



March 2023

Equitably and Rapidly Decarbonizing California

Pathways to 65 percent below 1990
greenhouse gas emissions levels by 2030
using the Energy Policy Simulator

the
climate
center

Equitably and Rapidly Decarbonizing California

Pathways to 65 percent below 1990 greenhouse gas emissions levels by 2030 using the Energy Policy Simulator

This report presents an analysis and a proposal using Energy Innovation's Energy Policy Simulator (EPS) model for attaining the urgently needed, ambitious, and achievable California greenhouse gas (GHG) emissions reduction target of 65 percent below 1990 levels by 2030. In addition, we make policy recommendations outside the scope of the EPS model to realize the 65 percent goal, including suggestions for monitoring our progress.

Introduction

More than 1 million people have died from COVID-19 in the United States. Thanks to initiatives such as Operation Warp Speed as well as unparalleled government backing and global research collaboration, vaccines were developed within a year. These vaccines saved millions of lives and facilitated a global recovery from the economic downturn caused by the pandemic. This extraordinary achievement was made possible because of immediate and speedy actions by the state and federal government, including a willingness to invest at the scale necessary to avert much worse outcomes.

A disaster of even greater magnitude is unfolding with climate change. Similar to the challenge with COVID-19, urgent and immediate actions at scale are required to combat the growing devastation caused by climate change. With GHG emissions on the rise, the impacts of climate change are rapidly accelerating. We cannot afford to delay our response. Unlike COVID-19, vaccines cannot mitigate the effects of climate change, and any delay in action will result in irreversible damage to our communities, ecosystems, and global economy. If we continue on our current trajectory of emissions, the climate change impacts could be at least five times as deadly than COVID-19¹ with impacts lasting millenia. The IPCC's 6th Assessment Report notes that we have "a brief and rapidly closing window of opportunity to secure a livable and sustainable future for all."² It is critical that we act now for rapid, equitable emissions reductions.

¹ <https://www.gatesnotes.com/Climate-and-COVID-19>

² [IPCC 6th Assessment](#), WGII, Feb. 28, 2022

California is well-positioned to take a leading role in significantly reducing emissions while simultaneously fostering a thriving economy and healthy communities, given its abundance of talent, wealth, and natural resources. Decarbonization forms the bedrock of 21st-century infrastructure and the technology developed in this pursuit could pave the way for economic prosperity for all. However, to tackle this issue effectively, we must elevate our ambitions and investments, as evidenced by China's commitment of \$546 billion in energy transition technologies, dwarfing the United States' \$141 billion investment in 2022.³

There are compelling economic reasons for acting now and leading the way in emissions reduction. Failing to act at scale now or acting too slowly will only increase the costs of climate change damages⁴ since these damage costs escalate in a non-linear fashion over time, with the severity and frequency of extreme⁵ weather events intensifying as a result. The cost of inaction or insufficient action in terms of lives and dollars is enormous, growing, and unjustifiable given the many cost-effective, early opportunities for action that exist now.

There are significant and dire health effects resulting from the use of fossil fuels. It is both urgent and critical that we reduce these health impacts of our fossil fuel economy, especially on frontline communities — which are primarily lower-income, working-class, and people of color.⁶ Fossil fuel air pollution is responsible for one in five deaths globally every year⁷ and leads to a [shortening of people's lives by an average of three years](#), an impact greater than smoking, HIV/AIDS, vector-borne diseases, and violence.⁸ Women exposed to high temperatures or air pollution are more likely to have premature, underweight, or stillborn babies.⁹ More than 7.3 million Californians live within one mile of oil and gas wells and are exposed to carcinogens on a regular basis.¹⁰ During extreme heat waves, natural gas peaker plants are used to provide additional electricity, and these are almost always situated in frontline communities, adding to their pollution burden. Transitioning to a truly renewable

³ [China's Purchasing Power Advantage & Wright's Law Mean Its Green Investments Go A Lot Further](#)

