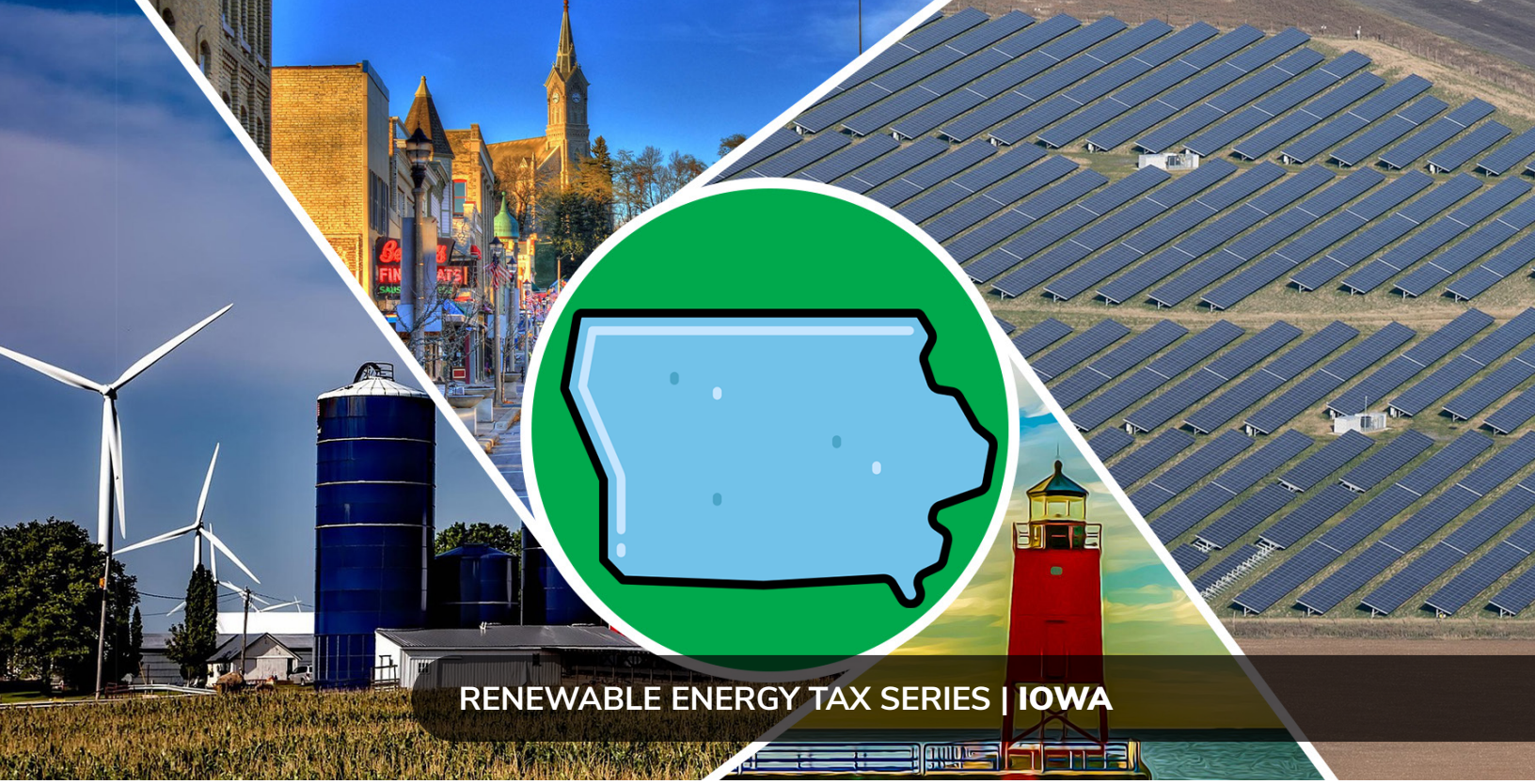


# Local Property Tax Impacts of Large-Scale Wind and Solar Projects

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*Center for EmPowering Communities, University of Michigan*

## About the Series

This state-specific series explores one key question: How do property taxes from large-scale wind and solar projects impact local government budgets?

