Renewable Energy Policy Initiative

June 2021

CLOSUP Center for Local, State, and Urban Policy

GERALD R. FORD SCHOOL OF PUBLIC POLICY
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Solar Energy Property Taxation

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In this memo, we examine the existing ways states have crafted legislation on property taxes for utility-scale solar[1] developments and find two main categories of existing legislation—"exemption or abatement," and "exemption and replacement." We point out the basic reasoning behind these different approaches and find 16 states fall in the former category and 12 in the latter. All other states have no property tax policies specific to solar. We find that in 11 states solar property tax benefits are subject to control by local governments and the remainder are blanket for an entire state or subject to determination by a state body. Next, we do a brief analysis of the potential ramifications of the different types of tax policy treatments. We then look at how some state laws unrelated to solar or renewables are used to lower solar developers' property tax burdens and how mandates within property tax legislation can be used to drive desirable developer behavior. Finally, we point out some common confusions to be aware of when reading legislation pertaining to solar property taxation.

Overview

In 2020, solar installations constituted 43% of the new electricity generating capacity installed in the US, up from 4% a decade ago.[2] In that same period, the cost per watt of installed solar for a 100MW$_{DC}$ solar farm has dropped from $5.66 to $1.01.[3] As a result, the development of utility-scale solar projects is accelerating across the US as the cost of solar becomes increasingly competitive with other forms of electricity generation.

Depending on the property tax rates and policies that apply to a solar development, property taxes may be one of the highest recurring costs for large solar projects in the US. Therefore, state guidelines for utility-scale solar property taxation impact the scale and intensity of future solar deployment. The details and potential ramifications of legislation that explicitly governs solar taxation are this document's focus. In some cases, the same legislation covers all renewables, or "alternative energy sources"; in other cases, legislation is written explicitly for solar. By inventorying and summarizing every US state's utility-scale solar property tax legislation,[4] we have created three broad categories in which to organize the existing types of legislation, and one category that overlaps the other three:

- Exemption and replacement
- Exemption or abatement
- No special treatment
- Local control (applies across other categories)

1 In this memo we define utility-scale as the largest unit defined by current legislation in a given state. States set this bar in different ways, either based on use type (for commercial sale vs onsite-use) or at a specific nameplate capacity threshold (over 1MW of nameplate capacity), or often as a hybrid of both (over 1MW of nameplate capacity and primarily for commercial sale). For more, see "defining utility-scale on page 5 of this document"

2 Solar Energy Industries Association. (2021, March 16). *Solar Market Insight Report 2020 Year in Review.* SEIA. https://www.seia.org/research-resources/solar-market-insight-report-2020-year-review.

3 Feldman, D., Ramasamy, V., Fu, R., Ramdas, A., Desai, J., & Margolis, R. (2021, January). *US Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020*, 49. NREL.gov. https://www.nrel.gov/docs/fy21osti/78882.pdf.

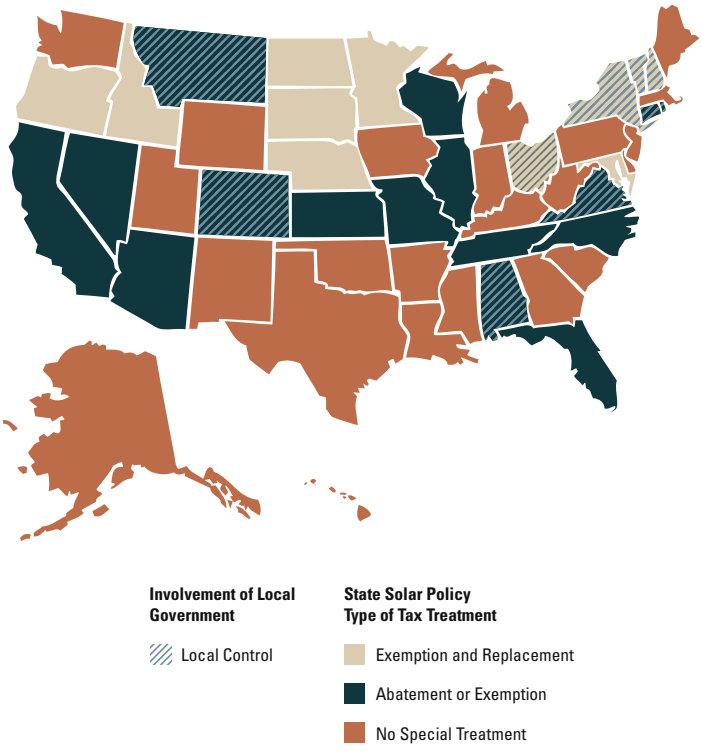
4 Hintz, O, Uebelhor, E., and Gold, E. (2021). Inventory of State Solar Property Tax Treatments. Available at: http://closup.umich.edu/research/working-papers/inventory-state-solar-property-tax-treatments

Categories of Tax Benefit

Exemption and Replacement

Twelve states have policies that exempt solar projects from ad valorem property taxes but replace those taxes with another form of more regularized payment such as "payments in lieu of taxes" (PILOT), "nameplate capacity excise tax," or a solar production tax. The mechanism and ultimate outcome of each of these forms of taxation is different. However, they serve similar purposes—they replace an irregular set of payments based on depreciating assessed property values with a more regular set of payments.

