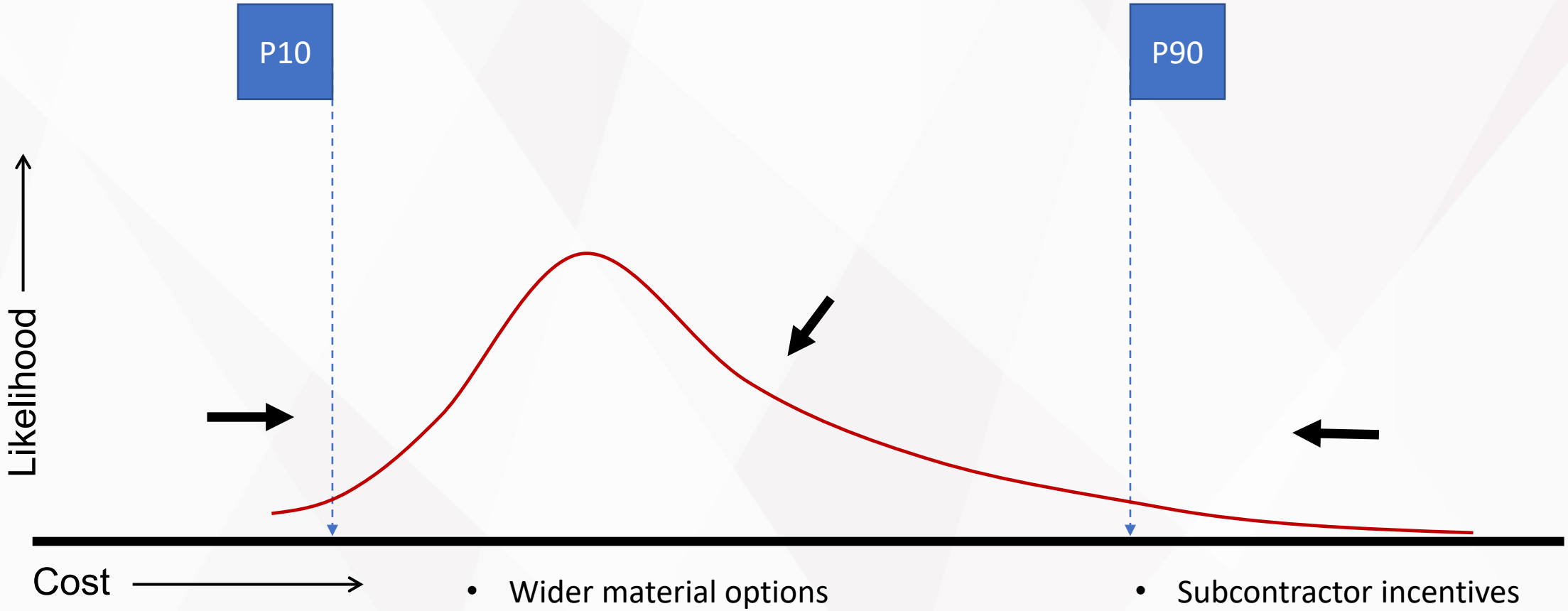


"Volatile" Market

Getting it Done – Managing uncertainty



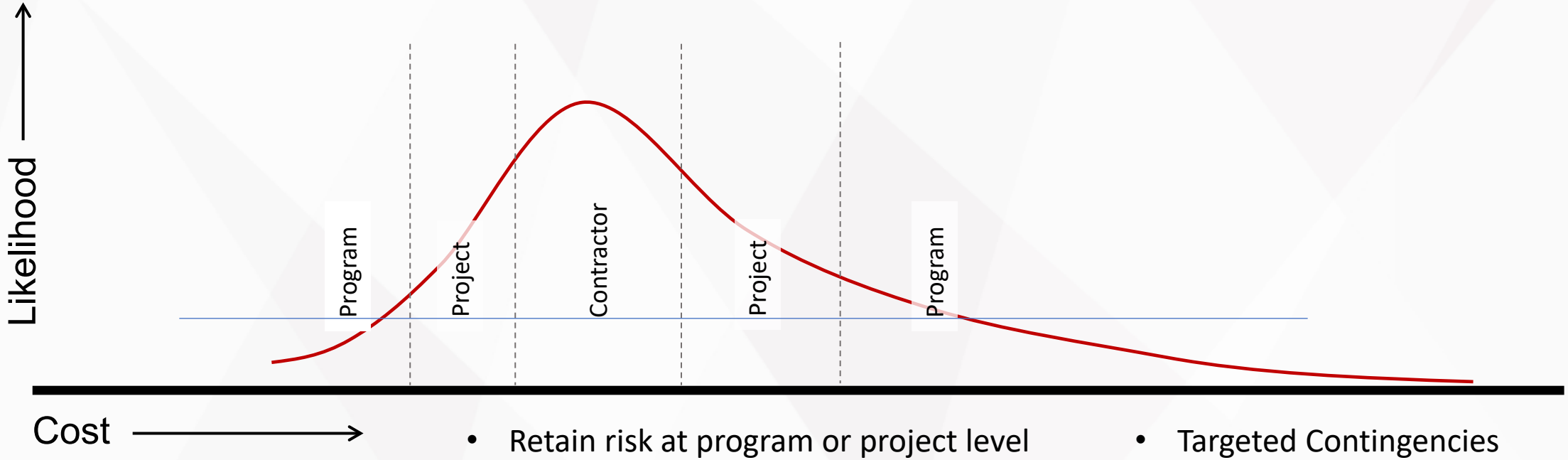
Getting it Done – Managing uncertainty



- Wider material options
- Flexible design
- “Last Responsible Moment”

- Subcontractor incentives
- Pool float/contingency

Getting it Done – Managing uncertainty



- Retain risk at program or project level
- Program level procurement/logistics
- Fluctuation/Relief Clauses

- Targeted Contingencies
- Ring fence allowance

Getting it Done – Summing Up

- Set realistic budgets – at the start
  - Match funds and expectations
  - Set appropriate contingencies
- Own and manage uncertainty - actively
- Manage at the project level – where you can

ALBANY
Unified School District

Albany Unified School District's Pathway To Sustainable Schools

CMAA Sustainable School Facilities
February 14, 2023

Who We Are:

- Small East Bay Community
- 3,500 Students
- Six Schools: 1 Preschool, 3 Elementary Schools, 1 Middle School, 1 High School
- Diverse community:

  29% Asian

  29% White

  16% Hispanic

  14% Two or More Races

  3% African American
- 17% Socioeconomically Disadvantaged

Healthier schools are better learning environments.

ALBANY
Unified School District

2016 School Bond Program Measure B ($70M) & Measure E ($25M)

Two Elementary Schools —
Replacement and/or major renovation

- One had originally been built as a middle school, facilities were out of sync with current use
- One built in the 1970's "pod style" with oddly shaped classrooms that were difficult to use.
- Both likely to unusable after a sizeable earthquake, although not likely to collapse

Middle and High School —
Classroom additions

- Both were overcrowded

