

Date of Hearing: June 28, 2023

ASSEMBLY COMMITTEE ON UTILITIES AND ENERGY

Eduardo Garcia, Chair

SB 688 (Padilla) – As Amended June 8, 2023

SENATE VOTE: 40-0

SUBJECT: Agrivoltaic systems: grant funding

SUMMARY: Requires the California Energy Commission (CEC) to award grants for agrivoltaic system projects to support research and development in agrivoltaic systems, conduct an evaluation of the grant program, as specified, and publish the evaluation on the CEC website, contingent upon an appropriation from the Legislature.

EXISTING LAW:

- 1) Establishes the policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers by 2045 and 100% of electricity procured to serve all state agencies by December 31, 2035. (Public Utilities Code § 454.53)
- 2) Establishes the California Renewable Portfolio Standard (RPS) Program which requires investor-owned utilities (IOUs), publicly owned utilities (POUs), community choice aggregators (CCAs), and energy service providers (ESPs) to increase purchases of renewable energy such that they each procure a minimum quantity of electricity products from eligible renewable energy resources, as defined, so that the total kilowatt hours (kWh) of those products sold to their retail end-use customers achieves 25% of retail sales by December 31, 2016, 33% by December 31, 2020, 44% by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030. (Public Utilities Code §§ 399.11, 399.13, 399.15, 399.30)
- 3) Requires the CEC to assess trends in energy consumption and analyze the social, economic, and environmental consequences of these trends. The CEC must establish energy conservation measures, including building and appliance energy efficiency standards, and recommend additional conservation measures to the governor and the Legislature. (Public Resources Code § 25216)
- 4) Establishes the Williamson Act and authorizes a city or county to contract with a landowner to limit the use of land devoted to agricultural use or located in an agricultural preserve designated by the city or county in exchange for reduced property tax assessments. (Government Code § 51201)

FISCAL EFFECT: According to the Senate Committee on Appropriations, costs to implement this bill could range into the several millions of dollars. The CEC estimates ongoing costs of \$300,000 annually (Energy Resource Program Account [ERPA] or General Fund), the Department of Food and Agriculture estimates one-time costs of at least \$373,000 spread over four or more years (General Fund), and unknown additional costs, likely around several million dollars (General Fund, special funds, or bond funds), will be necessary to provide funding for grants under the program.

BACKGROUND:

SB 100 And The Need For Solar – In 2018, the Legislature adopted SB 100 (De León, Chapter 312, Statutes of 2018) to establish a target for renewable and zero-carbon resources to supply 100% of retail sales and electricity serving all state agencies by 2045. The statute was updated by SB 1020 (Laird, Chapter 361, Statutes of 2022) to accelerate the requirement on state agencies to 2035. The statute calls upon the CEC, California Public Utilities Commission (CPUC), and California Air Resources Board (CARB) to use programs under existing law to achieve this policy and issue a joint policy report. The report, finalized in March 2021, identifies the likely need to triple solar photovoltaic energy procurement (includes both in-state and out-of-state resources) to meet the 2045 goal, from about 12.5 gigawatts (GW) in 2019 to nearly 70 GW in 2045 – a build out of just under 3 GW of solar energy generation annually.¹ The report acknowledges the many potential impacts of the build-out of energy resources to achieve the SB 100 target, including the need to address impacts to land-use, on both working and natural lands.

Power and Plants – “Agrivoltaics” refers to the co-location of solar energy on working agricultural lands to utilize the land simultaneously for both energy generation and agricultural production.^{2,3} Less than 2% of solar energy projects in the United States are co-located with crops or pollinator habitats.⁴ This low adoption rate is largely driven by uncertainties in how the dual uses of energy generation and agricultural production on land may provide mutual benefit or harm. For instance, shading by solar panels can impact crop production, livestock grazing, and pollinator habitat. These impacts may be negative, with reduced light availability limiting crop productivity, or positive, with shading by solar panels reducing heat stress on grazing livestock or reducing water loss by individual plants.^{5,6} The potential for co-benefits, alongside the wide variety of implementation methods, has spurred the creation of a raft of agrivoltaic research projects funded from state and federal sources.

Figure 1 – A Variety of Configurations Have Been Proposed for Implementing Agrivoltaics.⁷

¹ CEC, CPUC, and CARB; “2021 SB 100 Joint Agency Report”; March 2021.

