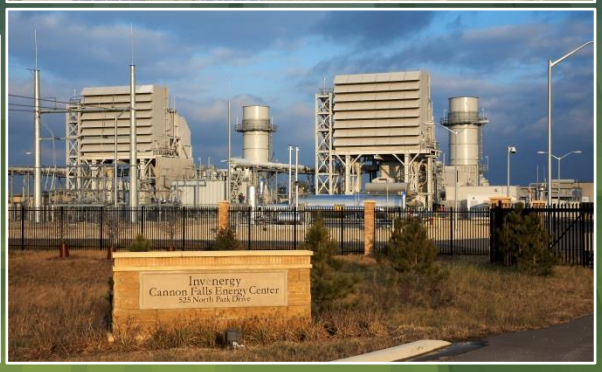
Study of Energy Producing Systems



February 2015

MINNESOTA · REVENUE

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Oak Glen Wind Farm, photo courtesy of Minnesota Municipal Power Agency
Maple Grove Solar Project, photo courtesy of Great River Energy
357 MW Cannon Falls Energy Center, photo courtesy of Invenergy
Calpine Mankato Energy Center, photo courtesy of Calpine Corp

This report cost $150,000.

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February 2, 2015

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To Members of the Legislature of the State of Minnesota:

I am pleased to present this study on Minnesota Energy Producing Systems undertaken by the Minnesota Department of Revenue, as required by Minnesota Laws 2014, Regular Session, Chapter 308, Article 2 section 19.

Sincerely,

Cynthia Bauerly
Commissioner

Contents

Legislative Charge Summary

The Minnesota Department of Revenue was charged by the 2014 Legislatures to create a report outlining the taxation of electric energy producing systems in Minnesota.

The report is to include:

- Descriptions, analyses, and comparisons of the various energy producing systems taxed under property tax
- Descriptions, analyses, and comparisons of available exclusions, exemptions, or payment-in-lieu of taxations that apply to the systems and their effects
- Evaluations of the extent to which host political subdivisions and communities are compensated for hosting energy-producing facilities
- Comparisons of the net cost of property and other taxes per unit of energy produced in Minnesota compared to border states
- Developments and evaluations of alternative tax or fee systems for compensating host political subdivisions and communities
- Recommendations for the taxation of solar energy producing systems

See Appendix A for the full text of the legislation.

Study Process

To ensure a broad understanding of the issues raised by the legislative charge, Revenue conducted thorough research, sought information from industry and local officials, and engaged a work group to assist in this process.

Revenue utilized a broad study of works available on the issues (See Appendix F for a complete list.) We studied the current process for taxing energy producing facilities, compared the taxes paid by energy producing facilities, identified existing exemptions and payment-in-lieu-of-tax arrangements, and identified potential costs associated with hosting an energy producing facility.

In September, Revenue gathered information from host communities and energy companies in Minnesota through a survey tool. The survey gathered perceptions of the costs and benefits of hosting energy producing facilities. This helped us to understand the issues surrounding the question of whether the property tax system adequately compensates the host jurisdictions for the burdens of hosting energy producing facilties. We sent the survey to 40 host jurisdictions and 24 energy companies. We received responses from 15 host communities and 7 energy companies.

In addition to conducting research and surveying cities and utilities, Revenue met with stakeholders throughout this process. In August and September, we met separately with utilities and members of the coalition of utility cities to hear what issues they thought were important to these questions and information they thought we should consider.

In October, Revenue sent a team to Collegeville, Minnesota to learn more about solar energy at the solar farm at St. John's University, one of the largest solar facilities in the state. In late October, we hosted a

meeting to solicit responses on our survey results with stakeholders including utilites, utility cities, legislators, and legislative staff attending to offer their feedback. In November, we again met with those stakeholders to present our initial findings and seek their input on what recommendations they would make. See Appendix E for a complete list of stakeholders.

The completed study was made available to those same stakeholders. We welcomed reactions and responses to the results of the study. Those responses were added to Appendix H: Stakeholder Responses in mid-February, 2015.

Study Limitations

The legislative charge directed Revenue to find information "to the extent practicable under the appropriation and time available." The information and recommendations in this study reflect that directive. There were a number of additional issues that we would have explored in greater detail, given more time and resources.

We identified these additional issues below. They require further time and resources if more information is warranted.

Expanded information on other states' taxation of energy producing facilities

A full comparative picture of the taxation of energy producing facilities is very difficult. In order to compare property taxes more effectively, we would need to examine other states' tax systems as a whole. Additionally, understanding of other states' non-property taxes would provide for a more complete comparison of these facilities' tax treatment in other states.

For the states that we were able to review, we were unable to fully examine their renewable energy mandates or gather the data necessary from each state to determine the property taxes per kWh.

Comparison of taxation of energy producing facilities and other industrial properties

We were unable to gather greater detail and additional data on other industrial (non-energy producing) facilities. This would have helped us better understand the tax differences between energy producing facilities and other commercial/industrial facilities in order to better analyze the adequacy of the property tax system.

Additionally, there were concerns raised regarding pollution and legacy impacts of energy-producing facilities. The analysis would benefit from knowing if non-energy industries have similar cost issues while being taxed differently. If other industries have similar legacy issues, a more adequate property tax system might take into account those costs.

Identify non-property tax areas to address host jurisdiction concerns

The scope of this report is strictly related to property taxes. There may be other non-property tax mechanisms for addressing the concerns of host communities that are not covered by this report.

Executive Summary

Over many decades, Minnesota developed policies for taxing energy production and energy producing facilities and compensating communities hosting energy production facilities. This study describes the state's current policies and their impacts, compares them to neighboring states, identifies weaknesses in our current approach, and examines alternatives.

Through this legislative charge, Revenue studied the current process for taxing energy producing facilities, compared the taxes paid by energy producing facilities, identified existing exemptions and payment-in-lieu-of-tax arrangements, and identified potential costs associated with hosting an energy producing facility.

This report identifies many of the costs and benefits of hosting a facility, but most of these are not quantifiable. The importance placed on particular costs and benefits would differ from community to community and resident to resident. Additionally, the information we were able to collect for the costs that are able to be quantified is not enough to measure whether the benefits accurately or adequately compensate them.

It is difficult to draw any particular correlation between the amount of taxes paid with the benefits received from programs and services that are funded by the property tax. Similarly, any correlation is also difficult to draw between the tax revenues received by the host communities from energy producers and the costs of hosting these facilities.

This study was also tasked with reviewing the 2014 legislation on the taxation of solar energy generating systems, and making recommendations on how they should be taxed. The 2014 legislation granted an exemption to solar energy generating systems. This is broader than the prior legislation that exempted only electric power photovoltaic devices. The clarified exemption is consistent with the general exemption for personal property machinery and equipment for most businesses, including wind energy production. Most traditional energy production facilities, however, do pay personal property tax on equipment.

Based on the information we were able to gather, the recently-enacted solar energy production tax is the best option for taxation of solar energy producing facilities.

The study concludes a value-based property tax system – with exemptions, exclusions, and production tax elements – provides various levels of compensation to host communities.

- It is inconclusive whether the property tax system accurately accounts for the unique and varying burdens imposed on host communities.
- It is inconclusive whether the property tax system adequately compensates for current burdens, but it does not account for potential long-term costs.

Background

This study describes the state's current policies and their impacts, compares them to neighboring states, identifies weaknesses in our current approach, and examines alternatives.

Accuracy of value-based property tax system

Accuracy of a value-based property tax system is examined by comparing the level to which taxes of similar facilities account for burdens imposed on host communities.

Within a perfectly accurate system:

- The host communities would receive property tax income from their energy producing facilities
- The property tax income would parallel the costs of hosting the different facilities
- Property taxes received would vary based on the different facility types and their different costs

Property taxes are generally distributed based on property values in a jurisdiction. The property tax system differentiates between the uses of property through the classification system, and has unique provisions for utility properties. Even so, the amount of taxes paid by a particular property will not take into account all the costs and benefits that the property brings to the jurisdiction. The taxes paid by energy producing facilities vary based on the fuel type, the ownership structure, and whether the facility qualifies for special tax exemptions.

Tax status of various energy producing facilities

The table below summarizes the tax treatment of various energy producing facilities. The differences are analyzed in more detail later in this report.

- **Personal property taxes**
  - Are levied against the value of machinery and tools of coal, gas, and nuclear energy producing facilities.
  - Most commercial and industrial property in Minnesota do not pay this tax.
  - Municipally owned utilities are exempt from this tax.
- **Real property taxes**
  - Are levied against the value of land and buildings.
  - Most commercial and industrial properties pay real property taxes.
  - Municipally owned utilities are exempt from this tax.
- **Production taxes**
  - Are based on the amount of energy produced and are unique to wind and solar facilities.

	Personal Property Tax	Real Property Tax	Production Tax
Non-municipal utilities[a]			
Wind	No	Yes[b]	Yes
Solar	No	Yes[b]	Yes[d]
Coal, Gas, Nuclear, Other	Yes[c]	Yes[c]	No
Municipal utilities			
Coal, Gas, Other	No	No	No

[a] Investor-owned utilities, cooperatives, and independent power producers
[b] Modified tax on land only
[c] Modified if qualifies for pollution control exemption, sliding-scale exclusion, or statutory exemption
[d] New production tax effective in 2015

The result of these policies is that the taxes paid per kilowatt hour (kWh) of production can vary by facility or fuel type. It is difficult to draw a correlation between the amount or type of energy produced and the taxes paid by the producing facility. It is not clear if the current tax system accurately accounts for the differences.

The table below shows the variation among fuel types for facilities owned by both investor-owned utilities and cooperatives. It shows biomass and nuclear facilities pay 0.70 cents and 0.22 cents per kWh respectively, while coal facilities pay 0.15 cents and wind facilities pay 0.11 cents per kWh.

Energy Source	2014 Tax/kWh Generation
Biomass	0.0070
Coal	0.0015
Hydroelectric	0.0048
Natural Gas	0.0018
Nuclear	0.0022
Other[1]	0.0049
Wind	0.0011
Statewide Average Weighted by Generation	0.0017

Adequacy of value-based property tax system

Adequacy of a value-based property tax system is determined by examining whether the taxes paid by a facility sufficiently account for the costs of hosting the facility.

Within a perfectly adequate system, the property taxes a host community receives would sufficiently cover the costs imposed by its energy producing facility.

[1] "Other" energy fuel types include recovered energy generation, distillate fuel oil generation, and black liquor energy generation. They are defined in Appendix B. These other fuel types are taxed in the same manner as coal, nuclear, natural gas, biomass, and hydroelectric facilities.

In many communities, a large energy producing facility can be 30 percent or more of the community's tax base for a few reasons. First, privately-owned energy generating facilities pay property taxes on some personal property that are exempted from taxation for other, non-energy producing, industrial properties (for example, attached machinery). In addition, for many energy-producing facilities, more of the property is subject to taxation than for non-energy producing facilities.

The presence of these facilities enables the communities to pay for the costs of services provided directly to the facility while maintaining competitive local tax rates to the benefit of other properties. Yet many of the costs associated with these facilities - including pollution and negative perceptions of safety - are not easily quantifiable. It is difficult to determine whether the taxes paid in a particular host community are adequate to cover the ongoing costs of hosting the facility, and in some cases it is clear that they are not.

Additionally, there are potential long-term costs to the community that may exist after the facility stops operating. It is unclear what resources will be available to host communities to deal with these costs. For example, a community hosting a nuclear facility will face the long-term costs of storing spent nuclear fuel (waste), even after the facility is no longer in operation and subject to property tax. Although these costs may be addressed in other state or federal programs, the property tax system alone does not adequately address those costs.

Alternative tax or fee systems for compensating local taxing jurisdictions

We do not have specific recommendations for changing existing mechanisms for compensating local taxing jurisdictions, nor do we have recommendations for new methods of compensating them.

As part of this study, we determined that it is inconclusive whether or not the property tax system is an accurate or adequate method to fund host communities when compared to the costs of hosting the facilities. It is not clear that the intent is for property tax to be the sole (or best) source of funding.

This report identifies many of the costs and benefits of hosting a facility, but most of these are not quantifiable. Additionally, the information we were able to collect for the quantifiable costs is not enough to measure whether the benefits accurately or adequately compensate them.

It is difficult to draw any particular correlation between the amount of taxes paid with the benefits received from programs and services that are funded by the property tax. Similarly, any such correlation is also difficult to draw between the tax revenues received by the host communities from energy producers and the costs of hosting these facilities.

Although property tax is not adequate to address legacy costs (particularly for the nuclear facilities), there may be other mechanisms to address those particular host community concerns. For example, the federal government has processes in place for dealing with decommissioned nuclear plants. Some of these other mechanisms are discussed in Appendix H.

It should also be noted that the property tax system does not address other non-energy industrial facilities that may cause pollution or have other legacy costs.

Within the existing methods for taxing energy production facilities in Minnesota, the major tax types have their own positive and negative aspects in terms of sound tax principles.

- Production Taxes
  - Are more efficient to administer, simpler to calculate, more responsive to changes in the facility's use, and understandable to the taxpayers.
  - Allow the facility more control over their taxes. A facility can modify its production output in order to change the taxes it will pay.
  - Inconclusive whether it is a stable source of taxes for the host community.
  - Control given to the facilities may impact the property owners' behavior. With wind energy production taxes, some of the facilities may change ownership and/or alter production in order to receive a lower production rate.
- Ad valorem Taxes
  - May be a more stable source of property taxes for the host community, but are less responsive to the production at the facilities.
  - Are more complicated and difficult to understand.

Taxation of solar energy producing systems

Based on the information we were able to gather, the recently-enacted solar energy production tax is the best option for taxation of solar energy producing facilities.

The 2014 changes included:

- Clarifying that solar energy generating systems are exempt
- Creating a solar energy production tax
- Clarifying the classification of property primarily used for solar energy production

Exemption

The 2014 legislation granted an exemption to solar energy generating systems. This is broader than the prior legislation that exempted only electric power photovoltaic devices. The clarified exemption is consistent with the general exemption for wind energy production. Most traditional energy production facilities, however, do pay personal property tax on equipment.

Production Tax

Benefits of a production tax are that it is transparent and understandable, simple and efficient to administer, equitable between the solar facilities, and responsive to changes in energy produced. A solar energy production tax is appropriate in that it mirrors taxation of another renewable energy source – wind energy.

For property owners, because the production tax is simpler to calculate, it is easier for companies to understand and comply with.

One of the potential concerns with a production tax for solar energy producing systems is that it may impact property owner behavior, as we have seen with the wind energy production tax. Exempting

facilities from the tax if they are below a specific generation capacity, or having graduated tax rates based on capacity, creates an incentive for owners to build capacity below the thresholds established in law.

Classification

As a result of 2014 legislation, solar energy producing facilities are subject to specific classification requirements based on land use.

- For larger facilities where solar energy production is the primary use of the land, and where solar energy production taxes are paid, the land must be classified as commercial/industrial property.
- For smaller facilities where solar energy production is not the primary use, the classification can be whatever the highest and best use of the land would be if the solar system were not in place.

This classification requirement is more accurate for solar facilities and other types of energy facilities that require large areas of land. It allows assessors to identify and acknowledge the primary use of a property.

Solar energy producing facilities require more land than wind energy producing facilities. For larger solar farms that may be subject to the new production tax, it is not feasible to use the land for any other purpose. Therefore, a commercial/industrial classification is the most appropriate. For wind towers, it is possible that the surrounding land can have another use, as the conversion systems have smaller footprints. This difference between solar and wind energy facilities' taxation is appropriate based on these considerations.

Recommendations

1. Maintain Solar Energy Production Tax

The Solar Energy Production Tax enacted in 2014 is the best option for taxation of solar energy producing facilities.

2. Update criteria for combining nameplate capacity of Wind Energy Conversion Systems

Update the criteria for combining the nameplate capacity of Wind Energy Conversion Systems (WECS) to require combining nameplate capacities for additional systems constructed within the same 12-month period. The change is instead of a calendar year, and matches the criteria for the Solar Energy Production Tax. This will make the two tax types more equitable.

The current graduated scale creates financial incentives for large energy developers and utilities to find ways to separate their wind energy systems to reduce the taxes they pay over the life of the system. This creates an unintended method for developers to avoid paying taxes for WECS constructed within a matter of days of each other if they were constructed in different calendar years – even if all other criteria are met.

