

**California’s Markets and its Mandates are in Conflict: How to address Climate Adaptation/Resilience, Emissions Reductions, and Forge Forward on Clean Energy and Fuels Effectively and Inclusively**

**What we Need to Do to Achieve our Goals Timely, Cost Effectively and Inclusively:**

California is a proven leader in addressing Climate Change, in shifting to a clean energy and fuels economy, and in creating and sustaining economic opportunity in the process. But, as with the rest of the planet, California is also facing existential deadlines to accelerate further reductions in emissions just as climate impacts on our natural lands and resources are creating even greater threats.

We have wildfires that spew carbon and deadly black carbon emissions farther, wider and in a more devastating fashion, scorching natural and working lands and homes and infrastructure and both immediately claiming human lives (alongside lives of both wild and domesticated animals) and posing short and long term health hazards to all life as they spread. Our soil temperature is 2 degrees warmer than it used to be, adversely impacting natural resilience and natural carbon sequestration on wild lands and working lands alike. Our cycles of drought and flooding further environmentally devastate our landscape by washing away even healthy soils, causing further damage to already fragile water quality and to natural watersheds, and creating large swaths of kindling for these fires and then vast amounts of waste across the land that will either decay and emit carbon and black carbon while further reducing natural sequestration or remain a fire risk or be subjected to open burning and emit and similarly leave nearby lands and vegetation less capable of healthy carbon sequestration.

The state has invested billions of dollars across its energy and fuels sectors and into transportation and building infrastructure and planning to directly address achieving emissions reduction through cleaner, renewable fuels and sources of electric generation and has surpassed its landmark 33% renewable energy goal on its way to 100% clean energy, and is moving toward its carbon reduction goals from all key sectors, including transportation, which currently accounts for most of the carbon and black carbon emitted. But so much more needs to be done, and to be done expeditiously and pragmatically, because in just the last two years the emissions reductions achieved across these sectors have been virtually wiped away by emissions from devastating wildfires and other climate related environmental disasters.

California needs to aggressively measure not just the emissions from wildfires, open burning, landfill emissions, etc. – it needs to do so on a lifecycle basis and aggressively address root causes, deployment of beneficial end uses for waste, sustainable soil health across wild and working lands, forest management, creation of an expansion of sustainable clean water supplies, and marry all of this with the policies it continues to implement and adapt to reduce emissions from manufacturing, energy production and generation and fuels production and use. We need to measure the emissions and costs of avoiding wildfires, of reducing their severity and of making natural and working lands more resilient and resistant to wildfires.

As we examine our fuels and energy sector and their emissions and our ability to achieve our mandated goals of 100% clean energy and reducing all emissions from these sectors below 1990 levels – we have to marry our polices of natural resilience and resistance with our policies for industrial reductions. The health of our forests, agricultural lands, marshes, watersheds, other working lands and all other natural lands has reached a crisis point in part because we have not made lifecycle assessments of natural emissions and resilience alongside lifecycle assessments of production and generation of electricity and production and use of fuels. We measure emissions from a tailpipe and at generation sites but we have not consistently or comprehensively addressed the full carbon footprints from inception to end use of all technologies nor have we consistently and comprehensively assessed avoided emissions of diversion of feedstocks or fuels into their end uses and inpacts on land use. This is part of why we are finding so much natural devastation and are struggling to address the harms already unleashed and to mitigate further devastation going forward.

**If a Tree Burns in the Forest, it impacts Human Health in the City:**

People living in cities have long experienced the air quality impacts of living closer together, having cars and delivery vehicles clogging up their streets, idling and emitting harmful toxins, and of industrial activity also spewing emissions into the air around them. When we began to aggressively address emission reductions we were already operating at a deficit because we had not only clearly anthropogenic emissions impacting human health in the particulate matter coming out of industrial stacks or from tailpipes of vehicles, but were also becoming increasingly aware of the impact of anthropogenic carbon emissions that increasingly outstripped natural carbon sequestration from our forests and natural lands. We had natural producers of carbon and natural sequesters of it outside of human activity, and indeed we had natural production of particulate matter in the fires that have always occurred naturally in forests or on natural lands – in addition to all the fires caused by human activity. Indeed, when our air quality is bad we are told not to burn in our fireplaces or light charcoal for outdoor cooking. But we didn’t focus soon enough or comprehensively enough on the deterioration of our natural and working lands and what that meant to overall resilience. Now we are in a place where it no longer matters who caused a forest or other wildfire, once a spark is lit our soil is warmer, dryer, our foliage and trees are diseased, dying. We’ve created the circumstances for all fires to be crackling, fierce, and our weather extremes, including more frequent higher winds, blow these fires in directions we had not previously imagined.

