Organize, Industrialize, Decarbonize!

A Pro-Worker, Green Industrial Policy for California

UAW Region 6

With contributions from Isabel Estevez, PhD

AUGUST 2025

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About the United Automobile, Aerospace and Agricultural Implement Workers of America (UAW) Region 6

UAW Region 6 covers over 120,000 active and retired UAW members in Alaska, Arizona, California, Hawai'i, Idaho, Nevada, Oregon, Utah, and Washington. Represented workplaces range from multinational corporations, small manufacturers, and state and local governments to colleges and universities, hospitals and private non-profit organizations. UAW Region 6 is organizing for a just and sustainable future for all.

Acknowledgements

UAW Region 6 would like to acknowledge the following individuals and organizations.

For staff support, institutional support, and presentation opportunities:

The UC Berkeley Labor Center, The Roosevelt Institute, the California Labor Federation and State Building and Construction Trades Council, and the Irvine Foundation.

For feedback, contributions, and insight:

Jessie Hammerling, Ken Jacobs, Brenda Munoz, Judith Barish, Elizabeth Pancotti, Lenny Mendonca, Kate Gordon, DeeDee Myers, Lauren Greenwood, Derrick Kirk, Susan Helper, Madeline Janis, Aesha Mahmoud, the Building Decarbonization Coalition, including Beckie Menten and Madison Vanderklay, BlueGreen Alliance, including Terin Mayer, JB Tengco, Tom Lewis and Roxanne Johnson, Lara Ettenson, Matt Freedman, Vince Sugrue, Catherine Houston, Jeff Hunerlach, Rebecca Lee, Vijay Dhar, Dan Adler, Derrick Tang, Dan Mitler, Travis Antoniono, Steven Vogel, Jonas Meckling, John Zysman, Neil Fligstein, Malcolm Harris, Richard Wang, Abhilasha Bhola, Mariela Loera, Jose Carmona, Toni Symonds, Katerina Robinson, Tim Degrasse, Max Krahe, Brian Kettenring, Bob O'Keefe, and Gene Russell.

Contact

Samuel Appel
SAppel@uaw.net

Jacob Whiton
JWhiton@uaw.net

SA/JW:at
opeiu494afl-cio

Foreword

Every week new natural disasters rock communities across the country, from flooding in Texas, to fires in Los Angeles, and heat waves in the Northeast.

As autoworkers, skilled tradespeople, educators, researchers, state scientists, and more, UAW members know that climate change is the signature challenge of our time.

The report before you offers a UAW worker-led vision for the climate transition that centers the needs of working people. It declares that we must embrace strong industrial policies that empower workers, working class communities, and the state to deliver good union jobs, affordable energy, and a liveable planet.

As of this writing, the billionaires in Washington are in an all out sprint to take power out of the hands of working people and unleash corporate control.

To that we say not only hell no!—but also that we have a better plan.

I hope you will read the report and consider the powerful ideas it conveys about how we can grow solid middle class jobs, protect our planet, and create affordable energy for working class families all at the same time by enacting strong state industrial policies.

Mike Miller

Director, UAW Region 6

Executive Summary

California's economy is not working for the working class, and it's not working for our planet.

Billionaires are raking in record profits, while millions struggle to meet their basic needs. For most California workers, a living wage job is hard to find, and climate change is sending the state's high cost-of-living skyrocketing even higher.

> It's time for California to embrace a bold new economic strategy to create tens of thousands of new union jobs, rapidly slash greenhouse gas emissions, and drive down energy costs for working class communities.

The following report is a rallying cry from organized labor for a ***pro-worker green industrial policy*** that empowers the state to shape growth for the greatest public good.

We can't afford to let private companies dictate what is and isn't possible based on what's best for their bottom line. Rather, the state must stand ready to finance and build the zero-emission technologies we need to meet our climate goals and create the high-quality union jobs our communities need to thrive. Only by creating new union jobs, raising labor standards, and targeting new opportunities to those most in need can we generate the mass purchasing power to realize California's massive potential demand for cleantech goods.

This isn't about deregulating and unleashing the private market. This is about a paradigm shift in the state's approach to economic development.

> We are calling for sustained reinvestment in the state's planning and coordinating capacity. Doing so will enable us to embrace transformational, time-tested industrial policy tools like strategic stockpiles, centralized procurement, price management, and public enterprises.

UAW members are leading the first phase of the fight to make this vision a reality. We've sponsored legislation—***Senate Bill 787 (McNerney)***—to create enabling institutions that will plan for and oversee a strategy of in-state supply chain development, scaled decarbonization, and increasing affordability. SB 787 targets three critical cleantech sectors as priorities for growth: ***zero-emission vehicles and batteries, offshore wind, and heat pump manufacturing and deployment.*** Standing with us is a broad coalition encompassing labor, environmental, business, local government, and community partners from across the state.

SB 787 lays down an essential foundation upon which to build a holistic green industrial policy. We look forward to passing this legislation and working with California policymakers to seize on the opportunity it represents.

We are also under no illusions that achieving our goals will be easy. The oligarchs in Washington D.C. would have us believe it is impossible, that there's no hope cutting-edge research and industrial transformation can bring about a just, sustainable future. They say this while stripping California of its regulatory powers, defunding its research institutions, and kneecapping its climate leadership.

> In the labor movement, we're used to the rich and powerful telling us what is and isn't possible. And we're used to proving them wrong.

We know it's time for bold action, and we hope you will join us in our fight for a better California. ■

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Section 1.
Introduction

California's working class needs a new vision of economic, social, and environmental justice to believe in and fight for.

Let's be clear, our economy is not working for working people, and it's not working for our planet:

> Last year, five Californians grew their wealth by $200 billion, while over six million residents suffered in poverty.[1]
>
> A third of workers made less than $20 per hour and most new jobs pay similarly low wages.[2]
>
> Black and Brown residents in particular remain concentrated in low-wage jobs and disproportionately exposed to industrial pollution.[3]
>
> As extreme weather destroys communities and drives electricity costs through the roof, achieving our urgent climate goals looks more challenging by the day.[4]

To make matters worse, billionaires are running the show in Washington, D.C. They won't stop until what's left of our safety net is shredded, labor and human rights protections are erased, and all remaining independent civic institutions are brought to heel.

It's time for the state of California—a global political, economic, and cultural powerhouse—to step up in word and deed.

> California must embrace a new economic strategy to create tens of thousands of union jobs, rapidly slash greenhouse gas emissions, and make energy affordable for working people.

The oligarchs would have us believe this is impossible. They say there's no hope for cutting-edge research and industrial transformation to bring about a just, sustainable future. They say this while stripping California of its regulatory powers, kneecapping its climate leadership, and defunding its universities and laboratories.

In the labor movement, we're used to the rich and powerful telling us things are impossible. And we're used to proving them wrong.

> This report is a rallying cry from organized labor for a green industrial policy that can deliver for working class Californians.

Industrial policy refers to coordinated government action to proactively shape what goods and services an economy produces, how they are produced, and how they are distributed.[5]

Rather than let private companies dictate what is and isn't possible based on what's best for their bottom line, the state must stand ready to finance and build the zero-emission technologies we need to meet our climate goals and create the high-quality jobs our communities need to thrive. We must reject Wall Street's "green" rebranding of the same corporate gimmicks that prioritize profit over people and the planet, and embrace powerful, but underutilized, industrial policy tools like strategic stockpiles, centralized procurement, price controls, and public enterprises.

To that end, UAW members in California are leading a broad coalition of union workers, environmental organizations, community advocates, local governments, and industry startups in support of legislation—Senate Bill 787 (McNerney)—the first step in making this bold vision a reality.

We know our people are suffering and the federal government is only making things worse. We also know that *the power to make change is in our hands.* The urgency of the task cannot be overstated: California workers have a better world to win, for ourselves and for the working class across this country. ■

Section 2.
Climate Crisis and Class Conflict

The Golden State is on fire.

