

Growing Agrivoltaics

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Photovoltaics continue to surge into a new era with nearly 600 GW of solar module installations estimated for the year 2024,¹ an increase of 33% over 2023. This growth is driven by decreases in module prices to below \$0.10/W,¹ following astonishing reductions in recent years that show no signs of slowing down. Efficiencies also continue to increase, for example with new records for laboratory-scale devices of 27.3% and 34.6% for single-junction silicon and silicon-perovskite tandem, respectively, being set earlier this year.^{2,3} JPE is looking ahead to the future and currently welcoming submissions for the [Special Section on Exceeding the Detailed Balance Limit](#), to which we invite you to submit your recent results and creative ideas on path-

ways to evening higher efficiencies.

This dramatic growth in the global photovoltaic industry is accompanied by an increased diversity in the location and integration of solar installations. A particularly intriguing area that is quickly gaining attention is agrivoltaic devices and systems, which is the focus of [another JPE special section](#) currently open for submission. This field encompasses a range of approaches, including integrating semitransparent photovoltaics into crop covers⁴ and greenhouses, co-locating bifacial solar modules between rows of crops, and using grazing animals to control weed growth beneath solar arrays—commonly referred to as “solar grazing.”⁵ Such multifunctional systems demonstrate how photovoltaics can be seamlessly integrated into agricultural landscapes, yielding win-win outcomes. Such principles of multifunctional design and emergent engineering⁶ are crucial to addressing the grand challenge of sustainable energy.

The advantages of agrivoltaics have attracted the interest of funding agencies, and new programs are being established for instance by the U.S. Department of Energy.⁷ Innovative applications are being explored, such as extending the growing season for vineyard grapes and increasing the production of high-quality wines.⁸ Community-based organizations are also “cropping up” to showcase agrivoltaic practices and engage the public (for example, Ref. 9).

We may be on the cusp of widespread integration of solar energy with agriculture. Recently, the author had the opportunity to witness agrivoltaics in action on a solar farm at his university (Fig. 1) and was impressed by the precision of the work performed by the skilled labor tending

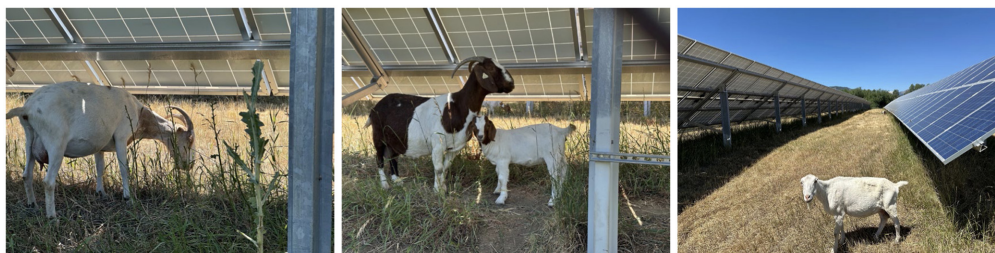


Fig. 1 Goats performing solar grazing on the University of Colorado Boulder campus. The goats were provided by the Mutton Mowers organization (muttonmowers.com).

the landscape. We at JPE encourage you to explore agrivoltaics, whether through your research and publications or by engaging with your local communities.

References

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