AUSD Existing School Facilities

Timeline—Development of Approach To Sustainability

- **2013** Facilities Master Plan — approved by Board of Education
- **Feb 2016** Sustainability and Integrated Design Committee
- **June 2016** Bond Measures passed
- **August 2016 Resolution Approved: 2016-17-01 Sustainability & The Design and Construction of High Performance Schools**
  - …Resolved further, that every new school, new building and major modernization project—within the budget for the project—meet the **CHPS Criteria** minimum qualifying point and prerequisite threshold… (*included a **Zero Net Energy Ready requirement** and other key sustainability guidelines such as daylighting, natural ventilation, the use of non toxic-emitting materials, and sound insulation or isolation to enhance classroom acoustical quality.*

CHPS COLLABORATIVE FOR HIGH PERFORMANCE SCHOOLS

ALBANY Unified School District

3 Projects Completed

All are CHPS verified (requires 110 pts.) and ZNE Ready

Albany Middle School Annex

12 classrooms, Theater Room, $13.7M, ***144 pts***

Does have PVs, may be at Zero Energy Use

Albany High School Courtyard Addition

8 classrooms, Design/Build Lab, $9.8M, ***110 pts***

Ocean View Elementary School

24 classrooms, Library, Office Wing, $39.5M, ***118 pts***

Marin Elementary School

Finishing next month, on track for CHPS verification

Albany Middle School Annex

Albany High School Addition

AUSD Design-Build Criteria

- Compliance with Board Resolution 2016-17-01
- **CHPS Verified** (Collaborative for High Performance Schools) including:
  - -Healthy building materials (non-toxic)
  - -Maximize operable windows
  - -HVAC maximum energy efficiency within budget
  - -Daylighting and Glare Study
  - -Exterior Shading Study