Climate change is already destabilizing California's ecosystems, communities, and economy. As temperatures rise, increasingly frequent heat waves strain the state's energy infrastructure, hospitalize thousands of vulnerable residents and workers, and heighten the risk of powerful wildfires.[6] Fifteen of the twenty most destructive wildfires in the state's history have occurred within the last decade, eight in just the last five years.[7] On their heels, torrential rains bring mudslides, but fail to relieve worsening drought conditions.[8] Groundwater is tapped, causing land to subside, which then threatens saltwater intrusion in the groundwater remaining during periods of coastal flooding.[9]

Every other month brings fresh evidence of how human-caused climate change endangers the state's ecological, social, and economic stability. The need to decarbonize is not in dispute.[10] Eight in ten residents consider climate change a serious threat to the state economy and their quality of life.[11] Nearly two-thirds support the state's goal of reducing carbon emissions 40% below 1990 levels by 2030, and of reaching net zero emissions by 2045.[12]

California's progress so far is laudable.[13] But to meet its 2030 target, emissions will now need to fall 4% every year through the rest of the decade, and at double that pace through 2045.[14] That's nearly twice as fast as what we've managed since 2018. And with California's Clean Air Act waiver under threat from a hostile presidential administration and Congress, the state may soon lose one of its most effective tools.[15]

Decarbonization will require roughly $60-80 billion a year in private and public investment.[16] This sum pales in comparison to the monetary costs of climate change, to say nothing of its human toll. By one estimate, the Los Angeles wildfires of January 2025 alone wiped out $135 billion in destroyed property and lost income.[17]

The state's climate challenge is clearly not whether it can afford to decarbonize. It can't afford not to. Its real challenge is how to decarbonize fast enough and fairly given our grossly unequal economy.

Decarbonization and affordability

In California, households in the top 5% make more than $330,000 a year, and as a group receive 40% of total state income.[18] On average, they save more than a third of their after-tax income.[19]

The rich can easily afford to install rooftop solar panels and battery storage systems, upgrade to a heat pump, and purchase a zero-emission vehicle (ZEV) without having to cut back on other spending. The state's working class, on the other hand, struggles to even cover the basics.

Households making less than $70,000 a year—the bottom 60% in California—spend more on food, housing, transportation, and healthcare than their annual post-tax income.[20] For these families to bear the full cost of decarbonization means either cutting back on essentials, like groceries and medicine, or taking on additional debt they cannot afford. And yet, their health and well-being are also at greatest risk from the ravages of a changing climate.[21]

Californians' surging electricity bills illustrate why the state's extreme inequality stands to thwart progress on its climate goals.

Investor-owned utilities (IOUs) like PG&E, with the California Public Utilities Commission's (CPUC) blessing, are financing investment in wildfire mitigation, new energy generation, and transmission and storage infrastructure by raising rates.[22] Since 2019, residential electricity bills have increased 50% and are now double the national average.

The richest Californians can absorb these additional costs without issue, since electricity bills eat up a negligible share of their income. For IOU shareholders, higher dividend payments more than compensate for higher bills, as rising electricity rates also fuel record utility company profits.[23]

Working class Californians, however, are barely able to keep the lights on.[24] One in five customers served by the state's three largest utilities are not current on their bills.[25] The state has provided two rounds of multibillion dollar relief on utility arrears, and starting this year, CPUC will require large IOUs to implement a modestly progressive income-based fixed charge.[26]

These policies are an implicit acknowledgement that working class families cannot be made to pay for the state's energy transition, climate change mitigation, *and* utility companies' record profits. To decarbonize and harden our energy system, utilities must make less or corporations and the wealthy must pay more. For example, several bills currently moving through the state legislature seek to publicly finance a greater share of grid-related investment, bringing down borrowing costs and limiting IOUs' ability to seek compensatory rate increases.[27] Supporters claim this could save ratepayers $7.5 billion over the next decade.

Lowering costs and raising incomes for the working class is both a material and political necessity to accelerate decarbonization. Most Californians oppose rate hikes, oppose the 2035 ban on internal combustion engine vehicles, and oppose requiring full electrification of new housing.[28] And not without good reason. Even with existing subsidy programs, for too many, decarbonization still simply costs too much.

Decarbonization, job quality, and equity

The state's ability to cut emissions hinges on its ability to make doing so affordable. But whether something is affordable doesn't just depend on how much it costs. It also depends on how much income households have to spend, which for the working class, mainly depends on what they earn on the job.

Too many workers in California struggle to find consistent work or are stuck in bad jobs with low wages. One in ten California workers are unemployed or underemployed.[29] One in three workers are paid less than $20 an hour.[30] And the problem is only getting worse: By the end of the decade, half of all openings will be in similarly low-wage jobs.[31] Black and Latino workers in particular consistently experience greater employment insecurity and remain concentrated in low wage jobs.[32]

The UAW has long fought for strong government action to support workers and consumers. In 1946, UAW autoworkers protested the end of the federal Office of Price Administration (OPA), which regulated prices and kept inflation in check during World War II.

Workers without a four-year college degree make up 58% of the state labor force but hold 85% of low-wage jobs. A career that paid a family-sustaining wage and offered employer-paid health care, retirement security, and time off was once a realistic aspiration for many workers in California. These days, the prospect of a stable, middle-class standard of living seems more and more out of reach for all but a highly credentialed few.

The transition away from fossil fuels stands to make matters worse. The oil and gas industry remains a redoubt of good blue-collar union jobs in the state.[33] But they are in decline, and new jobs in growing cleantech industries are often significantly lower quality. Union density is also lower in clean energy industries than in legacy energy sectors.[34]

Furthermore, California lacks a proactive plan for transitioning displaced union workers into industries that both make full use of their specialized skills and support high quality employment.[35] A survey of workers laid off after the idling of the Marathon Oil Refinery in Contra Costa County found that the average worker who was able to find a new job took a 24% pay cut.[36]

A large majority of Californians support the labor movement, but union jobs outside of the public sector are rare and barriers to new organizing formidable.[37] Over the last 40 years, private sector union density in California has fallen from 17.7% to 7.9%.[38] There are fewer private union jobs available in California today than there were in 1983, even though employment overall has grown by 5.7 million jobs.

The impact of this multi-decade corporate assault on organized worker power has been most acute in the state's manufacturing sector.[39] Just 5.3% of California manufacturing workers have union representation.[40] While production workers in the state do earn nominal wages above the national average, California's uniquely high cost-of-living erodes the entirety of that advantage. More than one in ten production workers in the state lives in poverty.[41] In terms of real purchasing power, production wages in California are closer to those in "right to work" Texas and Georgia than in historic union strongholds like Michigan or Ohio.[42]

Green industrial policy for a just transition

California's large-scale demand for decarbonization technologies, vibrant research ecosystem, and existing industrial specialization in advanced manufacturing offer great advantages for pursuing a green industrial policy premised on broad working-class prosperity.

New union jobs in cleantech industries and their supply chains can generate the purchasing power working class Californians need to decarbonize, directly and by putting upward pressure on wages at non-union shops and in the service sector.[43] At the same time, the state can use its own purchasing power and regulatory authority to further expand the market for those same cleantech industries, enabling California businesses to realize greater economies of scale and lower costs to consumers and businesses alike.

UAW workers are no strangers to technological change. Regardless of what's under the hood, we believe all autoworkers—including battery workers—deserve a living wage, affordable healthcare, a secure retirement, and a safe workplace.