⁴ [Deloitte research reveals inaction on climate change could cost the world's economy US\\$178 trillion by 2070](#)

⁵ Sampling of the many reports on the costs of delay as well as inadequate action and investments:

- [The Costs of Delay](#), Energy Innovation, Jan 2021
- [A Fair and Sustainable Economic Recovery Program for California](#). Political Econ. Research Institute, June 2020.
- [10 Charts Show the Economic Benefits of US Climate Action](#), World Resources Institute, Jul 2020

⁶ [New E3 Reports Quantify the Health Benefits of Reducing Fossil Fuel Use in California](#), E3, Jan 2022

⁷ <https://www.sciencedirect.com/science/article/abs/pii/S0013935121000487#preview-section-abstract>

⁸ <https://insideclimatenews.org/news/04032020/air-pollution-shortens-life-expectancy-fossil-fuel/>

⁹ Bekkar B, Pacheco S, Basu R, DeNicola N. Association of Air Pollution and Heat Exposure With Preterm Birth, Low Birth Weight, and Stillbirth in the US: A Systematic Review. *JAMA Netw Open*. 2020;3(6):e208243. doi:10.1001/jamanetworkopen.2020.8243

¹⁰ <https://www.fractracker.org/2020/12/people-and-production/>

energy economy will help restore the health, safety and quality of life for these frontline communities.

By approaching the transition to the 21st-century clean energy economy with strategies that avoid past mistakes and prioritize the health and well being of frontline communities, California can both reduce climate impacts on, and provide more opportunities for, those most impacted by our production and use of fossil fuels. In addition, investing at scale now in the clean energy economy will generate new industries and jobs for the state, further bolstering California's leadership in the market of equity-centered, global climate solutions.

A 65 percent California Greenhouse Gas Emissions Reduction Target by 2030

The proposed California GHG reduction target of 65 percent aligns with the goals set by various European countries. The European Union recently updated its target for reducing emissions to 62 percent¹¹ percent below 2005 levels by 2030 (EU emissions were only slightly lower in 2005 than 1990, making this relatively comparable to California's baseline of 1990).¹² The United Kingdom has set a more ambitious target of a 68 percent cut by 2030 below 1990 levels, while Denmark aims for a 70 percent cut by the same year. Achieving the 65 percent by 2030 target for emissions reduction in California is both essential and attainable, provided that decisive action is taken starting now.

Using Energy Innovation's Energy Policy Simulator (EPS) model, we illustrate the suite of policies that can deliver GHG emissions reductions of 65 percent below 1990 levels by 2030, given the political will. We can likely go farther, even faster, commensurate with the rapidly worsening climate crisis. Generally, models do not accurately account for how swiftly innovation can change the market when policy creates the secure economic environment necessary to invest at scale.¹³

To achieve 65 percent emissions reduction, we accelerated the schedule of policy implementation using the EPS Deep Decarbonization Scenario model.¹⁴ Energy Innovation's initial analysis (June 2022) showed a pathway to 47 percent GHG reductions by 2030. This was followed by an updated version (August 2022)

¹¹ <https://www.theenergymix.com/2022/12/18/eu-boosts-industrial-emissions-target-from-43-to-62-by-2030/>

¹² <https://www.eea.europa.eu/ims/total-greenhouse-gas-emission-trends>

¹³ https://carbontracker.org/wp-content/uploads/2023/01/Transition-Infographic_S-curves3-01.png?mc_cid=3107013f48&mc_eid=ff71bfc15b

¹⁴ <https://energyinnovation.org/wp-content/uploads/2022/06/California-Energy-Policy-Simulator-Insights-One-Pager.pdf>

demonstrating a pathway to 55 percent emissions reduction by 2030 including significant economic and job benefits.¹⁵

Following are the four largest policy initiatives from the Deep Decarbonization Scenario model showing how California could achieve 65 percent GHG cuts from 1990 levels by 2030. We also provide a sampling of current policies (not intended to be comprehensive) and some recommendations for policies California should consider adopting.

