

Private investment in California's solar energy industry increases climate vulnerabilities, study finds

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California is a national leader in renewable energy development. But energy systems development is driven more by financial considerations than environmental ones, leaving customers more vulnerable to the effects of climate change, a University of Illinois Urbana-Champaign

researcher determined.

Sean Kennedy is a professor in urban and regional planning whose research interests include energy systems. He examined private investments in solar energy infrastructure in northern Los Angeles County, including the financial beneficiaries and the development's environmental benefits and costs. Kennedy and co-author Ryan Stock, of the University of Northern Michigan, reported their findings in the online journal *Environment and Planning E: Nature and Space*.

California is one of the most climate-challenged regions in the country, with threats from wildfires, heat waves and drought. The area Kennedy and Stock studied bills itself as the "alternative energy capital of the world." But more than progressive climate policies, Kennedy said, what has driven the private development of energy systems in the state are environmental and [economic crises](#)—including the climate crisis, the state's uneven economic development and income polarization, an energy crisis that included rolling blackouts, the global financial crisis of 2007-09 and the difficulty of the energy industry to generate profits.

Regulatory changes in California's energy industry following its energy crisis called for more energy from renewable sources and an increase in capacity. Renewable [energy systems](#) are land-intensive, but persistent water shortages decreased the economic viability of irrigated farming, and the housing market collapse resulted in vacant land that would no longer be developed into housing. Large areas of devalued rural land, in a region most at risk of extreme heat, were transformed by being covered in huge arrays of solar panels, Kennedy said.

Solar development required private investment to supplement public spending, the researchers found. For the projects to be valuable investments, developers managed their financial risks by increasing the size of the projects and spreading the risks across multiple projects.

Large solar developers seek to build or acquire new projects to spread their risks and generate more profits, which in turn makes it easier to get low-cost loans.

This funding model depends on large-scale infrastructure, Kennedy said, but it overlooks the environmental risks that may make the system more vulnerable to climate extremes.

The result is an energy system characterized by a few very large generating stations linked to consumers over long transmission lines, rather than a more distributed system serving communities closer in proximity. That makes consumers vulnerable to an extreme weather event 1,000 miles away, Kennedy said.

"It's a precarious arrangement," he said.

Population in the study area, Antelope Valley, is projected to grow, and the area also will likely experience some of the highest increases of extreme heat days.

"They expect a high demand for air conditioning. That puts a strain on the existing electrical grid infrastructure. Concentrating much of the state's future [energy](#) supply in this environment will compound existing grid vulnerabilities," Kennedy said.

More information: Sean F Kennedy et al, Alternative energy capital of the world? Fix, risk, and solar energy in Los Angeles' urban periphery, *Environment and Planning E: Nature and Space* (2021). [DOI: 10.1177/25148486211054334](https://doi.org/10.1177/25148486211054334)

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