To catalyze a virtuous cycle of productive investment, rising wages, market growth, and falling costs, the state must:

1. ***Finance public and private investment*** in strategic decarbonization industries
2. ***Condition financing, subsidies, and procurement*** on in-state production, labor rights protections, targeted hiring of disadvantaged and dislocated workers, community benefits, and strict environmental compliance
3. ***Subsidize working class households' spending*** on decarbonization technologies and rein in energy costs
4. ***Procure and produce decarbonization technologies*** where necessary to realize economies of scale and stabilize prices
5. ***Levy progressive taxes*** to cover new and ongoing funding needs

Only by implementing such a policy mix can the state hope to address the mutually reinforcing crises of climate change, inequality, and affordability. We can build the broad political support necessary to sustain decarbonization by driving strategic cleantech supply chains in-state and by ensuring they create high quality union jobs for the Californians who need them most. ■

Section 3.
Industrial Policy: The Tools We Need

To meet its decarbonization targets, California has set ambitious goals for ZEV adoption, offshore wind deployment, and heat pump installation. These goals should be woven into an industrial policy that aims to materially improve the lives of working-class families by localizing production of critical cleantech goods and by lowering their cost.

But what is industrial policy, green or otherwise? At its most expansive, industrial policy refers to all government activities undertaken to deliberately shape what goods and services an economy produces, how they are produced, and how they are distributed.

Lawmakers and movement makers need to address three primary questions when designing industrial policy:

1. ***Why*** do we need industrial policy?
2. ***What*** strategic industries are we targeting?
3. ***How*** do we achieve our goals?

"Why?" is the most fundamental question of industrial policy design. Industries are only strategic insofar as their growth helps advance society's goals, which first must be defined. While often geared toward diversification and the development of productive capacity in high value-added industries, a holistic industrial policy should also seek to "multi-solve."[44]

> Multi-solving recognizes labor, environmental, and social goals as essential complements to greater resilience and productivity growth in the economy.

Deciding what industries to target will flow from the policy's goals. But to effectively multi-solve, lawmakers must consider a broad set of criteria for strategic industry selection, as well as the equity implications of their chosen industry targets.[45] These considerations should include prevailing wages by job classification in an industry, the industry's importance to reducing greenhouse gas emissions and pollution economy-wide and in environmental justice communities, or its potential to drive down consumer costs.

Both goal setting and identifying industry targets are political processes. They should be structured to ensure broad buy-in from different stakeholders, especially historically disinvested and disempowered communities.

How? The industrial policy toolkit

Governments have a wide array of tools at their disposal for engaging in industrial policy, especially in large, advanced economies like California. The main constraints on government action are self-imposed legal prohibitions, technical and administrative capacity, opposition by powerful political blocs, and lawmakers' own willingness to mobilize sufficient resources to meaningfully pursue their stated policy goals.

Strengthening state capacity is a prerequisite for successful industrial policy because private sector market actors are often too risk-averse and too focused on short term earnings to steward development in industries needing patient long-term investment.

Japanese and South Korean automakers are today globally competitive industry leaders, but their success was built on decades of public financing and demand support, domestic content requirements for foreign-owned production, and regulatory incentives to improve vehicle fuel efficiency.[46] They also enacted targeted import restrictions and tariff barriers to ensure promising domestic producers adequate time to learn and cultivate specialized capabilities before facing direct competition from incumbents abroad.

These countries' successes, though, should not be taken as one-size-fits-all solutions. A U.S. state, after all, is necessarily more limited in its powers than a national government, and a developing middle-income economy is likely to prioritize growth in different strategic industries than an advanced high-income one. Rather, their experience remains exemplary of the potential for a well-coordinated policy mix to drive structural economic change.

The full suite of industrial policy tools can be categorized according to how much power they confer on government to influence prices, production, and market structure. California, like most U.S. states, leans heavily on the weakest policy tools, which are seldom integrated into a single strategy or even targeted at specific industries. This is a choice; a choice not to choose. Call it industrial policy by omission. By not using the industrial policy tools at their disposal, state governments are simply ceding authority over how their economies develop to powerful companies whose bottom line is their only measure of success.

> A pro-worker, green industrial policy must empower government to shape target- industry growth for the greatest possible public benefit.

While even relatively weak tools have the potential to help advance a particular policy goal, they are much less effective at multi-solving. A generous consumer rebate program might be sufficient to grow the market for a target industry, but it will not be sufficient on its own to localize supply chains. Big government grants might work to attract investment in a target industry, but without strong labor conditions, they won't automatically improve job quality for all workers. To the extent strong labor conditions do improve workers' wages and benefits, subsidized businesses may still seek to preserve their profit margins by raising prices, worsening affordability for consumers at large.

We are calling on the state to move boldly and wield *all tools* at its disposal to bring about the kind of economic transformation necessary to decarbonize and raise working class living standards. The state's challenges are simply too urgent to let political timidity and corporate greed stand in our way.

Industrial policy toolkit: Least government power

- ***Operating and investment subsidies:*** Mechanisms that incentivize new business spending by increasing after-tax profits. Typically, these take the form of grants or tax credits, but governments have many levers at their disposal to lower business costs (free land, discounted utility rates, permit fee waivers, etc.).

  Business subsidies are the mainstays of state-level economic development in the United States, and if well designed, can be effective at boosting investment and employment in a targeted industry.[47] After all, in a capitalist economy, we would expect making something more profitable to get businesses to do more of it.

  While operating and investment subsidies certainly have a place in a broader industrial policy, all else equal, they divert government revenue from public services to shareholders and business owners, widening inequality.[48] Lawmakers should carefully weigh their net fiscal cost against the impact on the rest of the budget, and when crafting a program, guard against companies trying to take advantage of a potential windfall. A transparent award process, reporting and monitoring requirements post-award approval, and public interest conditions as described below are all ways to address the equity and accountability concerns inherent in the use of business subsidies.

- ***Consumer subsidies:*** Mechanisms that stimulate consumer spending in target industries by reducing the purchase price of final goods and services. Often these take the same form as operating and investment subsidies, like income tax credits, rebates, or sales tax exemptions.

  Uncapped programs with few eligibility restrictions might be more politically palatable, but they invariably subsidize consumers that don't need the help, some of whom may have made the decision to purchase regardless. This was found to be the

case with federal consumer tax credits for electric vehicles, which disproportionately went to wealthier households.[49]

And yet, subsidized consumers are not the only ones who benefit from such programs. By expanding the market for a particular good or service, the beneficiaries of a consumer subsidy also include business owners and workers all along the associated supply chain, whose additional earnings in turn support other locally traded businesses and increase the tax base. If rapid and widespread adoption of a good also has positive externalities—replacing internal combustion engine vehicles with ZEVs reduces greenhouse gas emissions—then the public at large is a beneficiary as well.

There is no guarantee, though, that the supply chain benefits of a demand-side subsidy will necessarily accrue to the jurisdiction that provides it. Consumer subsidies should therefore be crafted and conditioned to realize the broadest public benefit, including among residents who do not take advantage of the program themselves.

Industrial policy toolkit: Moderate government power

- ***Public financing:*** Government lending, credit enhancement, and equity financing. While similar to the kinds of investment subsidies mentioned above, these mechanisms—loans, industrial revenue bonds, venture capital—create new assets on the government's balance sheet and do not entail a net transfer of public money to private businesses. Unless recipients become insolvent and default, the government acts just as a private investor would, with the expectation of realizing a return on its financial stake in a project.

  Interest on government debt is tax-exempt, and because government need not prioritize maximizing quarterly returns, it can generally offer cheaper, more attractive financing terms to companies than private capital markets. This also gives government leverage to impose the kinds of public interest conditions discussed below.

  Public venture capital has been especially critical to the development of new industries in the U.S. The Small Business Innovation Research (SBIR) program was an important source of early-stage funding for companies like Intel, Qualcomm, and Symantec that made California a global information technology hub.[50]

- ***Public interest conditions*:** Standards and guardrails tying public money to awardee behavior. Conditionality is critical for multi-solving.[51] Programs aimed at attracting investment in a target industry should restrict eligibility to sufficiently "high road" employers. Such employers provide high quality jobs with family-sustaining wages, healthcare and retirement security, career pathways, predictable schedules, collective worker voice, and a safe, discrimination-free workplace.[52] They likewise strive to minimize their climate impact and act as stewards of public and environmental health; good jobs are no compensation for poor air quality and polluted ecosystems.