1. **TRANSPORTATION: New electric vehicle (EV) car sales reach 100 percent in 2030, EV heavy freight trucks (short and long haul) sales reach 100 percent in 2032.**¹⁶

- a. **Current policies:** California bans the sale of gasoline powered cars starting in 2035.¹⁷ However, many countries have more ambitious targets. New gas car sales bans start in 2025 in Norway and South Korea, and in 2030 in Belgium, Austria, Slovenia, Iceland, Netherlands, Denmark, Ireland, Israel, Sweden, India, and the state of Washington.¹⁸
- b. **Recommendations:** California should adopt a 2030 target date to ban new gas car sales, moving up the deadline from 2035. California should also accelerate the timeline for requiring EV heavy freight trucks (drayage) sales only to 2032.
 - i. These more aggressive goals better align with the policies being implemented by other climate leaders, are essential to turbocharging emissions reductions, benefit EV and related manufacturers based in California, dramatically improve air quality and public health, and position the state to leverage significant new funds available from the federal government (e.g., the Inflation Reduction Act).
 - ii. The earlier this deadline is instituted the better, since it is imperative that we avoid locking in new fossil fuel vehicles and infrastructure for at least another 12 years (the average lifetime of gas powered cars). In addition, it is expected to take 20 to 25 years to replace the entire existing gas vehicle fleet.¹⁹

¹⁵ <https://energyinnovation.org/wp-content/uploads/2022/08/California-Energy-Policy-Simulator-55-Percent-Reduction-revised-30-Aug-2022.pdf>

¹⁶ https://energyinnovation.org/wp-content/uploads/2021/04/Energy-Innovation_2035-2.0-Accelerating-Clean-Transportation-Policy_Executive-Summary.pdf

¹⁷ <https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035>

¹⁸ <https://insideevs.com/news/534890/countries-states-gas-car-bans/>

¹⁹ <https://www.npr.org/2019/02/16/694303169/as-more-electric-cars-arrive-whats-the-future-for-gas-powered-engines>

- iii. Clean emission public transit and other sustainable mobility uses should be included in state subsidies that support clean transportation to ensure that all Californians are served.
- iv. New federal funding in the Inflation Reduction Act for EV trucks and charging stations as well as public transit benefits along with increased state support will help accelerate this transition to GHG-free options.

2. **ELECTRICITY SUPPLY: 95 percent clean energy standard by 2030.**

a. **Current policies:**

Los Angeles adopted a goal of 100 percent clean electricity by 2035 and 98 percent by 2031²⁰ and the Sacramento Municipal Utility District has a goal of 100 percent GHG-free electricity by 2030.²¹ Peninsula Clean Energy established a goal of 24/7/365 100 percent clean electricity by 2025.²² In the state of Washington, as part of the Clean Energy Transformation Act, new rules dictate that utilities transition to GHG neutral electricity supply by 2030.²³ The Netherlands, Portugal, Denmark, and Austria all have goals of 100 percent clean electricity by 2030 as well.²⁴

Note that California's current Renewables Portfolio Standard (RPS) includes many forms of biomass-based electricity generation as eligible for inclusion. Bioenergy is only relevant to the RPS when it is scaled up to a capacity that is meaningful at the utility scale. However, since the RPS was last updated, much more has been learned about the detrimental impacts on frontline communities near bioenergy plants, methane leakage, and significant shortfalls in GHG net benefits.

b. **Recommendations:** California should establish a 95 percent RPS for 2030, fully employing distributed energy resources.