Renewable energy projects can boost rural economies and fund community priorities, but assessing their tax impacts is often difficult. This series aims to provide stakeholders with clear, detailed, and accurate information.

This material is for informational purposes only and is not intended as legal advice.

Renewable energy projects are expanding nationwide as governments and industries respond to climate change and advancing technology. This growth is expected to continue for projects of all sizes, especially utility-scale developments that power thousands of homes by feeding electricity directly to the grid. Spanning thousands of acres, these large projects are most often built in rural places and frequently on agricultural land.

Like other properties, these projects pay taxes to local government units, including towns, schools, libraries, and others. Energy property taxes are usually much higher than farmland taxes, though the size of the difference depends on state tax laws. Large-scale wind and solar projects are typically taxed in one of two ways: ad valorem (based on land and equipment value, taxed at local rates) or as a Payment in Lieu of Taxes or PILOT (often a flat rate tied to the project's electricity production capacity).

State policymakers determine which tax system applies and how it is implemented, balancing the trade-offs between lower taxes to attract developers and higher taxes to benefit host communities. These policies—from the broad structures to the tiny details—shape the size and distribution of tax payments over a project's 20- to 40-year lifespan. Sometimes units like counties and schools may be affected differently, and some local residents may benefit more than others. Policymakers must also plan for decommissioning to prevent "boom/bust" revenue cycles that can occur when major taxpayers enter and exit. With many of these policies newly established, state and local officials are still learning their applications and impacts.

# Local Property Tax Impacts of Large-Scale Wind and Solar Projects

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## Overview: Wind and Solar Property Taxes in Iowa

In Iowa, when large-scale solar projects are constructed, the farmland is no longer taxed as agricultural property. Instead, the solar projects continue to pay taxes to counties, townships, schools, and other local units, but through a different framework. When large-scale wind projects are constructed, in contrast, traditional real property taxes are still paid on the farmland, but the wind project itself is taxed according to a special valuation system.

**Solar projects** are treated as utility-scale energy producers, which pay a Replacement Tax rather than traditional property taxes. This is an annual fee based on a project's electricity generation, transmission assets, and electricity delivered to end-users in any given year. The replacement tax is distributed to local government units in the same proportions as property taxes.

**Wind projects** are typically taxed under a special valuation system, which assesses the project based on a percentage of its net acquisition cost (total cost to acquire and install turbines, including foundations and equipment, minus adjustments). This system uses a set percentage schedule, with 0% of net acquisition cost being taxable in Year 1 and an additional 5% added each year until Year 7, when the percentage is capped at 30%. This taxable value is then multiplied by local tax rates to determine the wind project's tax bill. Wind projects are also often set up as Tax Increment Financing (TIF) projects, in which the county directs the increased tax revenue from the projects to a special fund for public redevelopment projects.

## Example 1: 100 MW Solar Project in Marshall County, Iowa

A 700-acre, 100 MW solar project in Marshall County, Iowa would generate replacement tax revenue based on its expected electric generation of approximately $123,500 annually. Subtracting previous farmland taxes, this would result in an estimated $120,000 in Year 1 distributed proportionally to all taxing units.

**Table 1. Year 1 Net Impact and Distribution for 100 MW Solar Project in Marshall County, Iowa**

| Jurisdiction | Tax Rates | Electric Generation Tax | Previous Farmland Taxes | Net Tax Revenue |
|---|---|---|---|---|
| County | 0.62% | $32,000 | $7,000 | $25,000 |
| County (Additional Rural Rate) | 0.31% | $16,000 | $3,000 | $13,000 |
| School District | 1.48% | $76,000 | $17,000 | $59,000 |
| **Total** | **2.41%** | **$124,000** | $27,000 | $97,000 |

## Example 2: 100 MW Wind Project in Marshall County, Iowa

A 100 MW wind project in Marshall County, Iowa would be assessed each year based on a set percentage of its installation costs, estimated at $100 million. Tax revenue is either distributed to all local units based on tax rates, or captured in a TIF fund to finance county redevelopment projects

**Table 2. Annual Net Impact and Distribution for 100 MW Wind Project in Marshall County, Iowa**

| Jurisdiction | Unit Tax Rate | Year 1 | Year 2... | ...Years 7+ |
|---|---|---|---|---|
| Marshall County | 0.62% | $0 | $31,000 | $187,000 |
| Marshall County (Additional Rural Rate) | 0.31% | $0 | $15,000 | $92,000 |
| Marshalltown School District | 1.48% | $0 | $74,000 | $443,000 |
| **Total** | **2.41%** | **$0** | $120,000 | $722,000 |

Property tax laws vary by state. While states often use similar terms, their applied definitions can differ from place to place. Below, these shared terms are defined according to Iowa's tax system.

