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Solar Farms & Agriculture – Mutually Beneficial or Problematic?

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Introduction

Solar Farming has become increasingly adopted by farmers to diversify their income. This has raised concerns regarding the loss of agricultural land, impact on the environment, and application of policies to land that may have shifted from an agricultural to energy production focus. The following brief examines the benefits and disadvantages of solar farming for farmers and the environment and how new policies might affect the situation.

Solar Farming Adoption & Benefits

The number of farms and businesses in the United States that engage in producing renewable energy more than doubled from 2007 to 2012 (Hitaj, 2012). Depending on the situation, solar farming may or may not produce less money than agricultural crops. Its greatest advantage is the reliable income it creates. Concerns over income security and uncertainties from contracts are the main concern of farms when making decisions to adopt energy crops (Ge, 2017). As can be seen in Figure 1, cultivated cropland is the second most common land cover type in California for Solar installations. (Hernandez, 2015). Certain activities associated with cultivated cropland have been shown to have a synergistic relationship with solar farming. A study done in Scotland found that poultry, tourism, farm products processing, wood processing, percentage of owned area, percentage of severely disadvantageous area, and rough grazing area were also positive factors influencing solar energy adoption (see Figure 2) (Ge, 2017). Many of these factors are linked to the general diversification of farms, which allowed the farmers to become more financially stable. These farms also had a mutually beneficial relationship with solar energy. Poultry farmers were able to put solar panels on the roofs of their facilities, leading to relatively little disruption of their day to day activities (Ge, 2017). Farms with rough grazing area were able to set the solar panels far enough off the ground that animals were still able to graze underneath, putting the land to multiple uses (Hewitt, 2016). Farmland that was severely advantageous or otherwise unsuited for agriculture was also a great fit for solar panels.

Solar farms look at criteria like number of sun hours, irradiance, temperature, access to highways, population density and location of substations. Farmland conveniently caters to a number of these needs (Janke, 2009). It also bypasses some environmental concerns because the land has already been cleared, drained and leveled for agricultural production. This renders issues of historical heritage and endangered species relatively moot Janke, 2009). Construction of solar farms creates employment possibilities in the short term and potential long-term multiplier effects (Jones, 2015). They also create new employment opportunities beyond traditional agricultural employment. There are clear environmental benefits to solar power as a clean energy source and it is becoming a cost-effective energy alternative to fossil fuels (see Figure 3) (Solar in Maine, 2016).

Solar Farming Concerns

The main concern about the growing adoption of solar farming is that usable farm land will be given up for solar operations, in some cases causing damage to the local environment. Solar farm development is reversible, and the land can be reclaimed for agricultural purposes without long term negative effects (Jones, 2015). In many cases, the adoption of farmland for solar energy is not a permanent switch. Farmers can enter into leases that allow them to reclaim the land for crops at the end of a 25 or 30 year term (Nunez, 2015). In the case of lease agreements, the solar company should be responsible for the development, construction, operation, and returning the property to its former condition (Lease Your Land to Generate Revenue with Solar Farms). As with any

contract, farm owners should be educate themselves about their rights and be wary of companies that try to dodge any of these responsibilities. While there may be some cause for concern about the appropriation of farmable land for solar panels, there are ways to manage these issues, and relatively little potential for long term damage to the environment.

For the local population, there are also concerns about the loss of property value. In Simsbury Connecticut, Deepwater Wind proposed visual screens to hide their solar farm project (Skahill, 2017). Solar farms may not be the most attractive feature of a landscape, but there are ways to minimize their impact and increase their efficiency by "decreasing space between rows of PV modules of CSP mirrors – and prudent siting decisions that incorporate the weighting of environmental trade-offs and synergies" (Hernandez, 2015, pg. 2). Their potential to reduce neighboring residential values has also been dismissed by a number of local planning authorities (Jones, 2015).

Other concerns include: habitat loss, fragmentation and displacement of species, impact on heritage sites, and increased traffic flows and vehicle movements during the construction phase (Jones, 2015). Each of these factors can vary from situation to situation, but by and large they are offset by the very nature of the farmland having already been cleared for crop production. Generally speaking, farmland has already been at least partially developed, and issues of habitat loss and heritage sites were already addressed. The construction phase of solar farms tends to have no negative impact on traffic flows and vehicle movements (Jones, 2015).

