Payment in Lieu of Taxes Considerations and Model Interpretation

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March 11, 2021

Executive Summary

Michigan's approach to property taxation of large-scale solar developments is currently in flux. Legislation that would have exempted solar from ad valorem taxes and replaced it with a Payment in Lieu of Taxes (PILT) was introduced in late 2020 as Senate Bills 1105 and 1106, which were passed by both the Michigan House and Senate, but ultimately vetoed by Governor Gretchen Whitmer. One significant criticism of this legislation was that it did not properly value the property taxes that would be paid on solar developments when setting PILT rates. To help inform lawmakers, we developed a technical tool to better assess what might constitute a fair PILT payment. This memo describes the assumptions in our tool and looks at the major variables affecting the tax implications of PILT legislation on developers and communities that might host new solar projects.

Background

In their letter requesting Governor Whitmer veto SBs 1105 and 1106, the co-signatories—Michigan Municipal League, the Michigan Townships Association, and the Michigan Association of Counties—state, "Unfortunately, SBs 1105 and 1106 were crafted without the financial data necessary to develop an appropriate PILT reimbursement level and include provisions that run counter to local control and lacking the protections that are standard in other, existing economic development incentives utilized in Michigan."

Currently, a subcommittee within the State Tax Commission (STC) is working to clarify tax guidance around large-scale solar projects, but likely within the context of the existing ad valorem system. Although this guidance will be welcome, the proposition of substantial STC guidance has not quelled interest in alternate approaches, such as PILT. While there are benefits to the ad valorem tax structure—it is well understood and responsive to the wide variation in project costs and districts' property tax rates—there may be merits to using PILT. PILT agreements create predictability and continuity for developers and taxing districts that may benefit from the more stable property tax revenue streams over the lifetime of the agreement, in contrast to the rapidly tapering payments that come from ad valorem taxation. Further, PILTs are simpler for local governments to deploy and communities to understand, allowing them to more easily weigh the economic benefits of a solar development against perceived local drawbacks.

Although ad valorem taxation has functioned thus far, most utility-scale solar developments in Michigan, to date, have been in or near urban areas and are modest in scale. Where existing developments have mostly ranged between 1 and 3 MW (5-30

acres), pending developments of over 100 MW (500 – 1000 acres) would be sited almost exclusively in rural counties, bringing new property tax revenues and other economic development benefits—jobs, albeit many temporary, and lease payments to farmers which can help stabilize irregular farming income. Where the year-over-year diminishing value of property tax income for a small development in an urban county may not significantly affect overall budgets, a large solar project in a smaller rural county can have serious implications for townships and other taxing districts in these communities.
While there are several factors that would help define equitable legislation around the taxation of solar, many of which are mentioned in the veto-request letter cited above, this memo and the associated technical tool help fill a crucial gap by providing the "financial data necessary to develop an appropriate PILT reimbursement level."

Methodology
To try to establish a fair level of PILT, we built a calculator that matches a PILT payment to a calculated ad-valorem payment (as understood through December guidance by the STC), using a series of assumptions based on current and reputable data, and user determined inputs for a theoretical solar project.[1]

Using the cost of solar of a 100MW single-axis tracking solar installation, the median state property tax millage (23.49 mils), and a 3% discount rate, we found that $7,500 per MW_{AC} would closely match the total lifetime equivalent ad valorem property tax payments under the same assumptions (Figure 1). This value is near twice the $4,000 per MW_{AC} in the recently vetoed legislation.

That said, there are other equally reasonable assumptions that can be input into the calculator resulting in a range of PILT values, some of which are markedly higher and some lower than $7,500. For instance, if we assume the cost of solar of a 5MW single-axis tracking installation, the median property tax millage, and a discount rate of 5%, we find that $10,000 would be an equivalent PILT payment (Figure 2). Alternatively, if we use a state low tax rate of 16.16 mils[2], a 2% discount rate, and the predicted per-MW cost of solar for 2031, we calculate that $3,000 would be a PILT value equivalent to the existing ad valorem approach (Figure 3).

While we make no specific recommendations regarding the appropriate value of PILT payments, we believe that our work supports a reasoned decision-making process.