² U.S. Department of Energy; “Solar and Agriculture Co-Location”; <https://www.energy.gov/eere/solar/solar-and-agriculture-co-location>

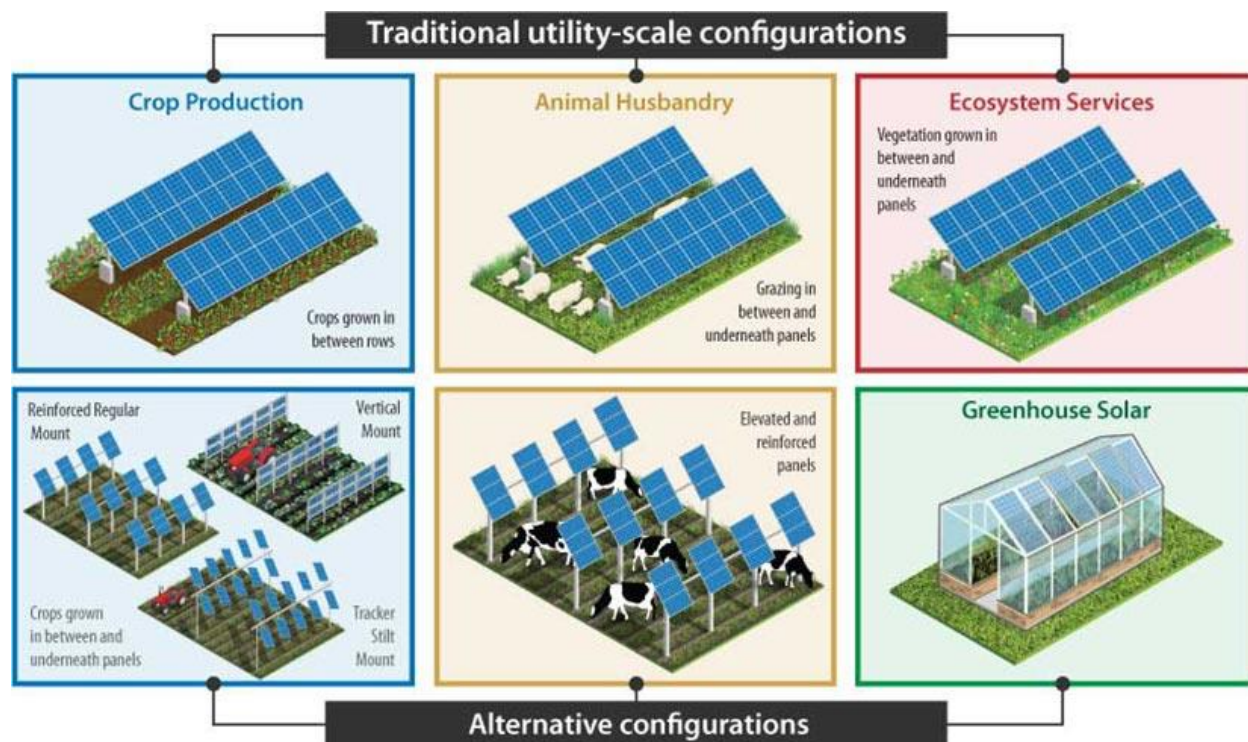
³ U.S. Department of Agriculture; “Agrivoltaics: Coming Soon to a Farm Near You?”; <https://www.climatehubs.usda.gov/hubs/northeast/topic/agrivoltaics-coming-soon-farm-near-you>

⁴ U.S. Department of Energy; “DOE Announces \$8 Million to Integrate Solar Energy Production with Farming”; December 2022; <https://www.energy.gov/articles/doe-announces-8-million-integrate-solar-energy-production-farming>

⁵ Clean Energy Council; “Australian Guide To Agrisolar For Large-scale Solar”; March 2021

⁶ Oregon State University; “Sustainable Farm Agrivoltaic”; <https://agsci.oregonstate.edu/newsroom/sustainable-farm-agrivoltaic>

⁷ National Renewable Energy Laboratory; “Growing Plants, Power, and Partnerships Through Agrivoltaics”; August 2022; <https://www.nrel.gov/news/program/2022/growing-plants-power-and-partnerships.html>