Public Policy Connections

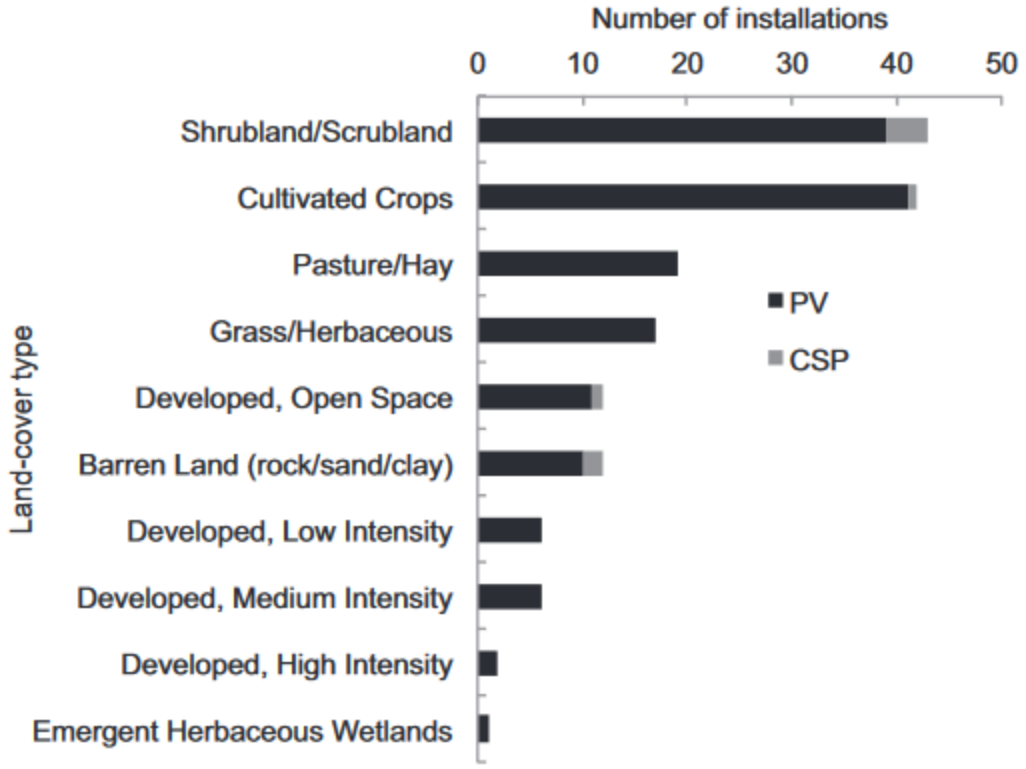
Maine Farms are currently able to adjust the valuation of their land based on the Farm and Open Space Tax Law. It is currently unclear how solar farms that are a part of the agricultural operation work into that valuation (MAINE REVENUE SERVICES PROPERTY TAX DIVISION PROPERTY TAX BULLETIN NO. 20, 2017). In Vermont, use of solar energy does not have a place on agricultural lands. Land utilized by solar energy must be valued separately, even it if it has a joint purpose as grazing land. If the landowner does not cooperate, their entire parcel of land can be disqualified from the Agricultural tax valuation program (Hewitt, 2016). There are two sides to this issue. On the one hand, solar power can be a crucial part of farm's diversification strategy and provide a much-needed boost for agriculture. In which case, perhaps they should be still considered farm land (Hewitt, 2016). On the other hand, "renewable energy structures do not technically fall within the definitions of the current use program" and what is more "farmers who lease their land for solar arrays are likely to see more income from those agreements than they would save on the tax break from current use" (Hewitt, 2016). It would be unfortunate if policies meant to help farmers instead served to incentivize solar energy companies to build on conveniently available farmland rather than seeking out less convenient options that are not agriculturally viable. Portions of land that are only being used for solar farming should not be given tax breaks. In instances where the land has a joint purpose, farmers should have the option of petitioning for a partial tax break. They would need to conclusively show how the land is still used for agricultural purposes and define what percentage of the land is still "farmed."

Conclusions

In some situations, farmers are only able to continue their traditional agricultural practices through diversification and solar farming. While there is the potential for abuse of the solar farming model, there is also a lot of potential for a mutually beneficial relationship.