3. Maintain the property tax classification reflective of property used for energy production

As with the solar energy production tax, maintain the property tax classification system that reflects the use of a property used for energy production. This maintains a level of equity and accuracy within the tax system.

Traditional Energy Systems

Traditional energy sources include coal, nuclear, and natural gas production.

Minnesota does not produce all of its traditional energy resources. Nuclear energy is produced here, but the uranium used for nuclear energy generation is mined elsewhere. Additionally, coal and natural gas are sent here from other states to produce the energy. Minnesotans spend approximately $13 billion annually to purchase fossil fuel resources (Fitzgerald, Hansen, Lawrence, & Maurer, 2013).

Most of Minnesota's electricity is generated from non-renewable sources, particularly coal and nuclear. The state consumes mostly natural gas as a fuel source (Retrieved from eia.gov).

Taxation laws do not distinguish between coal, nuclear, and natural gas systems. These energy generating facilities are treated as a utility property group. However, different types of utility ownership organizations are subject to different types of taxation. Additionally, some plants have specific exemptions granted, which are noted later. The various types of utility ownership organizations are defined in the glossary in the appendix of this report.

Taxation of traditional energy systems

The commissioner of revenue estimates the value of each electric utility operating in Minnesota and certifies the values to the counties. (See Minnesota Administrative Rule 8100.) These values are used by the counties along with locally assessed values in calculating property taxes. Some of the values are ordered, while some are recommended. Counties may use a different value for the recommended values, but the counties must follow ordered values. The steps in the valuation process are outlined below.

1. **Establish the unit value.** The operating system of the electric utility is valued as a whole, regardless of jurisdictional borders or boundaries, and without any regard to the value of its component parts through unitary valuation. Revenue uses generally-accepted appraisal principles (cost, income, and market) and data relating to the cost of the property, the future earnings of the company owning or operating the property, and additional indicators of value where applicable.

2. **Allocate value to Minnesota.** After the unit value of the utility property has been estimated, the amount of value attributable to Minnesota is calculated using percentages of original cost and gross revenue in Minnesota compared to the amounts of the entire system. This is called the "Minnesota Allocated Value."

3. **Deduct exempt and locally assessed property.** Any property in Minnesota which is exempt from property tax by Minnesota Law or is locally assessed is deducted from the Minnesota Allocated Value at its market value. The remaining amount after the deductions is called the "Minnesota Apportionable Value."

4. **Distribute the value to individual parcels.** The Minnesota Apportionable Value is then distributed across types of property on the parcels in the various taxing districts in Minnesota where the utility is located. This process is called "apportionment."

5. **Equalize the values.** If necessary, the value of structures is equalized based on sales and assessment ratios. This is to coincide with the assessment levels of other commercial and industrial property within each county receiving a share of the apportioned utilities value.

6. **Certify the values to the counties.** The commissioner must certify the final equalized values to county auditors and assessors by August 1 of each year.

Coal

How it's used

Power companies burn coal to make steam. The steam turns turbines to generate electricity. Different studies and host communities in Minnesota raised concerns about the impact of coal energy on the environment, such as the impact of carbon dioxide produced by burning coal.

- In 2013, about 46% of Minnesota's electricity came from coal-fired plants (Retrieved from eia.gov).
- Much of the coal Minnesota uses comes from Wyoming and Montana.
- Coal concerns include pollution and waste byproducts which may cause long-term pollution and become a burden for host communities.

Current taxation process

There are 18 energy production facilities in Minnesota primarily powered by coal. These facilities have a combined capacity of approximately 5,200 megawatts. They include:

- Seven investor-owned utilities
- Seven independent power producers
- Four owned by municipal governments

Coal plants owned by investor-owned utilities are valued on a unitary basis as described beginning on page 11.

- Some of these plants qualify for exemptions that reduce their taxable value.
- Privately-owned coal plants attached to industrial facilities are taxed based on the value of the facility itself.
- Municipally-owned coal plants are exempt from property taxation.

Largest coal-fired energy facilities – by 2012 capacity

Facility Name	County	Capacity (MW)	Generation (kWh)
Sherburne County 1, 2, & 3	Sherburne	2,469.3	8,257,298,420
Clay Boswell	Itasca	960.9	6,484,095,900
Allen S King	Washington	598.4	3,364,278,910
Black Dog 3 & 4	Dakota	276.8	1,230,101,183
Taconite Harbor Energy Center	Cook	225.0	872,319,000

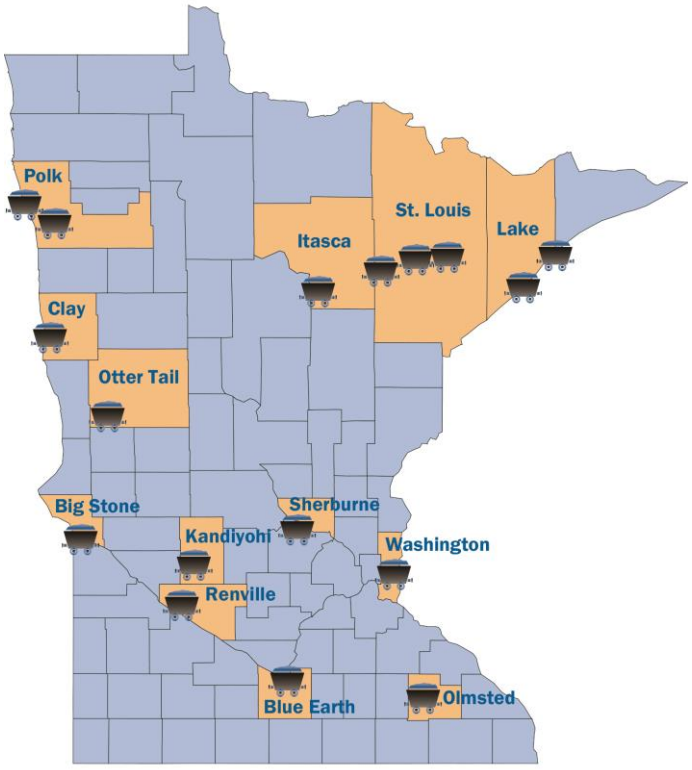
Exemptions

Pollution Control Exemption

The pollution control exemption applies to property used primarily to reduce or control air, water, or land pollution. (For example, the measures used to reduce or control pollution by coal ash or nuclear waste.) The exemption reduces the taxable value of companies in certain industries.

- A company must file an application with Revenue to receive this exemption.
- The application is reviewed by the Minnesota Pollution Control Agency and is approved or denied by Revenue.
- If an application is approved, the property would qualify for the exemption in the following assessment year.

After the application is approved, the pollution control exemption must be claimed each year by February 15. The exemption typically applies to equipment at energy producing facilities. Currently, six of the seven coal facilities owned by investor-owned utilities receive this exemption.



Coal-Fired Energy Facilities

Statutory Exemptions

Some specific facilities receive exemptions for the personal property and attached machinery of their coal energy producing facilities. (See Minnesota Statutes 272.02.) Currently, only one facility receives a statutory exemption (Taconite Harbor Energy Center in the Town of Schroeder). As noted, municipally-owned coal plants are exempt from property taxes.

Impact

These exemptions reduce the taxable value of the coal facilities, and the taxes they pay, by about 39 percent.

Summary of estimated 2014 tax information on coal-fired energy facilities[2]

Taxable Market Value	$1,178,247,715
Total Exemptions and Exclusions	$751,353,402
Taxes Paid	$32,296,378
Taxes Saved	$24,456,366

Note: "Taxes saved" is an estimate of the taxes that would be paid if exemptions and exclusions were removed.

[2]Estimated payable 2014 tax information uses information from the 2013 assessment, which is based on generation data from 2012.

Variation in taxes

The tax per kilowatt hour generated can vary by facility. Variations happen because:

- Some facilities are more efficient.
- Some run more continuously than others.
- Some qualify for different levels of exemptions.
- Some are municipal utilities that are not subject to property taxes.
- Local tax rates vary.

Effective 2014 tax rates for coal-fired energy facilities

The table below only includes investor-owned utilities and cooperatives.

Facility Name	Company Name	Tax/kWh Generation
Allen S King	Northern States Power Co	0.0017
Black Dog 3 & 4	Northern States Power Co	0.0017
Boswell	Minnesota Power Inc. & WPPI Energy	0.0011
Hoot Lake	Otter Tail Power Co	0.0015
Sherburne County 1, 2, & 3	Northern States Power Co	0.0018
Syl Laskin	Minnesota Power Inc.	0.0026
Taconite Harbor Energy Center	Minnesota Power Inc.	0.0002
Average		**0.0015**

Costs and benefits

The costs and benefits to the host communities can vary by facility. In a survey of host communities we received responses from six coal facility host communities.

- Six cited job creation as a positive benefit due to the presence of the coal-fired plant.
- Four of the six jurisdictions cited the benefit of a strong tax base or low tax rates, although two of the four cited the unpredictability of utility tax revenues as a problem.
- Four cited pollution as a negative consequence.
- Three mentioned development limitations as a cost.

Additional emergency equipment and training were also cited as associated costs for hosting coal facilities.

There are long-term storage issues for the byproducts of coal energy facilities, which may cause long-term pollution and become a burden to host communities. As a national industry, coal produces the most pollution compared to other energy sources. Usually bigger and/or newer coal facilities produce fewer pollutants per kilowatt hour of energy produced than smaller and/or older facilities (National Research Council, 2009).

The variations in the amount of taxes paid based on kWh produced are not well correlated with the costs, so it is inconclusive whether ad valorem taxes are adequate to address those costs.

Nuclear

- In 2013, 21% of Minnesota's net electricity production came from the Prairie Island reactors (Retrieved from eia.gov).
- Nuclear reactors do not produce air pollution or carbon dioxide.
- Nuclear concerns include:
  - radioactive waste produced
  - potential impacts of leaking nuclear contamination or other catastrophe

How it's used

At nuclear facilities, electricity is produced using the energy released from splitting atoms into smaller atoms. This is called "nuclear fission." Nuclear fission is fueled by uranium, a non-renewable energy source commonly found in rocks.

Current taxation process

There are two nuclear energy producing properties in Minnesota:

1. Monticello Nuclear Generating Plant in Wright County
2. Prairie Island Nuclear Power Plant in Goodhue County

Both nuclear plants are owned by investor-owned utilities, which are valued on a unitary basis as described beginning on page 11. Both of these plants qualify for exemptions that reduce their taxable value.

The two power plants are scheduled to retire when their operating licenses expire (2030-2034). These decommissioned nuclear sites will continue to place burdens on their host jurisdictions, while the taxes they pay will decrease after they are no longer in use.

Nuclear energy facilities – by 2012 capacity

Facility Name	County	Capacity (MW)	Generation (kWh)
Prairie Island	Goodhue	1,186.2	7,061,651,000
Monticello	Wright	685.0	4,890,374,000

Exemptions

Pollution Control Exemption

This exemption applies to property used primarily to reduce or control air, water, or land pollution. (For example, the measures used to reduce or control pollution by coal ash or nuclear waste.) The exemption reduces the taxable value of companies in certain industries.

- A company must file an application with Revenue to receive this exemption.
- The application is reviewed by the Minnesota Pollution Control Agency and is approved or denied by Revenue.
- If an application is approved, the property would qualify for the exemption in the following assessment year.

- After the application is approved, the pollution control exemption must be claimed each year by February 15. The exemption typically applies to equipment at both nuclear facilities owned by investor-owned utilities currently receive this exemption.

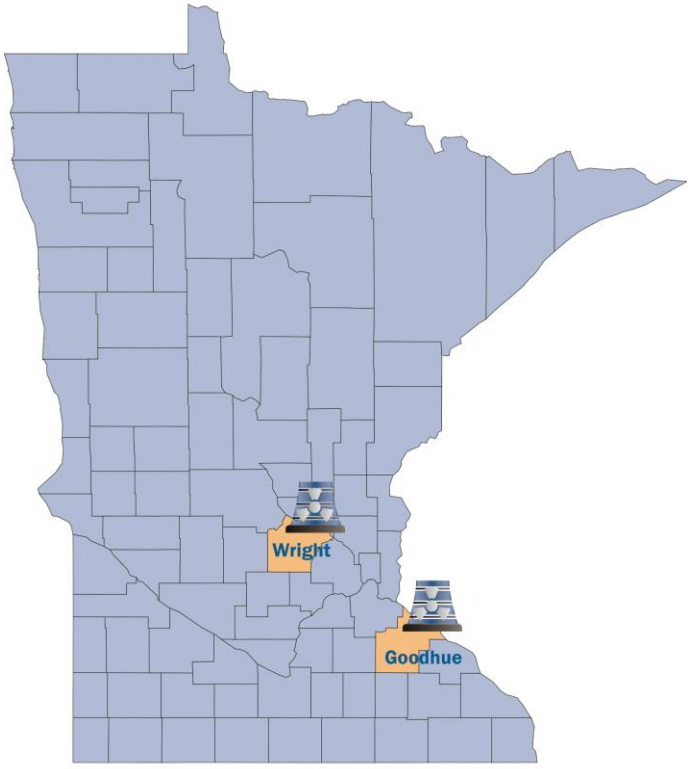
Impact

This exemption reduces the taxable value of the nuclear facilities, and the taxes they pay by about 15 percent.

Summary of estimated 2014 tax information on nuclear energy facilities

Taxable Market Value	$926,192,520
Total Exemptions and Exclusions	$159,592,351
Taxes Paid	$26,282,501
Taxes Saved	$5,924,476

Note: "Taxes saved" is an estimate of the taxes that would be paid if exemptions and exclusions were removed.



Nuclear Energy Facilities

Variation in taxes

The tax per kilowatt hour produced can vary by facility. Variations happen because:

- Some facilities are more efficient.
- Some run more continuously than others.
- Some qualify for different levels of exemptions.
- Local tax rates vary.

For example, the Monticello facility had a low production year in 2013 due to refueling, so its tax per kilowatt hour produced was unusually high in 2013.

Effective 2014 tax rates for nuclear energy facilities

Facility Name	Company Name	Tax/kWh Generation
Monticello	Northern States Power Co	0.0025
Prairie Island	Northern States Power Co	0.0020
All Nuclear Facilities		**0.0022**

Costs and benefits

The costs and benefits to the host communities can vary by facility. Both nuclear facility host communities responded to the survey, noting the secondary economic benefits and community involvement/charity as positive benefits due to the presence of the nuclear plant. Other benefits cited in the survey included:

- Job creation
- A strong tax base and lower tax rates
- Environmental benefits and recreation on land surrounding the plant
- Companies providing emergency equipment or training

Host communities also identified costs associated with hosting a nuclear facility:

- A negative public perception of the facility
- Development and use limitations of the land surrounding the facility
- The facility deterring businesses from entering the community
- Additional emergency equipment and training

The long-term storage of waste from nuclear facilities is also a cost to host communities, as these byproducts may cause long-term pollution. The U.S. Nuclear Regulatory Commission monitors the radiological environment after the decommissioning of a nuclear plant. The risk of potential hazards to the public and accidents are much less than when the facility is operating (Nuclear Regulatory Commission, 2014). In general, nuclear power and renewable energy sources have very small external costs in comparison to fossil fuels (National Research Council, 2009).

Due to the unique legacy costs that nuclear facilities place on host communities, the property tax system does not accurately or adequately account for some of the costs from nuclear energy producing facilities.

Natural Gas

How it's used

Natural gas is a fossil fuel used to produce energy. Natural gas is also used to heat homes, as well as fuel stoves, water heaters, clothes dryers, and other common appliances.

- Most energy consumption in Minnesota is from natural gas (Retrieved from eia.gov).
- Natural gas is considered efficient, relatively clean, and economical .
- Environmental concerns include the potential leaking of methane gas for host communities.

Current taxation process

There are 37 energy production facilities in Minnesota primarily powered by natural gas. These facilities have a combined capacity of approximately 5,600 megawatts. They include:

- Nine investor-owned utilities
- Four owned by cooperatives
- Eleven independent power producers
- Thirteen owned by municipal governments

Natural gas facilities owned by investor-owned utilities and cooperatives are valued on a unitary basis as described beginning on page 11. Some of these plants qualify for exemptions and/or exclusions that reduce their taxable value.