Fires are not the only peril we face, but they are currently doing the most devastation. When you have to stay indoors for 20+ days due to unhealthy air in some of our most remote and pristine areas, you do not feel like people in the city are the only ones impacted by poor air quality. People hundreds of miles away also had to stay indoors. People in cities were impacted by remote, rural forest and wildland fires in ways they had not been impacted before because the fires were larger and lasted longer. Whole towns disappeared from the landscape. And towns that had still been rebuilding from fires two or three years ago suffered massive setbacks. And all of that rebuilding leaves a carbon footprint.

The point is, it no longer matters if no one is there to hear a tree falling in the forest. There are over 175 million dead and dying trees in California and the opportunistic diseases causing much of this die off have moved on from forests and into cities. And with each new fire we are left with more charred trees. Unhealthy trees do no sequester carbon. Unhealthy trees do not resist wildfire. And beneath those unhealthy trees is unhealthy soil. Unhealthy soil lives in forests, in orchards, in your backyard and mine. At the same time we are trying to remove trees from the forests and wild and working lands to address wildfire prevention and reduction, we need to also be addressing soil health everywhere. Every acre of agricultural land that no longer produces food, every orchard that is removed and not replaced poses a threat. The threat is not just the loss of trees or reduced food production – but all the natural systems that combine to create healthy landscapes. Watersheds. Less rainfall means less water. Less healthy soil means less absorption and retention of water, let alone less water to store, treat and provide for human consumption. After huge fires sustained rainfalls caused flooding, washing away healthy soil, flooding rivers with tainted waste and washing away shorelines and streambeds and whole populations of wildlife and ecosystems.

It turns out our rural areas were equally as impacted as our urban and suburban areas by climate change and by manmade emissions. They became less resilient. We took away their nutrients. We didn’t manage lands as well as we should have to create and sustain resilience because we were focused on things we could see or things that were making more noise. Well, the trees are falling. They are decaying and emitting carbon. They are igniting and emitting black carbon. It is spreading for hundreds and even thousands of miles. The conditions we are experiencing now are not unlike those of the greatest manmade natural disaster of the 20th century, The Dust Bowl. In the 1930s the ground lifted up in Texas and Kansas and Oklahoma and eastern Colorado, and it moved all the way to New York City. Smoke from the recent Camp Fire in mostly rural Butte County and particulate matter from that smoke went out into the Pacific Ocean and across the Great Plains. Days after you could no longer see the brown smoke on the horizon or in the air around you, it was still there and still just as deadly. In regions far from Paradise, California, invisible death lingered in the air, dropped to the earth, submerged in the soil. It was an object lesson in the folly of us measuring things from stacks and pipes and not tracing everything to its origin and following it out as far as it would go and developing strategies to address the whole lifecycle and the full geographic scope of impacts. We quite literally missed the forest for the trees.

**I Thought this was About the Conflict between Markets and Mandates?**

At the end of the day we are faced with an even more daunting task than we at first anticipated, and in California we have many mandates to require production and purchase of renewable energy, reduction of industrial emissions, and myriad environmental laws that also sometimes come in conflict with achieving those goals. We shift from fossil-fueled plants on the outskirts of town or in industrial sectors to wind farms on our ag lands or wildlands and solar arrays in the desert. We have to keep adjusting the height of our wind turbines because birds get killed passing through (and in the case of one wind farm in particular, we later had to adjust them again because they inhibited flight paths out of a military facility). Desert tortoise habitats must be protected when building either actual solar arrays or the transmission or distribution facilities to bring the power from the desert to the people. We can take dead and dying trees out of the forest, can divert this type of waste from our landfills, or take orchard waste and convert it into electricity or into fuel – what we call bioenergy or biofuels – but when you convert it to electricity or fuels there are some emissions. We have huge hydro-electric resources that do not emit any carbon, but they exist at large dams that pose their own environmental issues and when we divert flows to generate electricity there are also habitat and streambed impacts that impact ecosystems. We have large geothermal reserves throughout the state, and many mature geothermal plants that can operate for another 50+ years and have the benefit of helping with water quality and river restoration by superheating waste water, removing impurities and returning clean water to the rivers that help restore natural balance and wildlife populations. We can generate electricity from hydrogen fuel cells, hydrogen – water. And we have new technologies emerging that can both produce electricity and produce water.