- i. **Increase deployment:** Replacing fossil fuels in the electricity supply requires a large increase in solar production, which in turn requires innovative design and siting at multiple scales. California should adopt

²⁰ <https://www.utilitydive.com/news/la-approves-100-clean-energy-by-2035-target-a-decade-ahead-of-prior-goal/605980/>

²¹ <https://www.smud.org/en/Corporate/Environmental-Leadership/2030-Clean-Energy-Vision>

²² <https://www.peninsulacleanenergy.com/our-path-to-24-7-renewable-power-by-2025/>

²³ The law requires utilities to phase out coal-fired electricity from their state portfolios by 2025. By 2030, their portfolios must be greenhouse gas emissions neutral, which means they may use limited amounts of electricity generated from natural gas if it is offset by other actions.

<https://www.commerce.wa.gov/growing-the-economy/energy/ceta/ceta-overview/>

²⁴ <https://www.euronews.com/green/2022/10/17/these-eu-countries-are-aiming-for-100-per-cent-clean-power-by-2030>

pioneering strategies. For example, Hawaii is moving to pay households for providing clean energy to the grid²⁵ and France is considering a new law that requires solar panels on large parking lots (50 or more cars), which could increase generating capacity by 8 percent.²⁶ New legislation proposing tax incentives for solar canopies over large parking lots is pending in the California state legislature (SB 49, Becker).²⁷

- ii. **Remove biomass/bioenergy as eligible:** California should remove biomass/bioenergy as an eligible energy source in the RPS.
- iii. **Resolve interconnection and transmission bottlenecks:** A key bottleneck to siting of renewables and needed transmission in the United States is the “chronic sclerosis” of current permitting and interconnection rules.²⁸ A mechanism is needed whereby impacted parties can negotiate the costs and benefits of the sites and where compensation can be given to those affected. An interesting approach from Philadelphia is the development of a digital permit planning tool²⁹ to streamline permitting of clean energy projects.³⁰ There are several bills related to interconnection pending in the California legislature.³¹
- iv. **Change utility compensation structure:** California should restructure the compensation of investor owned utilities using a performance-based regulation model like Hawaii’s and other states.³² This will support the accelerated deployment of distributed energy resources that provide resilience, flexibility, and cost savings to the electricity system, reward utilities for rapid interconnection, and remove regulatory barriers to developing community microgrids.
- v. **Increase storage:** Grid storage can be increased significantly through implementation of vehicle to grid integration (VGI) technology, where EV batteries are used to support the grid by aggregating this resource during peak demand. The California Energy Commission estimates there will be 8 million electric vehicles in the state by 2030³³ with approximately 80 GW of storage capacity (compared to 52 GW of peak load during the

²⁵ <https://www.canarymedia.com/articles/batteries/people-power-hawaii-utility-wants-to-pay-households-to-share-clean-energy>

²⁶ <https://wapo.st/3Xg1lmU>

²⁷ <https://theclimatecenter.org/our-work/bill-tracker/sb-49-tax-incentives-solar-canopies/>

²⁸ <https://on.ft.com/3YzzbF9>

²⁹ <https://www.smartcitiesdive.com/news/philly-digital-tool-ease-building-permits-philadelphia/642180/>

³⁰ <https://emp.lbl.gov/news/record-amounts-zero-carbon-electricity>.

³¹ https://theclimatecenter.org/our-work/bill-tracker/?_keyword=interconnection&_status=active

³² <https://www.utilitydive.com/news/upheaval-in-utility-regulation-emerging-nationally-as-hawaii-proves-a-perfo/625529/>

³³ <https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127#>

September 2022 heat wave³⁴). New battery technologies are expected to continue to proliferate with additional economic incentives such as from the Inflation Reduction Act.³⁵

- vi. **Develop a Clean Energy Deployment Plan:** The complexity of rapidly eliminating emissions from every sector of the economy creates a vital need for planning. A lead agency should begin a coordinated, multi-sectoral, and multi-agency process to develop a Clean Energy Deployment Plan with specific quantities, locations, and timing of new resource development and infrastructure expansion.³⁶