- **Net Zero Energy Ready** including:
  - Energy modelling—to develop and confirm a design where future rooftop solar arrays will generate enough energy to meet or exceed projected energy use
  - Design for Photovoltaic Panel installation (to be provided with future funding)

Ocean View Elementary

Ocean View Elementary Library

How Did This Happen?

- Presence on the Board of Education of a majority that were favorable to sustainable development
- Presence within the Albany community of architects, engineers, and construction professionals who were willing to donate their time
  - Organized in response to early information that a bond program was planned
  - Made extensive time commitments to Design Teams
  - Advised board trustees and district administrators
  - Spoke at many board meetings
  - Reviewed documents and commented based on their professional expertise, far beyond the ability of most parents and educators
- Presence of a strong Project Manager (DCA) that provided leadership and worked to keep costs down during Design-Build process

Challenges

- Cost escalation
- Conflicts over design—rare, but happened
- District’s awareness of sustainability goals can fluctuate
- Ensuring that outreach and community engagement occur when input is actionable.

Lessons Learned

- Net-zero ready is do-able and affordable.
- Designing roofs to accept PV's is easily do-able with today's technology and is now required by code
- High-functioning schools don't require natural gas
- Design-Build helps contain costs
- Input from community members is important—helped AUSD develop a forward-thinking approach to address global warming

AUSD Middle School Classroom

Healthier schools are better learning environments.

ASK YOUR **QUESTIONS**

1

How is DSA's approach shifting with the 2023 CalGreen and energy code changes supporting California's 2045 goal of 100 percent clean electricity and what type of support or advice can school districts expect from DSA in meeting new requirements?

ASK YOUR **QUESTIONS**

2

Understanding PV's are now required to be fully installed at K-12 construction sites for campuses undertaking new building construction, what is the optimal approach for solar installation and how can school districts best prepare themselves for solar installation?

ASK YOUR **QUESTIONS**

3

What are the challenges to accommodate battery storage and what options exist to minimize space impacts? What would you recommend to Districts if they are thinking about integrative battery storage on their campus?

ASK YOUR **QUESTIONS**

4

With CPUC authorizing the Net Energy Metering NEM 3.0 policy which now offers utility customers 75% less savings (from the previous NEM 2.0 policy) for additional on-site electricity being sent back to grid, how will this impact school district's new school solar planning & project financing? (NEM impacts PG&E, SCE, and SDG&E customers)

ASK YOUR **QUESTIONS**

5

What is the best approach for Districts to monitor their energy use when going to electric and solar?

ASK YOUR **QUESTIONS**

6

What impacts to construction budgets and schedule are we experiencing due to regulatory changes from moving to electric buildings and on-site renewable energy? How can we mitigate cost and schedule risks?

ASK YOUR **QUESTIONS**

7

How can Design Build project delivery add value when delivering CHPS verified and net-zero ready projects? For Albany USD, what tradeoffs were made to meet your budget resulting from of the District's mandated goals?

ASK YOUR **QUESTIONS**

8

While not mandated, when asked to design to net-zero in K-12, what steps are necessary to plan for success?

ASK YOUR **QUESTIONS**

9

In order to be fully ZNE, electrification is. What further steps is AUSD taking towards solar ready to offset greenhouse emissions in order to be fully get to ZNE?

ASK YOUR **QUESTIONS**

10

There is a learning curve required for designers to meet and implement the new codes and regulations into their practice. What actions achieve the greatest impacts on addressing sustainability and ZNE buildings?

UPCOMING **EVENTS**

Understanding the Buy Clean California Act on Public Projects
March 9. 11:30 AM. Zoom Webinar

Charging the Evolution of E-mobility
April 12 11:30 AM. Zoom Webinar

Industry Celebration & Awards Ceremony
June 8, 5:00 PM. California Museum, Sacramento

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