Variables Affecting Ad Valorem Tax Payments

Several variables affect the lifetime value of ad valorem property tax payments on a solar installation. The most important are the total new cost of the installation itself and local property tax rates. Additionally, because of the difference in payment schedules between ad valorem tax payments and PILT payments, net present value assessment affects the overall effective value of property tax/tax-like payments.

[1] See pages 5-6
[2] See page 6 for explanation of how this "low" value was calculated

Installation Cost

Type/Size/Location: There are two primary types of utility-scale solar installation that come with different price tags and production capacity factors[1]: fixed-tilt and tracking. Developments with tracking systems are more expensive to build, on a per-MW basis, than fixed-tilt developments but have higher capacity factors, meaning they generate more energy over a day. Single-axis trackers are now common in large-scale solar developments as their cost has come down and their mechanical reliability has increased. Thus, our calculator uses the price of single-axis tracking developments as a benchmark.

Size and location also substantially affect the costs of solar development. Under most circumstances, the larger a solar development, the lower its total per MW cost. Thus, when determining the expected ad valorem value of a development, it is worth recognizing that a smaller installation will generally produce higher property tax revenue on a per MW basis. Furthermore, smaller installations are often sited nearer to urban areas where property tax millages tend to be higher and where the city may already be granting the developer a tax abatement or waiver to incentivize the development.[2]

Time of Installation: The cost of solar has halved approximately three times in the last ten years and is predicted to halve again in another 10-15 years. This changing cost is important when trying to determine both what the future ad valorem tax implications are of a solar development and what an optimal PILT payment amount would be. One way to consider this is to suggest that a PILT payment determined now should reflect future decreases in the cost of solar, and therefore property tax liability. Alternatively, a PILT payment set today could be used to ensure that there are ample economic incentives enticing host communities to continue to accept projects even as the per-MW cost of solar development falls over time. While not all communities approach utility-scale solar development with an eye toward economic development, for the largest solar projects, this is often the primary reason communities choose to set land-use policies that make such projects viable.

On top of these considerations is how closely declines in wholesale power prices match the reduction of solar development costs. If wholesale power costs decrease at a rate mirroring solar development costs, then legislation mandating a higher PILT payment may make solar development in Michigan uncompetitive in the future. However, in neighboring Ohio, which is experiencing rapid growth in utility-scale solar projects, PILT payments are $6,000-$9,000 per MW_{AC} and are not yet hindering solar development's viability.

[1] Capacity factor refers to a percentage of nameplate capacity generated by an installation. A solar installation with a 1MW nameplate capacity may generate, on average, at 30% capacity in parts of California and 23% capacity in parts of Michigan.

[2] See "Millage" section below for more on urban tax benefits for solar

Millage
Property tax millages have a strong effect on the amount of property tax a developer will pay on their solar development. One of the most important functions of a PILT agreement is equalizing the property tax liability of development across the state. Property tax mils for industrial personal property in Michigan range from 10.166 to 72.175 mils, with an overall median of 23.491 and an interquartile range from 19.7 to 29. While urban communities may want solar installations, an ad valorem tax structure is one of several factors steering solar developers to rural areas. A caveat to this is that those (mostly urban) communities listed as "Eligible Distressed Areas" may provide solar developers with a New Personal Property Exemption under PA 328—an 11MW solar project developed in East Lansing was granted a 10-year exemption through this mechanism.

Assessment / Property Type / Depreciation
One of the clearest advantages of adopting PILT legislation is removing both the transaction costs and inherent uncertainty associated with property tax assessments. This removal can benefit both host communities and developers. Until recently, the state had issued minimal guidance as to how solar property should be valued and on what depreciation schedules different parts of the project should be set. Even with this guidance, there is still confusion among local officials and developers about which portion of the solar energy systems should be assessed as industrial personal property vs. utility personal property (the latter depreciates much more slowly, therefore yielding a higher lifetime tax value), and whether or not labor is included in the taxable value of solar installations.

Furthermore, drawing from the state's history with the property taxation of wind energy, even when there is guidance from the state on assessment, it is not uncommon for project developers to contest local assessors' property valuations in court, which both increases overall project costs and slows the development process.

Net Present Value Implications on Ad Valorem Taxation vs. PILT Agreements
Net Present Value (NPV) is a measure of the current value of future dollars. To calculate NPV, future earnings are discounted at a rate determined on a case-by-case basis called the discount rate.