3. **INDUSTRIAL PROCESSES: Powered 100 percent by green hydrogen or GHG-free electricity by 2030.**³⁷

a. **Current policies:**

- i. In New Jersey, a new law that received bipartisan support codifies a state-led approach to eliminating embodied carbon emissions in concrete that is the first of its kind in the United States.³⁸ The novel approach leverages market dynamics for both short- and long-term carbon emissions reductions. Key drivers for this policy are standards or mandates setting a timeline for the elimination of fossil fuel use in industrial processes.

b. **Recommendations:**

- i. Industry can reduce emissions by using passive or renewable energy based heating and cooling systems, improving energy efficiency, and addressing methane leakages.³⁹
- ii. Green hydrogen, produced by renewable energy (solar, wind, geothermal and/or hydro), can be used for powering high heat industrial processes.
- iii. California should reduce methane leaks from the production, transmission, and distribution of fossil gas, including scaling up efforts to seal leaking pipes as well as orphan and abandoned wells.

³⁴ <https://www.utilitydive.com/news/electric-reliability-power-outage-extreme-weather-california-texas-pacific-northwest-ercot-caiso/637065/>

³⁵ <https://www.yahoo.com/now/10-most-advanced-battery-technologies-150057439.html> and <https://www.technologyreview.com/2023/01/04/1066141/whats-next-for-batteries/>

³⁶ <https://www.catf.us/resource/growing-grid-plan-accelerate-californias-clean-energy-transition/>

³⁷ https://www.mckinsey.com/~media/mckinsey/business_percent20functions/sustainability/our_percent20insights/how_percent20industry_percent20can_percent20move_percent20toward_percent20a_percent20low_percent20carbon_percent20future/how-industry-can-move-toward-a-low-carbon-future.pdf

³⁸ <https://www.nrdc.org/experts/sasha-stashwick/new-jersey-adopts-first-kind-low-carbon-concrete-law>

³⁹ <https://www.energy.gov/eere/doe-industrial-decarbonization-roadmap>

iv. The state should also incentivize the use of waste process heat.

4. **HYDROGEN: All hydrogen is produced by electrolysis by 2032.** Using green hydrogen will help California decarbonize long haul trucking, shipping, and air travel while also supplying another form of stationary, very long-duration — seasonal — energy storage. The Bipartisan Infrastructure Law provided a financial loan of \$504 million in 2022 to develop a large-scale hydrogen storage facility using electrolysis. This and similar projects will lead to experience and learning which are key to scaling up and lowering the costs of these technologies.

a. Current Policies:

- i. The Inflation Reduction Act of 2022 includes incentives for green hydrogen, produced by solar, wind, geothermal and hydro, making it cost competitive with fossil-fueled hydrogen production.⁴⁰
- ii. The European Union Commission is now recommending that the European Union adopt new green hydrogen rules to ensure that hard-to-decarbonize industries use power generated from renewable energy to help reach their decarbonization goals.⁴¹
- iii. \$100 million is allocated in California's 2023 general fund budget request to advance the use and production of green hydrogen, defined as electricity used to split water into oxygen and hydrogen.

b. Recommendations:

- i. California should accelerate electrification where electrification is feasible. Where it is not, fuel switching to green hydrogen should be considered along with appropriate state regulations to limit impacts on and ensure the safety of surrounding communities. California should not subsidize or support any method of hydrogen production based on fossil fuels.
- ii. All green hydrogen production deployments should be carried out with robust community and other stakeholder engagement to reduce negative impacts on community health and the environment by a new or converted hydrogen production facility.
- iii. The state should support green hydrogen applications in difficult-to-electrify sectors such as steelmaking, sheet glass manufacturing, and cement production, as well as heavy duty transportation, rail, marine, and

⁴⁰ <https://www.utilitydive.com/news/the-ira-will-accelerate-electrolyzed-hydrogens-future-heres-what-that-me/632925/>

⁴¹ <https://cen.acs.org/policy/European-Commission-proposes-definition-green/101/web/2023/02>

- aviation sectors where they are powered by fuel cells and do not require distribution pipelines.
- iv. The state should reconsider its investment of public dollars in hydrogen fueling infrastructure for light duty vehicles, since there is a clear and cost effective pathway for the electrification of light duty vehicles with battery-electric EVs.
 - v. The state should prioritize solar- and wind-powered hydrogen facilities that produce and consume hydrogen onsite.

