The Taxation of Wind Energy

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WIND VISION
See the projected growth of the wind industry over the next 35 years.
Select a Year:
2000  2010  2013  2020  2030  2050

TOTAL WIND CAPACITY INSTALLED IN 2000
2.53 GW ACROSS 4 STATES

WIND POWER TYPE
- Land Based
- Offshore

Wind Power Capacity in Gigawatts (GW)

All units are in gigawatts (GW). Only states with total capacity over 0.1 GW are included per year. Find out more about the data by reading the Wind Vision Report. You can download the data used for this graphic directly here.
WIND VISION
See the projected growth of the wind industry over the next 35 years.
Select a Year:
2000 2010 2013 2020 2030 2050

TOTAL WIND CAPACITY PROJECTED IN 2020
113.43 GW ACROSS 36 STATES
AN INCREASE OF 52.31 GW SINCE 2013

WIND POWER TYPE
Land Based
Offshore

Wind Power Capacity
in Gigawatts (GW)

All units are in gigawatts (GW). Only states with total capacity over 0.1 GW are included per year. Find out more about the data by reading the Wind Visions Report. You can download the data used for this graphic directly here.
WIND VISION

See the projected growth of the wind industry over the next 35 years.

Select a Year

2000 2010 2013 2020 2030 2050

TOTAL WIND CAPACITY PROJECTED IN 2030
224.07 GW ACROSS 47 STATES
AN INCREASE OF 110.66 GW SINCE 2020

WIND POWER TYPE

Land Based

Offshore

Wind Power Capacity
In Gigawatts (GW)

All units are in gigawatts (GW). Only states with total capacity over 0.1 GW are included per year. Find out more about the data by reading the Wind Vision Report. You can download the data used for this graphic directly here.
Policy Questions

• Part I – How *do* state and local governments tax utility-scale wind energy?
  • Typology of different tax treatments
  • Are there certain state characteristics associated with tax policy?

• Part II – How *should* state and local governments tax utility-scale wind energy?
  • What are the advantages and disadvantages of each type of tax policy?
Part I - Types of Tax Treatments

• Alternative taxes—usually in combination with a property tax exemption
  o PILOT—locally negotiated payments
  o Production tax—based on kilowatt hours of energy produced
  o Nameplate capacity tax—based on the maximum rated output
  o Gross receipts tax—based on revenue generated from the sale of energy

• Partial abatement or exemption

• Special assessment rules

• Standard assessment and taxation

Abatements and Exemptions

[Map of the United States with states colored to indicate abatements and exemptions]
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td>Region of the country in which state is located</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>US Dept. of Energy, Office of Energy Efficiency &amp; Renewable Energy, 2017 Wind Technologies Market Report: Summary</td>
</tr>
<tr>
<td>Wind Penetration Rate</td>
<td>Percent of total in-state electricity generation from wind</td>
<td>7.6%</td>
<td>0% (multiple states)</td>
<td>36.9% (IA)</td>
<td>US Dept. of Energy, Office of Energy Efficiency &amp; Renewable Energy, 2017 Wind Technologies Market Report data file</td>
</tr>
<tr>
<td>Potential Capacity</td>
<td>Amount of wind power that is technologically possible to have installed at 80 meters</td>
<td>224,660 MW</td>
<td>755 MW (DE)</td>
<td>1,300,000 MW (TX)</td>
<td>US Dept. of Energy, Office of Energy Efficiency &amp; Renewable Energy, WINDEExchange</td>
</tr>
<tr>
<td>State Revenue</td>
<td>Percent of state revenue from property taxes</td>
<td>16.0%</td>
<td>7.0% (AL)</td>
<td>37.2% (NH)</td>
<td>US Census Bureau, Annual Survey of State and Local Government Finances, 2016</td>
</tr>
<tr>
<td>Financial Incentives</td>
<td>Number of state-level financial incentives for wind (tax credits, grants, loans, etc.)</td>
<td>6</td>
<td>0 (multiple states)</td>
<td>19 (PA)</td>
<td>Database of State Incentives for Renewables &amp; Efficiency (DSIRE), NC Clean Energy Technology Center, Jan. 2019</td>
</tr>
<tr>
<td>Regulatory Policies</td>
<td>Number of state-level regulatory policies for wind (permitting standards, RPS, net metering, etc.)</td>
<td>6</td>
<td>0 (multiple states)</td>
<td>21 (TX)</td>
<td>Database of State Incentives for Renewables &amp; Efficiency (DSIRE), NC Clean Energy Technology Center, Jan. 2019</td>
</tr>
<tr>
<td>Siting Authority</td>
<td>Level of government with siting jurisdiction</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>National Conference of State Legislatures, 2016</td>
</tr>
</tbody>
</table>
Part I - Main Findings

• The use of alternative taxes appears to be related to:
  o Higher wind penetration rates
  o Greater use of regulatory policies
  o Split siting authority

• Surprisingly, no clear relationship between tax policy and installed or potential capacity

• No clear evidence of policy convergence
Part II – Normative Policy Considerations
Efficiency – Minimize distortions in economic decision-making

1. Local-level incentives should match local-level externalities.

2. Interstate/inter-local policy variation and competition may be counterproductive.

3. Consider distortions between wind energy vs. other energy sources (e.g. Colorado)
Adequacy – Assess the sufficiency of the revenue stream generated

1. Consider how the revenue stream changes over time. Declining revenues should not be used for ongoing expenses.

2. Consider your jurisdiction’s tolerance of revenue volatility.

3. Small jurisdictions should consider revenue concentration risk and evaluate whether new revenues from wind energy will put pressure or force tax reductions for other taxpayers.
Hypothetical tax revenue for 2 MW $3 million wind turbine

- 25 yr life, 20% floor, 1% ETR
- 10 yr life, 35% floor, 1% ETR
- $0.002 per kWh, 5 m kWh initial, 1.6% annual decline
- $3,518 per MW nameplate capacity
Distributional equity – Assess how the burdens and benefits are distributed

1. Power purchase agreements may limit the ability of wind energy owners to pass taxes onto consumers, so the incidence of property taxes is likely to be primarily on the owners.