- Privately-owned natural gas facilities attached to industrial facilities or commercial property are taxed based on the value of the facility itself.
- Municipally-owned natural gas facilities are exempt from property taxation.

Largest natural gas energy facilities – by 2012 capacity

Facility Name	County	Capacity (MW)	Generation (kWh)
High Bridge	Ramsey	644.1	1,853,376,000
Riverside	Hennepin	585.9	1,953,054,672
Lakefield Junction	Martin	535.5	151,233,000
Pleasant Valley	Mower	467.7	173,837,000
Blue Lake	Scott	332.6	146,544,717

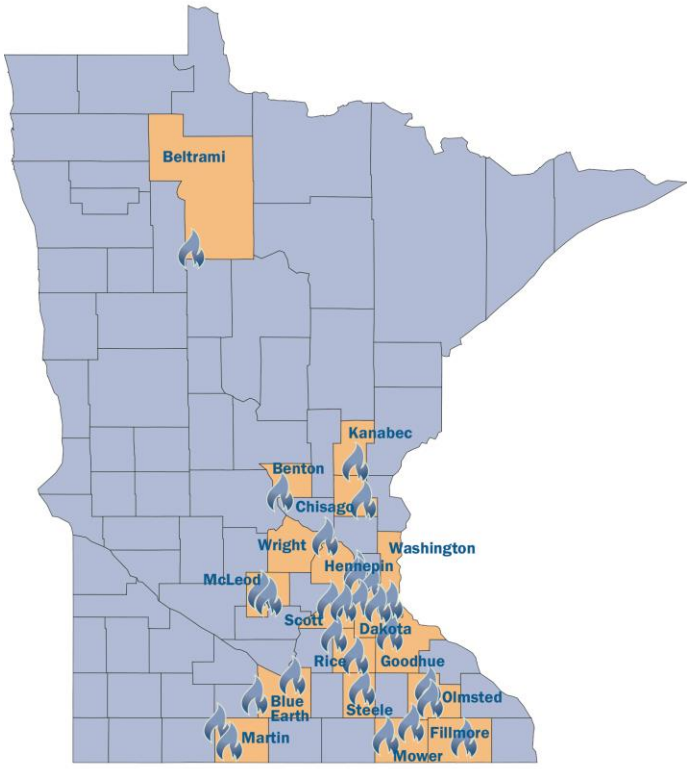
Exclusions and exemptions

Sliding Scale Market Value Exclusion

The sliding scale market value exclusion is based on the efficiency of a facility that produces electricity.

- A company must file its application with Revenue. We forward the application to the Department of Commerce.
- Commerce determines the efficiency of the facility. They post their determination on e-dockets and notify Revenue.
- The department calculates the market value exclusion based on the efficiency. For each facility efficiency percentage point above 40 percent, the department reduces the market value by 8 percent.

The exclusion applies to the energy producing machinery, but does not apply to the market value of the facility's structures or the land where it is located. Most power plants are state-assessed, and the department applies the exclusion when valuing these facilities. If the facility is locally-assessed, the department tells the county assessor the exclusion percentage to apply to their valuations.



Natural Gas Facilities

The sliding scale market value exclusion is valid for two assessment years. There are currently three natural gas energy production facilities that receive sliding scale market value exclusions. All three are investor-owned utilities.

Pollution Control Exemption

This exemption applies to property used primarily to reduce or control air, water, or land pollution. (For example, the measures used to reduce or control pollution by coal ash or nuclear waste.) The exemption reduces the taxable value of companies in certain industries.

- A company must file an application with Revenue to receive this exemption.
- The application is reviewed by the Minnesota Pollution Control Agency and is approved or denied by Revenue.
- If an application is approved, the property would qualify for the exemption in the following assessment year.
- After the application is approved, the pollution control exemption must be claimed each year by February 15. The exemption typically applies to equipment at Five natural gas facilities currently receive pollution control exemptions. Of these five facilities, four are owned by investor-owned utilities and one is owned by a cooperative.

Statutory Exemptions

Municipally-owned natural gas facilities are exempt from property taxes. Some specific facilities receive exemptions for the personal property and attached machinery of their biomass electricity producing facilities:

- Cambridge II: Town of Cambridge
- Elk River: City of Elk River
- Lakefield Junction: Town of Cedar
- Pleasant Valley: Town of Pleasant Valley
- Solway CT: Town of Lammers

(See Minnesota Statutes, 272.02, subdivisions 71, 89, 33, 44, and 52.)

Impact

These exclusions and exemptions reduce the taxable value of the natural gas facilities, and the taxes they pay by about 64 percent.

Summary of estimated 2014 taxes on natural gas energy facilities

Taxable Market Value	$265,330,802
Total Exemptions and Exclusions	$464,318,908
Taxes Paid	$8,443,906
Taxes Saved	$16,050,064

Note: "Taxes saved" is an estimate of the taxes that would be paid if exemptions and exclusions were removed.

Variation in taxes

The tax per kilowatt hour produced can vary by facility. Variations happen because:

- Some facilities are more efficient
- Some run more continuously than others
- Some qualify for different levels of exemptions and exclusions
- Some are municipal utilities that are not subject to property taxes
- Local tax rates vary

Effective 2014 tax rates for natural gas energy facilities

The table below includes only investor-owned utilities and cooperatives.

Facility Name	Company Name	Tax/kWh Generation
Black Dog Unit 5	Northern States Power Co	0.0099
Blue Lake	Northern States Power Co	0.0013
Cambridge II	Great River Energy	0.0011
Elk River	Great River Energy	0.0075
Fox Lake	Interstate Power and Light Co	0.0101
Granite City	Northern States Power Co	0.0785
High Bridge	Northern States Power Co	0.0009
Inver Hills	Northern States Power Co	0.0212
Key City	Northern States Power Co	0.0404
Lakefield Junction	Great River Energy	0.0021
Pleasant Valley	Great River Energy	0.0015
Riverside	Northern States Power Co	0.0012
Solway CT	Otter Tail Power Co	0.0011
Average		**0.0018**

Costs and benefits

The costs and benefits to the host communities can vary by facility. Of the three communities hosting natural gas facilities that responded to a survey we conducted, two mentioned a stable source of electricity as positive benefits due to the presence of the plant.

They stated the biggest cost associated with hosting a natural gas facility is trucking hazardous materials.

Generally, natural gas-fired power plants have lower pollution than coal plants. However, they still have more pollution than nuclear and renewable energy (National Research Council, 2009).

The variations in the amount of taxes paid based on kWh produced are not well correlated with the costs, so it is inconclusive whether ad valorem taxes are adequate to address those costs.

Renewable Energy Systems

Renewable energy sources include solar, wind, biomass, and hydro.

According to the EIA, 21.7 percent of Minnesota's energy is produced from renewable sources. The state's primary source of renewable energy is wind.

Unlike traditional energy sources, Minnesota does not need to import fuel sources from other states.

Biomass and hydroelectric facilities are valued and taxed in the same manner as other utility property (discussed beginning on page 11). Solar and wind energy production facilities, on the other hand, pay a production tax.

Solar

- 2013 Minnesota legislation created a statewide solar goal of 10% of retail electric sales from solar by 2030.
- Solar energy systems do not produce air pollutants or carbon dioxide, and have minimal environmental impacts.
- The main environmental impact relates to land usage and the impact of concentrated beams of solar light on wildlife on host communities.

How it's used

Solar energy systems use the sun's light to produce electricity by means of any combination of collecting, transferring, or converting solar generated energy. Two main technologies are currently in use which do this: Photovoltaic (PV devices) or "solar cells" change sunlight directly into electricity through cells that are grouped into panels.

Concentrated Solar Power (CSP) systems use mirrors or lenses to concentrate a large area of sunlight onto a small area to create heat that powers a stream turbine. Large surfaces are required for utility scale systems producing electricity using either technology.

One of the limitations for solar energy is that it depends on the amount of sunlight that reaches the earth. Weather conditions and time of year are two factors that will affect this. In Minnesota, for example, we receive much more solar radiation during the summer months, but limited solar exposure in the winter months when days are shorter. Electricity from solar energy is more heavily concentrated in the lower portion of the state, where there is a slightly smaller effect of diminished daylight hours during the winter months (EIA, 2014).

Current taxation process

Based on the information we were able to gather, the recently-enacted solar energy production tax is the best option for taxation of solar energy producing facilities.

The 2014 changes included:

- Clarifying that solar energy generating systems are exempt
- Creating a solar energy production tax
- Clarifying the classification of property primarily used for solar energy production

There is no process of valuation, allocation, or apportionment as with other energy producing facilities.

The solar energy production tax is $1.20 per megawatt-hour produced on solar energy producing systems with an alternating current (AC) capacity over 1 megawatt. Systems with AC capacities of 1 megawatt or less are exempt from the solar energy production tax.

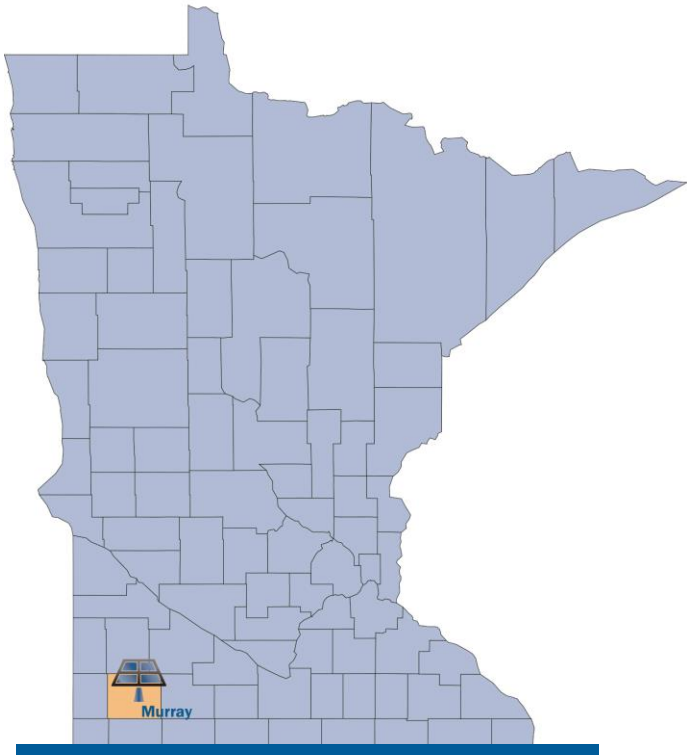
Revenue annually calculates the amount of solar energy production tax due and notifies the system owners and County Auditors. The tax is paid to the County Treasurer and then distributed – 80 percent to counties and 20 percent to cities and townships. When enacted, the solar energy production tax was based largely on the wind energy production tax.

Largest known Photovoltaic (PV) solar systems in the state

System Owner/Host	City	Capacity (kW)	Year
Slayton Solar, LLC	Slayton	2,000	2013
IKEA	Bloomington	1,014	2012
Minneapolis Convention Center	Minneapolis	600	2010
St. John's University	Collegeville	400	2009
Performance Office Papers	Lakeville	200	2013
Mayo Clinic	Rochester	145	2010
Woodbury Village	Woodbury	120	2011
Merrick Corporation	Vadnais Heights	100	2008
City of Minneapolis Royalston Facility	Minneapolis	100	2011
Hennepin County	Medina	97	2009
Army Training Center	Arden Hills	89	2011
DNR Regional Center, New Ulm	New Ulm	83	2013
City of Saint Paul RiverCentre	Saint Paul	82	2011
Great River Energy (Utility HQ)	Elk River	70	2008

Variation in taxes

Because solar energy facilities pay a production tax instead of ad valorem taxes, the tax per kWh generated is more uniform among facilities that meet the 1 MW (1,000 kW) capacity threshold. As the solar energy production tax will begin in 2015, no tax amounts were calculated in 2014.



Solar Energy Facilities

Costs and Benefits

One of the potential concerns with a production tax for solar energy producing systems is that it may impact property owner behavior, as we have seen with the wind energy production tax. Exempting facilities from the tax if they are below a specific generation capacity, or having graduated tax rates based on capacity, creates an incentive for owners to build capacity below the thresholds established in law.

In general, renewable energy sources have very small external costs in comparison to fossil fuels. Solar panels produce no emissions during operation (National Research Council, 2009). Costs to the community may include impacts on wildlife and the area's landscape.

Benefits to communities for hosting a solar energy facility are similar to other traditional and renewable energy sources. These benefits include a stronger tax base, lower tax rates, and other economic benefits. Benefits of a production tax are that it is transparent and understandable, simple and efficient to administer, equitable between the solar facilities, and responsive to changes in energy produced. A solar energy production tax is appropriate in that it mirrors taxation of another renewable energy source – wind energy.

For property owners, because the production tax is simpler to calculate, it is easier for companies to understand and comply with.

Since the costs of the impact on wildlife and landscape cannot be quantified, it is inconclusive whether the property tax system adequately accounts for potential costs of hosting solar energy producing facilities.

Wind

How it's used

A "wind energy conversion system" is defined as any device, such as a wind charger, windmill, or wind turbine, which converts wind energy to a form of usable energy. Wind energy conversion systems can also include an entire wind energy "farm" made of multiple turbines.

Minnesota is in the top 10 in the nation for both installed wind capacity and net electricity produced from wind. Over one-seventh of the state's net production came from wind power in 2012 (Retrieved from eia.gov).

- Minnesota ranked 7th in the nation in net electricity produced from wind energy in 2013 (Retrieved from eia.gov).
- Wind is clean, renewable, and the turbines do not release emissions.
- Costs to host communities can include an impact on the wild life and area's landscape.

Largest 2013 wind energy facilities – by production

Company	County	Production (MWH)	Taxes Paid
Fenton Power Partners I, LLC	Murray/Nobles	677,080	$812,496
Northern States Power Nobles Wind	Nobles County	657,690	$789,228
Prairie Rose Wind, LLC	Rock	635,589	$762,707
Wisconsin Power & Light Company	Freeborn	554,611	$665,553
Elm Creek Wind II, LLC	Martin/Jackson	437,437	$524,924

Current taxation process

Wind Energy Conversion Systems (WECS) are exempt from ad valorem property taxes, but are subject to a wind energy production tax. (See Minnesota Statutes 272.029.) This production tax was enacted in 2002.

The following wind energy conversion systems are exempt from tax:

- Small scale systems with a capacity of 0.25 megawatts or less
- Small scale systems owned by a municipality and with a capacity of 2 megawatts or less

There is no process of valuation, allocation, or apportionment as with other energy producing facilities.

By February 1 of each year, the owner of the wind energy conversion system must file a form with the commissioner of revenue detailing the amount of electricity produced in the previous calendar year. If a wind energy company fails to file a report by the due date, the department will determine the tax due based on the "nameplate capacity" of the system multiplied by 60 percent. The nameplate capacity is the maximum output rating of a wind generator.

Revenue annually calculates the amount of wind energy production tax due and notifies the system owners and County Auditors. The tax is paid to the County Treasurer and then distributed – 80 percent to counties and 20 percent to cities and townships.

Current tax rates for Wind Energy Production Tax (WEPT)

The rates for the wind energy production tax are legislatively set and are based on the energy output of the conversion system. (See Minnesota Statutes 272.029, subdivision 3.) The owner of a wind energy conversion system must pay a production tax based on the following rates:

Type of WECS	Nameplate Capacity	Tax per Kilowatt Hour	Tax per Megawatt Hour
Large Scale	Over 12 megawatts	$0.0012 (0.12 cents)	$1.20
Medium Scale	Over 2 to 12 megawatts	$0.00036 (0.036 cents)	$0.36
Small Scale	2 megawatts and under	$0.00012 (0.012 cents)	$0.12

Distribution of WEPT revenues

The tax is distributed, along with the regular property tax settlements made by the county treasurer, to the local governments in the following percentages for 2010 distributions and thereafter: 80 percent to counties and 20 percent to cities and townships. The state does not receive WEPT revenues.

WEPT revenues for the past four years are listed below[3]:

Wind Energy Production Year	Assessment Year	Tax Assessment Total
2013	2014	$9,398,537
2012	2013	$8,625,597
2011	2012	$7,838,603
2010	2011	$5,287,435

[3] 2010-2012 tax amounts were not included in the results because of potential inaccuracies with apportionment methods and calculations.

A complete listing of the 2013 production yearly totals per county for the 2014 assessment year is listed below[4].