Benefits for Jobs and Health

The EPS model shows that the 65 percent scenario has significant economic benefits for California. By 2030, more than 300,000 new jobs will be created relative to the Business as Usual scenario in the Energy Innovations Energy Policy Simulator model, with GDP growth 1.79 percent higher. In addition, there are substantial, lifesaving health benefits resulting from not producing, refining, transporting, and using polluting fossil fuels. By 2030, 2,430 deaths will be avoided each year as a result of the cleaner environment, per the EPS model.

Another recent report supports these conclusions, showing that eliminating fossil fuel air pollution in buildings and transportation in California will “yield monetized health benefits of \$44 billion per year and that eliminating emissions from natural gas generators would yield benefits of \$1 billion per year. The benefits are due to improved health and the avoidance of 4,950 premature deaths per year. Much of these benefits would accrue in disadvantaged communities, which have historically borne a disproportionately high share of air quality impacts from energy use.”⁴²

Policy Options Beyond the Energy Policy Simulator

The EPS model uses a limited range of policies and is a useful tool for examining different emissions reduction policies and their impacts. However, as with all modeling exercises, the EPS model is necessarily a simplification and does not contain the universe of policies that can be used to address decarbonization.

There are many policies available that are not represented in great detail in the EPS model, such as scaling up natural carbon sequestration⁴³ and reforming California’s Cap and Trade

⁴² <https://www.ethree.com/new-e3-reports-quantify-the-health-benefits-of-reducing-fossil-fuel-use-in-california/>

⁴³ Natural Working land sequestration should be encouraged and ramped up now. See [Carbon Capture and Storage Policy Brief](#), The Climate Center, March 2022.

program. Here are some additional policy options the state should consider implementing for accelerated, equitable climate action:

Reforming Cap and Trade⁴⁴: As explained in the 2021 Independent Market Advisory Committee report,⁴⁵ chronic oversupply of cap and trade allowances should be addressed so that carbon prices have their desired incentive effects, free allocations to emissions-intensive industries should be stopped, leakage issues can be addressed via a carbon border adjustment, and offsets should be minimized.

In the European Union Emissions Trading Scheme (EU ETS), carbon allowance prices have risen fivefold in the last three years, and have for the first time risen above 100 euros⁴⁶ (\$105+) per ton. This has been a result of the European Union tightening rules for polluters and removing free allowances and excess supplies. Higher carbon prices increase the costs of continuing with current polluting technologies. These prices send important market signals that business as usual is not a viable option. The role of financial incentives to motivate behavioral changes needs to be substantially strengthened in California. For example, the state should provide feebates for the purchase of energy consuming devices — vehicles, appliances, travel, and a host of purchases. The fees levied on higher emitting devices are transferred directly as subsidies to similar-in-class devices that are lower emitting.

Workforce Training: There is also a critical need to scale up workforce training programs and apprenticeship programs that will be essential to electrify technologies and implement GHG reductions of all kinds. This includes power system engineers, heat pump installers, and workers skilled with all aspects of electrification for residences and in industry.

Equitable Access to Solutions: Frontline communities need to have equitable access to climate solutions and programs proposed by the state and must be engaged in policymaking that impacts their communities.⁴⁷ Furthermore, use of decarbonizing technologies and policies should not exacerbate air and water pollution in frontline, disadvantaged communities. For example, the use of carbon offsets and other market-based compliance mechanisms should not allow increased air or water pollution in these communities.