  When companies fail to live up to their commitments, public authorities must be prepared to follow through on agreed-upon penalties, and those penalties should be sufficient to actually encourage compliance.

- ***Industry regulations*:** Legal constraints on undesirable market activity. These vary in their degree of restrictiveness, from government oversight (antitrust review, public utility boards) to outright proscriptions on private business activity (emissions limits, occupational health protections).

  Unlike public interest conditions, regulations apply to an entire industry or economy-wide. They too, though, are important for multi-solving, penalizing and preventing anti-competitive tactics or forms of cost minimization like pollution or neglecting safety protocols that come at the expense of

workers and communities. Creating a level playing field in this way ensures that high road businesses aren't at a competitive disadvantage.

Industrial policy toolkit: Most government power

- ***Price management*:** Legal constraints on private actors' price-setting power. While often made a bogeyman, government price regulation has a long and effective history in the U.S. and is widely practiced around the world.[53]

  These policies are strong levers for shaping private incentives on both the demand and supply side of a market. They include price caps on critical goods and services, like pharmaceuticals or rent, and price floors, like a minimum wage. Direct government intervention in price-setting is often found where markets are concentrated and uncompetitive or when extreme price volatility dampens investment and threatens otherwise solvent businesses.

- ***Public procurement*:** Government spending on privately produced goods and services. Aligning procurement policy with industrial policy goals is one of government's most powerful market-shaping tools. Public entities are frequently some of the single biggest buyers in a market. Their purchasing power exerts significant influence over labor and environmental standards and the geography of production.

  How procurement policies are designed can vary to address different, industry-specific challenges. *Advance market commitments*, for instance, are a type of offtake agreement that reduces uncertainty and risk to producers.[54] This is important in nascent capital-intensive industries, like cleantech, where upfront costs are high and expected profit margins hard to predict.[55] *Procurement clubs* and *leveraged procurement*, meanwhile, aggregate the purchasing power of multiple government entities in order to counterbalance companies' price-setting power in highly concentrated industries, like pharmaceuticals. *Strategic stockpiling* has long been a strategy for ensuring uninterrupted access to basic commodities at risk of disruption from price volatility and idiosyncratic supply shocks.[56] Government can then pass along per unit savings from bulk purchases directly to consumers and even resell procured goods to select consumers and sectors.

  In a recent deal with MP Materials, a rare earth miner and processor, the U.S. Department of Defense (DoD) entered into a 10-year modified "contract-for-difference" guaranteeing a price floor on the NdPr oxide MP produces for magnets at Mountain Pass, California.[57] The contract stipulates that DoD will pay MP the difference between the market price of NdPr oxide and the contracted floor, and that DoD will receive 30% of excess profits earned should the market price rise higher than the floor.

  The deal also includes a 10-year 100% offtake agreement for rare earth magnets produced at MP's new manufacturing facility in Texas.[58] The offtake price will be equal to MP's production costs and DoD will guarantee MP a minimum level of profitability during the term of the agreement. MP can sell some magnets commercially, with DoD's consent, though the resulting profits will be split between the two.

- ***Public ownership and production:*** Government investment in 1) physical infrastructure and public services that support private market activity, and 2) productive assets owned entirely or in part by the public sector, like joint ventures and state-owned enterprises.

  The need for the former reflects the fact that private market activity depends on a host of public goods not adequately supplied by private actors. Private businesses tend to underinvest in worker training, for example, since any individual firm would prefer to freeride off others' investment by poaching employees who've already been trained. Government can resolve this market failure by socializing the cost and funding training services itself, and by providing supportive services like public transportation and childcare that ensure broad accessibility and set workers up for success.

Likewise, when powerful incumbent firms use their market power to thwart innovative startups and price-gouge consumers, government can establish a public option to dynamize uncompetitive industries and ensure equitable access to critical goods.[59]

While free market fundamentalists uncritically malign public enterprises, empirical studies have not corroborated the idea that they are any less effective or efficient than their privately owned counterparts.[60] Furthermore, research shows that executives of publicly traded corporations often prioritize short-term stock price targets to the detriment of the company's long-term competitiveness, especially when their own compensation includes stock options.[61]

Public enterprises need not be wholly government owned to realize the benefits of public ownership. Instead, it is common for governments to hold substantial equity stakes or "golden shares" in an array of strategic industries.[62]

Singapore's Temasek Holdings, owned by the Singapore Ministry of Finance, holds majority stakes in local power, technology, engineering, and telecommunications companies, and 53% of shares in Singapore Airlines.[63] The German state of Lower Saxony owns 11% of Volkswagen, the second largest automaker in the world, and holds 20% of voting rights on the company's supervisory board.[64] The two largest shareholders in Swedish steelmaker, SSAB, are the Swedish and Finnish governments, which together own 17% of equity and control a quarter of votes.[65] Union workers also have elected representation on VW and SSAB's boards.[66]

The final component of DoD's MP Materials deal is a $400 million equity investment to help finance construction of MP's new magnet factory.[67] This will give DoD a 15% stake in the company, making it MP's largest shareholder. The federal government has also recently acquired a golden share in U.S. Steel as a condition of approving its acquisition by Japan's Nippon Steel.[68] The single share grants the president and presidential designees veto power over specified investment and production decisions.

In California, government ownership of corporate equity is currently restricted by the state constitution to public employee pension funds. But government equity stakes are hardly radical by international standards and are increasingly a part of the U.S. government's own industrial strategy. These alternative ownership structures give government and workers a real seat at the table in corporate decision-making, which they can then use to advocate internally for high road employment practices, supply chain localization, and increased investment in decarbonization.

Industrial policy toolkit: State capacity

- ***Enabling institutions:*** Government entities or quasi-governmental nonprofits that undertake market and technological research and facilitate stakeholder engagement. They also coordinate the public and private actors responsible for different elements of the policy and track progress toward its goals.

  Japan's Ministry of International Trade and Industry (MITI)—today the Ministry of Economy, Trade and Industry—is often cited as the paradigm of a successful enabling institution.[69] Its remit during the country's postwar economic boom was to set industrial policy goals, develop strategies for growth in targeted industries, and employ a relatively autonomous, industrially embedded bureaucracy to oversee implementation of those strategies.

  Enabling institutions are the infrastructure that supports effective industrial policy. Developing this kind of critical state planning capacity is the focus of our legislative efforts in 2025, Senate Bill 787 (McNerney), which we describe in greater detail below. ■

Section 4.
The Policy Landscape in California

Significant as its challenges may be, California enjoys an enviable position from which to pursue industrial policy.

The state is a $4.1 trillion economy—the fourth largest globally—and a $2.5 trillion consumer market.[70] Some of the most iconic and profitable corporations in the world are headquartered in the state, anchoring mature industry clusters in digital technology, media and entertainment, aerospace, and pharmaceuticals. We are far-and-away the country's hub of venture capital financing, and a major VC hub globally.[71] Home to fourteen R1 research universities awarding over 6,000 doctorates annually, California accounts for fully 30% of research and development activity in the United States.[72]

History of industrial policy in California

California's economic development has also been thoroughly shaped by industrial policy, offering much precedent to draw on. The state built a vast network of irrigation infrastructure and established agricultural extension programs at public colleges. It granted land monopolies and wielded eminent domain to enable railroad expansion. During and after World War II, federal defense and research spending subsidized the Southern California aerospace industry and helped launch Northern California's globally dominant electronics and information technology industries.

The state likewise responded to these industries' post-Cold War contraction with policies to stem job losses and tax base erosion in affected regions. The California Council on Science and Technology (CCST) was founded in 1988 as a nonprofit technical advisor to state government formed by experts drawn from state universities and public research laboratories. During defense deindustrialization, CCST launched Project California, an initiative to align private and public stakeholders around a shared agenda for boosting in-state investment in growing industries.[73] This laid the groundwork for some of California's most ambitious decarbonization initiatives, including mass vehicle electrification and high-speed rail.