County Name	County Total Year Production (MWh)	Taxes Paid ($)	Number of Towers	Number of Companies
Clay	5,082	610	3	1
Cottonwood	235,081	235,765	37	14
Dodge	100,983	12,118	40	24
Faribault	130,157	139,264	22	4
Freeborn	554,611	665,533	122	1
Grant	60,308	72,370	10	1
Jackson	1,286,979	1,449,498	296	17
Lincoln	761,308	858,920	373	30
Lyon	64,167	19,633	9	6
Martin	324,798	383,789	58	3
Meeker	120,963	145,155	24	2
Mower	1,371,397	1,591,330	254	13
Murray	1,151,398	1,250,705	252	28
Nobles	902,455.63	1,041,222	179	12
Pipestone	581,104	511,593	229	33
Rock	673,662	767,271	130	10
St. Louis	55,891	67,069	1	1
Sherburne	844	101	10	1
Steele	119,040	142,848	24	1
Todd	3,858	1,389	1	1
Watonwan	31,529	37,834	5	1
Winona	13,895	4,518	4	2
Total	8,549,470	9,398,537	2083	206*

Note: There are seven companies that are located in more than one county, meaning the total number of companies that file WEPT is 199.

Exclusions and exemptions

JOBZ

Wind energy conversion systems qualifying as JOBZ properties do not pay wind energy production tax for the duration of the zone. This exemption is not limited to qualified businesses and is granted to any wind energy conversion systems that become included within a JOBZ.

Assessors or auditors granting these exemptions are asked to notify Revenue of their existence to ensure they are tracked for when the exemptions expire. As of this report, no one has notified the department of the existence of conversion systems in qualifying JOBZ.

[4] The table does not include exempt towers (for example, municipally-owned towers), and is rounded to the nearest whole number.

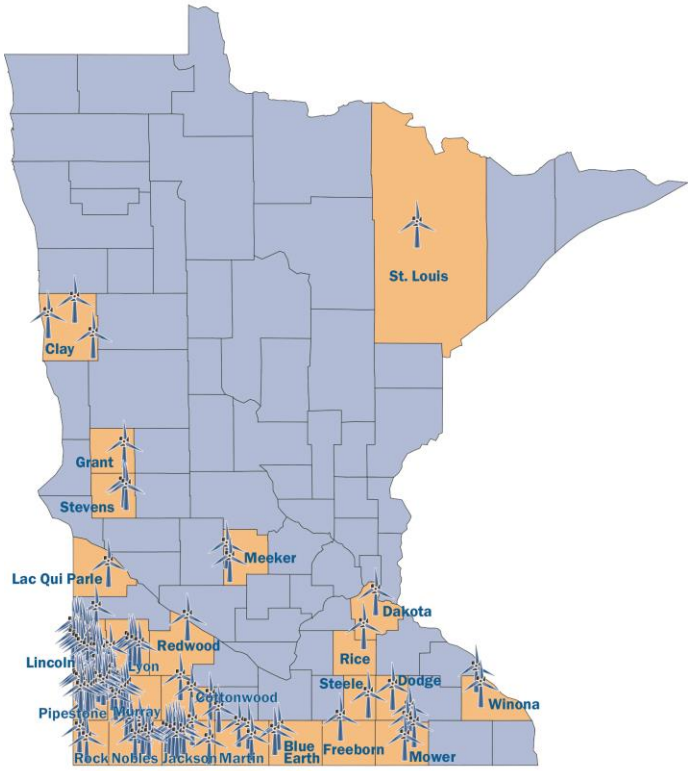
Payment in lieu of WEPT

A developer of a new or existing wind energy conversion system may negotiate with the county where the wind energy conversion system is located to establish a payment instead ("in lieu") of the wind energy production tax.

The in lieu payment provides fees or compensation to the host jurisdictions to maintain public infrastructure and services. A host jurisdiction includes a city or town and the county where the facility is located. The payment in lieu of the production tax may be based on production capacity, historical production, or other factors agreed upon by the parties.

The payment in lieu of tax agreement must be signed by the parties and filed with the commissioner of revenue and the County Recorder. Exemption from the production tax is effective for the same duration as the in lieu payments.

As of this report, no owners of wind energy conversion systems have filed an agreement with Revenue.



Wind Energy Facilities

Variation in taxes

The different tier structures complicate the tax system and make it difficult to make generalizations about tax amounts. For example, a large power company may split off ownership of various conversion systems. This way they are considered (separately) as small-scale systems and assessed a lower tax rate, even if the company as a whole would be considered a large-scale system. Disputes related to the size of the system are settled by the Department of Commerce.

Costs and benefits

Benefits to communities for hosting a wind energy producing facility are similar to other renewable energy sources. These benefits include a stronger tax base, lower taxes, and other economic benefits.

In general, renewable energy sources have very small external costs in comparison to fossil fuels. Lifecycle emissions from wind power are extremely low. Costs to the community may include impacts on wildlife and the area's landscape (National Research Council, 2009).

Since the costs of the impact on wildlife and landscape cannot be quantified, it is inconclusive whether the property tax systemadequately accounts for potential costs of hosting wind energy generating facilities.

Biomass

- Biomass energy can come from wood, garbage, or any carbon-based organism.
- One cost of biomass facilities is pollution, as they emit some greenhouse gases.
- Depending on the type of biomass burned, there may be more or less air pollution when compared to nonrenewable energy sources.

How it's used

Biomass facilities burn carbon-based organisms to generate steam in order to power turbines for electricity production. All types of biomass release emissions when burned.

Current taxation process

There are 13 energy production facilities in Minnesota primarily powered by biomass. These facilities have a combined capacity of approximately 260 megawatts. They include:

- Four investor-owned utilities
- One owned by a cooperative
- Seven privately owned
- One owned by a municipal government

Biomass facilities are valued and taxed like coal, nuclear, and natural gas energy producing facilities. Biomass facilities owned by investor-owned utilities and cooperatives are valued on a unitary basis as described beginning on page 11.

- Some of these plants qualify for exemptions that reduce their taxable value.
- Privately-owned biomass facilities attached to industrial facilities are taxed based on the value of the facility itself.
- Municipally-owned biomass facilities are exempt from property taxation.

Largest biomass energy facilities – by 2012 capacity

Facility Name	County	Capacity (MW)	Generation (kWh)
M L Hibbard	St. Louis	70.5	20,331,600
Elk River	Sherburne	48.0	130,743,000
Wilmarth	Blue Earth	25.0	103,410,272
Red Wing	Goodhue	23.0	103,884,990

Exclusions and exemptions

Pollution control exemption

This exemption applies to property used primarily to reduce or control air, water, or land pollution. The exemption reduces the taxable value of companies in certain industries.

- A company must file an application with Revenue to receive this exemption.
- The application is reviewed by the Minnesota Pollution Control Agency and is approved or denied by Revenue.

- If an application is approved, the property would qualify for the exemption in the following assessment year.
- After the application is approved, the pollution control exemption must be claimed each year by February 15. The exemption typically applies to equipment. Currently, four biomass facilities receive this exemption. Three of these facilities are owned by investor-owned utilities and one facility is owned by a cooperative.

Statutory exemptions

Statutes grant special tax exemptions to three small biomass facilities. However, none of these facilities are assessed by the state so they are not included in this report. Municipally-owned biomass facilities are exempt from property taxes.

Impact

The pollution control exemptions reduce the taxable value of the biomass facilities, and the taxes they pay by about 18 percent.

Summary of estimated 2014 taxes on biomass energy facilities

Taxable Market Value	$75,762,586
Total Exemptions and Exclusions	$16,998,500
Taxes Paid	$2,499,425
Taxes Saved	$626,091

Note: "Taxes saved" is an estimate of the taxes that would be paid if exemptions and exclusions were removed.

Variation in taxes

The tax per kilowatt hour produced can vary by facility. Variations happen because:

- Some facilities are more efficient
- Some run more continuously than others
- Some qualify for different levels of exemptions
- Some are municipal utilities that are not subject to property taxes
- Local tax rates vary

Effective 2014 tax rates for biomass energy facilities

Facility Name	Company Name	Tax/kWh Generation
Elk River	Great River Energy	0.0057
M L Hibbard	Minnesota Power Inc.	0.0435
Red Wing	Northern States Power Co	0.0041
Wilmarth	Northern States Power Co	0.0043
All Biomass Facilities		0.0079

Note: Two facilities were excluded due to incomplete generation data. This table includes only investor-owned utilities and cooperatives.

Costs and benefits

The costs and benefits of hosting a biomass facility are similar to those for other traditional and renewable energy sources. Benefits include job creation and a skilled workforce, a stronger tax base, and lower taxes.

Like other renewable energy sources, the costs of hosting a biomass facility are much less than fossil fuels. One cost to host communities is pollution, as biomass facilities emit some greenhouse gases and particulate matter.

Since we cannot quantify the costs that biomass facilities place on host communities, it is not conclusive whether the property tax system adequately compensates for the potential costs of hosting biomass facilities.

Hydroelectric/ Hydromechanical Electricity

- Hydroelectricity uses water to power turbines.
- Hydroelectric facilities impact land usage near the dam for host communities.

How it's used

Hydroelectricity uses flowing water (from tides, rivers, dams, etc.) to produce electricity through turbines. While hydroelectricity is renewable, there are concerns about how these facilities impede the natural flow of water.

Current taxation process

There are 24 hydroelectric energy production facilities in Minnesota. These facilities have a combined capacity of approximately 200 megawatts. They include:

- Twelve investor-owned utilities
- Eight independent power producers
- Four municipal governments

Hydroelectric facilities are valued and taxed in the same manner as coal, nuclear, natural gas, and biomass facilities. Hydroelectric facilities owned by investor-owned utilities are valued on a unitary basis as described beginning on page 11.

- Privately-owned hydroelectric facilities are taxed based on the value of the facility itself.
- Municipally-owned hydroelectric facilities are exempt from property taxation.

Largest hydroelectric energy facilities – by 2012 capacity

Facility Name	County	Capacity (MW)	Generation (kWh)
Thomson	Carlton	72.6	136,467,600
Blanchard	Morrison	18.0	75,557,600
Hennepin Island & Upper Dam	Hennepin	13.9	47,317,278
Little Falls	Morrison	4.7	29,383,900
Winton	Lake	4.0	12,471,000

Exemptions

Statutory exemptions

Statute grants a special tax exemption to one hydroelectric facility. However, this facility is not assessed by the state so it is not included in this report. Additionally, municipally-owned hydroelectric facilities are exempt from property taxes.

Impact

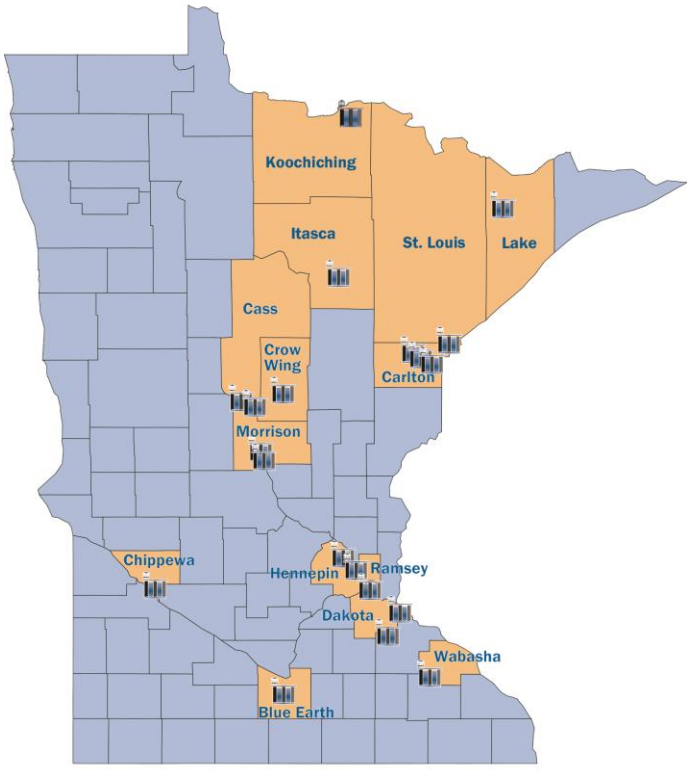
The statutory exemption mentioned reduces the taxable value of that hydroelectric facility, and the taxes the facility pays.

However, hydroelectric facilities are also impacted by pollution control exemptions to other (non-hydroelectric) facilities owned by the same company. Because of unitary valuation, the pollution control exemption can result in an increase in value in property that does not have pollution control equipment. This is the case for some hydroelectric facilities[5].

Summary of estimated 2014 taxes on hydroelectric energy facilities

Taxable Market Value	$48,794,929
Total Exemptions and Exclusions	($471,200)
Taxes Paid	$1,599,759
Taxes Saved	($18,808)

Note: "Taxes saved" is an estimate of the taxes that would be paid if exemptions and exclusions were removed.



Hydroelectric/ Hydromechanical Electricity Energy Facilities

Variation in taxes

The tax per kilowatt hour produced can vary by facility. Variations happen because:

- Some facilities are more efficient
- Some run more continuously than others
- Some qualify for different levels of exemptions
- Some are municipal utilities that are not subject to property taxes
- Local tax rates vary

[5] Pollution control exemptions for a company affect that company's values in each of the taxing districts it operates, not only where the pollution control equipment is located. As utility companies are valued as a unit, when property is added or removed most parcels feel some impact, either in an upward or downward shift. This phenomenon is also described in a 2010 study and report on Pollution Control submitted to Legislature (Minnesota Department of Revenue, 2010).

Effective 2014 tax rates for hydroelectric energy facilities

Facility Name	Company Name	Tax/kWh Generation
Blanchard	Minnesota Power Inc.	0.0019
Hennepin Island & Upper Dam	Northern States Power Co	0.0090
Knife Falls	Minnesota Power Inc.	0.0137
Little Falls	Minnesota Power Inc.	0.0058
Pillager	Minnesota Power Inc.	0.0040
Scanlon	Minnesota Power Inc.	0.0089
Sylvan	Minnesota Power Inc.	0.0041
Thomson	Minnesota Power Inc.	0.0033
Winton	Minnesota Power Inc.	0.0143
Average		0.0048

Note: Three facilities were excluded due to incomplete or atypical generation data. This table includes only investor-owned utilities and cooperatives.

Costs and benefits

The costs and benefits of hosting a hydroelectricity facility are similar to those for other traditional and renewable energy sources. Benefits include job creation and a skilled workforce, a stronger tax base, and lower taxes.

Like other renewable energy sources, the costs of hosting a hydroelectricity facility are much less than fossil fuels. Costs to host communities may include impacts on the natural flow of water, wildlife, and landscape.

Since the costs of the impact on wildlife, natural flow of water, and landscape cannot be quantified, it is inconclusive whether the property tax system adequately addresses these costs.

Impacts to Energy Facility Host Jurisdictions

For this study, Revenue sent a survey to host communities and energy companies in Minnesota. The survey gathered their perceptions of the costs and benefits of hosting energy producing facilities. This helped us to understand whether the property tax system adequately compensates the host jurisdictions for the burdens of hosting energy producing facilities.

Forty host jurisdictions and 24 energy companies were sent the survey. We received responses from 15 host communities and 7 energy companies.

Responses to the survey indicate that energy producing facilities may impact the surrounding areas in different ways. Further, the understanding of how the areas are impacted may be different between host jurisdictions and the energy companies.

Benefits

Both energy companies and host jurisdictions agree on some of the benefits of having an energy facility in the jurisdiction. The most frequently cited benefit is job creation and a highly skilled workforce, which received responses from 10 of the 15 host communities and all 7 energy companies. The second most cited benefit is a strong tax base.

The table below lists all benefit responses received.

