



# COLORADO AGRIVOLTAIC LEARNING CENTER at Jack's Solar Garden

## Are You Ready for Solar Power? - Four Essential Steps to Consider

Agrivoltaics is the coupling of agricultural activities within a solar array.

The first step in operating an agrivoltaic system is having access to a solar array. This document targets landowners / farmers / ranchers and lays out four essential steps you need to take to understand whether building your own solar array is right for you.

### 01 Choose whether you're doing an off-grid or on-grid solar array.

Off-grid means you likely don't have to work with a utility and won't be selling your electricity to any off-takers. On-grid means your local utility must allow you to interconnect to, and sell electricity through, their grid. Your utility must be willing to:

- a. allow a solar developer or a landowner to build a solar array to connect to their transmission lines,
- b. either: purchase electricity from you, or own and manage a solar array on your land, or let you sell your electricity through their electrical lines to customers that would 'subscribe' to your solar array in a **community solar garden** model, and,
- c. agree to your location on their grid for supplying power, accept the power you plan to produce, and ensure the local substation can handle that amount of power. If you are far from a substation or there's another power plant nearby, chances are your utility will not allow the interconnection of a solar array at your location.

So go talk to your local utility with your questions ready.

### 02 Find the zoning and local building codes for your property.

Most communities across the USA have a local regulatory body, either a municipality or a county, that dictates what can be built in certain zoning districts. This information is usually found in a land use code, or zoning code. Find out if the solar array you hope to build will be allowable on your property. If it's not, you can ask your local government and see if the political or regulatory circumstances can be changed to accommodate your solar array. It would also be important to know from your local community if your land has certain designations attached to it, be it a wildlife corridor, wetland, economic zone, **conservation easement**, or floodplain, which could impact your plans.

#### Helpful Terms

**Off-grid solar system** - a self-contained energy system that independently produces and stores electricity.

**On-grid solar system** - your solar system is tied to your local utility's electrical transmission lines.

**Community Solar Garden** - a distributed solar energy model where subscribers typically receive a monthly bill credit for electricity generated by their share of a solar energy system.

**Conservation Easement** - a voluntary, legal agreement that permanently limits uses of the land in order to protect specific conservation values.

**MW - Megawatt**

**Tax Equity Investor** - businesses or individuals that invest in solar energy projects in return for tax benefits and revenue.

**Net Meter** - a billing mechanism that credits solar energy system owners for the electricity they add to the grid.

*The Colorado Agrivoltaic Learning Center showcases clean energy generation coupled with local food production to educate and inspire our community into taking action to improve land stewardship within solar arrays.*

### 03 Figure out how to finance your solar array.

Solar arrays aren't cheap. A traditional community solar garden (<5MW) could be built for \$1.30-1.50/Watt (i.e. a 1 MW system would cost \$1.3-1.5 million). Developing an agrivoltaic system might increase costs up to \$1.4-1.7/Watt due to design changes like additional spacing between panels, elevated panels, alternative structures, etc. Below are some financing options:

- a. use your own capital if you have it.
- b. look into a commercial or construction bank loan leveraging whatever assets you have.
- c. find a **tax equity investor** and have them finance, own, and operate the system for X number of years. Once they have received their agreed upon return on investment, the solar array's ownership can be transferred back to you to own and operate. Losing ownership during the building of the solar array may impact your ability to modify the structural design or may forego your ability to steward the land under the solar panels. Onboarding a tax equity investor can entail expensive legal contracts.
- d. reach out to a local solar developer to lease your land and work with you on the system design and construction practices. You will receive land lease payments and can negotiate the use of the land within the solar array.



Joanna Kulesza/Courtesy The Nature Conservancy

### 04 Select a model for generating revenue - On-Grid only.

Before your solar array starts producing electricity, you need contracts in place for someone to buy that power. From Step 1, you should know whether your utility will mandate the power be sold to them. If this is the case, they will probably pay you wholesale rates for your power (between \$0.01-\$0.06/kWh). If that doesn't work for your payback, you need to know if they'll allow you to sell it to others on their grid. Utilities will extract a transmission fee from the sale of your electricity and likely other fees. When selling to subscribers, learn how the utility will **net meter** your energy and how the financial benefits will accrue to your subscribers. You need to ensure that the prices you sell your electricity for help you pay back the bank, make a tax equity investor interested, or simply provide you the revenue you need.

These steps are essential in knowing whether you are ready to move forward with building a solar array. Start with talking to your local utility and local government before delving into the financing of a project as they could derail your plans. Once in Steps 3 and 4, explore ideas for different agrivoltaic system designs as agrivoltaics may require modifications to the solar array. Any planned agricultural practices will also need to adapt to being integrated within the solar array you build. I hope you have found this advice useful.

**Written by:**  
**Byron Kominek**  
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