In retrospect, Project California also represented the high-water mark of the state's industrial policy ambitions. The state's Technology, Trade, and Commerce Agency (TTCA) was established in 1992 with broad responsibility for economic development, trade and tourism, and for overseeing defense conversion. Less than a decade later, during the recession that followed the dot-com crash of 2000, state lawmakers defunded TTCA, eliminating its export promotion, industrial subsidy, market research, and technology consulting programs.[74]

The office was reconstituted in 2012 as the Governor's Office for Business and Economic Development, or GO-Biz, but remained diminished. Excluding the state's independently run Infrastructure and Economic Development Bank, TTCA was funded at $102 million in fiscal year 2001-02. In FY 2018-19, GO-Biz received just $42 million. Factoring in 20 years of inflation, that amounted to a 75% real funding cut.

In the aftermath of the COVID-19 pandemic, the office saw a large infusion of state and federal stimulus to administer emergency relief for small businesses and hard-hit sectors like tourism.[75] Included in this spending was a $600 million fund for GO-Biz, the Governor's Office of Planning and Research, and the Labor and Workforce Development Agency (LWDA) to stand up a regionally-led planning initiative promoting equitable and sustainable economic growth.[76]

Under the California Jobs First initiative, the state has already disbursed $287 million across 13 regional collaboratives, charged with selecting and stimulating strategic sectors.[77] The state is now soliciting proposals for another $125 million in implementation grants and $15 million in grants specifically for California Tribes.

California has created a plethora of policies, programs, and ad hoc fora to reduce emissions, create good jobs, and lower costs to residents. What it still lacks, though, is a single central authority responsible for integrating

these discrete efforts into a higher-order framework to maximize opportunities for multi-solving. Put differently, the state has an abundance of trees, but no forest.

Without a centrally administered industrial policy that makes full use of the state's market-shaping powers, California will struggle to make progress on any of its goals, let alone all three at once.

Need for centralized capacity, coordination, and vision

The state must begin by reinvesting in the institutional capacity needed to undertake long-range research and planning, and to coordinate public and private industry stakeholders.

California Jobs First is a welcome reversal after decades of relative state disengagement from economic development. But while its bottom-up approach has built valuable institutional capacity at the regional level, this structure should support rather than substitute for state-level industrial policy.

The Jobs First State Economic Blueprint identifies at least 28 strategic sectors and subsectors across the state's 13 regions, covering virtually all large, mature industry clusters and several potential growth industries.[78] Each of these may have its merits as a focus for regional economic development efforts, but only the "Clean Economy" sector will supply the essential commodities needed to accelerate decarbonization and drive down energy costs.

The California Jobs First Council, composed of nine state agencies, was impaneled in March 2024 to oversee the initiative.[79] This kind of multi-agency governance structure is a step in the right direction, but ultimately, Jobs First's decentralized structure prevents the state from leveraging its greatest advantage to drive cleantech supply chains in-state: its scale. The initiative may influence the intra-state geography of Clean Economy industries, but unless California can expand its share of new cleantech investment among U.S. states and globally, the regional collaboratives will merely be competing with each other. All but one region named a Clean Economy subsector as a strategic priority.

Like other interagency fora managing various aspects of the state's decarbonization agenda—the Infrastructure Strike Team, the Tracking Energy Development taskforce, the Heat Pump Partnership, the Renewable Energy Action Team—the Council's remit is too narrow at present to effectively leverage the scale and power of the California economy and to multi-solve across policy domains. The ad hoc, timebound nature of these bodies also means the state will not develop its own capacity to engage in the kind of "marketcrafting" enabled by more powerful industrial policy tools.[80]

That will require new, permanent enabling institutions charged with steering cleantech supply chain growth in-state as a deliberate strategy for high road job creation, lowering household energy costs, and achieving carbon neutrality.

Need for in-state production preferences

Since 2013, the bulk of state decarbonization funding has flowed through the Greenhouse Gas Reduction Fund (GGRF), where proceeds from cap-and-trade auctions are deposited.[81] The auctions have raised $33 billion for the GGRF, of which $7.5 billion has gone to the state's High-Speed Rail Authority.[82]

The remaining funds have gone to the California Climate Investments (CCI) portfolio, which is overseen by the California Air Resources Board (CARB) and encompasses 110 programs administered by 27 state agencies.[83] These agencies must conform to the overarching principles set out in CARB's Funding Guidelines when designing program eligibility and scoring criteria.[84] The latest Funding Guidelines require CCI programs to "foster job creation by selecting and supporting projects carried out by California workers and business, to the extent feasible," and yet demand-side GGRF funding is not being fully exploited to increase the state's share of cleantech production capacity.

None of CCI's incentive programs for ZEVs include provisions linking financial assistance to in-state content or production preferences. The same is true of TECH Clean California and the Equitable Building Decarbonization (EBD) Program, GGRF-backed incentives for heat pump water heaters and HVAC systems. No major original equipment manufacturer (OEM) producing heat pumps has plans to invest in the state, though many have supported efforts to promote widespread deployment.[85]

Case Study: California Renewables Portfolio Standard (RPS)

California is already implementing a successful industrial policy in the power sector, delivering high road job creation while facilitating the transition to renewable energy.

The state's strategy centers on the Renewables Portfolio Standard (RPS), a set of policies initiated in 2002 by Senate Bill 1078 (Sher), and subsequently amended by SBX1-2 (2011), SB 350 (2015), and SB 100 (2018).

RPS requires power companies to meet an increasing share of electricity demand from carbon-free sources, reaching 100% in 2045.[86] The program is jointly overseen by CPUC and the California Energy Commission (CEC).

In addition to regulating how much renewable power they must provide, the RPS program also imposes compliance requirements on electric utilities. This includes the so-called "bucket system," which mandates a significant percentage of procured energy be generated in California.[87] This requirement has helped create a robust, high road labor market for renewables construction in the state. RPS and the bucket system are directly responsible for the installation of dozens of gigawatts of solar and wind farms and the creation of tens of millions of job hours for California construction workers.[88] Thanks to a combination of successful labor policy, committed organizing, and inventive legal strategies, these jobs have largely been performed by union labor.

The RPS example shows the basic elements of a successful labor-centered green industrial strategy:

- ***Grow and protect the California labor market while accelerating decarbonization:*** The RPS bucket system ensures demand for renewable energy projects built in California by requiring the use of California generated energy, thereby creating tens of thousands of jobs for California construction workers.
- ***Support organizing and high-quality union jobs:*** Building trades unions have won Project Labor Agreements (PLAs) and created career pipelines to union jobs in the renewables construction industry for disadvantaged workers and dislocated fossil fuel workers across the state.
- ***Ensure accountability:*** Community advocates and unions throughout the state are able to organize coalitions around each project and win enforceable Community Benefits Agreements (CBAs). ■

The state must also do more to leverage its procurement spending to bring production in-state. Under CPUC's recently adopted centralized procurement strategy for long lead-time energy resources, pursuant to AB 1373 (2023), the Department of Water Resources (DWR) is statutorily obliged to evaluate bids according to multiple criteria, including the bidder's "economic and local community impact… and equipment acquisition and supply chain investment plan."[89]

Bid solicitations are expected next year. DWR, the Department of General Services, and all agencies responsible for large-scale state procurement ought to model their contracting processes after the L.A. County Metropolitan Transit Authority's Manufacturing Careers Policy (MCP), which gives preference to domestic producers, and for projects exclusively funded by local government, to bidders that create and retain jobs in Los Angeles County.[90]

Need for high road standards

L.A. Metro's MCP scoring system also advantages bidders that commit to paying high wages and offering generous benefits for production workers. Workforce standards for permanent production work, as opposed to construction work, are likewise missing from most state procurement, climate-related spending, and land use permitting exemptions.[91] Funding and permit streamlining, like the AB 205 process, for targeted cleantech industries should explicitly condition funding on recipients' commitment to high road labor, equity, and environmental practices.[1]

Because nominal wages and operating costs in California are high relative to other states, lawmakers often fear placing such demands on companies will put the state at a further competitive disadvantage. Certainly, some firms will always choose to prioritize low wages, minimal regulation, and tax avoidance above all else. The state should nevertheless steer its financial support to those companies willing and able to compete for market share in ways that don't come at the expense of workers and communities.