Funding – At the state level, various funding streams provide direct investment for agrivoltaic projects. California’s Renewable Energy for Agriculture Program (REAP), funded under AB 109 (Ting, Chapter 249, Statutes of 2017), provides grants for the installation of onsite renewable energy on agricultural operations in California to reduce greenhouse gas (GHG) emissions and provide co-benefits to local communities.⁸ The program has received \$10 million from the Greenhouse Gas Reduction Fund. In April 2019, the CEC awarded 45 grants, ranging from \$25,000-\$350,000, across 18 counties, representing \$9.5 million in total and exhausting the funding pool. The CEC has not yet posted a report evaluating these projects to their website, suggesting that it may be too early to assess the effectiveness of these projects. California also provides funding through the State Water Efficiency and Enhancement Program (SWEEP), which provides financial assistance in the form of grants to implement irrigation systems that reduce GHG and save water on California agricultural operations. Eligible projects include those that use solar energy to operate irrigation systems. Additionally, the California Department of Conservation (DOC) administers the Multibenefit Land Repurposing Program (MLRP), which was established by the Legislature in SB 170 (Committee on Budget, Chapter 240, Statutes of 2021) to increase regional capacity to repurpose fallowed agricultural land and reduce reliance on groundwater while providing community benefits. Though no energy projects have been funded through the MLRP to date, the DOC has indicated that the development of renewable energy generation infrastructure is an acceptable use for award funding to repurpose fallowed land.⁹

At the federal level, the U.S. Department of Energy recently announced \$8 million in funding for six solar energy research projects as part of the Foundational Agrivoltaic Research for Megawatt Scale (FARMS) program that supports agrivoltaics. The projects selected are all outside

⁸ CEC; “Renewable Energy for Agriculture Program”; <https://www.energy.ca.gov/programs-and-topics/programs/renewable-energy-agriculture-program>

⁹ DOC; “Multibenefit Land Repurposing Program – Final Solicitation and Application”; January 2023.

California, and five of the six grants were awarded to universities for agrivoltaic research.¹⁰ The projects selected for FARMS build on ongoing DOE-funded research, which is focused on conducting research, analysis, and dissemination of best practices for the implementation of agrivoltaics. Additionally, as part of the federal Inflation Reduction Act (IRA), the federal government is funding the Rural Energy for America Program Renewable Energy Systems & Energy Efficiency (REAP). The federal REAP program aims to distribute \$1.7 billion over five years, starting in 2022, with grant awards from \$2,500 to \$1 million to support renewable energy system development in rural areas.¹¹ The program description lists solar generation as an acceptable use of program funding which, though it is not explicitly stated, seems likely to include agrivoltaics.

Tax Considerations For Agricultural Land – The Williamson Act, also known as the California Land Conservation Act of 1965, enables local governments to enter into contracts with private landowners to restrict specific parcels of land to agricultural use or related open space use. In return, landowners receive below-market property tax assessments based on farming and open space uses rather than full market value. These contracts renew automatically each year unless the contract is ended through nonrenewal, cancellation, or termination. This tax structure has been relied-upon by farmers throughout California for decades and is an important aspect of planning and budgeting for agriculture. For this reason, any effort or perceived effort to change or include other land uses in these agricultural tax considerations may raise concerns from farmers who worry about any changes to their tax assessment.

COMMENTS:

- 1) *Author’s Statement.* According to the author, “Including agrivoltaic projects in California would help farmers improve working conditions for workers, shield crops from extreme weather, generate energy needed around their farming operations, and offers an additional revenue stream to farmers. As our summers get hotter and our winters colder, it is vital that we protect our agricultural workforce from these climate change consequences. Agrivoltaics are an exciting tool that benefits farmers and workers alike. Establishing this pilot program will serve as the test case for California, paving the way to future projects and improvements.”
- 2) *Funding For (Solar) Farms?* The profit potential to farmers for solar development on their land, as well as the existence of multiple state and federal funding sources for agrivoltaic research currently, suggest that an additional research grant program as proposed by this bill may not be necessary to grow the industry. However, agrivoltaics have not been widely deployed in California to date, and many uncertainties still exist about the potential impacts of the co-location of solar energy systems on working agricultural lands. These systems may provide substantial benefit in terms of energy generation, agricultural production, reduced agricultural water usage, as well as a means