The implications of NPV on the issue at hand is that the NPV of property tax payments made on an ad valorem basis is worth more than PILT payments totaling an equivalent amount. Ad valorem property tax payments are heavily weighted towards earlier years in a project's life, so they suffer less from the heavy discounting of later payments than PILT payments, which are spread out evenly over time. Thus, a million total property tax dollars paid by a developer over twenty-five years will have a higher NPV than a million dollars in PILT payments paid over the same period.

How discount rates are calculated/selected varies between entities. Local governments tend to use lower discount rates than private entities, sometimes pegging discount rates

to the yield on ten-year treasury bonds to calculate NPV for governmental budgeting—ten-year treasuries historically return 1-5%, with 1-3% being the norm over the past ten years. The private sector generally expects higher returns on their investments and thus uses higher discount rates, perhaps 5-10%.

This discrepancy in discount rates used between local governments and private developers could actually benefit a negotiation around PILT acceptability. Why? Because when comparing the lifetime cost of PILT payments vs. property tax payments, the NPV benefit to the developer from making equal payments over the lifetime of a development will be greater than the added total dollar value expense of the PILT payments compared to the front-loaded property tax payments. And for the local government the reverse is true—the benefit they stand to gain from front-loaded payments is less because they are discounting future payments at a lower rate.

Calculator Assumptions and Functionality

Overview of Calculator Function

The PILT calculator's function is fairly simple. The user has three inputs—mils, cost per MW, and discount rate. The calculator's outputs are an adjusted yearly PILT payment, that same payment rounded to the nearest five-hundred-dollar increment, and that rounded PILT value multiplied by the length of the PILT agreement—to give total lifetime PILT value per MW. These outputs are given twice, once for a 25-year PILT agreement and once for a 20-year PILT agreement. We included the two PILT lengths, 20 and 25-year, to reflect that some states, like Oregon and New York, with existing PILT agreements, have legally limited their durations, whereas other states have negotiable durations that can extend to the full life of the solar development, which we approximate to be 25 years. A PILT agreement's length is meaningful because a shorter PILT agreement will likely be worth less than a longer one, as PILT payments tend to be higher than tax payments on developments with already depreciated taxable values. [1]

When selecting mils and cost per MW, the user has the option of using pre-programmed dropdown menus, which use values based on 2020 Michigan millage data and the National Renewable Energy Laboratory's (NREL) most recent data on the cost of solar—both current and projected.

What the calculator actually calculates is an estimate of the lifetime ad valorem property tax payments given the user's inputs. It then solves for a PILT payment using the same discount rate input, thus accounting for the difference in NPV between a series of depreciating payments, as a local government would receive under the current property tax system, and the fixed payments they would receive under a PILT system.

Assumptions Around Millages and Depreciation

There are 3583 different millages levied on property at the school-district level in Michigan. These districts reside in 83 counties. The three pre-programmed millages

[1] In Michigan, IPP has depreciated to its lowest taxable—23% of its initial taxable value—by year fifteen.

were calculated using Michigan's 2020 millage data for industrial personal property (IPP). The "median" millage is the median of all of Michigan's IPP millages at the school-district level. To calculate the "high" and "low" millages, we grouped school-district level data into counties, found the lowest and highest millages in each county, and then took the median of those sets of highest and lowest county millages.

The calculator uses two depreciation schedules for its calculations. These are tables "I" and "B" as described in Michigan tax code; they are schedules for utility infrastructure and industrial property, respectively. Table "I" is a much slower depreciation schedule than table "B."

When determining how much of a project's cost would be taxed on which table, we use two methods. For per-MW price selections "100 MW Single Axis Tracker" and "5 MW Single Axis Tracker" from the dropdown menu we use NREL's actual 2020 total installed cost data (which includes labor) for projects of those sizes, where the project's inverter and transmission are depreciated as utility personal property (UPP) on table "I" and the rest of the system cost is depreciated as IPP on table "B." We also assume that any property determined to be UPP would be taxed at a rate that is approximately 24 mils higher than for IPP, because UPP is not exempt from certain standard millages that IPP is exempt from in Michigan. For "100 MW in 2031 Single Axis Tracker" or a custom price selection, we assume 5% of the project's cost will be taxed and depreciated as UPP, which is an approximation based on the actual values from the NREL data.