These high road firms do exist, especially in fast-growing emerging industries. For them, gaining a technological edge, scaling up production, and getting to market first are far more important for their success than marginal operating cost reductions. And with the federal government withdrawing financial support for cleantech industries, California enjoys even more leverage as a source of public capital.

Look no further than the PowerForward ZEV Battery Manufacturing grant program, funded by the CEC and administered by CALSTART. It uses a scoring system that incentivizes grantees to meet at least one of the following conditions: 1) enter a card check neutrality agreement, 2) have a collective bargaining agreement, or 3) pay a living wage and offer employer-paid health insurance, family leave, and retirement benefits to full-time employees.[92]

PowerForward applicants are also given preference for adopting an injury and illness prevention program, proactively investigating and remedying any complaints of inappropriate workplace conditions, and for demonstrating success in reducing emissions. The program received 14 applications requesting $161 million out of a total initial allocation of $43 million. Two California-based startups manufacturing battery components have since been awarded a combined $26.5 million in grant funding. ■

1. For a deeper discussion of high road workforce standards in California climate investments, see Appel, S., & Hammerling, J.H. (2023, September 20). California's Climate Investments and high road workforce standards: Gaps and opportunities for advancing workforce equity. UC Berkeley Labor Center. https://laborcenter.berkeley.edu/californias-climate-investments-and-high-road-workforce-standards/

Case Study: Tesla

In April 2010, New United Motor Manufacturing Inc. (NUMMI), a Toyota-General Motors joint venture, shuttered its assembly plant in Fremont. For 25 years, NUMMI employed thousands of workers represented by United Auto Workers Local 2244, all of whom were laid off when the plant closed.[93] Months later, Tesla, then a young and promising upstart, acquired the plant.

As it ramped up production over the subsequent decade, Tesla received considerable government financial assistance. This included more than $200 million in sales tax exemptions from the California Alternative Energy and Advanced Transportation Financing Authority and a $15 million CalCompetes tax credit from GO-Biz.[94] The federal Department of Energy also loaned the company $465 million through its Advanced Technology Vehicles Manufacturing program.[95]

More valuable still were government initiatives to support the EV market. California, the federal Environmental Protection Agency, and many other states require automakers to meet emissions standards or ZEV sales benchmarks in exchange for regulatory credits. Compliant companies can then sell these credits to noncompliant companies, allowing the latter to avoid paying even more in penalties.[96]

As an exclusively electric automaker, Tesla was able to rapidly amass such credits. Their sale provided a crucial source of revenue in the company's early days, when it was still operating at a loss, but before any other major automaker had earnestly begun electrifying their portfolio.[97] In California alone, Tesla's ZEV credit sales yielded an estimated $2.5 billion between 2012 and 2020.[98] What's more, 40% of ZEV rebates the state issued through its various consumer incentive programs during the same period were used to purchase Tesla vehicles.[99] That amounted to $690 million in state-financed demand.

The wage conditions on its 2015 CalCompetes award required Tesla to pay a minimum wage of just $35,000 a year and an average wage of $55,000 through 2019. The company's workforce remains without a collective bargaining agreement and most production workers at Tesla Fremont make less than PowerForward's living wage threshold—$42.48 an hour for a family of four in the Bay Area.[100]

If Tesla were to apply for state funding today, it would also likely struggle to meet PowerForward's scoring requirements related to workers' rights and safety on the job.

In the last two years, the company has settled two lawsuits brought by Black workers alleging severe racial harassment at Tesla Fremont.[101] Another two racial discrimination lawsuits by the U.S. Equal Employment Opportunity Commission and the California Department of Fair Employment and Housing are still in litigation.[102] In 2023, a federal judge ordered Tesla to reinstate a worker who was illegally fired for attempting to organize a union at the plant.[103] Since 2022, California's workplace health and safety regulator has fined the company nearly $300,000 for dozens of serious violations and accidents.[104]

Meanwhile, despite being a leading cleantech manufacturer, the company racked up over 112 air quality violations between 2019 and 2024 from the Bay Area Air District associated with thousands of pounds of illegal pollution.[105]

Tesla is a cautionary tale.

On the one hand, it amply demonstrates the power and potential of state industrial policy. Through a combination of regulation and demand- and supply-side financing, California played a leading role in kick-starting the domestic EV market and incubating the country's dominant electric automaker. As industry observers readily acknowledge, the company would not be what it is today, if it was able to survive at all, without the secondary market for state and federal regulatory credits.

But the state also missed its window of maximum leverage to set the industry on a high road trajectory. The expansion of the EV market globally has diminished the importance of California's market to Tesla's overall sales volume. While the company continues to generate billions in revenue from the sale of regulatory credits, they now represent a diminished fraction of its total earnings across all segments.[106] With $16 billion in cash and over $29 billion in working capital, it no longer needs low-cost public financing and subsidies to invest in further expansion.

Structuring its early financial support in the form of tax exemptions and credits, the state also failed to realize any direct fiscal return.

Had California been able to take a $200 million equity stake in Tesla in 2019, it would be worth over $2.5 billion today. The proceeds from this capital gain could then have been used as a new source of revenue to finance additional spending on decarbonization. Or, by retaining its shares, the state could have used its voting power to push for stricter regulatory compliance, respect for workers' freedom of association, and greater investment in California, rather than "right to work" Texas and Nevada.

Acquiring $200 million worth of stock six years ago, the state would today own as much equity in the company as all executives and directors combined, excluding founder and CEO, Elon Musk.[107] ■

Section 5.
Winning a Green Industrial Policy for the Working Class

UAW Region 6 is already taking steps to make this vision of green industrial policy a reality in California by sponsoring SB 787.

Side by side with bill author, State Senator Jerry McNerney of Stockton, we are pushing for critical legislation to create the enabling institutions the state needs to plan for and oversee a strategy of in-state supply chain development, scaled decarbonization, and increasing affordability across three clean economy sectors: ZEVs and batteries, offshore wind, and building decarbonization.[108]

A successful green industrial policy should capitalize on the state's existing economic advantages, realistic market development opportunities, and unmet needs for affordable decarbonization. Below, we explain our choice of target industries and offer some ideas for how the state might promote their future growth.

Target industries

ZEVs and batteries

California is the undoubted national leader in ZEV and battery energy storage system (BESS) deployment and innovation.[109] Last year, a quarter of the 1.75 million light-duty vehicles sold in the state were ZEVs.[110] The number of registered light-duty ZEVs on the road now exceeds the next largest state by over a million vehicles.[111] And California exceeds all other states in installed BESS capacity.[112]

That said, the market is far from its full growth potential and far from meeting California climate goals. There are still over 30 million internal combustion engine vehicles registered in California. The State will need over 35 gigawatts of new energy storage capacity installed by 2045.[113] Residents, businesses, and government entities will need to spend roughly $80 billion over the next two decades to fully electrify the state fleet of passenger vehicles, medium- and heavy-duty trucks, and buses.[114]

Continued market expansion, however, is poised to coincide with a sharp drop in state production share. In 2024, 37% of light-duty ZEVs produced in the U.S. were made in California at Tesla Fremont.[115] Based on investment announcements and current industry plans, analysts project that share will fall to 10% by 2030 as legacy automakers and Tesla bring new EV capacity online in other states.

In response, the state should focus on both diversifying the types of ZEVs produced in-state and on upstream segments of the supply chain, namely battery cells and components.