Benefits	# of Host Communities	% of Total Respondents	# of Energy Companies	% of Total Respondents
Job creation and skilled workforce	10	67%	7	100%
Lower tax rates/strong tax base	6	40%	5	71%
Environmental benefits of buffer area	2	13%	3	43%
Viability of local railroad	1	7%	0	0%
Lower-cost utilities	3	20%	1	14%
Additional economic benefits from jobs in community	4	27%	5	71%
Stable source of electricity	3	20%	4	57%
Recycling and materials recovery	0	0%	2	29%
Charity/good corporate citizenship	5	33%	5	71%
Attract other businesses to area	1	7%	2	29%
Educational outreach provided by facility	1	7%	2	29%
Tourism	2	13%	1	14%
Provide emergency equipment/ training	2	13%	1	14%
Provide local recreation	2	13%	2	29%
Total Surveys Received	15		7	

Before conducting this survey, the department studied other publications that identified impacts to host jurisdictions from around the nation.We reviewed existing literature on the taxation of energy systems, giving particular attention to studies examining external costs and benefits of various types of energy production systems and their impact on the host communities. The review found that other benefits to the local communities include:

- Wind energy production increases personal income in local communities.
- Wind turbines and nuclear facilities have a low or no impact on home values.

Costs

Along with the benefits energy facilities bring to the surrounding area, host communities express a number of negative impacts (costs) the areas face. The two costs most jurisdictions provided are associated with:

- Pollution created from energy producing facilities
- Development and use limitation of land near the facilities

These negative impacts are each mentioned by 6 of the 15 host communities. Some additional burdens host communities mentioned include:

- Need for additional emergency training and equipment and disposal sites
- Storage of waste or by-products for some facilities
- Reluctance of businesses to locate around the high-voltage power lines necessary to transmit the power to markets

From the responses received, energy companies cite fewer costs than host communities. The negative impacts noted by the most energy companies are rail congestion, noise, and increased traffic. Each cost is mentioned by 4 of the 7 energy companies.

Though companies mention some of the same impacts as the communities, they also convey their efforts in reducing some of them (for example, additional pollution control and reimbursements to local government for additional emergency training costs). Some energy providers suggest that the negative impacts they may impose are comparable to most manufacturing and industrial facilities and are not clearly specific to energy producing facilities.

The table below lists all impact responses received.

Impacts	# of Host Communities	% of Total Respondents	# of Energy Providers	% of Total Respondents
Unpredictable source of taxes	3	20%	1	14%
Negative public perception	4	27%	0	0%
Pollution	6	40%	3	43%
Land development and use limitations	6	40%	0	0%
Rail congestion	3	20%	4	57%
Noise	1	7%	4	57%
Threats of catastrophic incident	4	27%	2	29%
Legacy issues (for example, long term pollution)	4	27%	0	0%
Decrease in aesthetic appeal of area	2	13%	2	29%
Trucking of hazardous materials	2	13%	0	0%
Odor	1	7%	0	0%
Facility deters businesses	3	20%	0	0%
Clear-cutting of trees near power lines	1	7%	0	0%
Reduced value of nearby homes	2	13%	0	0%
Traffic	2	13%	4	57%
Airport restrictions	1	7%	0	0%
Additional emergency equipment	5	33%	1	14%
Additional emergency training	7	47%	2	29%
Upgraded water/sewer systems	1	7%	0	0%
Disposal sites and storage of waste/by-products	6	40%	0	0%
Total Surveys Received	15		7	

Though there are efforts made by the companies to reduce the amount and impact of pollutants (air, water, dust) in the surrounding areas, communities still feel it creates a negative impact on their area.

Our external review of costs to jurisdictions also found:

- Power plants moderately decrease housing values (3-7 percent) and mean household income within a 2 mile radius of plants.
- There may be impacts to visual aesthetics in communities hosting wind turbines.
- Alternative energy sources, including nuclear power and renewable sources, such as wind and solar, have very small external costs in comparison to fossil fuels.

Response variance

Responses vary from host communities depending on the energy source, size, and ownership structure of the energy facility.

Energy source

Of the 15 survey responses received from host jurisdictions:

- Six host coal facilities
- Two host nuclear facilities
- Three host natural gas facilities
- Four host facilities producing energy through other sources (agriculture byproducts, distillate fuel oil, biomass, hydroelectricity, wood/wood waste solids, and wind)

Host communities with coal and nuclear energy producing facilities cite more costs and benefits than communities with natural gas or energy facilities using other sources. While job creation and a highly skilled workforce is mentioned by about half the communities with nuclear, natural gas, or other facilities, all six communities hosting coal facilities note this as a positive. Coal facility hosts are more likely to cite the diversification of the tax base and lower taxes than hosts of other facilities.

The costs vary much more by energy source. Jurisdictions with coal and nuclear facilities have higher response rates for costs than natural gas or other energy sources. Pollution is the main concern for coal host communities, as well as development and use limitations of land surrounding the facility and rail congestion. Communities with nuclear facilities also cited land development and use limitations and add other costs (negative public perception, legacy issues, and deterring businesses from entering the community) as their biggest negatives.

The only costs cited by more than one host of natural gas or energy producing facilities from other sources is trucking hazardous materials for natural gas facilities.

Facility size

Of the 15 survey responses from host communities:

- Five have a facility with a nameplate capacity of more than 500 megawatts (MW) in their jurisdiction
- Five have a facility with a capacity between 100 and 500 MW
- Five have a facility with a capacity less than 100 MW

Those communities with facilities with a capacity greater than 500 MW have the most responses for both costs and benefits. The benefits cited most by the communities with large facilities are consistent with the overall responses mentioned earlier. The top benefits each received four responses. They included:

- Job creation and a skilled workforce
- A diversified tax base
- Lower taxes being

Four of the 5 jurisdictions with facilities with a capacity between 100 and 500 MW also note job creation and a skilled workforce. Communities with facilities smaller than a 500 MW capacity have comparatively few benefit responses.

A similar pattern exists for the costs noted. Those host communities with facilities with capacity greater than 500 MW account for 70 percent of the total responses for costs, compared with 50 percent of the responses for benefits. Jurisdictions with facilities with a capacity less than 500 MW cite few costs.

Ownership structure

Of the 15 surveys received from host communities:

- Eight host investor-owned utilities in their area
- Two host municipal utilities
- Two host cooperative-owned facilities
- Three host energy producing facilities with other ownership structures

The costs and benefits cited by host communities are most prevalent for investor-owned utilities. The top benefits and costs cited by hosts of investor-owned facilities are consistent with the overall totals. Municipal utilities vary from the other ownership structures in that their top-cited benefit to host communities is lower-cost utilities. Hosts of municipal utilities and facilities with other ownership structures mentioned fewer costs than hosts of investor-owned or cooperative-owned facilities.

Impacts Unique to Energy Producing Facilities

Many of the impacts listed above are similar to other non-energy industries. Some, however, were identified through the survey as unique to energy producing facilities.

Benefits unique to energy producing facilities include:

- A stable source of electricity
- Lower cost utilities, especially for municipally-owned utilities
- Higher tax base due to taxation of utility personal property
- Environmental benefits of mandated buffer areas
- Recycling and materials recovery for biomass facilities
- Recreation and tourism related to buffer areas and lakes created by hydroelectric dams

Costs unique to energy producing facilities include:

- Long-term costs of clean-up and land reclamation
- Special public safety and emergency response costs
- Concerns about potential catastrophic incidents, including terrorism
- Land development and use restrictions around facilities and transmission lines

Some of the impacts shared with other industries may be perceived as unique to energy producers by communities due to the large scale and visibility of some facilities. Many impacts from other industries may be proportionally similar to energy facilities, but less visible to the community.

Compensation to Host Jurisdictions

Communities that host privately-owned energy producing facilities receive property taxes from the facilities. In many communities, a large energy producing facility may be 30 percent or more of the community's tax base.

Energy producing facilities pay property taxes on personal property (machinery and tools) that are exempt for some other (non-energy producing) industrial facilities. This means that, for many energy-producing facilities, more of the property is subject to property taxes than for non-energy producing facilities. Three-quarters of the $4.8 billion of taxable market value in public utility land, buildings, tools, and machinery would be exempt if utility property were exempt like other industrial property.

The table below shows this difference through the jurisdictions that host the largest energy production facilities.

City	Utility Property Percent of Market Value	Utility Machinery and Tools Percent of Market Value*
Becker	66%	49%
Cohasset	50%	41%
Oak Park Heights	40%	36%
Monticello	38%	29%
Red Wing	34%	27%
Hoyt Lakes	25%	22%
State average	0.6%	0.4%

*Exempted for other industries.

Note: Public utility land buildings, tools, and machinery do not include transmission and distribution lines.

The taxable value that is unique to utilities account for two-thirds of the value of utility property. If utility personal property were exempted like in other industries, utility taxes would decline by $95 million, or approximately 68%. This includes machinery attached to utility property other than electric generating facilities.

Tax compensation by fuel type

Many of the host communities noted that the presence of the energy-producing facility led to a benefit of a strong tax base, helping to keep local property tax rates low. This response varied by fuel type. The variations between the tax base provided by the different fuel types shows that there is not a clear correlation between taxes paid by the facility and its energy generated, costs, or benefits provided.

Coal

For coal energy producing facilities:

- The seven host communities received approximately $7.5 million in municipal taxes in 2014 from the facilities.
- Other local governments received $22 million.
- The state received $2.7 million.
- The share of the local tax that is paid by energy producing facilities ranges from two percent in Burnsville to 76 percent in Becker.

Facility name	Municipality	Host community tax	Municipal levy	Share of municipal levy paid by facility
Allen S King	City of Oak Park Heights	$1,483,926	$4,572,868	32%
Black Dog 3 & 4	City of Burnsville	$381,798	$24,825,964	2%
Boswell	City of Cohasset	$1,188,928	$1,977,625	60%
Hoot Lake	City of Fergus Falls	$365,901	$4,701,993	8%
Sherburne County 1, 2, & 3	City of Becker	$3,747,414	$4,957,471	76%
Syl Laskin	City of Hoyt Lakes	$375,671	$1,283,145	29%
Taconite Harbor Energy Center	Town of Schroeder	$2,629	$34,661	8%

Nuclear

For nuclear energy producing facilities:

- The two host communities received approximately $10.1 million in municipal taxes in 2014 from the facilities.
- Other local governments received $14 million.
- The state received $2.1 million.

Facility name	Municipality	Host community tax	Municipal levy	Share of municipal levy paid by facility
Monticello	City of Monticello	$3,976,916	$8,150,013	49%
Prairie Island	City of Red Wing	$6,180,412	$14,574,846	42%

Natural Gas

For natural gas energy producing facilities:

- The 13 host communities received approximately $1.8 million in municipal taxes in 2014 from the facilities.
- Other local governments received $5 million.
- The state received $1.6 million.
- The share of the local tax that is paid by energy producing facilities is less than 5 percent for all but three facilities.

Facility name	Municipality	Host community tax	Municipal levy	Share of municipal levy paid by facility
Black Dog Unit 5	City of Burnsville	$284,635	$24,825,964	1%
Blue Lake	City of Shakopee	$35,008	$14,175,871	0%
Cambridge II	Town of Cambridge	$12,145	$402,100	3%
Elk River	City of Elk River	$183,602	$9,853,831	2%
Fox Lake	Town of Manayaska	$20,721	$140,005	15%
Granite City	City of St. Cloud	$42,756	$18,783,969	0%
High Bridge	City of St. Paul	$230,541	$78,728,582	0%
Inver Hills	City of Inver Grove Heights	$165,249	$13,137,915	1%
Key City	City of Mankato	$22,822	$14,536,326	0%
Lakefield Junction	Town of Cedar	$10,897	$80,001	14%
Pleasant Valley	Town of Pleasant Valley	$11,510	$100,000	12%
Riverside	City of Minneapolis	$761,111	$233,712,884	0%
Solway CT	Town of Lammers	$6,946	$164,295	4%

Impact of unstable tax base

One of the main benefits of hosting an energy-producing facility is the increase in the local tax base. The increase helps keep property tax rates low for other properties. However, the utility tax base comprised of these energy producing facilities is not predictable. The unpredictability is a result of law and rule changes that determine the amount of utility tax base available for host communities.

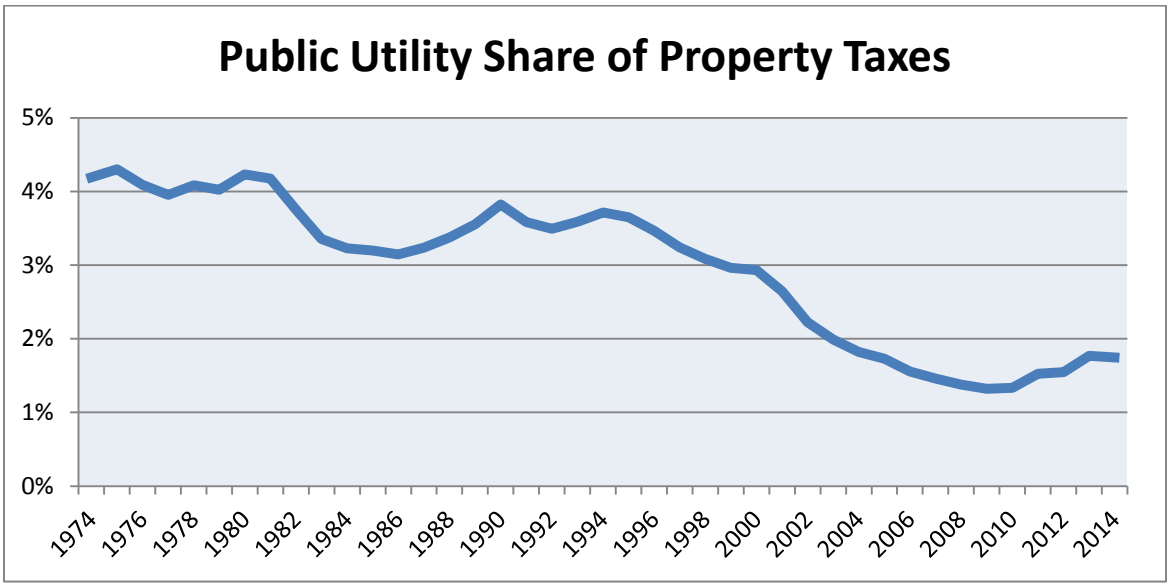
Classification rates, which determine the share of local taxes paid by utility properties in relation to other properties, changed continually between 1988 and 2002. The first change increased the share of local taxes paid by utilities. Subsequent changes in 1990s to the 2001 tax reform eroded the share paid by utilities, as shown in the table below.

	1984 assessment ratio	**1989 net tax capacity rates**	**2002 to present net tax capacity rates**
A. Homestead first tier	17% on first $30,000	1% on first $68,000	1% on first $500,000
B. Utility machinery and tools	33 1/3%	4.6%	2%
Ratio of first tier homestead rate to utility machinery rate (A/B)	*51%*	*22%*	*50%*
C. Top tier commercial, industrial and utility land and buildings	43% on value over $60,000	5.25% on value over $100,000	2% on value over $150,000
Ratio of first tier homestead rate to top tier business (A/C)	*40%*	*19%*	*50%*

In 2007, the State rewrote the rule that governs how utility property (including energy producing facilities) is valued[6]. It did not affect all utility property equally, as new investments in utility properties partly offset the reduced valuations. As the new rule was phased in, the communities of Red Wing, Cohasset, and Becker all lost more than 10% of utility market value from 2007 to 2010.

[6] The updated rule allows for consideration of appropriate data (including income forecasts, stock prices, comparable sales, etc.), and allows for balance between a prescriptive rule and sound appraisal judgment in estimating market value. The rules prior to the change were rigid, formula-driven, did not allow for consideration of all appropriate data, and did not allow for use of appraiser judgment to estimate market value.

The table below shows the declining share of Minnesota's total property taxes paid by utility property. In this graph, public utility taxes include taxes paid for pipelines, as well as transmission and distribution lines.



The classification and valuation rule changes described above are one major reason for the decline in the utility share of property taxes. Other reasons for the decline include:

- The growth in housing, agricultural, commercial, and industrial market values far outpaced utility values, even after accounting for the rule change, shifting property taxes from utility property onto other property types.
- Other state policy changes, including the establishment of the state property tax levy and changes to homestead credits changed the relative tax burdens among types of property.

Accuracy and Adequacy Analyses

This study concludes a value-based property tax system – with exemptions, exclusions, and production tax elements – provides various levels of compensation to host communities.

- It is inconclusive whether the property tax system accurately accounts for the unique and varying burdens imposed on host communities.
- It is inconclusive whether the property tax system adequately compensates for current burdens, but it does not account for potential long-term costs.

Accuracy

Accuracy of a value-based property tax system is examined by comparing the level to which taxes of similar facilities account for burdens imposed on host communities.