We have so many options for types of clean electricity and clean fuels, and yet we are stalled right now, hovering at 33-35% renewable power and new contracts to build and generate new and more clean power not being executed. We are maximizing fuel efficiency of vehicles and increasing the number of electric vehicles of all types and sizes, and we have the capacity to shift much of our natural gas fuel base to completely renewable content. We have our bridge to the cleaner, more resilient future and we have virtually stopped less than half way across it.

Markets and mandates are part of why this is so. When we have mandates that require us to buy certain resources or to reduce emissions to a certain level, there is a cost associated with this shift. Fifteen years ago when we began to aggressively move forward with first renewable energy penetration (a 20% Renewables Portfolio Standard or RPS) and then aggressive carbon reduction goals a few years later in California landmark Assembly Bill (AB) 32, we had utilities providing our electricity. Since electricity is also a fuel source for the transportation sector the path seemed clear to broad achievement for this sector and that it might help lead others. Industrial and fossil fuel interests were not advocates for either more renewables or the mandated path to carbon emission reductions, and so it was the utility sector that was an early leader. Utilities no longer produced most of their own power due to mid 1990s deregulation in California that had them sell off most of their generation assets and turned them into purchasers of wholesale electricity who also provided all distribution and transmission service to their customers. After an energy crisis on 2000-2001 in which wholsesale electricity prices skyrocketed and utilities were left with rates that could not cover their procurement costs, changes were made.

When RPS legislation required utilities to buy 20% of their power from renewable resources (which are more narrowly defined in California law than elsewhere – excluding large hydroelectric power and nuclear power among others resources) it was in a timeframe when many of those older, fossil-fueled plants that had been sold off were also reaching the ends of their useful lives. The cost of renewable energy was high, but there was going to be a need to replace existing resources anyway, so between the reality that utilities could recover their prudent costs of wholesale renewables in rates from end users and that additional supply was going to be needed, the first mandate was easier to meet and to absorb. As carbon reduction became part of the equation the reality that emissions from older plants were now being replaced by zero or near zero carbon emissions associated with utility power purchases also helped – because two goals could be met with the same megawatt of power.

When carbon goals extended into the transportation and fuels sectors there was another beneficial outcome for utilities, who had lost some large customers during and after de-regulation to ‘direct access’, where large customers bought their power directly from energy service providers (ESPs) rather than from utilities, but still received their distribution and/or transmission level service from the utilities. Transportation electrification increased demand for electricity. Increased demand offset losses to direct access and sustained a customer base across which to spread the higher cost of renewable power.

But ten years after the energy crisis in California another phenomenon began to slowly take hold. Another configuration of obtaining electricity service had been authorized in 2002, Community Choice Aggregation (CCA), which allowed cities and counties or other jurisdictions to use joint powers authority to create an electricity aggregator to purchase power for customers within their formed entity. It took a decade for the first CCA to successfully form, Marin Clean Energy, but once the door was open so many other groups wanted to come through. CCAs are not the same as municipal utilities, which are also formed around local governments, because CCAs are not vertically integrated – they only buy power for their customers, the utility still provides distribution and transmission service. They are also different from ESPs – as they do not buy wholesale power for specific customers, they buy for all residential and commercial customers within their jurisdiction. CCAs are spread across California now, and end use customers that live within their defined CCA jurisdictions must opt out of the CCA once it has gone through the formation process if they want to stay with full utility service.

Many of the initial CCAs were indeed formed to provide more clean energy to their customers, as it was perceived that the utilities were not moving as fast as they should to replace fossil fueled resources with renewable resources. In 2011 the RPS mandate moved from 20% to 33%, and it was to be achieved by 2020. Some of the early CCAs wanted most or all of their power to be sourced from renewable resources. And as the numbers of CCAs have grown across California, cost of service has become an even bigger factor for many than content of the electricity. Often CCAs and their customers alike are focused only on the commodity price of renewable power, which has been going down in California, and this seems at odds with the escalating price of electricity in the state.

**How Do Markets and Mandates Co-Exist? How do We Move Forward?**

Here’s where markets and mandates are in conflict and where markets may need nudging to get us across the threshold to clean energy and transportation and to broad emissions reductions. Utilities are mandated now to get to 60% RPS and to 100% carbon free electricity by 2045. Utilities are also under all of the AB 32 (and its successor, SB 32) emission reduction mandates. They also have to implement energy efficiency and demand response programs that are designed to reduce total usage (or make it more efficient) and to drive energy consumption to periods when electricity is both abundant and inexpensive. These two elements of achieving our mandates require significant behavioral and technological assistance and focus on the customer side of the equation even as the funding comes from the utility side. And, as more renewable energy, more energy storage, smarter metering and distribution technologies, etc. are deployed, it is utilities that build the infrastructure to support all of this. Utilities are used to being regulated. They are used to having their procurement subject to review and approval, their investments similarly reviewed, and then they earn their return.