Given the state's core strengths in early-stage financing and R&D, helping innovative small- and medium-sized firms scale up and compete outside of the light-duty passenger ZEV market offers greater promise for growth than courting large, multinational OEMs that don't already have a footprint in California. Of the six in-progress and operational EV assembly plants announced in the state since the passage of the Bipartisan Infrastructure Law in November 2021, not one is owned by a major OEM and two are startups.[116]

Four of these plants will produce medium- and heavy-duty vehicles and the other two are supplying niches in the light-duty market (two-seaters and low-speed). State-level leveraged procurement is well suited to help drive down acquisition costs in these industry segments. By prioritizing procurement spending in-state, California can also boost its production share.

For example, ZM Trucks, North American subsidiary of Japan-based ZO Motors, is building its first U.S. production facility in Fontana, where it plans to make electric terminal tractors and ground service equipment for public ports and airports.[117] China-based automaker, BYD, has been producing electric transit buses and batteries with union labor in Lancaster for over ten years, helping the Los Angeles Department of Transportation electrify its fleet.[118] Last year, the CEC awarded the company a $30 million Clean Transportation grant to build battery-electric school buses.[119] Allowing school districts to purchase these buses through leveraged procurement will help accelerate electrification in disadvantaged communities.

Electrified mass transit is also a more efficient use for the state's prodigious lithium reserves.[120]

Lawrence Berkeley National Lab has estimated that the state's Salton Sea Region in the Imperial Valley contains up to 18 million metric tons of lithium extractable from geothermal brine, enough to manufacture 375 million EV batteries.[121] Sustainably developing this resource is of utmost importance, as is fully leveraging its presence to drive in-state investment in downstream activities. To be sustainable, though, the Imperial Valley's working-class Latino and Indigenous communities—who have historically paid a steep environmental price for economic development in other parts of the state—must have a real voice in the planning process.[122] They must also be equipped to hold companies accountable for their community benefits and environmental mitigation commitments.[123]

Filling the gap between raw lithium extraction and cell production represents a prime target for state industrial policies like grants, advanced purchase commitments, joint ventures, and stockpiling. Argonne National Lab projects domestic lithium-ion cell manufacturing capacity will be sufficient to meet demand growth over the next six to seven years.[124] However, projected component capacity for anode (AAM) and cathode active materials (CAM), foil substrates, and separators is less than half of expected demand from domestic cell production.

Three companies making AAM and CAM have opened facilities in California since 2021, and another making separators expects to start operations in the next two years.[125] The latter, Sepion, is partially funded through a $17.5 million PowerForward grant. Doubling down on these links in the supply chain, while retraining strong and effective program conditions, will remain a good bet as protracted trade hostilities put pressure on battery makers and end users to source more inputs domestically.

By establishing offtake agreements with lithium producers in the Imperial Valley, the state could guarantee a minimum level of demand, derisk investment, and stabilize prices to downstream buyers.

Of course, component makers also require critical minerals besides lithium, very little of which are currently produced in the U.S.[126] Many California-based startups are tackling this head on.

Lyten, headquartered in San Jose, is making proprietary lithium-sulfur batteries that do not require the use of heavy metals like nickel, cobalt, or graphite and are more energy dense than the most common lithium-ion battery chemistries.[127] The company has been the recipient of $21.3 million in state grants and is currently producing batteries at both its San Jose and San Leandro facilities.[128] Its first gigafactory, though, will be located across the state line in Nevada.[129] Inlyte Energy, whose founder developed its battery tech with the support of Berkeley Lab as a PhD student at Stanford University, is piloting sodium metal halide batteries that only require cheap, abundant iron and sodium.[130] It is also based in San Leandro, but is currently evaluating potential sites to scale up U.S. production for long-duration energy storage systems.[131]

These alternative battery chemistries are just some of the many new technologies roiling the industry, and California should continue to ensure future breakthroughs are made and commercialized in-state.[132] In the meantime, the state can continue to lead by adopting responsible sourcing restrictions for companies receiving public money, requiring them to audit their supply

chains for exposure to forced and child labor, environmental harms, and human rights violations in countries exporting critical minerals.[133]

When it comes to cell production, the industry's reorientation to Energy Storage Systems (ESS) presents new opportunities for in-state growth. In just the last five years, ESS's share of the global market has quadrupled to 20% and has helped buoy Tesla's earnings in the face of sliding vehicle sales.[134] Battery storage installations are accelerating rapidly in California.[135] DWR plans to purchase 2 GW of long-duration grid storage as part of CPUC's centralized procurement strategy. IOUs under the CPUC's direction and procurement mandates will be purchasing dozens of gigawatts of utility scale storage and are incentivizing behind-the-meter storage.[136] This demand should be sourced in-state to the greatest extent possible through procurement conditions, stockpiling, and equity stakes. By supporting continued growth in the storage market generally, the state will help battery makers and their suppliers hedge against uncertainty in ZEV-related demand.[137]

The scale of the state battery market, for ZEVs and BESS, also makes it a compelling candidate for battery recycling. Regardless of where technological change takes cell production, exhausted lithium-ion batteries are widely recognized as a rich vein of domestically sourced critical minerals with multiple uses.[138]

California currently does not have a strategy for building up its battery recycling capacity. Battery recyclers are not, for instance, currently eligible for CalRecycle's CCI loan program.[139] To create a truly closed-loop, vertically integrated ZEV-battery industrial complex, California should align demand- and supply-side funding around expanding in-state recycling capacity and consider a wider array of industrial policy tools, including state enterprises, joint ventures, and advance market commitments. These should be conditioned on industry-leading best practices to safeguard against worker and community exposure to hazardous materials.

Offshore wind

Offshore wind (OSW) will be a critical renewable energy resource in California's decarbonized future, affording utilities and regulators the kind of predictability that other renewables like solar and onshore wind do not. The state's challenge is getting the industry off the ground in a hostile federal political environment without driving up rates.

With as much as 200 GW of OSW energy potential off the California coast, the state is poised to lead the long-run development of the industry in the U.S.[140] The CEC's current target is 5 GW of generating capacity by 2030 and 25 GW by 2045.[141]

OSW construction, assembly, and operations are projected to support thousands of jobs, but the industry's multiple upstream linkages offer opportunities for additional high road job creation as well. California already has the largest concentration of non-aircraft turbine manufacturing in the country.[142] The state should seek to retain this edge and deepen supply chain integration by localizing component manufacturing as well—nacelles, generators, gearboxes, power converters, and blades.[143]

To this end, the California Offshore Wind Advancement Act (AB 3, 2023) calls for the CEC, in consultation with other state agencies and private stakeholders, to study how the state might feasibly capture 50-65% of the manufacturing and assembly activity associated with OSW development.[144] The report must be submitted to the Governor and state legislature by the end of 2027.

For all its promise, the build-out of OSW in California still faces major challenges. Upfront capital costs are formidable compared to other energy sources, renewable or from fossil fuels, and these threaten to drive up

rates.[145] The industry is also plagued by infrastructural and regulatory hurdles, including minimal land availability at major commercial ports, long lead times for permitting and regulatory approvals, and major gaps and bottlenecks in the transmission grid.[146] While bad faith opponents frequently exaggerate the industry's environmental harms,[147] Tribal Nations and frontline port communities have expressed well-founded concerns about the short- and long-term impact of OSW development on residents' health, local ecosystems, and traditional lifeways.[148]

These challenges have left regulators in the state reluctant to mandate that public and private utilities procure offshore wind energy for fear of raising electricity costs to consumers. OSW's prodigious generating capacity and long-lived physical assets mean, though, that the technology is already cost competitive on a standardized per MWh basis with most other new-build energy sources.[149] And proactive outreach and community engagement during the project planning process can help address resident concerns, building public buy-in through strong equity commitments and environmental protections.