## Property Tax 101

- **Assessed value:** The value of a property set by a government for the purpose of taxation.
- **Depreciation:** The gradual loss of value of a property as it ages or gets used. If a property depreciates by 20%, Taxable Value = Assessed Value x (80%)
- **Fair market value:** The price at which a property is most likely to be sold in the current real estate market. Sometimes called fair cash value.
- **Levy rate:** An expression of the tax rate, used in Iowa. A $2 levy is a rate of $2 per every $1,000 of taxable value, or a 0.2% tax rate. Sometimes called a millage rate.
- **Personal property:** Moveable items, not permanently affixed to or part of the real estate.
- **Real property:** Land and permanent improvements to land, such as buildings.
- **Taxable value:** The value of a property used to calculate property taxes, determined in Iowa by reducing assessed value by a set percentage or amount depending on property type.
- **Tax rate:** A percentage at which a property owner is taxed on the value of their property.
- **Taxing unit:** Any government unit that imposes property taxes, such as counties, towns, school districts, and special districts.

## Renewable Energy 101

- **Capacity factor:** The ratio of a generator's actual electricity output compared to what it could have generated if it had been operating continuously at full capacity.[1] The average capacity factor of wind energy projects was about 34% in 2024, while that of solar was about 23%.[2] The capacity factors of individual projects can vary considerably.
- **Megawatt (MW) / Megawatt-hour (MWh):** A megawatt is a unit of power capacity equal to one million watts, or one thousand kilowatts. A megawatt-hour is a unit of electric output equal to the amount of electricity that one megawatt can generate in one hour.[3]
- **Nameplate capacity:** Maximum amount of electricity in megawatts (MW) that a solar or wind farm could produce under perfect conditions. Sometimes called installed capacity.

*Adapted from Lincoln Institute of Land Policy Property Tax Glossary.*

A farm scene, IA. (Canva)

# Iowa: Key Concepts

- **Competitive service areas:** Geographic boundaries established by the Iowa Public Utilities Commission in which electric utilities provide exclusive service to customers.[4] The commission publishes a map of electric service boundaries.[5]
- **Net Acquisition Cost:** The total cost to acquire and install wind turbines, including foundations and equipment, minus adjustments.[6]
- **Replacement Tax:** Iowa's Replacement Tax system applies to natural gas and electric utilities, including solar farms, electric cooperatives, and municipal utilities. It consists of three separate tax rates on electric generation, delivery, and transmission. The taxes are collected and distributed to local taxing bodies in the same proportion as traditional property taxes, supporting public services such as schools, infrastructure, and community programs.[7]
- **Rollback:** Iowa places statewide limitations on the growth of property assessments.[8] Each year the Iowa Department of Revenue sets **rollback rates** for each class of property. To find an individual property's **taxable value**, multiply its **assessed value** by its rollback rate.[9] The rollback rate for industrial property is typically higher than that of agricultural property, meaning that more of its value is taxable.[10]
- **Tax Increment Financing (TIF):** A method of financing development projects in which a "TIF district" is established around the project, a "base" value of the property is established, and any taxes from incremental property value above that base are diverted into a special fund for additional public investments.[11]

## Deeper Dive: Iowa Property Tax Assessment Guidelines

### Property Tax Overview

Unless otherwise stated for certain types of property, **assessed value** for **real property** in Iowa is set as **fair market value**, which is assessed by the county every two years.[12] These assessments are reported to the Iowa Department of Revenue (DOR). DOR then applies **rollbacks**, which limit the **taxable value** of properties to account for inflation and limit increases to property owners' tax bills. The DOR also conducts equalization to ensure consistency in property **valuation** across jurisdictions.