Tax Treatments for Solar Energy Development in the United States



[An interactive map is available online[5]]

Both PILOTs and nameplate capacity taxes use the scale of a solar project to determine the yearly payment amount of a solar development. A production tax requires a solar developer to report the number of kilowatt-hours (kWh) of electricity sold and pay a per kWh fee. The rates and taxing authorities of these forms of payment differ between states; some effectively reduce the cost of solar taxes like exemptions or abatements, and others simply regularize payments without necessarily reducing the overall expense to the developer. Furthermore, in some instances, the rates are negotiated on a case-by-case basis.

In New York, PILOT payments are negotiable and can range from a full exemption to a cap equivalent to the ad valorem value.[6] Alternatively, Minnesota replaces property taxes with a relatively low production tax of $1.20 per MWh, which, under current conditions, is much lower than what ad valorem property taxes would be.

Abatement or Exemption

Sixteen states have policies that abate some or all the assessed costs of a utility-scale solar project or exempt some or all of the property tax liabilities of solar developers. North Carolina tax code has a long list of property tax "exclusions," one of which is: "Eighty percent (80%) of the appraised value of a solar energy electric system."[7] This language is broad and inclusive and lays no conditions on project size or scope. Other states have eligibility requirements for exemptions or abatements. For example, Alabama allows utilities that develop "alternative energy sources" with capital costs of over $100 million to apply for full property tax abatements on new projects. Abatements apply only to non-educational taxes and are subject to the approval of their relevant taxing authorities (see local control) and may only be approved for ten years at a time for a maximum of twenty years.

5 Hintz, O, Gold, E., and Uebelhor, E. (2021). Map of State Solar Energy Property Treatments. Available at:https://www.arcgis.com/apps/dashboards/9b8b2ed6738648b09a4f7c938e4c42a2

6 *New York Real Property Tax Law Sec. § 487 Exemption From Taxation for Certain Solar or Wind Energy Systems or Farm Waste Energy Systems.* New York Public Law. (2016, December 13). https://newyork.public.law/laws/n.y._real_property_tax_law_section_487.

7 *North Carolina General Statutes Chapter 105. Taxation § 105-275.* Findlaw. (2020, January). https://codes.findlaw.com/nc/chapter-105-taxation/nc-gen-st-sect-105-275.html.codes.findlaw.com/nc/chapter-105-taxation/nc-gen-st-sect-105-275.html.

No Special Treatment

Seventeen states do not have property tax policies specific to utility-scale solar development. Some of these states do have property tax policies related to residential, commercial, and industrial uses of solar. Furthermore, some of these states may have tax policies not specific to renewables, but that can be applied to utility-scale solar projects (see below).

Local Control

In eleven states, whether to grant a property-tax benefit to a solar energy project is determined by the local government. This control can act as a potential veto point for localities that may not have siting authority over utility-scale solar projects. This category is not discrete from the other categories above and is evident in some, but not all, of the legislation affecting utility-scale solar development.

For example, Ohio does not grant siting authority to local governments but does allow local governments to accept or deny a PILOT agreement. Thus, a local government's best means of preventing a solar project from being sited locally may be denying the development a PILOT agreement.

Analysis of Property Tax Policy Considerations

Property tax policies in the abatement or exemption category can broadly be viewed as ways to encourage solar development in a state. They can be combined with local control and/or provisions incentivizing or mandating developer behavior as described above.

Working to pass legislation that benefits or streamlines the property taxation of utility-scale solar development implies that legislators believe solar development is a net benefit to their state. However, the structure of these policies is important to their ultimate outcome. Local governments and their constituents have a lot to gain from solar development, and a lot of power over whether solar developments can be built. Even in states without local control over siting or tax benefits, local governments and organizers can make solar development difficult in the long term through advocacy for anti-solar legislation and political backlash. For this reason, as well as for reasons of ethics and equity, it is crucial for policymakers to balance their desire to promote the development of the rapidly expanding solar industry, and the needs of host communities, many of which are small and rural. Giving large property tax breaks to solar developers without the consent of local governments may backfire and paradoxically slow the expansion of solar development by creating localized opposition in communities that no longer stand to benefit from solar farms. In general, however, clarity and predictability around taxation benefits both host communities and developers.