Figures

Figure 1 – Number of photovoltaic (PV) and concentrating solar power (CSP) installations by land cover type in California; represented in order of most installations to least for both technologies.
Source: Hernandez, 2015



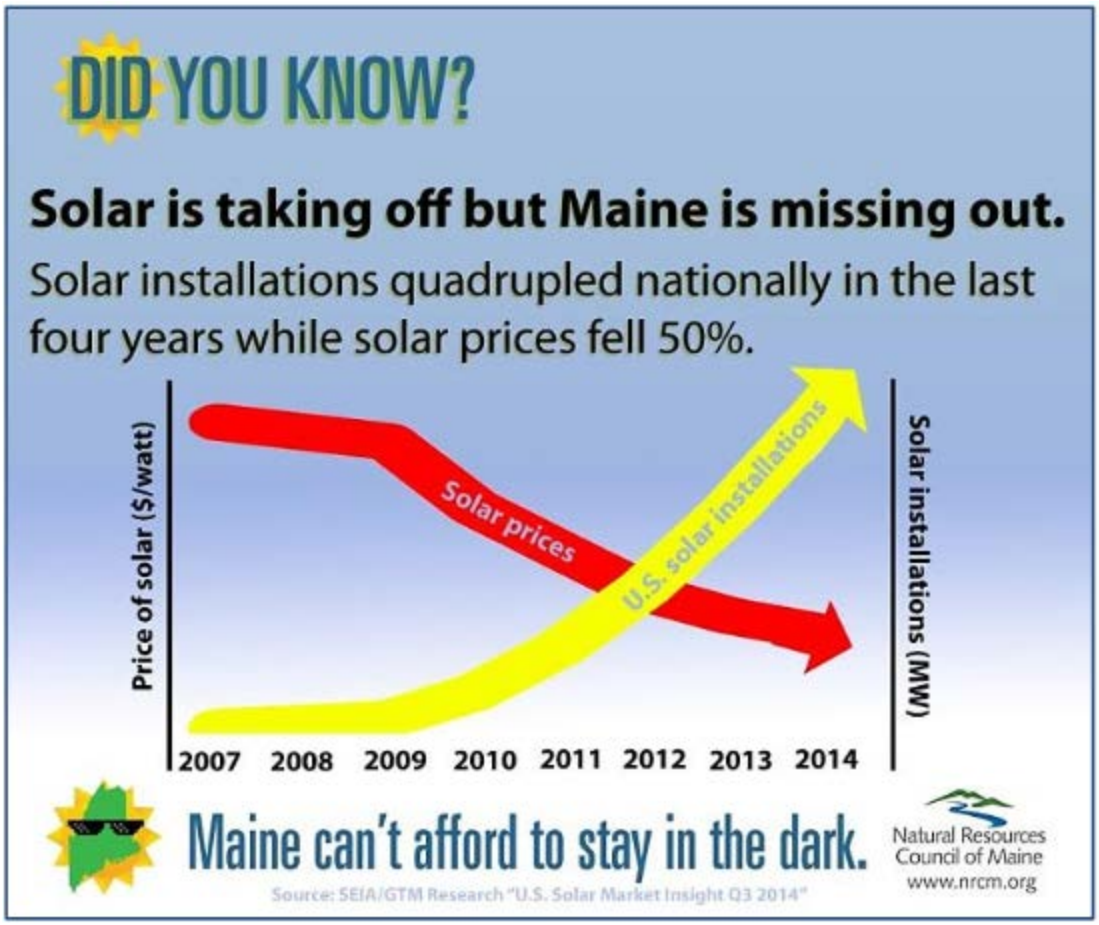
Number of photovoltaic (PV) and concentrating solar power (CSP) installations (planned, under construction, operating) by land cover type in California; represented in order of most installations to least for both technologies.

Figure 2 – Significant Factors of solar energy adoption in Scotland
Source: Ge, 2017

. Significant factors of solar energy adoption.

Positive effect	Negative effect
poultry	age of the owner/manager
tourism	
farm products processing	
wood processing	
percentage of owned area	
percentage of severely disadvantageous area	
rough grazing area	

Figure 3 – Economic Benefits of Solar Power in Maine
Source: Solar Power in Maine



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