



Testimony of Professor Daniel Kammen to the
California Joint Legislative Committee on Climate Change Policies
10:30 AM – Thursday, March 11, 2022 - Room 4202

I thank the committee for the invitation to speak today about the climate and social justice crises we face, and the significant opportunities that California can pursue to re-assert our leadership position in ensuring a sustainable and just society and a healthy environment, and creating numerous new jobs.

Biography: I am the James and Katherine Lau Distinguished Professor of Sustainability at the University of California, Berkeley, and faculty member in the Energy and Resources Group, the Department of Nuclear Engineering, and in the Goldman School of Public Policy. I have served as a Coordinating Lead Author for the Intergovernmental Panel on Climate Change (IPCC) since 1999. The IPCC shared the 2007 Nobel Peace Prize. I have served in the Obama Administration as Science Envoy, and currently serve as Senior Energy Advisor to the US Agency for International Development (USAID). My laboratory at UC Berkeley developed and maintains the SWITCH model (<http://rael.berkeley.edu/project/SWITCH>) of the California and WECC power grid, as well as for other nations.

My comments today can be summarized in a simple assessment:

California's historic position as national and global leader in climate protection has benefitted the state and planet in both environmental and economic terms. That leadership has slowed in dangerous ways that can be addressed through immediate action for the Just Transition.

Multiple technical analyses, including that from my own laboratory find that a 100% clean energy economy by 2035 is not only possible, but also an economic boom for California¹. This testimony will highlight the benefits of action in this area, and highlight a number of legislative, policy, and funding opportunities for lawmakers to consider.

The Good News: 90% of new energy generation worldwide in 2020 and 2021 was from renewable energy. Solar accounted for 46% of all new electricity-generating capacity added in the US in 2021. This represents the third year in a row that solar has made up the largest share of new generating capacity in the US².

California has met, and now well exceeds, its one million solar roof mandate (SB 1), and the one million electric vehicle mandate, both of which were criticized as unrealistic when first proposed (2006 & 2010). California met its Renewable Portfolio Standard (RPS) target of producing 1/3 of electricity from clean sources over three years ahead of the target date of 2020. California passed and then met the target of AB 2514, to install 1.3 GW of storage by 2020. California adopted a global-first standard of devoting 35% or more of Cap & Trade Revenues to be spent on fence-line, under-served, and minority communities.

California has now set targets of five million zero-emission vehicles by 2030 and the deployment of 250,000 light-duty or passenger ZEV chargers by 2025. Governor Newsom's allocation of \$10 billion for clean and just mobility is an important step that if used correctly will bring climate, social justice, and economic benefits to the state. The Biden Administration has adopted and advanced these California-developed targets in the form of federal commitments to a fully decarbonized national energy sector by 2035, and to *Justice40*, that allocates 40% of energy and infrastructure spending to positively impact underserved and minority communities.

The Bad News: Nationwide, residential solar installations totaled 4.2 GW_{dc} in 2021, but the first time, California is no longer #1 nationwide in new solar energy installations³.

¹ Mileva, A., Nelson, J. H., Johnston, J., & Daniel M Kammen (2013) "SunShot Solar Power Reduces Costs and Uncertainty in Future Low-Carbon Electricity Systems," *Environmental Science & Technology*, **47** (16), 9053 – 9060. <https://doi.org/10.1021/es401898f>

² <https://www.scia.org/sites/default/files/2022-03/USSMI%20-%202021%20YIR%20ES.pdf>



California has stumbled in not aggressively pursuing a steady diet of accelerated targets. As the developer of the SWITCH model, I am well-acquainted with the benefits of energy systems modeling, but also the ‘paralysis by analysis’ of using staid, traditional models that emphasize costs and under-estimate or fail completely to capture the benefits of the Just Transition. Two points not well captured in existing models suffice to make this clear:

- It is cheaper to build renewable energy projects than it is to simply *operate* existing fossil fuel power plants⁴
- The benefits of renewable energy and energy efficiency over fossil fuels is significant: we observe up to *two to three times more jobs per dollar invested in renewable energy, energy storage and energy efficiency than in fossil energy projects.*⁵

California has also stunted progress through the Public Utilities Commission Proposed Ruling that would blunt growth in the solar energy industry, retroactively tax early-adopters, and hurt the evolution of Net Energy Metering (NEM). California’s *Behind-the-meter* solar is a massive, under-valued, asset that benefits rate payers and utilities. It is important to stop this destructive war on solar, and instead aggressively move forward on innovate new goals that can be integrated into pending and future legislation and funding packages. Examples include:

- Giving the investor-owned utilities credit for new installations of distributed solar for low-income Californians, and give credit for solar + storage integrated installations for other consumers.
- Electric vehicle charging stations should become omni-directional vehicle-to-grid (V2) connections to build storage capacity, improve, reliability, and pollution.

Urgent Recommendations:

- California should bring forward the end-date for the sale of new internal combustion engine vehicles from 2035 to 2030, or earlier. At the same time, the recent \$10 billion commitment to EV mobility should be used to accelerate the deployment of *smart* (two way, V2G) connection points with a focus on low-income communities, and at the same time should work to make purchase and lease options at lowest cost to the most-needy populations⁶.
- California should work with the U. S. Department of Justice and the White House to overturn the recent lower court decision to halt work on the Social Cost of Carbon (SCC)⁷. A California SCC would be a start.
- Develop a Nature-Based Solutions program of climate (& water) smart farming that rewards agricultural and forest practices that sequester carbon. A premium can be offered for CH₄ abatement and for programs that target socioeconomically disadvantaged farmers. This would enable the 2035 climate neutrality target.
- Housing policy is climate policy⁸: For climate and social justice reasons, California should facilitate re-zoning to integrate multi-family housing into the most desirable neighborhoods to build social cohesion, to share the benefits of the best infrastructure, and to re-energize public transportation of people and goods.
- California should accelerate the lease and build timelines for marine energy to supply electricity and *green*-Hydrogen into the state economy. 10 GW of off-shore clean energy by 2030 is an achievable and massively job-producing goal.
- Akin to the Low Carbon Fuel Standard (S-7-01), California should launch a sustainable materials code that rewards the sale (and recycling) of solar cell and battery technologies that are manufactured with sustainably sourced Lithium, Cobalt, and other critical materials.

³ <https://www.scia.org/sites/default/files/2022-03/USSMI%20-%202021%20YIR%20ES.pdf>

⁴ <https://www.bloomberg.com/news/articles/2021-06-23/building-new-renewables-cheaper-than-running-fossil-fuel-plants>

⁵ <https://citizensclimatelobby.org/laser-talks/jobs-fossil-fuels-vs-renewables/>

⁶ <https://www.sfchronicle.com/opinion/article/How-electric-vehicles-can-help-advance-social-15351293.php>

⁷ <https://www.eenews.net/articles/judge-blocks-key-biden-climate-metric/>

⁸ <https://www.nytimes.com/2019/03/25/opinion/california-home-prices-climate.html>