



**Testimony of Dr. Daniel Kammen to the
California Senate Environmental Quality Committee
9 am – Monday, April 11, 2021 - Room 4203**

Dear Chair and Members of the Environmental Quality Committee:

I am honored to speak today in support of SB 582 following the comments of Senator Stern.

Senate Bill 582 updates the statewide greenhouse gas (GHG) emission reduction target to 80% reductions by 2030; establishes climate restoration goals of achieving net negative GHGs by 2035; exercises global leadership to align California policies with a path to restore GHGs to preindustrial levels before 2050; and tasks the Office of Planning and Research (OPR) and other agencies with developing a just resilience plan to ensure that the path to achieving these climate goals is carried out equitably and provides additional resources to low-income and vulnerable communities.

These are ambitious -- but I want to stress -- *achievable* goals, that are necessary for climate protection. Equally important, SB 582 will trigger and integrate a suite of actions that will invest in social justice and will be a huge net economic benefit for all Californians.

Climate Science

The fact that we are in a climate emergency is plain to see and need not be debated further. Evidence is everywhere, from the die-offs of trees in the Sierra Mountains, to the community-destroying wild-fires we experienced each of the last two summers, to damage to our rich agricultural sector. As a Coordinating Lead Author for the Intergovernmental Panel on Climate Change I can highlight the list of climate damagers Senator Stern reviewed in his opening comments. I will add a further warning. The most informed experts in California and globally concur: from choking air pollution, to dramatic shifts in terrestrial ecosystems, to the massive and under-discussed changes to coastal and marine biomes, climate change is both upon us, and additional painful surprises surely loom in the greenhouse we are creating.

California is technologically and economically ready to implement SB 582

As we all know, California has a remarkable track-record of passing and achieving dramatic and cost-effective climate legislation. AB 1493 (2002) accelerated the hybrid and then electric vehicle revolution; AB32 (2006) established a world-leading climate protection plan for 2020, which SB32 (2016) then extended to 2030 and critically also began the integration of racial and social justice into the fight for a livable climate. SB100 (2018) set a goal for a climate neutral economy by 2045 based on the *then* best available data. California's 1 million solar roof and 1 million electric vehicle goals for 2020 were seen skeptically by many when first announced, yet both are now great successes where new targets are now needed.

California has benefitted dramatically from each of these steps, with more than 80,000 Californians employed in the solar energy industry alone, with California now a global hub of 'cleantech' to rival the rise of Silicon Valley. 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.

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>



Driven by dramatic price declines, more than 80 per cent of all new electricity capacity added worldwide last year was renewable energy (IRENA, 2021).²

California needs both short- and long-term energy storage to make best use of clean energy generation. Due to in part to our lead with storage mandates (AB 2514), costs for energy storage are today falling as fast or faster than solar and wind power ever have³. A new storage mandate is needed and will be cost effective. California's prior climate legislation and the resulting wave of investment made this clean energy progress possible, and benefitted the state economy directly in terms of jobs. We need to redouble our efforts to again lead in the energy transition and to be the hub of off-shore wind energy investment and deployment, the rise of Hydrogen for energy storage, and in other emerging climate solutions.

The critical role of environmental and climate justice

I close with the third key reason why we must pass SB 582: social equity and justice. A polluted California is an unjust California. Spare-the-air days, the August/September 2020 fires and resulting blackouts, toxic spills, and pollution from internal combustion engine vehicles all disproportionately impact fence-line, low-income, and communities of color. Many of our past solar efforts targeted affluent, white communities while leaving behind much of the state⁴. California's commitment to spend 35% or more of Cap & Trade revenues to address marginalized communities was copied and improved on by the Biden Administration's call for a 40% share in the American Jobs Plan⁵.

We are now in a position to do better for the climate, for our economy, and for social justice. These are why SB 582 is so important, as are the many individual bills that are under discussion in this legislative session which SB582 will accelerate.

Biography: Daniel Kammen is a physicist by training, who is currently professor and Chair of the Energy and Resources Group (ERG) at the University of California, Berkeley, where I am also a professor and Faculty Chair of the Environmental Policy Program in the Goldman School of Public Policy, and Professor of Nuclear Engineering. In 2020 I was elected to the American Academy of Arts & Sciences. I have served as the Chief Technical Specialist for Renewable Energy and Energy Efficiency at the World Bank (2010 – 2011). My federal service includes serving in the Bureau of Educational and Cultural Affairs of U. S. State Department as Lead Scientist for the Fulbright NEXUS⁶ program (2012 – 2014), appointment by Secretary of State Hilary Clinton as Energy Fellow of the Energy and Climate Partnership of the Americas (2010 – 2016), and appointment by President Barack Obama to serve as Science Envoy for Secretary of State John Kerry (2016 – 2017). Since 1999 have been a Coordinating Lead Author for the Intergovernmental Panel on Climate Change (IPCC), which shared the 2007 Nobel Peace Prize.

² <https://www.irena.org/newsroom/pressreleases/2021/Apr/World-Adds-Record-New-Renewable-Energy-Capacity-in-2020>

³ Noah Kittner, Oliver Schmidt, Iain Staffell & Daniel M. Kammen (2019) "Grid scale energy storage", *Technological Learning in the Transition to a Low-Carbon Energy System*, 119 – 143. <https://doi.org/10.1016/B978-0-12-818762-3.00008-X>

⁴ Sunter, Deborah, Castellanos, Sergio & Daniel M Kammen (2019) "Disparities in rooftop photovoltaics deployment in the United States by race and ethnicity," *Nature Sustainability*, **2**, 71 – 76. <https://doi.org/10.1038/s41893-018-0204-z>

⁵ <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>

⁶ <https://eca.state.gov/fulbright>