Dual-Use or (Agrivoltaic) Solar Installations

What is Dual-Use?

- Dual use is the integration of agricultural production with a photovoltaic (PV) system. It allows for solar energy production while maintaining agricultural activities.
- Typically it is considered the installation of a solar array that partially obstructs solar penetration to crop production (either forage land or crops).
- Solar mounted on barns, greenhouses, or floating on agricultural ponds may also be considered dual-use operations.

Benefits of Dual-Use

- Landowners diversify their income streams while continuing to produce agricultural products.
- Protects against loss of productive farmland due to permanent solar development.
- Provides a marketing opportunity to a sustainability-minded audience.
- Required security fencing doubles as an extra secure enclosure for livestock.
- Shaded soils may retain more moisture and reduce water consumption for some species of crops.
- Provides relief for workers and animals beneath the array.

Potential Drawbacks

- Loss of tax benefits for the conversion of land into solar production for landowners enrolled in the State’s Farmland, Open Space, and/or Tree Growth Tax Programs.
- Although well established in some countries, experimentation in the Northeast is just beginning.
- Potential for reduced crop yields, and limitations on mechanical harvesting equipment access beneath the solar array.

Crop production around a solar array
Source: Grist / National Renewable Energy Lab
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Dual-Use Applications

Greenhouse systems

• Applications can include rigid or flexible or thin-film solar cell modules seen to the right. (Flexible solar module technology still being developed).

• Strategic placement of modules to optimize sun in winter and selective shading/cooling in summer.

• Applications being studied in Maine.

Cropping systems

• Growing crops directly beneath, between, and around solar arrays in a field.

• Clearance beneath the array will vary depending on harvesting techniques (hand vs mechanical harvest).

• Spacing between panels may vary depending on location and desired shading effect.

• May include the mechanical or manual solar tracking and tilting of the array to optimize production.

• Northeast crops that are more shade tolerant and show potential for this application include: peppers, broccoli and chard.

Grazing

• Height of array may vary for different livestock.

• Offers protection from predators.

• Applications may include: sheep, cows, chickens, and horses.

Interested in learning more?

• Explore the American Solar Grazing Association’s webpage: https://solargrazing.org/


• The University of Massachusetts Amherst’s Clean Energy Extension is another great source: https://ag.umass.edu/clean-energy/research-new-initiatives/dual-use-solar-agriculture

• Check out Maine Sustainable Agriculture Society’s dual-use research: https://mesas.org/syra/

• FMI on Solar Installations please see our factsheet at: http://www.maine.gov/dacf/ard/resources/docs/solar-installation-applications-factsheet.pdf