Property taxes are generally distributed based on property values in a jurisdiction. The property tax system differentiates between the uses of property through the classification system, and has unique provisions for utility properties. Even so, the amount of taxes paid by a particular property will not take into account all the costs and benefits the property brings to the jurisdiction. The taxes paid by energy producing facilities vary based on the fuel type, the ownership structure, and whether the facility qualifies for special tax exemptions.

It is inconclusive whether the property tax system accurately accounts for the burdens imposed on host communities by similar facilities.

Tax status of various energy producing facilities

	Personal Property Tax	Real Property Tax	Production Tax
Non-municipal utilities[a]			
Wind	No	Yes[b]	Yes
Solar	No	Yes[b]	Yes[d]
Coal, Gas, Nuclear, Other	Yes[c]	Yes[c]	No
Municipal utilities			
Coal, Gas, Other	No	No	No

[a] Investor-owned utilities, cooperatives, and independent power producers
[b] Modified tax on land only
[c] Modified if qualifies for pollution control exemption, sliding-scale exclusion, or statutory exemption
[d] New production tax effective in 2015

The result of these policies is that the taxes paid per kilowatt hour (kWh) of production can vary by facility or fuel type.

The following table shows the variation among fuel types for facilities owned by both investor-owned utilities and cooperatives. It shows biomass and nuclear facilities pay 0.79 cents and 0.45 cents per kWh respectively, while coal facilities pay 0.17 cents and wind facilities pay 0.11 cents per kWh. Of the traditional fuels, coal pays the lowest tax per kilowatt hour produced.

Energy Source	2014 Tax/kWh Generation	Total Taxes Paid*
Biomass	0.0070	2,499,425
Coal	0.0015	32,296,378
Hydroelectric	0.0048	1,599,759
Natural Gas	0.0018	8,443,906
Nuclear	0.0022	26,282,501
Other[7]	0.0049	833,305
Wind	0.0011	9,398,537
Statewide Average Weighted by Generation	0.0017	81,373,087

Note: This table includes only investor-owned utilities and cooperatives.

In addition to the differences among fuel types, the ownership structure of a facility also causes variation in taxes.

- Investor-owned utilities and cooperatives are valued on a unitary basis and pay ad valorem taxes.
- Municipal utilities are exempt from taxation.

However, municipal utilities may provide other benefits to host communities, such as discounted utility rates for municipal buildings and transfers of revenue to the municipality. From 2010 to 2012, the number of municipal utilities in the state averaged 130. These utilities transferred a statewide average $40.1 million per year to host communities.

Costs of production

The cost of production for energy facilities varies depending on the fuel type. The table below shows the national average power plant operating expenses for investor-owned utilities. Facilities using coal and fuel oil have higher operating expenses than those powered by nuclear and hydroelectricity.

The other category, which includes natural gas, solar, and wind, has the highest average operating expenses. In the context of operating expenses compared to taxes, there is a negative correlation: fuel types with higher operating expenses pay lower taxes per kWh.

[7] "Other" energy fuel types include recovered energy generation, distillate fuel oil generation, and black liquor energy generation. These are defined in Appendix B of the report for further detail. These other fuel types are taxed in the same manner as coal, nuclear, natural gas, biomass, and hydroelectric facilities.

Average Operating Expenses for Major U.S. Investor-Owned Electric Utilities (Dollars per Kilowatt hour)

Year	Nuclear	Coal and Fuel Oil	Hydroelectric	Other*
2002	$18,650	$21,360	$6,330	$37,470
2003	$18,950	$22,750	$5,790	$49,660
2004	$18,930	$24,310	$6,600	$51,590
2005	$18,150	$27,880	$6,680	$61,100
2006	$19,570	$29,850	$6,460	$59,560
2007	$20,320	$30,880	$9,320	$64,430
2008	$21,370	$35,750	$9,670	$70,720
2009	$21,690	$40,480	$8,380	$57,550
2010	$23,980	$35,760	$9,150	$48,740
2011	$24,700	$35,090	$8,880	$44,540
2012	$25,480	$31,890	$11,340	$35,670

Note: Other consists of natural gas, internal combustion, solar, and wind. (Retrieved from http://www.eia.gov/tools/faqs/faq.cfm?id=19&t=3.)

Benefits and costs

In context, the variation in taxes paid correlate with the variations in many other benefits and costs generated by the facilities. Some of the benefits of hosting an energy generating facility include:

- Highly-skilled jobs
- Ancillary economic benefits to the community
- Good corporate citizenship by utility companies

These benefits are more prevalent in communities hosting large coal, natural gas, and nuclear facilities and less prevalent with wind, solar, and hydroelectric facilities.

There are also costs to hosting energy producing facilities. The table below lists the costs most frequently cited in our survey, stakeholder meetings, and literature review.

Fuel type	Main Costs to Host Communities
Natural Gas	Trucking of hazardous materials and pollution
Coal	Pollution, public safety costs, development and land-use limitations, and rail congestion
Wind	Negative impact on wildlife and landscape
Nuclear	Negative public perception, fear of catastrophic accident, public safety costs, deterrent to business development, and long-term waste storage
Biomass	Pollution
Hydroelectric	Negative impact on wildlife and landscape
Solar	Negative impact on wildlife and landscape

Pollutant emissions

Some federal data is available on the amount of different types of pollutants emitted by Minnesota's electricity producing facilities. The tables below show annual emissions of several major pollutants by fuel type. Note:

- Natural gas facilities generally have lower emissions than other traditional fuel types.
- Nuclear, wind, hydro, and solar energy producing facilities have little or no emissions.
- Many pollutants impact areas well beyond the host community.

Minnesota emissions rates from electricity production by fuel type

	State annual NO_x output emission rate (lb/MWh)	State annual SO_2 output emission rate (lb/MWh)	State annual CO_2 output emission rate (lb/MWh)
Coal	2.31	3.12	2,249.8
Oil	20.42	1.23	2,258.2
Gas	0.35	0.01	972.1
Biomass	4.09	2.15	926.0

NOx = nitrogen oxides
SO_2 = sulfur dioxide
CO_2 = carbon dioxide

Minnesota annual power plant emissions by fuel type for 2011

	Particulate Matter 10 microns and less (tons)	Particulate Matter 2.5 microns and less (tons)	Mercury (lbs)	Lead (lbs)	Arsenic (lbs)
Biomass	398	330	30	222	135
Natural Gas	147	65	16	113	4
Coal	8,022	4,624	1,307	1,404	966
Oil	106	52	3	261	14

(Retrieved from http://www.epa.gov/ttn/chief/net/2011inventory.html.)

The amount of taxes paid by fuel type per kilowatt hour of production is not well correlated with the amount of pollution emitted per kilowatt hour of production.

- Coal and wind facilities pay the lowest rate of taxes per kilowatt hour of energy produced but vary greatly in the pollution and other costs to host communities.
- Nuclear facilities pay a high rate of tax per kilowatt hour generated and emit little pollution, but have other significant costs associated with them.

Minnesota energy producers account for a large portion of the state's total emissions. This is true particularly for arsenic, carbon dioxide, sulfur dioxide, and mercury. The following graph illustrates annual emissions produced by all sources in Minnesota.

Minnesota Statewide Emissions by Source in 2011

	Biomass	Natural Gas	Oil	Coal
Arsenic	0.2%	0.1%	0.1%	99.6%
Carbon Dioxide	0%	6.3%	0.1%	93.6%
Carbon Monoxide	18.5%	9.7%	0.1%	71.7%
Lead	13.1%	0.1%	0.1%	86.7%
Mercury	1.8%	0.2%	0.1%	98.0%
Nitrogen Oxides	4.7%	2.8%	0.2%	92.3%
Particulate Matter ≤ 2.5 micrometers	6.3%	0.6%	0.3%	92.8%
Particulate Matter ≤ 10 micrometers	3.8%	0.6%	0.2%	95.4%
Sulfur Dioxide	0.8%	0.3%	0%	98.8%

Note: Carbon Dioxide amounts are from year 2010. (Retrieved from http://epa.gov/cleanenergy/energy-resources/egrid/index.html).

Electric generation is the largest source of some pollutants, but a modest source of other pollutants. Given that energy producing facilities pay taxes on personal property that other non-energy producing properties do not, taxes do not appear to be correlated with emissions.

Utility taxes are reduced by about $30 million because of the tax exemption for pollution control equipment. The exempted equipment also results in lower pollution emissions, one of the most frequently-cited costs. However, even with the equipment, some facilities still have large amounts of emissions. It is unclear if the tradeoff of less tax base for lower pollution is acceptable to host communities and their residents.

We are unable to quantify the impacts of the rest of the costs and benefits. The importance placed on particular costs and benefits will differ from community-to-community and resident-to-resident.

Adequacy

Adequacy of a value-based property tax system is determined by examining whether the taxes paid by a facility sufficiently account for the costs of hosting the facility.

Privately-owned energy producing facilities pay property taxes on some personal property that are exempted from taxation for other non-energy producing industrial properties (for example, attached machinery). If energy producing facilities were taxed like other industrial property, the taxable value of these facilities would be reduced by 75 percent.

Municipally-owned production facilities do not pay property taxes to cover any costs they create, but they may provide other benefits, including lower-cost energy to the community and direct financial assistance to the municipal government.

The presence of these facilities enables the communities to pay for the costs of services provided directly to the facility while maintaining competitive local tax rates to the benefit of other properties. In many host communities, the energy producing facility can be 30 percent or more of the tax base.

While the tax benefits are welcomed, local officials have expressed frustration at the instability of the utility tax base due to state policy changes and the difficulty they have in long-term budgeting because of the instability.

Many of the costs associated with these facilities – including pollution and negative perceptions of safety – are not easily quantifiable. It is difficult to say whether the taxes paid in a particular host community are adequate to cover the ongoing costs of hosting the facility.

Additionally, there are potential long-term costs to the community that may exist after the facility stops operating. It is unclear what resources will be available for host communities to deal with these costs. For example, a community hosting a nuclear facility will face the long-term costs of storing spent nuclear fuel (waste), even after the facility is no longer in operation and subject to property tax.

Federal rules cover the direct costs of decommissioning nuclear power plants; however the property tax system does not address long-term costs. Some of the long-term costs include pollution or the negative public perception if nuclear waste remains on site. Similarly, there are long-term storage issues for the byproducts of coal energy facilities, which may cause long-term pollution and be a burden to host communities.

It is inconcluvie whether the property tax system adequately compensates for current burdens, but it does not account for potential long-term costs.

Neighboring States' Energy Producing System Taxation

Minnesota Revenue researched the taxation of energy producing systems in our neighboring states (North Dakota, South Dakota, Iowa, Wisconsin, and Michigan).

A direct comparison of tax rates is complicated by each state's unique process for determining tax amounts. What is provided is a high-level overview of the property taxation of energy producing facilities in our neighboring states.

North Dakota

North Dakota has three types of taxes that apply to energy producing facilities:

1. Ad valorem tax that applies to a facility based on unitary value.
2. Coal conversion tax.
3. Generation and capacity tax that applies to wind energy and other energy generating facilities that do not pay the coal conversion tax.

North Dakota has no nuclear, biomass, or solar facilities. Beginning in 2014, two natural gas turbines are taxed; however data about them was unavailable at the time of this survey. These natural gas turbines are subject to the same generation tax as the other facilities that do not pay coal conversion or wind generation taxes.

In North Dakota, the assessed value of centrally-assessed property is 50 percent of the true and full value. "Centrally-assessed" is equivalent to Minnesota's state-assessed property. Centrally-assessed public utilities include investor-owned power, gas, and pipeline companies.

Taxable values

The taxable value of a utility's real and personal operating property is subject to the mill levies of the taxing districts where the property is located. The tax is collected by the county and distributed to the taxing districts within the county. The taxable values vary depending on things like purchasing, construction, and generation capacity.

- The taxable value is 10 percent of the assessed value for all centrally assessed property. It does not include wind turbine electric generation units with a nameplate generation capacity of 100 kilowatts or more.
- The taxable value is 1.5 percent for units with all of the following:
  - A purchased power agreement executed between April 30, 2005 and January 1, 2006.
  - Construction that began between April 30, 2005 and July 1, 2006.
  - Centrally assessed wind turbine electric generation unit of 100 kilowatts or more where construction is completed between June 30, 2006 and January 1, 2015.
- The taxable value is 3 percent for all other units where construction is completed before January 1, 2015. The taxable value of centrally assessed property is subject to property taxes as discussed below for each type of property.

Property of rural electric cooperatives is subject to generation, distribution, and transmission taxes under state law. (See North Dakota Century Code, Chapter 57-33.2.) The taxes are in lieu of property taxes on all property excluding land owned and used by a company to generate or deliver electricity through distribution or transmission lines. Other companies engaged in electric generation, distribution, and transmission may file an "irrevocable election to be taxed" and exemption from ad valorem taxation. (See North Dakota Century Code, Chapters 57-33.2 and 57-06.)

Taxation of fuel types

Specifically, wind generators, wind farms, and associated collector systems are subject to taxes consisting of the following two components:

1. $2.50 per kilowatt times the rated capacity of the wind generator.
2. One-half of one mill per kilowatt-hour of electricity generated by the wind generator during the taxable period.

Other grid-connected generators part of a project with generation capacity of 100 kilowatts or more are subject to specific taxes. The taxes apply if the generation is not produced from coal or wind, or from coal not subject to coal conversion taxes. The tax consists of the following two components:

1. Fifty cents per kilowatt times the rated capacity of the generation unit.
2. One mill per kilowatt-hour of electricity generated by the production unit during the taxable period.

A coal conversion facility is defined as one of the following:

1. An electrical generating plant which has at least one unit with a generating capacity of 10,000 kilowatts or more of electricity.
2. A plant other than an electrical generating plant which processes or converts coal and uses or is designed to use over 500,000 tons of coal per year.
3. A coal beneficiation plant.

The coal conversion tax is in lieu of property taxes on the plant itself, while the land on which the plant is located remains subject to property tax. The tax is paid monthly.

The coal conversion tax is based on two levies:

1. 0.65 mill times 60 percent of installed capacity times the number of hours in the taxable period
2. 0.25 mill per kwh of electricity produced for sale.

Revenue from levy 1 is distributed as follows:

- 85 percent to the state General Fund, 5 percent of which is allocated to the Lignite Research Fund through July 31, 2018.
- 15 percent to the county in which the plant is located:
  - 40 percent is deposited in the county General Fund.
  - 30 percent is divided among all incorporated cities in the county according to population.
  - 30 percent is divided among all school districts in the county on the basis of average daily membership.

Revenue generated from levy 2 is deposited into the state General Fund.

Specific exemptions

There is a state-affiliated hydroelectric dam that is exempt from property taxes. There are also exemptions allowed for the coal conversion tax.

A coal conversion facility that achieves a 20 percent capture of carbon dioxide emissions during a taxable period receives a 20 percent reduction in the state General Fund share of the coal conversion tax. They also receive a reduction of one percent for every additional two percentage points of its capture of carbon dioxide emissions, up to 50% reduction for 80% or more capture. The reduction is available for ten years from the date of first capture or from the date the facility is eligible to receive the credit.

A new or re-powered coal-burning electrical generating unit is exempt from the state General Fund portion of both levies for five years. The county may grant an exemption for up to five years from the county's 15 percent share of the levy on installed capacity.

Specific credits

North Dakota does not provide any property tax credits to energy production facilities.

Traditional versus renewable energy

Only wind energy systems receive a discount compared to other utilities. The turbine portion of the assessment receives an 85 percent reduction on 90 percent of the value.

South Dakota

- Energy generating facilities are valued on their overall unit/site value, not on production (with the exception of wind energy systems).
- Facilities that generate less than 5 MW are locally-assessed, all others are centrally assessed.
- Some counties have a discretionary tax formula.

With the exception of wind energy production taxes, the taxes paid by energy generating facilities all fund local governments. The state receives some of the wind energy production tax. For wind energy systems, all of the receipts from the capacity tax and 20 percent of the gross receipts tax are redistributed back to the local governments where the wind energy facilities are located.

South Dakota has no nuclear, biomass, or solar facilities that are above 5MW at this time.

Specific exemptions

There is a partial exemption for coal facilities that undertake environmental upgrades. For the first full year, the upgrades are fully exempt, and the exemption phases out.