Policies that exempt and replace property taxes can benefit both developers and the localities in which developments are sited. Developers typically prefer exempt and replace legislation because it often reduces costs early in a project's lifespan and makes tax liabilities over the course of the project more predictable. It also helps avoid confusion and the potential for disagreement over the property tax assessment of solar projects. Local governments can benefit from an exempt and replace law because it regularizes payments over the life of a project. This regularization is especially valuable in rural areas where local governments' budgets are relatively small, and the tax payments made by a large solar project can constitute a major portion of their property tax income. In these scenarios, an evenly dispersed payment can be relied upon to augment operations or introduce a new service, whereas this is more a challenge when

the tax structure includes large, front-loaded property tax payments followed by rapidly diminishing property tax payments.

For developers, a production tax may be better than a PILOT. Under a production tax, a developer's costs are based entirely on their electricity generation. As long as the tax is well below the rate they are receiving for the electricity they produce, it can be understood as a variable cost that scales with their output.

Other Property Tax Policy Considerations

Using Property Tax Legislation to Incentivize Developer Behavior

Property tax legislation can be a tool to affect developer behavior in ways that benefit state and local economies. States have taken different approaches to this by mandating or incentivizing certain behaviors with property-tax legislation.

For example, in Ohio, solar projects must be built with 80% in-state labor to be eligible for a PILOT agreement. Maryland requires $2,500/MW PILOT payments for solar facilities built on farmland and only $2,000/MW payments for facilities built elsewhere to incentivize more costly development and maintenance of agricultural lands. Nevada gives substantial property tax abatements to solar developers but only if developers pay construction workers 175% of the average state hourly wage and full-time employees 110% of the average hourly wage. Nevada also sets quotas on the use of in-state labor to determine tax abatement eligibility.

Tax Policies Not Specific to Renewables

Many states have legislation that is designed to promote industrial development by exempting or abating property taxes. While these policies may not explicitly mention solar energy, utility-scale solar developments may be eligible.

For example, Texas has no special property tax treatment for utility-scale solar. However, there are two chapters in the Texas Tax Code that create pathways for large property tax exemptions for solar developers. These are Chapters 312 and 313. Chapter 312 gives cities and counties the right to designate reinvestment zones in which they can offer ten-year property tax abatement agreements. Chapter 312 abatements do not apply to school taxes. Chapter 313 allows for ten-year property tax abatements by school districts based on whether developments produce new jobs. The laws codifying Chapters 312 and 313 were not written with solar development in mind, but these chapters are used regularly to incentivize the development of utility-scale solar installations.

Considerations when Reading Solar Policy

This section briefly describes two recurring issues that are easy to overlook or misunderstand when reading existing property tax codes or legislation pertaining to utility-scale solar.

DC vs AC Measurement of Solar Installations

There is a regular point of confusion when reading exempt-and-replace policies—whether the policy measures the nameplate value of an installation in AC (alternating current) or DC (direct current).

Solar developments can be measured by the aggregate DC power capacity of the solar modules or the aggregate AC capacity of the inverters that convert DC power to AC. For reasons beyond the scope of this explanation, a 100MW solar development requires, according to NREL[8], 1MW of AC inverter capacity for every 1.34MW of DC solar capacity. Thus, a piece of legislation referring to a $3000 per MW (units unspecified) PILOT payment made on a 134MW$_{DC}$ solar farm could amount to $300,000 per year if the payment is based on MWAC or $402,000 per year if the payment is based on MW$_{DC}$.

Much of the exempt-and-replace legislation does not define whether they are using AC or DC units, referring simply to the "nameplate capacity" of a solar installation. In practice, it is usually the case that nameplate capacity refers to the AC capacity of a solar farm but knowing this explicitly is important, especially when trying to compare one policy to another.

Defining Utility-Scale

Legislation pertaining to the taxation of large-scale solar energy installations uses a range of definitions. Some, but not all legislation, uses the terms "utility-scale," which we have chosen here to mean that the project is built to function as a power plant, with the energy generated primarily for the electricity grid rather than on-site electricity needs. Some states, though, use alternate terms including "grid-scale," "solar for commercial sale," or simply "commercial solar." The last of these being easily mistaken for solar on commercial buildings.

The technical definition of utility-scale solar also varies between states, but there are two primary ways it tends to be defined:

1. Many states define utility-scale solar as solar above a certain MW nameplate value. These range from 250kW (.25MW) in Ohio to 5MW in South Dakota. However, 1 to 2MW is relatively typical.
2. Other states, like Oregon, define utility-scale solar through an onsite/offsite paradigm, where utility-scale is defined as "primarily providing electricity for offsite use." Most states using the onsite/offsite definition also have a capacity threshold: "over 1MW and primarily providing electricity for offsite use."

Acknowledgements

Support for this research was provided by the Ford School Renewable Energy Support Fund.

8 Feldman, D., Ramasamy, V., Fu, R., Ramdas, A., Desai, J., & Margolis, R. (2021, January). U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020, 49. NREL.gov. https://www.nrel.gov/docs/fy21osti/78882.pdf.