Local **taxing units**, like counties and schools, develop annual budgets based on their service needs, such as education infrastructure and public safety. These budgets are used to calculate **levy rates**, expressed in dollars per $1,000 of taxable value, which determine individual property tax bills.[13] Taxes are collected twice a year by county treasurers, who then distribute the funds to other local units in accordance with their levy rates.

### Solar Property Tax Treatment

Utility-scale solar projects are solar projects that generate electricity for the primary purpose of wholesale or retail sales.[14] In Iowa, they are taxed through the **replacement tax**, which replaces traditional **real property** taxes. This tax consists of **generation, delivery,** and **transmission components**.

The land underneath energy generating equipment is assessed on a case-by-case basis by DOR. If it is used solely for utility property, it is exempt from local taxation. If the land underneath solar panels is used for another purpose, such as agrivoltaics like crop production or livestock grazing, it may be subject to local property tax assessment.[15]

#### Replacement Tax Components[16]

| Component | Description |
|---|---|
| Electric Generation Tax | Solar project owners pay $0.0006 per **kilowatt-hour (kWh)** – or $0.60 per **megawatt-hour (MWh)** of electricity generated. For example, a 100 MW solar project with a capacity factor of 20% would generate 175,200 MWh per year and owe more than $100,000 annually.<br>**Taxes owed = Total MWh generated * $0.60/MWh** |
| Electricity Delivery Tax | This tax applies when electricity is sold directly to end-users within a specific utility service area. Projects pay per kWh delivered within each competitive service area, according to each service area's tax rate. Rates vary by service area and are updated biannually by the Iowa Department of Revenue. If electricity is sold to another utility rather than directly to end-users, as is often the case for large-scale solar projects, the delivery tax does not apply.[17]<br>**Taxes owed per service area = Total kWh delivered * service area rate** |
| Electric Transmission Tax | If project owners own or lease transmission infrastructure, they pay a tax based on the number of pole line miles and the capacity of the transmission lines (measured in kilovolts). This tax does not apply if the transmission lines are owned by a third party, like a utility,[18] which is often the case for solar projects.<br>**Taxes owed per transmission line capacity type = Total miles * pole line mile rate** |

The State of Iowa also imposes and collects a property tax of $0.03 per $1,000 of book value (cost minus **depreciation**) on property used for the generation, delivery, and transmission of electricity within Iowa that goes into the State General Fund.[19] This tax applies to solar, but not wind projects, as the latter are subject to a separate special valuation process.

### Replacement Tax Reporting and Distribution

Project owners annually report the following to DOR: total kWh generated, total kWh delivered in each competitive service area, pole miles of electric transmission lines owned or leased, and a calculation of replacement taxes owed based on this data. The amount owed is verified by DOR.[20]

Replacement tax revenue is distributed to local **taxing units** in the same proportions as regular **ad valorem** property taxes[21]. An individual taxing unit's proportionate share is calculated by dividing its **levy rate** by the total levy rate (including those of other taxing units) in the relevant jurisdiction.

## Wind Property Tax Treatment

### Special Valuation System

Wind projects in Iowa are primarily assessed under a **special valuation system**, which is adopted by counties through local ordinances. **Assessed value** is set as the **net acquisition cost (NAC)**, defined as the total cost to acquire and install turbines, including foundations and equipment, minus adjustments. **Taxable value** equals 0% of NAC in Year 1 after installation, and increases by 5% each year until it caps at 30% in Year 7.[22] In other words, a wind project has zero **tax liability** in its first year. Maintenance or replacement of turbine components does not affect the assessed value under this system.[23]

**Table 3. Taxable Value Schedule for Special Valuation of Wind Projects**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7+ |
|---|---|---|---|---|---|---|---|
| Taxable Value (% of NAC) | 0% | 5% | 10% | 15% | 20% | 25% | 30% |

### Replacement Tax Option

If a county does not adopt the special valuation system, wind projects are assessed at full value and subject to the **replacement tax** (described further below). However, as of June 2023, all Iowa counties with utility-scale wind projects have adopted the **special valuation system**.[24]

### Distribution and Tax Increment Financing (TIF)

Tax revenue is distributed using standard local tax rates, determined by **levy rates** set by local taxing bodies (e.g., schools, counties, and cities).