¹⁰ U.S. Department of Energy; “DOE Announces \$8 Million to Integrate Solar Energy Production with Farming”; December 2022; <https://www.energy.gov/articles/doe-announces-8-million-integrate-solar-energy-production-farming>

¹¹ U.S. Department of Agriculture; “Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement Guaranteed Loans & Grants”; <https://www.rd.usda.gov/programs-services/energy-programs/rural-energy-america-program-renewable-energy-systems-energy-efficiency-improvement-guaranteed-loans>

for reconciling the often conflicting land-use demands of agriculture and expanded solar development in rural areas. Or these systems may reduce crop productivity, depending on the climate, crop type, or panel alignment configuration. Given that the CEC's REAP has exhausted its funding, while many outstanding questions persist, additional grants to support agrivoltaic research may be reasonable.

- 3) *Aligning Priorities.* The bill specifies that agrivoltaic projects must maximize the benefit to farmland by maximizing both agricultural production and water savings. This may be a difficult threshold to reach because of the potential tradeoffs between water savings and crop production. Moreover, the bill specifies energy production must also be optimized, further complicating implementation. It is important to ensure that these projects have as positive an effect on farmland as possible, as well as explore ways to integrate substantial energy generation. However, statutory requirements to maximize both agricultural production and water saving benefits may restrict the ability of the CEC to design effective, informative projects, potentially limiting their research value. *As such, the author and committee may wish to consider amendments to clarify that the requirement to maximize benefits to farmland in the grant-funded projects in 25238(f) may not reduce the research value of the projects.*
- 4) *Duplicative Tax Language.* The research projects proposed in the bill would transition agricultural land into dual-purpose land, yielding both agricultural production and energy generation. With that repurposing comes the risk that the land may be reclassified and no longer be eligible for certain tax considerations reserved for agricultural land. The bill protects grant recipients from this outcome by specifying that these projects will not cause land to lose agricultural zoning status or agricultural designation. The bill separately, and duplicatively, states that the projects will not cause agricultural land used for the grant program to lose agricultural designation and receive adverse tax treatment. *As such, the author and committee may wish to consider amendments to strike the duplicative tax treatment language in 25238(f)(4).*
- 5) *Additional Amendments.* Some of this bill's findings and declarations were unable to be verified, *as such, the author and committee may wish to consider amendments to strike (e) from Section 1.*
- 6) *Related Legislation.*

AB 580 (Bennett), would have required the CPUC, in consultation with the CEC, the Department of Conservation, and the Department of Food and Agriculture, to assess existing challenges to farmers repurposing fallowed land for zero-emission energy infrastructure and develop best practices for navigating those challenges. Status: held in the Assembly Committee on Appropriations.

- 7) *Prior Legislation.*

SB 1020 (Laird), established as a policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of electricity procured to serve all state agencies by December 31, 2035, rather than the previous target of December 31, 2045. Status: Chapter 361, Statutes of 2022.

SB 100 (De León), established the 100 Percent Clean Energy Act of 2018 as a policy of the state that eligible renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045. The bill also increased the state's RPS to 60% of retail sales by December 31, 2030 and requires all state agencies to incorporate these targets into their relevant planning. Status: Chapter 312, Statutes of 2018.

SB 856 (Budget and Fiscal Review Committee), appropriated four million dollars to fund renewable energy projects in the agriculture sector from the Greenhouse Gas Reduction Fund. Status: Chapter 30, Statutes of 2018.

AB 109 (Ting), the Budget Act of 2017 appropriated six million dollars to fund renewable energy projects in the agriculture sector from the Greenhouse Gas Reduction Fund. Status: Chapter 249, Statutes of 2017.

SB 618 (Wolk), authorized a city or county and a landowner to simultaneously rescind a Williamson Act contract on marginally productive or physically impaired lands and enter into a solar-use easement that restricts the use of land to photovoltaic solar facilities, as specified. Status: Chapter 596, Statutes of 2011.

REGISTERED SUPPORT / OPPOSITION:**Support**

350 Bay Area Action
American Farmland Trust
California Climate and Agriculture Network
Climate Action California
Community Alliance With Family Farmers

Oppose Unless Amended

Large Scale Solar Association

Other

California Farm Bureau Federation
Lightstar

Analysis Prepared by: Samuel Mahanes / U. & E. / (916) 319-2083