To reach this scale, OSW will require continued state support to steward development. CPUC's decision to include 7.6 GW of OSW in its centralized procurement strategy will provide welcome long-term certainty on demand and pricing as projects are brought online over the next decade.[150] The State Lands Commission (SLC) has also entered a memorandum of understanding with the ports of Long Beach and Humboldt to collaborate on infrastructural upgrades needed to support turbine and platform assembly.[151] Last year, California voters approved a bond measure that sets aside $475 million in proceeds for OSW-related port infrastructure, and in its 2023-24 transmission plan, the state's grid operator, CAISO, approved $4.6 billion for transmission lines to deliver OSW energy via Humboldt Bay.[152] SB 787's passage would also create essential coordination capacity among state agencies involved in offshore wind.

The ports' MOU with the SLC contains provisions calling for consultation with tribal communities, community benefits programs, joint labor-management training initiatives, and in-state supply chain development. And yet, sustaining OSW projects will not be sufficient to attract linked upstream activities or downstream production for grid investments. Since 2021, no manufacturer has announced plans to invest in making OSW components, transformers, or utility structures in California.[153] Nationally, companies are investing over $4.5 billion to expand domestic production.

Its exceptionally high upfront costs and large minimally efficient scale also make OSW a compelling candidate for public financing, operation, and ownership. Golden State Wind, a joint venture between Ocean Winds, a global OSW developer headquartered in Spain, and Reventus Power, which is wholly owned by the national public pension plan of Canada, is a case in point.[154] It plans to deploy 2 GW of capacity in California's Morro Bay Wind Energy Area. Such public or joint projects can be financed over a much longer horizon and with lower cost financing than privately owned energy projects.

While all five federal lease areas in California have already been allocated, the Trump administration's professed hostility to wind energy has created much policy uncertainty and fear among investors.[155] One North Coast project has already been indefinitely paused.[156]

Two-thirds of California residents support OSW development.[157] The state and CalPERS should stand ready as a stable source of long-term capital to ensure this viable industry isn't prematurely stifled.[158] And given these projects' long timelines, the state should begin thinking now about how to support future capacity growth beyond existing federal lease areas.

Heat pumps and building decarbonization

Heat pumps are HVAC systems that efficiently use electricity, rather than natural gas, to transfer hot and cold air throughout a building. The same technology can also be used to replace gas water heaters.

Mass deployment of heat pumps is essential for decarbonizing homes and commercial buildings, which account for a quarter of state emissions.[159] There is currently no roadmap for widespread building decarbonization. And yet, if not carefully considered, status quo building policies risk displacing and increasing the energy burden on renters, low-income families, and working-class Californians of color.[160]

The heat pump manufacturing industry is already mature, with many globally competitive firms. Several large OEMs, including unionized producers like Carrier and A.O. Smith, are based in the U.S. Most existing production capacity is in the Midwest and South.

Demand for heat pumps is strong nationwide and expected to see continued growth. Heat pumps have outsold gas furnaces for each of the last three years, and 25 states have pledged to install 20 million more over the next five years.[161] California, one of the 25, set itself the goal of six million installations by that time.[162]

To support this market growth, the state originally appropriated nearly a billion dollars over six years for the CEC's Equitable Building Decarbonization (EBD) program, funded out of both the GGRF and the General Fund.[163] Most of this funding was meant for the statewide Direct Install program, which will fully cover the cost of building decarbonization retrofits for low-income households in disadvantaged communities. Another $30 million was set aside for Tribal Nations and $80 million for a statewide incentive program to lower decarbonization financing costs. Unfortunately, in subsequent budget cycles, EBD's funding was pared down to half its original level.[164]

CPUC is also administering a heat pump incentive program of its own, offering rebates through TECH Clean California.[165] And the CEC's 2025 Energy Code includes aggressive efficiency standards that are projected to lead to half a million heat pump installations over the next three years and save ratepayers $4.8 billion in energy costs.[166]

Ten major HVAC OEMs have signed an agreement with the CEC expressing their commitment to building the manufacturing capacity needed for the state to reach its deployment goals.[167] This agreement does not, however, give any indication as to where those heat pumps and their components will be produced, nor that localizing production is a stated objective.

Manufacturers have announced nearly half a billion dollars in new investment in heat pump production over the last three years, none of which is planned in California. In the CEC's EBD Direct Install program guidelines, a secondary goal of the program is to "support local workforce and high-quality jobs," but the metrics defining success exclusively refer to contractors and installation jobs.[168] Ensuring this work is performed by skilled union tradespeople is crucial, but the state should not miss its chance to create more union production jobs as well.

Achieving its goal of six million installations by 2030 is not to be taken for granted, but California will ultimately need to install 23 million heat pumps for residential and commercial use to fully decarbonize its building sector before midcentury.[169]

Looking beyond the next five years, California can both accelerate heat pump deployment and add in-state manufacturing capacity by establishing a strategic stockpile.

To do so, the state would enter into advance purchase agreements with heat pump manufacturers that commit to fulfilling their orders locally. Directly procuring heat pumps in this way would give the state greater leverage to set high road labor standards, incentivize local production and manufacturing jobs, and allow it to distribute the stockpile at wholesale or subsidized prices in strategic projects and for maximum equity benefits. As with EBD, the state could also make stockpiled heat pumps available at no cost to low-income households, nonprofit social service organizations, and to public facilities like schools and libraries. ■

Section 6.
Conclusion

California and the nation are at a crossroads.

The billionaires in Washington are trampling on our civil rights, doubling down on fossil fuels, slashing taxes on corporations, attacking immigrants at every turn, defunding our safety net, and busting unions. For all their bluster, this reckless agenda is about little more than funneling wealth upwards into the pockets of the rich. It promises to stifle American innovation, squeeze the working and middle classes, and render our planet unlivable.

As union members accustomed to taking on big fights, we know it's time to act and act boldly where there's hope for change. Right now, the greatest promise for action is at the state level.

Even as we reject the extreme right-wing agenda in Washington, California's business-as-usual playbook also holds little promise for addressing the state's greatest challenges: climate change, affordability, and the loss of good union jobs. We know there's a better way.

Only by embracing the kind of pro-worker green industrial strategy laid out in this report can California hope to make simultaneous progress on all three fronts at once.

The first step in that strategy is to pass SB 787, which:

1. Requires state agencies to align and coordinate funding and program administration around in-state supply chain development, accelerating decarbonization, and affordability.
2. Establishes a permanent Senior Counsellor on Equitable Supply Chains to convene the public, industry, and external stakeholders who can advise state agencies on policy and centralize the dissemination of industry data and market research.

We know from the state's own history of industrial policy that such coordination is essential. Standing beside us in this fight is a large and diverse statewide coalition that shares a common commitment to the bill's three primary goals and a recognition that business as usual will not be sufficient to make progress on all fronts at once.

The goals of this report cannot become incidental outcomes; the stakes are simply too high. The working class has a better world to win, a world of good union jobs, affordable energy for all, and ecological abundance.

We're ready to fight to make this world a reality. We hope you will join us. ■

Postscript. *Abundance* and the 2025 California Legislative Session

Abundance, the recently released popular economics book, is seemingly everywhere in 2025. The book marks a new development in the national debate over industrial policy, a major area of focus for both the Trump and Biden administrations.[170]

We wholeheartedly agree with authors Derek Thompson and Ezra Klein that transformative policy change will be necessary to make essential goods and services affordable, and that doing so will require increased state capacity, empowered public authorities, and investments in innovation.

Klein and Thompson also emphasize permitting reform as a necessary aspect of policy change. While we agree in concept, reform must be thoughtful, and done in such a way that that lifts and protects the working class while accelerating projects and making project delivery more predictable. Eliminating environmental review and project conditionalities entirely will lead to low road economic development that endangers California workers, communities, and ecosystems.[171]

We need a holistic green industrial policy that prioritizes public benefits, equity, sustainability, speed, and scale in development. We hope California legislators return at end of the 2025 legislative session to pass comprehensive measures like SB 787, while amending recent manufacturing permitting deregulation. Strategic, targeted solutions like the AB 205 permit streamlining process—which could benefit from stronger community benefits, job quality, and job access conditions—are waiting to be used.[172] ■

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