There is another exemption that only applies to a coal facility's value over the product of $500 and the nameplate capacity of the facility (for facilities over 500MW). This exemption has not been used.

Specific credits

Other than the rebate for wind energy generating facilities, there are no other property tax credits for energy producing facilities.

Traditional versus renewable energy

Wind farms constructed after July 1, 2007, are subject to an alternative production tax in lieu of all taxes on real and personal property levied by the state, counties, municipalities, school districts, and other political subdivisions.

The alternative taxation method has two components:

1. An annual tax equal to $3 per kilowatt (kW) of capacity of the wind farm, prorated according to when the wind farm begins operation during the first calendar year.
2. A 2 percent annual tax on the gross receipts of the wind farm. The gross receipts are calculated as the number of kilowatt-hours (kWh) produced multiplied by a base electricity rate of $0.0475/kWh in 2008, with the base rate increasing by 2.5 percent annually thereafter.

The average wind energy production tax is around $6.75/kWh.

Iowa

In Iowa, the property taxation of most energy producing facilities is based on an excise tax. The tax is imposed on deliveries of electricity and natural gas, electric generation, and transmission. The electric generation portion of the tax is six hundredths of a cent per kilowatt-hour ($.0006 x kWh). Only three small utility companies are opted out of the excise tax. They are centrally-assessed (ad valorem).

A majority of the property taxes paid by utility companies are used to fund local governments. Only a small share of the tax is paid to the state General Fund. The State's portion is 3 cents per $1,000 of assessed value of the companies' operating property, which amounts to about $300,000 of the roughly $150 million in property taxes paid by the utilities in Iowa.

Specific exemptions

Specific exemptions have been created for all of the following:

- Low-capacity factor electric power generating plants (those that operate at a net tax capacity factor of 20 percent or less)
- Methane gas conversion property
- Energy facilities owned by or leased to a municipal utility when devoted to public use and not held for pecuniary profit, except facilities of a municipally owned electric utility held under joint ownership or lease
- Wind energy conversion property subject to a special valuation described below
- On-site facilities where a company produces its own energy for its own use and does not sell any to the energy grid
- Pollution control property that is used at an energy facility (applications are made to and approved by Iowa's Department of Natural Resources)

Additionally, no tax bill is sent if the bill is less than $300.

Specific credits

New cogeneration facilities may be eligible for a credit described in Iowa Code 437A.16A.

Traditional versus renewable energy

Iowa's excise tax applies equally to both traditional and renewable energy. However, a city council or county board of supervisors may allow special valuation of wind energy conversion property.

The special valuation is based on the net acquisition cost. The "net acquisition cost" is the cost of the property, including the foundations and installation costs, minus any excess cost adjustment. The special valuation allows:

- For the first assessment year, a 0percent net acquisition cost.
- For assessment years 2-6, a net acquisition cost percent that increases by 5 percent each assessment year.
- For assessment years 7 and beyond, a 30 percent net acquisition cost.

Wisconsin

We were unable to gather specific data directly from the Wisconsin Department of Revenue. However, using our survey information and our own research, we determined Wisconsin has a "license fee" in lieu of property taxes for utility companies. Additionally, solar and wind energy systems are exempt from taxation.

Michigan

All of Michigan's properties are locally-assessed. The utility property tax returns are created by the State and provided to the local jurisdictions to aid in the assessment of utility property. As a result, the Michigan Department of Revenue was unable to provide us with the same level of detail as other neighboring states.

Advantages and disadvantages of different types of taxes

All types of taxes have advantages and disadvantages. The Legislature uses a set of principles in evaluating property tax laws. (See Minnesota Statutes 270C.991, subdivision 2.) The principles include:

- **Understandable**. Easy to understand and administer
- **Accountable**. Taxpayer understands who is responsible for tax and what revenues are used for
- **Efficient**. Low administrative overhead, tax does not distort taxpayer behavior
- **Equitable.** Similar taxpayers taxed similarly
- **Stable.** Taxes are predictable for government and taxpayer

- **Competitive**. Businesses stay in or come to the host jurisdiction
- **Responsive.** Reacts to changes in economy and tax base

These principles can be useful in evaluating different methods of taxation. Several neighboring states apply both ad valorem property taxes and production taxes to energy producers. In addition, North Dakota bases some of its taxes on the capacity of a facility and Iowa uses an excise tax.

Ad valorem property taxes

Ad valorem taxes are based on an estimate of the value of the physical property, including land and buildings. Sometimes machinery, tools, and equipment may also be included in the value.

Ad valorem taxes are generally a very stable source of revenue for the government. Because the base of taxation is physical property that is difficult to move, the tax base can be stable. However, if the valuation method used results in unpredictable or non-uniform values for a facility, then the revenues are less stable and predictable.

For example, valuation that is heavily weighted by recent income can change rapidly. It is inconclusive whether ad valorem taxes are responsive to changes at a particular facility. For example, a peaking plant that is idle for most of one year but running at full capacity another year may have the same value for tax purposes in both years despite the very different production.

Ad valorem taxes are considered to be inefficient compared to other forms of taxation because they are expensive to administer. Most ad valorem property taxes are hard for taxpayers to understand.

Production taxes

Production taxes are very responsive to changes in the use of the property. If a plant is idle, it does not pay production taxes. Conversely, a production tax can provide an unpredictable or unstable revenue source for the government. Production taxes are easy to understand and administratively efficient.

Capacity taxes

Taxes based on production capacity are more stable than production taxes, as capacity rarely changes from year to year. These taxes provide a more stable revenue stream to governments. Capacity taxes are easy to understand and administratively efficient compared to ad valorem property taxes. However, capacity taxes are not responsive to changes in level of use.

Excise taxes

Excise taxes are taxes applied to a narrow set of transactions, often at the wholesale level. Excise taxes are responsive to changes in the industry – as use goes up, the excise taxes will increase. They can be administratively efficient if paid by the companies at the wholesale level.

Conclusion

The costs and benefits to host communities for hosting energy producing facilities can vary. Some of the variations include:

- Energy source
- Facility size
- Ownership structure

Minnesota's value-based property tax system – with exemptions, exclusions, and production tax elements – provides various levels of compensation to host communities.

- It is inconclusive whether the property tax system accurately accounts for the unique and varying burdens imposed on host communities.
- It is inconclusive whether the property tax system adequately compensates for current burdens, but it does not account for potential long-term costs.

There may be other non-property tax mechanisms for addressing the concerns of host communities that are not covered by this report.

Neighboring states have some similar taxes (ad valorem, production), as well as capacity taxes and excise taxes. Each method of taxation has its own positive and negative outcomes.

A clear solution to addressing the various concerns of energy facility host communities is not identified within this report. The many factors to consider for each fuel type and facility type make it difficult to identify a solution for taxing facilities that would be accurate and adequate for all property types.

Appendix A: Legislative Charge

Laws 2014, Chapter 308, Article 2, section 19:

(a) The commissioner of revenue shall prepare a report on the taxation of electric energy producing systems in the state of Minnesota, including both traditional and renewable energy sources. For purposes of this study, traditional sources include coal, nuclear, and natural gas production and renewable sources include, but are not limited to, solar, wind, biomass, and hydro.

(b) The report must, to the extent practicable under the appropriation and the time available:

(1) describe, analyze, and compare the various methods by which the personal and real property of energy producing systems, using both traditional and renewable energy sources, are taxed under the property tax;

(2) describe, analyze, and compare the availability of any exclusions, exemptions, or payment-in-lieu of taxation arrangements that apply to the systems and relative tax and economic effects of the arrangements;

(3) evaluate the extent to which host political subdivisions and communities are compensated under the existing Minnesota property tax system for the external costs that the various types of production facilities impose on the host political subdivisions and communities;

(4) compare the net cost of property and other taxes per unit of energy produced in Minnesota compared to its border states, for both traditional and renewable energy sources;

(5) develop and evaluate alternative tax or fee systems for appropriately compensating host political subdivisions and communities for the external costs imposed by the facilities; and

(6) make recommendations for the taxation of solar energy producing systems, including both real and personal property.

(c) The commissioner shall report the findings of the study to the committees of the house of representatives and senate having jurisdiction over taxes by February 1, 2015, and file the report as required by Minnesota Statutes, section 3.195.

Appendix B: Related Energy Legislation

Biomass Mandate

Laws 2000, Chapter 443 enacted the biomass mandate. This legislation required "a public utility that operates a nuclear-powered electric generating plant within the state to develop 125 megawatts of electric energy installed capacity generated using farm-grown closed-loop biomass."

This act modified the biomass mandate allowing a facility that uses poultry litter to generate electricity to be eligible to provide up to 50 megawatts of the required capacity if it can meet or beat the price of other facilities already approved by the Public Utilities Commission to satisfy the biomass mandate. Additionally, the act required that at least 75 of the 125 mandated megawatts must be generated using agricultural biomass (Cochran, 2000).

Renewable Energy Objectives

The Minnesota Renewable Energy Objectives (REO) was enacted during the 2001 Legislative session (See Minnesota Statutes 216B.1691). This statute requires each electric utility to "make a good faith effort to generate or procure electricity generated by an eligible energy technology" so that, by 2025, 25 percent "of the electric utility's total retail electric sales to retail customers in Minnesota are generated by eligible energy technologies". This is referred to as the "25 by 25" initiative.

Solar Energy Mandate

A solar energy mandate signed into law in 2013 requires major utilities to generate 1.5 percent of their power from solar energy by 2020 (See Laws 2013, Chapter 85). When enacted, this mandate applied to the state's four largest utility companies. This mandate is in addition to the requirements of the REO.

Renewable Energy Production Incentive

Minnesota Statutes, section 216C.41 was originally enacted in 1994 and provides payments of 1.5 cents per kilowatt-hour for ten years to small wind generators (generally, under 2 Mw), owners of qualified hydroelectric dams, and farm anaerobic digesters. Payments to wind generators are limited to 200 Mw of capacity.

Appendix C: Glossary of Terms and Concepts

Electricity Generation Terms

Black Liquor Electricity Generations

Black liquor electricity generation functions similarly to other biomass electricity generation. Black liquor is a waste product from some types of wood and is burned to generate steam, which drives turbines to generate electricity.

Distillate Fuel Oil Electricity Generation

Distillate fuel oil generation occurs when a liquid petroleum product is burned in order to drive engines and generate electricity.

Recovered Energy Generation

Recovered energy generation facilities use the "waste heat" released by compressor stations. This heat drives turbines and produces energy.

Operating Property

Operating property is any tangible property that is owned or leased, except land, which is directly associated with the generation, transmission, or distribution of electricity, natural gas, gasoline, petroleum products, or crude oil. (See Minnesota Administrative Rules, 8100.) Examples of operating property include, but are not limited to:

- Substations
- Transmission and distribution lines
- Generating plants
- Pipelines

Property that is located on the same or contiguous parcels of land as operating property is presumed to also be operating property.

Non-Operating Property

Property that does not meet the definition of operating property is non-operating property. Land is always non-operating property.

Megawatt (MW)

A unit of power (as opposed to a unit of energy) equal to one million watts. Power is the rate at which energy is generated or consumed, and megawatts are measured in units of time. Nameplate capacities of energy producing facilities are often described in MW.

Watt Hours

Watt-hours measure the total amount of energy consumed over a period of time (as compared to watts, which measure instantaneous power). A 100-watt light bulb left burning for one hour would use 100 watt-hours.

Kilowatt Hour (kWh)

A unit of energy (as opposed to a unit of power). Kilowatt hours are the product of the power (watts/kilowatts) and the time in hours. The energy used by consumers is typically described in kWh.

Utility Ownership Types

- **Investor-Owned Utilities.** Investor-Owned Utilities are for-profit utility companies that generate, transmit, and distribute their own power; they may also buy power at wholesale for distribution. They are subject to property tax unless they are specifically exempted.
- **Rural Electric Associations (Co-ops/REAs).** Co-ops are non-profit entities. There are two types of co-ops: distribution co-ops and generation and transmission co-ops. According to the Minnesota Public Utilities Commission (PUC), there are 45 electric association co-ops in Minnesota.
    - *Distribution Co-ops:* Distribution co-ops make a payment in lieu of taxation (PILT) on a fee-per-customer basis on their distribution lines in unincorporated areas. This fee is $10 per 100 members (or 10 cents per member). Revenue collects this PILT and distributes it to the affected taxing jurisdictions. Currently, 45 REAs pay this PILT. In incorporated areas, they are subject to property tax on their distribution lines. (See Minnesota Statutes 273.40 and 273.41.)
    - *Generation and transmission co-ops:* Generation and transmission co-ops are subject to property tax unless specifically exempted.
- **Municipal Utilities (Munis).** Munis are public, non-profit utility entities that are run by a city council or appointed city utility commission. Generally, munis are either distribution munis, or municipal power agencies. Both types of munis are generally exempt, but municipal power agencies pay PILT to the jurisdictions they are in. (See Minnesota Statutes 453.54.)
- **Independent Power Producers.** Independent Power Producers (IPP) generate power to sell wholesale, and are for-profit entities. IPPs are generally taxable unless specifically exempted.

Appendix D: Specific Exemptions for Traditional Energy Sources

Specific Exemptions for Utility Properties – Traditional Energy Sources

The following utilities have been granted specific property tax exemption:

1. **L.S. Power Plant.** (See Minnesota Statute 272.02, subdivision. 29.)
2. **Lakefield Junction.** (See Minnesota Statute 272.02, subdivision. 33.)
3. **Pleasant Valley Station.** (See Minnesota Statute 272.02, subdivision 44.)
4. **Beltrami County.** (See Minnesota Statute 272.02, subdivision 52.)
5. **LTV Steel Mining Company, St. Louis County.** (See Minnesota Statute 272.02, subdivision 55.)
6. **Calpine (Mankato/Blue Earth County).** (See Minnesota Statute 272.02, subdivision 56.)
7. **Electric generation facility personal property (Cannon Falls/Goodhue County).** (See Minnesota Statute 272.02, subdivision 68.)
8. **Electric generation facility personal property (Faribault/Rice County).** (See Minnesota Statute 272.02, subdivision 69.)
9. **Electric generation facility personal property (Shakopee/Scott County).** (See Minnesota Statute 272.02, subdivision 70.)
10. **Electric generation facility personal property (Cambridge/Isanti County).** (See Minnesota Statute 272.02, subdivision 71.)
11. **Minneapolis.** (See Minnesota Statute 272.02, subdivision 84.)
12. **Elk River.** (See Minnesota Statute 272.02, subdivision 89.)
13. **Lent Township and Chisago County.** (See Minnesota Statute 272.02, subdivision 92.)
14. **City of Fairmont.** (See Minnesota Statute 272.02, subdivision 96.)
15. **Minnesota Municipal Power Agency.** (See Minnesota Statute 272.02, subdivision 99.)

Subdivisions 51, 67, 72, and 93 (Beltrami County) granted exemptions for electric generation facilities, but none of these facilities were built. These exemptions were repealed in 2014.

An exemption for a direct-reduction steel mill of an electric generating facility with a capacity of at least 450 megawatts adjacent to a taconite mine direct-reduction steel mill that supplies over 60 percent of its electricity generated in the prior year to the adjacent direct-reduction plant and steel mill was provided under Minnesota Statute 272.027, subdivision. 3, and was repealed in 2008.

Additionally, both real and personal property of municipally-owned utilities is generally exempt from taxation as public property used for a public purpose in both the Minnesota Constitution and Minnesota Statutes, section 272.02, subdivision 8. Municipally-owned property that is leased to private parties becomes subject to taxation.

Specific Exemptions for Renewable Energy Sources

Biomass Electric Generation

1. **Benson (Swift County).** (See Minnesota Statute 272.02, subdivision 47.)
2. **Rahr Malting/Koda Energy, Shakopee.** (See Minnesota Statute 272.02, subdivision 54.)

Subdivision 43 (Northom; Itasca Power Company) and subdivision 82 (Minneapolis Midtown Exchange) were granted exemptions, but were repealed in 2014 because the facilities were never built.

Hyrdroelectric/Hydromechanical Systems

1. **Lower St. Anthony/Minneapolis.** (See Minnesota Statute 272.02, subdivision 84.)

Subdivision 53 (Crown Hydro, Minneapolis) was repealed in 2014 because the facility was never built.