Alternatively, counties can establish **tax increment financing (TIF) districts** to capture tax revenue from wind or solar projects to fund particular community improvement projects.[25] These projects could range from revitalizing a downtown area, to repaving roads, to improving municipal water infrastructure.[26] In practice, TIFs are more commonly used for wind development.

Under the TIF framework, the property's original value, called the base value, is frozen at pre-project levels for the duration of the TIF. In other words, the farmland **real property** tax revenue continues to go to the usual taxing bodies. The increase in **taxable value** generated by the project, called the increment, is taxed separately, with the revenue going into a special fund to pay for the community improvement projects. Certain millages are exempt from being redistributed into TIFs – most notably, voter-approved levies for school district capital projects – meaning that they still benefit from increases in property taxes.[27]

Most counties use at least a partial TIF. In this case, a portion of the increase in taxable value is set aside for community improvement projects, while the rest of the increase is distributed to the usual taxing bodies. For example, in a Story County wind project that became operational in 2008, the county limited the TIF fund to 50% of project tax revenue. [28]

## Agricultural Land Property Tax Treatment

Farm land is subject to traditional property tax rates. The **assessed value** for a plot of agricultural land is calculated by estimating the earning potential of a property. This is based on two factors: the average annual income of farmland across the county (called productivity value) and the land's soil productivity (called corn suitability rating).

1. The productivity value assesses agricultural land based on its expected income while in use as farmland, not by the property's **fair market value**. The productivity value in each county is determined by the 5-year rolling average of factors like acres in production, crop yield, and crop market prices.[29]
2. The corn suitability rating (CSR2) is a number between 5 and 100 that measures the long-term potential productivity of row crops on a particular plot of land, regardless of individual farm management.[30]

The assessor totals the productivity value of farmland across the county by multiplying the productivity value per acre by the total number of agricultural acres in the county, called the target value. Next, they divide the target value, minus the value of buildings on the land, by the total CSR2 points in the county, which results in an estimated economic value (in dollars) per CSR2 point in the county. The $ / CSR2 point value is then multiplied by the CSR2 points of the given parcel to determine its assessed land value.[31]

**Productivity value per acre × # Agricultural acres in county = Total target value**

**Total target value - Total agricultural building value = Agricultural land value**

**Agricultural land value ÷ Total adjusted CSR2 points = $ / CSR2 point**

**$ / CSR2 point × Individual parcel's CSR2 points = Parcel's assessed value**

Lastly, the parcel's assessed value is multiplied by a **rollback rate** and each taxing unit's **levy rate** to calculate the **real property** tax liability. Rollback rates are statewide and set annually by DOR for each property class.[32]

*Wind turbine, IA (Canva)*

## Discussion of Impacts

### Tax Increment Financing (TIF)

Distribution of wind tax revenue varies widely depending on if the county sets up tax increment financing (TIF). Without TIF, the entire **taxable value** of the wind project is distributed based on standard property tax law (collected by the county and distributed to local bodies). With TIF, the original taxable value of the property before the wind project is frozen for the duration of the TIF and normal millage rates apply. The increase in taxable value of the property after the wind project is built (called the increment) is then captured by the county for a special fund. This can be spent on infrastructure and other projects. Lower taxing jurisdictions can benefit indirectly from these projects, or receive direct allocations from the fund.

### Solar replacement tax revenue variation

Since solar project taxation is based on the amount of electricity produced each year, there is variation in the amount of tax revenue generated. This variation exists year-over-year for any given project (for example, if there is extended downtime for maintenance), as well as across regions. Some regions have solar resources superior to others, enabling them to generate more electricity and, consequently, more tax revenue.