Early on in the RPS program, utilities purchased much of their power under long term contracts – and this helped with financing of new renewable facilities. Capital was attracted to big projects that could secure longer term power purchase agreements (PPAs) with utilities at a lower cost of money, and the utility’s revenue stream from rates was further securitization. Under the compliance regime for RPS, power purchased directly from a renewable facility in California or interconnected directly to it was in the top ‘bucket’ for counting compliance toward 20-33-50 and now 60% renewables. And to get from what generally amounted to 2-5% renewables within a utility’s overall portfolio of power owned or purchased at the outset (mostly small hydro power and old qualifying facilities (QFs) that had been federally mandated in the 1980s) to 20% as the supply market was opening up was manageable and also did not impact the cost of total purchased power/owned generation, especially when utilities owned large hydro and nuclear plants that were already largely depreciated and lower cost. Going to 33% was a steeper curve, and that mandate, enacted in 2011, coincided more or less with the successful formation of the first CCA. So utilities looked at overall size of their load (customer base), which had gone down when Direct Access was enacted, and at the total cost of purchased power versus owned generation, and tended to buy new renewables based on cost of just the commodity and not additional system costs associated with it – like interconnection, offsetting peaking power, etc. When one CCA became two and then three and looked to expand beyond the wealthier regions of the service territory of a single utility, PG&E, to other regions and into the territories of the other two major utilities in California, SCE and SDG&E, the equation shifted.

This was also in the timeframe that rooftop solar was proliferating in California under a generous compensation program to homeowners and businesses that invested in onsite renewable power. That program, ‘net metering’ allowed a customer to place solar or another renewable technology on their rooftop or at their premises and when they were generating power onto the system they received compensation at the full retail rate, but they received a discount when consuming power. Other states and regions (and indeed within the service territories of municipal utilities in California) had less generous programs that compensated at wholesale power rates versus full retail, but the system in the investor owned utility (IOU) areas of California was also perceived by utilities as a threat. The more people who opted to generate their own power, even if they were still drawing some power from the utility and paying transmission and distribution costs, the less overall electricity sales the IOUs experienced. With CCAs coming onto the stage, they would now lose large portions of whole communities to another provider of purchased power, but would still have to provide transmission and distribution service.

Today in California we have approximately 19 CCAs, with a dozen in PG&E’s service territory alone. California’s Public Utilities Commission (PUC) estimates that by the mid 2020s 85% of the previously vertically integrated or ‘bundled’ load (energy+distribution+transmission) will be unbundled and served by either ESPs. CCAs or will be distributed energy (rooftop solar, etc.). PG&E asserts that 40% of its load loss in recent years has been due to the formation of the 12 CCAs in its territory. While all of this market disruption is a good thing and it has helped shift from an antiquated model of utility central station power provided directly to residential, commercial and industrial customers by vertically integrated utilities with little incentive to diversify supply or to innovate to improve customer control in decision-making about power use or power source/content, it has also challenged the model in policy implementation in California.

Mandates on utilities were easily implemented, the costs could be readily examined and assessed, and compliance was generally through transparent processes and even through extensive proceedings at regulatory agencies. Investment in renewable energy was transparent to the regulator and in the aggregate to the community as was investment in energy efficiency, demand response, etc. Other, related mandates, like providing for local reliability – ensuring that regions or communities did not get islanded or suffer outages due to poor planning; for resource adequacy, which is closely related and ensures that utilities have either procured or own sufficient resources to meet demand throughout their service territories, are challenged in this current environment. How different entities comply with these mandates, let alone the larger mandates of procuring sufficient renewable power, implementing energy efficiency and demand response programs, and contributing to energy sector carbon emission reductions is not so transparent and does not always translate equitably across providers. Different ways of complying may be required, and if these put some entities at a cost disadvantage it can send the wrong investment or demand signals.