Real and personal property used or to be used primarily for the production of hydroelectric or hydromechanical power on a site owned by the federal government, the state, or a local governmental unit may be exempt from property tax for all years during which the site is developed and operated under terms of a lease or agreement as authorized in Minnesota Statutes, section 103G.535. (See Minnesota Statute 272.02, subdivision 15.)

Waste Tire Cogeneration

An exemption was granted under Minnesota Statute 272.02, subdivision 48 for a waste tire cogeneration plant, but that facility was never constructed, and the exemption was repealed in 2014.

Appendix E: Stakeholder Group

Below is a list of the individuals we worked with and/or surveyed.

Host jurisdictions

- Greg Pruszinske, Becker City
- Rob Wolfington, Benson City
- Lynda Woulfe, Cambridge City
- Carol Consway, Carlton City
- Max Peters, Cohasset City
- Kristin Mroz, Elk River City
- Dan Edwards, P.E., Fergus Falls City
- Michael Betker, Granite Falls City
- Rebecca Burich, Hoyt Lakes City
- Wayne Oberg, Monticello City
- Jeff O'Neill, Monticello City
- William Swanson, New Ulm City
- Mayor Mary McComber, Oak Park Heights City
- Eric Johnson, Oak Park Heights City
- Marshall Hallock, Red Wing City
- Kay Kuhlmann, Red Wing City
- Mayor Dan Bender, Red Wing City
- Doug Schwecke, Schroeder Township
- Melissa Flohrs, Trimont City
- Bradley Peterson, Coalition of Utility Cities
- Amanda Duerr, Coalition of Utility Cities

Energy companies

- Rena Verdoljak, Allete, Minnesota Power
- Thomas Balster, Alliant Energy
- Andrew Tiefenthaler, Cannon Falls Energy Center
- Stacey Fujii, Great River Energy
- Steve Leyh, Great River Energy
- Thor Underdahl, Minnesota Power
- Ross Kramer, Messerli & Kramer FBO Otter Tail Energy
- Susan Vukonich, Otter Tail Power Company
- John Winter, Southern Minnesota Municipal Power Agency
- Larry Johnson, Southern Minnesota Municipal Power Agency
- Grania McKiernan, Xcel Energy

- Tad Katsman, Xcel Energy
- Pauk Koepke, Xcel Energy
- Jim Duevel, Xcel Energy

Legislative staff

- Krista Broton, Senate Majority Research
- Steve Hinze, House Research, Property Tax
- Ali Holzman, Legislative Assistant to Senator Koenen
- Annie Levenson, Falk-Legislative Energy Commission Staff
- Steve Peterson, Senate Tax Committee

Appendix F: Works Consulted

The following is a list of reports used by the Department of Revenue in drafting this study.

Barnes, J., Laurent, C., Uppal, J., Barnes, C. & Heinemann, A. (2013). *Property taxes and solar PV systems: Policies, practices and issues.* Retrieved from http://nccleantech.ncsu.edu/wp-content/uploads/Property-Taxes-and-Solar-PV-Systems-2013.pdf

Bracmort, K. (2013, July 19). *Is biopower carbon neutral?*Retrieved from http://www.fas.org/sgp/crs/misc/R41603.pdf

Brown, J., Pender, J., Wiser, R., Lantz, E., & Hoen, B. (2012). Ex-post analysis of economic impacts from wind power development in U.S. counties. *Energy Economics 34*(6), 1743-1754. Retrieved from http://emp.lbl.gov/publications/ex-post-analysis-economic-impacts-wind-power-development-us-counties

Brown, P & Whitney, G. (2011, August 5). *U.S. renewable electricity generation: Resources and challenges.*Retrieved from http://www.fas.org/sgp/crs/misc/R41954.pdf

Burr, J. Dutzik, T., Schneider, J. & Sargent, R. (2014). *Shining cities: At the forefront of America's solar energy revolution.* Retrieved from http://www.environmentamerica.org/sites/environment/files/reports/EA_shining_cities_scrn_0.pdf

Burtraw, D., Krupnick, A., & Sampson, G. (2012). *The True Cost of Electric Power: An Inventory of Methodologies to Support Future Decisionmaking in Comparing the Cost and Competitiveness of Electricity Generation Technologies.* Retrieved from http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21870

Burtraw, D. & Krupnick, A. (2012). *Summary for policymakers. The true cost of electric power: An inventory of methodologies to support future decisionmaking in comparing the cost and competitiveness of electricity generation technologies.* Retrieved from http://www.ren21.net/Portals/0/documents/Resources/RFF-Rpt-BurtrawKrupnick.TrueCosts_Summary_web.pdf

City of Red Wing. (2013). *City of Red Wing & Goodhue County emergency response plan for the Prairie Island Nuclear Generating Plant.* Red Wing, MN: City of Red Wing.

Cochran, J. (2000, May 10). House Research Act Summary *Minnesota House of Representatives.* Retrieved from http://www.house.leg.state.mn.us/hrd/as/81/as443.pdf

Collins, C. & Chopra, A. (2013). Property tax incentives for renewable energy: Pervasive yet idiosyncratic. *State Tax Notes, 205*(70).

Davis, L. W. (2011). The effect of power plants on local housing values and rents. *Review of Economics & Statistics, 93*(4), 1391-1402.

DSIRE (Database of State Incentives for Renewables & Efficiency). (2014). *Policy comparisons.* Retrieved from http://dsireusa.org/

Eleff, B. (2013, August). 2013 Solar Energy Legislation in Minnesota. In *Short Subjects.* Retrieved from http://archive.leg.state.mn.us/docs/2014/other/140234.pdf

Emergency Services Consulting Inc. (2008). *Red Wing Fire Department: Fire and EMS master plan*. Red Wing, MN: City of Red Wing.

Farrell, J. (2014, April). *Minnesota's value of solar: Can a northern state's new solar policy defuse distributed generation battles?* Retrieved from http://www.ilsr.org/wp-content/uploads/2014/04/MN-Value-of-Solar-from-ILSR.pdf

Fitzgerald, G., Hansen, L., Lawrence, D., & Maurer, E. (2013). Scoping an energy future study for Minnesota. *Minnesota Legislative Reference Library*. Retrieved from http://archive.leg.state.mn.us/docs/2014/mandated/140013.pdf

Hashem, H. (2012). Mounting storage concerns: Who's responsible? *Nuclear Energy Insider*. Retrieved from http://analysis.nuclearenergyinsider.com/decommissioning/mounting-storage-concerns-who%E2%80%99s-responsible/

Hoen, B., Brown, J. P., Jackson, T., Wiser, R., Thayer, M. & Cappers, P. (2013). *A spatial hedonic analysis of the effects of wind energy facilities on surrounding property values in the United States*. Retrieved from http://emp.lbl.gov/sites/all/files/lbnl-6362e.pdf

Holt, M. (2014, Mar 14). *Nuclear energy: Overview of congressional issues*. Retrieved from http://www.fas.org/sgp/crs/misc/R42853.pdf

Meister Consultants Group, Inc., & Minnesota. Department of Commerce. (2013, December). The value of solar heating and cooling (SHC) in Minnesota: Solar thermal and Minnesota energy and climate goals. *Minnesota Legislative Reference Library.* Retrieved from http://archive.leg.state.mn.us/docs/2014/mandated/140014.pdf

Minneapolis Saint Paul Solar Cities. (2010). Report to the legislature. *Minnesota Legislative Reference Library.* Retrieved from http://archive.leg.state.mn.us/docs/2011/mandated/110427.pdf

Minnesota Department of Commerce. (2014, April). Energy savings goal study & stakeholder process legislative report. *Minnesota Legislative Reference Library.* Retrieved from http://archive.leg.state.mn.us/docs/2014/mandated/140481.pdf

Minnesota Department of Revenue (2010). *Study of pollution control exemption.* Retrieved from http://www.house.leg.state.mn.us/comm/docs/PCAStudyMarch2010.pdf.

Minnesota Office of Energy Security. (2009). *Before the Minnesota Public Utilities Commission: Comments of recommendations of the Minnesota Office of Energy Security Energy Facility Permitting Staff.* Retrieved from

http://mn.gov/commerce/energyfacilities/documents/19665/Bent%20Tree%20Commission%20Order.pdf

Minnesota Power (2013*). 2013 Integrated resource plan, Appendix K: UMD economic impact report.* Retrieved from https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7B96118A96-3406-4C00-A1F2-EA066430C7A9%7D&documentTitle=20133-84350-04

National Research Council. (2009). Hidden costs of energy: Unpriced consequences of energy production and use. *The National Academies Press*. Retrieved from http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/hidden_costs_of_energy_Final.pdf

National Research Council (2010). *Hidden costs of energy: Unpriced consequences of energy production and use*. Washington, DC: The National Academies Press.

Nuclear Energy Institute. (n.d.). *Disposal*. Retrieved from http://www.nei.org/issues-policy/nuclear-waste-management/disposal/

Nuclear Energy Institute. (n.d.). *Life-Cycle emissions analyses*. Retrieved from http://www.nei.org/Issues-Policy/Protecting-the-Environment/Life-Cycle-Emissions-Analyses/

PORTSfuture. (2012). *The use of hedonic models in the analysis of nuclear facilities' impact on property values: A survey of the economic literature*. Retrieved from http://www.portsfuture.com/(Editor)_!78/Literature%20Review%20of%20Hedonic%20Models%20(Final).pdf

Ratner, M. (2010, December 22). *Global natural gas: A growing resource*. Retrieved from http://www.fas.org/sgp/crs/misc/R41543.pdf

Sherlock, M. F. (2012, September 18). *Energy tax incentives: Measuring value across different types of energy resources*. Retrieved from http://fas.org/sgp/crs/misc/R41953.pdf

The Solar Foundation. (2014). *Minnesota solar jobs census 2013: Analysis of the Minnesota solar workforce.* Retrieved from http://www.thesolarfoundation.org/sites/thesolarfoundation.org/files/Minnesota%20Solar%20Jobs%20Census%202013_Web.pdf

United States Department of Energy. (2013, January). *Strategy for the management and disposal of used nuclear fuel and high-level radioactive waste*. Retrieved from http://energy.gov/sites/prod/files/Strategy%20for%20the%20Management%20and%20Disposal%20of%20Used%20Nuclear%20Fuel%20and%20High%20Level%20Radioactive%20Waste.pdf

United States Department of Energy, Energy Information Administration. (2013, January 3). *Electricity generating capacity*. Retrieved from http://www.eia.gov/electricity/capacity/

United States Department of Energy, Energy Information Administration. (2013, November 12). *Detailed state data.* Retrieved from http://www.eia.gov/electricity/data/state/

United States Department of Energy, Energy Information Administration. (2014, April 17). *Annual energy outlook 2014.* Retrieved from http://www.eia.gov/forecasts/aeo/electricity_generation.cfm

United States Department of Energy, Energy Information Administration . (2013, December 12). *Electric power annual.* Retrieved from http://www.eia.gov/electricity/annual/

United States Department of Energy, Energy Information Administration . (2014). How much does it cost to generate electricity with different types of power plants? Retrieved from http://www.eia.gov/tools/faqs/faq.cfm?id=19&t=3

United States Department of Energy, Energy Information Administration. (2013, December 12). *Table 8.4. Average power plant operating expenses for major U.S. investor-owned electric utilities, 2002 through 2012 (Mills per Kilowatt hour).* Retrieved from http://www.eia.gov/electricity/annual/html/epa_08_04.html

United States Department of Energy, Energy Information Administration . (2014, May 1). *Table 5. Electric power industry generation by primary energy source, 1990-2012 Minnesota*. Retrieved from http://www.eia.gov/electricity/state/Minnesota/

United States Environmental Protection Agency. (2014). *eGRID*. Retrieved from http://epa.gov/cleanenergy/energy-resources/egrid/index.html

United States Environmental Protection Agency. (2013). *2011 National emissions inventory*. Retrieved from http://www.epa.gov/ttn/chief/net/2011inventory.html

United States Environmental Protection Agency. (2014, February 24). *Emissions & generation resource integrated database (eGRID): Ninth Edition with year 2010 data* . Retrieved from http://epa.gov/cleanenergy/energy-resources/egrid/index.html

United States Nuclear Regulatory Commission. (2013, Dec 11). *Frequently asked questions about reactor decommissioning.* Retrieved from http://www.nrc.gov/waste/decommissioning/faq.html/

United States Nuclear Regulatory Commission, Office of Public Affairs. (2014, May). Decommissioning nuclear power plants. *Backgrounder.* Retrieved from http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html

Appendix G: Nuclear Waste Federal Laws

Nuclear facilities have pollution and legacy costs that are considered unique to the nuclear energy industry. The property tax system does not account for many of these costs, but they are addressed elsewhere, such as in federal laws.

The following information was provided by Xcel Energy:

MANAGEMENT OF USED NUCLEAR FUEL

Under federal law, the company is responsible for the safe management of the used fuel, even after the plant is closed.

- The Atomic Energy Act of 1954 (AEA) requires that civilian uses of nuclear materials and facilities be licensed, and it empowers the NRC to establish by rule or order, and to enforce, such standards to govern these uses.
- To fulfill the requirements of the AEA with regards to spent nuclear fuel the NRC put 10 CFR Part 72 - LICENSING REQUIREMENTS FOR THE INDEPENDENT STORAGE OF SPENT NUCLEAR FUEL, HIGH-LEVEL RADIOACTIVE WASTE, AND REACTOR- RELATED GREATER THAN CLASS C WASTE in place.
- The license to store spent nuclear fuel outside of the plant proper is required, whether or not the plant is operating. The NRC license governs all operations of the storage facility, including monitoring, radiation detection, emergency planning, security, decommissioning, and ensuring sufficient funding to meet all of these requirements.
- The storage of spent fuel must be done within a Protected Area in accordance with federal regulation 10 CFR Part 73 - PHYSICAL PROTECTION OF PLANTS AND MATERIALS. As such, it includes a physical protection system, state-of-the-art intrusion detection devices, camera monitoring, and security patrols. Access to the ISFSI is controlled at the same level as Prairie Island's nuclear plant Protected Area.

FUNDING FOR USED NUCLEAR FUEL MANAGEMENT

Federal law and MN Public Utilities Commission order require the company to maintain funds sufficient to address the costs of interim storage until the federal government removes the spent nuclear fuel.

- Federal law, The Nuclear Waste Policy Act of 1982 (NWPA) as amended, specifies that the generators and owners of high-level radioactive waste and spent nuclear fuel have the primary responsibility to provide for, and the responsibility to pay the costs of, the interim storage of such waste and spent fuel until such waste and spent fuel is accepted by the Secretary of Energy in accordance with the provisions of this Act.
- Funds to pay for current and future storage costs are collected from customers on an ongoing basis while the plants are operating. This includes the cost to radiologically decontaminate the plant, manage spent fuel, radiologically decontaminate the spent fuel storage facility and return the site to a usable condition.

- The funds collected for used fuel management are kept in external decommissioning trust funds required by the Nuclear Regulatory Commission and overseen by the Minnesota Public Utilities Commission.
  - Trust fund balance $960,667,545 (MN Jurisdiction) $1,149,280,099 (Total) as of June 30, 2014
  - Escrow fund balance $117,482,821 (MN Jurisdiction) $118,450,202 (Total) as of June 30, 2014
- The cost and financial assumptions that determine the level of collections are reviewed, adjusted, and approved by the Minnesota Public Utilities Commission in a triennial Nuclear Decommissioning Accrual Plan filed by Xcel Energy.
- The triennial Nuclear Decommissioning Accrual Plan
  - Examines the impact of assumptions in four primary areas
    - Engineering cost estimates
    - Escalation rates
    - Forecast earning rates
    - Length of recovery period
  - Addresses NRC decommissioning specifications
  - Is conducted in conjunction with independent investment and financial consulting firms, and in keeping with federal nuclear and financial accounting standards;
  - Is supported by extensive schedules
    - Cost estimate and NRC Minimum Calculation
    - Escalation analysis
    - External fund analysis
    - Qualified trust fund balances
    - Escrow fund balances
    - Theoretical fund balance
    - Decommissioning accrual recommendation
    - End of life accrual
    - Premature risk investigation
    - Asset retirement obligation
    - Decommissioning cost analysis for the Monticello Plant

Appendix H: Stakeholder Responses

This appendix includes letters received from our stakeholders in response to the study.

Note: Content will be added in mid February.