### OBSERVATIONS ON IMPACTS ACROSS STATES

- **Closer neighbors benefit more:** Because projects pay taxes to overlapping **taxing units** (e.g., county, township, and school), those living nearest—who use all these public services—see the greatest economic impact.
- **Less populous areas benefit more:** Since tax benefits are distributed within the project's **taxing units**, counties and townships with fewer residents receive a higher per-person benefit.
- **Tax revenue becomes more concentrated:** A large taxpayer like a wind or solar farm shifts the tax base, increasing reliance on a single source. When the project is decommissioned, local units may struggle to replace the lost revenue.
- **Wind project revenue is more dispersed:** Wind farms retain most farmland, converting only 0.5 to 1 acre per turbine use. With turbines spread over many more acres than solar panels, less agricultural tax revenue is lost and and benefits are shared across more **taxing units**.

## Calculation Steps

### Solar Project: 100 MW in Marshall County, Iowa

*This is an example for a 700-acre, 100 MW solar project in Taylor Township, Marshall County, Iowa, within the borders of Marshalltown School District. Tax data is from 2025.*[33] *For simplicity, the project is assumed to reside entirely in one taxing district. Numbers are rounded.*

*In practice, many solar projects are developed by independent power producers that do not own transmission assets or deliver electricity to end-use customers, and so the transmission and delivery components of the replacement tax do not apply to them.*

### Step 1: Determine Electric Generation Tax Revenue

**A. Estimate annual electricity production**

- **Project Size:** 100 MW
- **Capacity Factor:** 23.5%[34]
- **Hours in a Year:** 365 days × 24 hours = 8,760 hours

**100 MW x 23.5% x 8,760 = 205,860 MWh**

**B. Calculate Electric Generation Tax**

- Estimated annual electricity production: 205,860 MWh
- Replacement Tax Rate: $0.0006 per kWh = $0.60/MWh

**205,860 MWh x $0.60/MWh = $123,500**

### Step 2: If applicable, add Electricity Delivery Tax and Electric Transmission Tax [See below]

### Step 3: Calculate Proportional Distribution of Replacement Tax Revenue

Unit Tax Revenue = (Unit Tax Rate ÷ Total District Tax Rate) × Total Tax Revenue

| Jurisdiction | Unit Tax Rates | Proportion of Total District Rate | Portion of Replacement Tax Allocated to Each Unit |
|---|---|---|---|
| Marshall County | 0.62% | 26% | $32,000 |
| Marshall County (Additional Rural Rate) | 0.31% | 13% | $16,000 |
| Marshalltown School District | 1.48% | 61% | $76,000 |
| **Total** | **2.41%** | 100% | $124,000 |

### Step 4: Calculate Previous Farmland Taxes

**A. Calculate target value for agricultural land in county.**

- Agricultural productivity value per acre (Marshall County): $2,168/acre[35]
- Number of agricultural acres (Marshall County): 333,581[36]

**$2,168 x 333,581 = $723.2 million**

**B. Estimate total Corn Suitability Rating (CSR2) points in county.**

- Average Corn Suitability Rating (Marshall County): 75.7[37]
- Number of agricultural acres (Marshall County): 333,581[38]

**75.7 x 333,581 = 25.3 million CSR2 points**

**C. Estimate the economic value per CSR2 point in the county.**

- Total target value for agricultural land: $723.2 million
- Total estimated CSR2 points: 25.3 million
- *Note: Agricultural building value, which would be subtracted from target value, is assumed to be zero to simplify calculation.*

**$723.2 million ÷ 25.3 million = $28.60 per CSR2 point**

**D. Estimate the taxable value of the property.**

- Estimated economic value per CSR2 point: $28.60
- Estimated CSR across property (average CSR, Marshall County): 75.7[39]
- Acres converted: 700 acres
- Statewide agricultural rollback adjustment: 73.86%[40]

**$28.60 x 75.7 x 700 acres x 73.86% = $1.12 million**

**E. Calculate previous farmland taxes in Year 1.**

- Estimated taxable value: $1.12 million
- Total tax rate for Taylor Township: 2.406%

**$1.12 million x 2.41% = $27,000**

## Step 5: Calculate Year 1 Net Tax Revenue & Distribution Across Local Units

| Jurisdiction | Replacement Tax Revenue | Previous Farmland Tax Revenue | Net Tax Revenue |
|---|---|---|---|
| Marshall County | $32,000 | $7,000 | $25,000 |
| Marshall County (Additional Rural Rate) | $16,000 | $3,000 | $13,000 |
| Marshalltown School District | $76,000 | $17,000 | $59,000 |
| **Total** | **$124,000** | $27,000 | $97,000 |

## Bonus 1: Electric Delivery Tax Calculation

While most utility-scale solar projects sell their power to utility companies, if the power were delivered directly to local end-users, the following calculation steps would be used. In this example, we assume that all power generated by the project is delivered to Interstate Power and Light customers.