2. Local variation in policy (e.g. PILOTs) may violate horizontal equity.

3. Consider the effects of the policy on different types of taxing jurisdictions (e.g. school districts vs. general purpose governments).
Violation of Horizontal Equity: Kansas Annual PILOTS

Source: Flatland Analysis of 2017 County PILOTs
Administration and compliance – Ease and cost for governments and taxpayers

1. Policy complexity and non-uniformity increase compliance costs and administrative costs.

2. Centralized assessment generally reduces costs and minimizes uncertainty, but may risk reducing local autonomy.
Political tenability and procedural justice – legitimacy in the eyes of taxpayers and citizens

1. Local option taxes give communities and taxpayers flexibility to negotiate a mutually-agreeable payment, but they may not reflect equal bargaining power, especially in small communities.

2. Citizens are more likely to support wind energy tax policy if the process is transparent and there is an opportunity for community input (e.g. in negotiating local-option policies).
Questions?
Extra Maps
Wind Energy Tax Treatment
Alternative Taxes Data
Alternative Taxes by Region

- Great Lakes (n=5)
  - No Alternative Tax
  - Local Option
  - PILOT (negotiated)
- Interior (n=13)
  - Production Tax
- Northeast (n=9)
  - Nameplace Capacity Tax
- Southeast (n=14)
  - Gross Receipts Tax
- West (n=7)
  - No Alternative Tax
- N/A (n=2)
Potential Capacity

Alternative Taxes by Potential Wind Capacity

- 1st Quartile (n=12)
- 2nd Quartile (n=12)
- 3rd Quartile (n=12)
- 4th Quartile (n=12)
- No data (n=2)

- No Alternative Tax
- Local Option
- PILOT (negotiated)
- Production Tax
- Nameplace Capacity Tax
- Gross Receipts Tax
Siting Authority

Alternative Taxes by Siting Authority

- **Local Government** (n=14)
  - No Alternative Tax
  - Local Option
  - Production Tax
  - Nameplace Capacity Tax

- **Split Authority** (n=27)
  - No Alternative Tax
  - Local Option
  - PILOT (negotiated)

- **State Government** (n=5)
  - No Alternative Tax
  - Nameplace Capacity Tax

- **Information Unavailable** (n=4)
  - No Alternative Tax
  - Gross Receipts Tax
Wind Penetration

Alternative Taxes by Wind Penetration Rate
Financial Incentives

Alternative Taxes by Number of Financial Incentives

1st Quartile (n=11)
2nd Quartile (n=12)
3rd Quartile (n=10)
4th Quartile (n=17)

- No Alternative Tax
- Local Option
- PILOT (negotiated)
- Production Tax
- Nameplace Capacity Tax
- Gross Receipts Tax
Regulatory Policies

Alternative Taxes by Number of Regulatory Policies

- No Alternative Tax
- Local Option
- PILOT (negotiated)
- Production Tax
- Nameplace Capacity Tax
- Gross Receipts Tax
Abatements and Exemptions Data
Abatements and Exemptions by Region

- Great Lakes (n=5)
- Interior (n=13)
- Northeast (n=9)
- Southeast (n=14)
- West (n=7)
- N/A (n=2)

- Abatements
- Exemptions
Installed Capacity

Abatements and Exemptions by Cumulative Installed Capacity

- 1st Quartile (n=13)
- 2nd Quartile (n=12)
- 3rd Quartile (n=12)
- 4th Quartile (n=13)

- Abatements
- Exemptions
Abatements and Exemptions by Potential Wind Capacity

- 1st Quartile (n=13)
- 2nd Quartile (n=12)
- 3rd Quartile (n=12)
- 4th Quartile (n=13)
- No data (n=2)

Legend:
- Green bars: Exemptions
- Yellow bars: Abatements
State Property Tax Revenue

Abatements and Exemptions by Property Taxes as Percent of State Revenue

1st Quartile (n=13)

2nd Quartile (n=12)

3rd Quartile (n=12)

4th Quartile (n=13)

Abatements

Exemptions
Siting Authority

Abatements and Exemptions by Siting Authority

- Local Government (n=14)
  - Abatements
  - Exemptions

- Split Authority (n=27)
  - Abatements
  - Exemptions

- State Government (n=5)
  - Abatements
  - Exemptions

- Information Unavailable (n=4)
  - Abatements
  - Exemptions

Legend:
- Green: Abatements
- Blue: Exemptions
Wind Penetration

Abatements and Exemptions by Wind Penetration Rate

1st Quartile (n=13)  2nd Quartile (n=12)  3rd Quartile (n=12)  4th Quartile (n=13)

- Abatements
- Exemptions
Financial Incentives

Abatements and Exemptions by Number of Financial Incentives

- 1st Quartile (n=11)
- 2nd Quartile (n=12)
- 3rd Quartile (n=10)
- 4th Quartile (n=17)

Abatements  Exemptions
Regulatory Policies

Abatements and Exemptions by Number of Regulatory Policies

<table>
<thead>
<tr>
<th>Quartile</th>
<th>Abatements</th>
<th>Exemptions</th>
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<tbody>
<tr>
<td>1st Quartile (n=10)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2nd Quartile (n=14)</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3rd Quartile (n=13)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4th Quartile (n=13)</td>
<td>1</td>
<td>4</td>
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