Cost Assumptions

Cost assumptions for solar are based on two NREL sources. The data used for the "100 MW Single-Axis Tracker" and "5 MW Single-Axis Tracker" price selections come from NREL's report and data set entitled "U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020," and the "100 MW in 2031 Single Axis Tracker" price selection is based on NREL's Annual Technology Baseline (ATB) data set, which, among other things, contains three possible trajectories for the price of utility-scale solar over time—advanced, moderate, and conservative. The "100 MW in 2031 Single Axis Tracker" value pulls from the document's moderate trajectory.

Figures

Figure 1

Set Your Variables			
median		23.491	IPP Mils (Select from this list or Enter your own in B5)
IPP Mils Set Your Own			
IPP Mils Being Used		**23.491**	
Discount Rate - Set as Decimal		**0.03**	
100 MW Single Axis Tracker	$	1,353,400.00	Costper MW (Select from this List or Enter your Own in B9)
Cost per MW Set Your Own			
Cost per MW Being Used	**$**	**1,353,400.00**	
Adjusted Yearly PILT Payment 25-Year	**$**	**7,516.22**	Calculated Yearly 25-Year PILT Payment to Match Ad Valorem
Rounded PILT	$	7,500.00	Rounds Dollar Value Above to the Nearest $500
25 Year Per MW Payment Rounded	$	187,500.00	Total Value of 25 Years of PILT Payments Per MW
Adjusted Yearly PILT Payment 20-Year	**$**	**8,026.77**	Calculated Yearly 20-Year PILT Payment to Match Ad Valorem
Rounded PILT	$	8,000.00	Rounds Dollar Value Above to the Nearest $500
25 Year Per MW Payment Rounded	$	183,000.00	Total Value of 20 Years of PILT Payments Plus 5 Years of Ad Valorem Per MW

Figure 2

Set Your Variables			
median		23.491	IPP Mils (Select from this list or Enter your own in B4)
IPP Mils Set Your Own		18	
IPP Mils Being Used		**23.491**	
Discount Rate - Set as Decimal		**0.05**	
5 MW Single Axis Tracker	$	1,795,600.00	Costper MW (Select from this List or Enter your Own in B10)
Cost per MW Set Your Own			
Cost per MW Being Used	**$**	**1,795,600.00**	
Adjusted Yearly PILT Payment 25-Year	**$**	**9,869.04**	Calculated Yearly 25-Year PILT Payment to Match Ad Valorem
Rounded PILT	$	10,000.00	Rounds Dollar Value Above to the Nearest $500
25 Year Per MW Payment Rounded	$	250,000.00	Total Value of 25 Years of PILT Payments Per MW
Adjusted Yearly PILT Payment 20-Year	**$**	**10,445.26**	Calculated Yearly 20-Year PILT Payment to Match Ad Valorem
Rounded PILT	$	10,500.00	Rounds Dollar Value Above to the Nearest $500
25 Year Per MW Payment Rounded	$	237,000.00	Total Value of 20 Years of PILT Payments Plus 5 Years of Ad Valorem Per MW

Figure 3

Set Your Variables			
low		16.161	IPP Mils (Select from this list or Enter your own in B4)
IPP Mils Set Your Own			
IPP Mils Being Used		**16.161**	
Discount Rate - Set as Decimal		**0.02**	
100 MW in 2031 Single Axis Tracker		829,000.00	Costper MW (Select from this List or Enter your Own in B10)
Cost per MW Set Your Own			
Cost per MW Being Used	**$**	**829,000.00**	
Adjusted Yearly PILT Payment 25-Year	**$**	**3,140.94**	Calculated Yearly 25-Year PILT Payment to Match Ad Valorem
Rounded PILT	$	3,000.00	Rounds Dollar Value Above to the Nearest $500
25 Year Per MW Payment Rounded	$	75,000.00	Total Value of 25 Years of PILT Payments Per MW
Adjusted Yearly PILT Payment 20-Year	**$**	**3,372.73**	Calculated Yearly 20-Year PILT Payment to Match Ad Valorem
Rounded PILT	$	3,500.00	Rounds Dollar Value Above to the Nearest $500
25 Year Per MW Payment Rounded	$	80,000.00	Total Value of 20 Years of PILT Payments Plus 5 Years of Ad Valorem Per MW