⁴⁴ [https://ca-rta.org/lao-says-2022-scoping-plan-update-lacks-near-term-focus/#:~:text=The percent20California percent20Legislative percent20Analyst's percent20Office,\(GHG\) percent20emissions percent20reduction percent20goal.](https://ca-rta.org/lao-says-2022-scoping-plan-update-lacks-near-term-focus/#:~:text=The percent20California percent20Legislative percent20Analyst's percent20Office,(GHG) percent20emissions percent20reduction percent20goal.)

⁴⁵ <https://calepa.ca.gov/wp-content/uploads/sites/6/2022/01/2021-IEMAC-Annual-Report.a.pdf>

⁴⁶ https://www.washingtonpost.com/business/eu-carbon-price-passes-symbolic-100-euros-as-reforms-bite/2023/02/22/0ce8423e-b2c0-11ed-94a0-512954d75716_story.html

⁴⁷ <https://www.greenbiz.com/article/5-priorities-ensure-climate-action-benefits-low-income-and-disadvantaged-groups>

State Implementation Plan and Climate Czar. The LAO analysis⁴⁸ of the 2022 Scoping Plan Update goal of a 48 percent reduction in GHG emissions by 2030 concludes that many specific actionable details are lacking. Given that the Scoping Plan is not detailed enough, California needs to develop an actionable implementation plan that lays out the clear path to the state goal, with interim goals and monitorable metrics for every sector by year. This scorecard should be collated and reported annually by a new state Climate Czar,⁴⁹ so that remedial actions and bottlenecks can be addressed in a coordinated and efficient manner. The Climate Czar⁵⁰ should sit in the governor's office and help agencies coordinate their work, hold them accountable, certify annually where the state is in reaching its goals, and critically develop plans to address deficiencies. In a similar vein, the state needs an actionable plan for the managed decline of the fossil fuel industry to ensure a reliable interim supply and that workers and communities dependent on the industry are not left behind. If the above policies were put into place in California, they would allow the state to meet a 65 percent reduction target with less aggressive policies than indicated by the EPS model alone.

Conclusion

Using the California Energy Policy Simulator model developed by Energy Innovation, The Climate Center produced and analyzed a pathway to reach or exceed a target of 65 percent GHG cuts below 1990 levels by 2030.

We recognize that these are very aggressive recommended policies with uncertainty about implementation and outcomes. The value of this roadmap is to demonstrate the ambition required to accomplish rapid and equitable decarbonization commensurate with the accelerating deterioration of our climate and life-supporting systems globally.

It is worth remembering the successful 'moonshot' of producing a COVID vaccine within a year! With political will, ambition, and effort, what is difficult becomes possible. Setting bold targets sends signals to agencies, private interests, and markets to direct critical investment resources to innovative and creative ventures. With thoughtful policy, ingenuity, and investment, many of these outcomes will materialize sooner than expected and other innovations that we do not expect will also contribute.

It is time for California to retake its lead on GHG reduction efforts and be a model as a first mover implementing ambitious targets. The climate crisis demands nothing less. This will

⁴⁸ <https://ca-rti.org/lao-says-2022-scoping-plan-update-lacks-near-term-focus/>

⁴⁹ <https://on.ft.com/3YWgTOv>

⁵⁰ For example, Chris Skidmore is the Net Zero Climate Czar who monitors the UK progress with reaching targets. <https://www.politico.eu/article/uks-net-zero-czar-chris-skidmore-blasts-climate-leadership-vacuum/>

yield significant economic benefits from the innovation unleashed, while improving the well being and health of our communities, especially lower-income and frontline communities especially at risk from climate change impacts.

Analysis draft by Jasmin Ansar, Ph.D., Ellie Cohen, and Barry Vesser from The Climate Center; please send any feedback, questions or suggestions to jasmin@theclimatecenter.org and barry@theclimatecenter.org.

Reviewed by:

Professor Dan Kammen, Chair, UC Berkeley, Energy and Resources Group
Julia E. Stein, JD, UCLA