**A. Find Service Area Delivery Tax Rate**

- Service area electric delivery tax rate for Interstate Power and Light: $0.0010363/kWh ($1.0363/MWh)[41]

**B. Calculate Delivery Tax Revenue**

- Delivery tax revenue = 205,860 MWh x $1.0363/MWh = $213,333

## Bonus 2: Electric Transmission Tax Calculation

While most utility-scale solar projects do not own transmission assets, if they did, the following calculation steps would be used. In this example, we assume that the project owns 5 miles of 33 kV lines and 5 miles of 66 kV lines.

### A. Find Transmission Tax Rate Per Line Mile

- Transmission tax rate for lines between 4.5 to 100 kV: $550 per pole mile line[42]

### B. Calculate Transmission Tax Revenue

- Transmission tax revenue = 10 pole mile lines x $550 = $5,500

## Wind Project: 100 MW in Marshall County, Iowa

This is an example for a 700-acre, 100 MW wind project in Taylor Township, Marshall County, Iowa, within the borders of Marshalltown School District. Tax data is from 2025.[43] For simplicity, the project is assumed to reside entirely in one taxing district. Numbers are rounded. This example assumes agricultural **real property** taxes continue on the land underneath wind turbines, so there is no subtraction of previous farmland taxes to calculate net impact.

### Step 1: Calculate Assessed Value (Net Acquisition Cost)

- Project Size: 100 MW
- Estimated installation costs: $1 million/MW

**$1 million x 100 MW = $100 million**

### Step 2: Calculate Taxable Value Based on Special Valuation Schedule

- Estimated assessed value (Net Acquisition Cost): $100 million

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7+ |
|---|---|---|---|---|---|---|---|
| Special Valuation Percentage of Net Acquisition Cost | 0% | 5% | 10% | 15% | 20% | 25% | 30% |
| Taxable Value | $0 | $5 million | $10 million | $15 million | $20 million | $25 million | $30 million |

### Step 3: Determine if project is being taxed as a TIF project [See below]

### Step 4: Calculate Tax Revenue and Distribution

- *Subtract revenue allocated to TIF district before distribution*
- Taxable value: See table above
- Unit tax rates (Marshall County)

| Jurisdiction | Unit Tax Rate | Year 1 | Year 2... | ...Years 7+ |
|---|---|---|---|---|
| Marshall County | 0.62% | $0 | $31,000 | $187,000 |
| Marshall County (Additional Rural Rate) | 0.31% | $0 | $15,000 | $92,000 |
| Marshalltown School District | 1.48% | $0 | $74,000 | $443,000 |
| **Total** | 2.41% | $0 | $120,000 | $722,000 |

## Bonus 1: TIF Project Revenue Distribution

If the wind development is a TIF project, the real property taxes on the underlying land would continue to be distributed to local taxing units, while the tax revenue from the special valuation (calculated below) would be fully collected by the county TIF fund. If the project is set up as a partial TIF, a negotiated percentage of the revenue would be collected by the TIF fund, while the remaining revenue would be distributed to all local units according to their tax rates.

**A. Calculate portion of Year 2 total tax revenue assigned to TIF district**

- Negotiated TIF percentage: 50%
- Year 2 total district tax revenue: $120,000

**$120,000 x 50% = $60,000**

**B. Distribute remaining revenue according to local tax rate proportions**

- Remaining Year 2 total tax revenue: $60,000
- Unit Tax Revenue = (Unit Tax Rate ÷ Total District Tax Rate) × Total Tax Revenue

### CALCULATIONS FOR MULTIPLE TAXING DISTRICTS

This example assumes the project is entirely within one taxing district for simplicity. To determine benefits for a project spanning multiple taxing districts, repeat these steps for each portion of the project (either by megawatts or acreage, depending on the step) within each taxing unit.


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