In California today renewable energy sales are stagnant. Utilities, whose loads are shrinking, have already procured enough renewable power, they assert, to hold for the next 3-5 years. CCAs, which do not enjoy the same credit ratings (or any credit rating in many cases) as utilities, are unable to obtain financing for large, long term PPAs, although they assert they have purchased 2 gigawatts(GW) of renewable contracts, enough to power 1.4 million homes. But, not all CCAs are created equal and some have been operating for many years while some are still getting their operations up and running. How much power they will be able to purchase, under what terms, and at what cost and what cost of money, is uncertain. Utilities in California are also suffering financially, in part due to the huge risk they all carry for wildfires. When a wildfire passes through utility equipment, let alone may be sparked by it, the utility has strict liability for all losses going forward from that point. PG&E is in federal bankruptcy. Larger customers are seeking expansion of the state’s Direct Access program, as there has been significant stability for them in that program.

In this environment, ‘prudent’ investment and making the right choices for customers, for California and for the planet may not be aligned. To continue to grow CCAs need to manage costs effectively. Utilities are already aggressively pursuing lowest cost options, and investing in infrastructure, including infrastructure that supports transportation and other electrification, because they can recover those costs and earn on those investments. ESPs, if they are allowed to expand their service to existing customers and potentially add new customers, will also be looking at cost as a bottom line. And the temptation is to look only at the unbundled commodity cost of purchased electricity and not the value of the resource purchased to the grid, to customers and to the environment, costs imposed by any resource upon the grid, lifecycle environmental and emissions impacts of a resource – among many other factors. For example, with different purchasing dynamics and a better focus on investments in safety and grid resilience, utilities can reduce risk, but they also need to look beyond the grid to the natural landscape and how resources impact it, beneficially and detrimentally, in the short and long term. CCAs should be doing a similar analysis as should ESPs. Self-reliance and local decision making are great assets to have, but they need to be applied to regional, statewide and global thinking.

We’ve looked for too long in our planning practices at supply and demand, and more recently at the costs of supply and retaining sufficient demand to support those costs. We have to look at security, safety, resilience and sustainability in every decision made about supply and in all aspects of managing demand. These key components of our planning don’t come cheap on the front end, but as we’ve experienced so tragically in recent years, failing to invest in security, safety, resilience and sustainability has led to high cost, high risk energy.

Diversity of supply and diversity in resource size and location needs to be assessed. The forests and the beaches and the cities are all literally interconnected, but we can no longer ignore that their destinies are intertwined and transportation fuel, electricity and energy choices made in any of these regions for any of these regions will impact the others. We have mandates to address imperatives (energy self- reliance, reduction and elimination of fossil fuel consumption) and emergencies (climate emergency, wildfire emergency, drought, etc.) and we have market mechanisms within those mandates that should be directing us to make the best choices and not just the cheapest choices – but the reality is the shifting markets and overall market disruption in how we provide retail electricity and energy and with our fuels provision needs to be reformed to ensure we can meet our goals. Our natural defenses are struggling and how we implement our RPS, emission reduction and low carbon fuels policies going forward will determine whether those natural defenses can hold up. We have to think across programs and agencies and sectors and think about human health. We have to think about how to get back to healthy forests at the same time we are increasing renewable electricity and fuels. We have to think about sustainable agriculture and how to reduce our increasingly deadly landfills in that same policy making discussion.

Diversity and inclusion could not be more important in our energy and transportation planning than it is right now. We have to solve for problems like individual provider creditworthiness while solving for overall investment attraction that maximizes benefits across sectors. Is it worth spending 2 cents a kilowatthour (kWh) more for a resource that can help balance other resources and reduce overall carbon impacts of production of more infrastructure and that also helps sustain watershed quality or improve the health of nearby rivers - or reduces forest or agricultural or landfill waste? Well, what’s the cost of not making that extra investment? Can we facilitate better purchasing configurations that allow us to pay more for a standalone commodity like renewable energy but reduces costs elsewhere or lowers the overall cost of money of development of that resource? Can we aggregate compliance rather than break it down provider by provider? Can we bring in other regions and all work together assessing our collective resources and needs? What role will CCAs, distributed energy, ESPs, utilities and others play, and can they collaborate?

While we figure these things out and begin to get better and broader assessments of emissions impacts on a lifecycle basis, we need to find ways to make the markets work to the benefit of critical progress, because our forests are barely standing, our wild and working lands are imperiled, and people are dying – some in an instant as flood waters consume them or flames overcome them, and some over time from the cumulative effects of preventable harm. Fighting over price or market share or even the fight over our preferred use of land versus its necessary management for best short and long term environmental outcomes is short-sighted and ultimately deadly. We have to craft a collective path forward and California has the opportunity to be economically inclusive and environmentally decisive right now. It can’t wait.

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