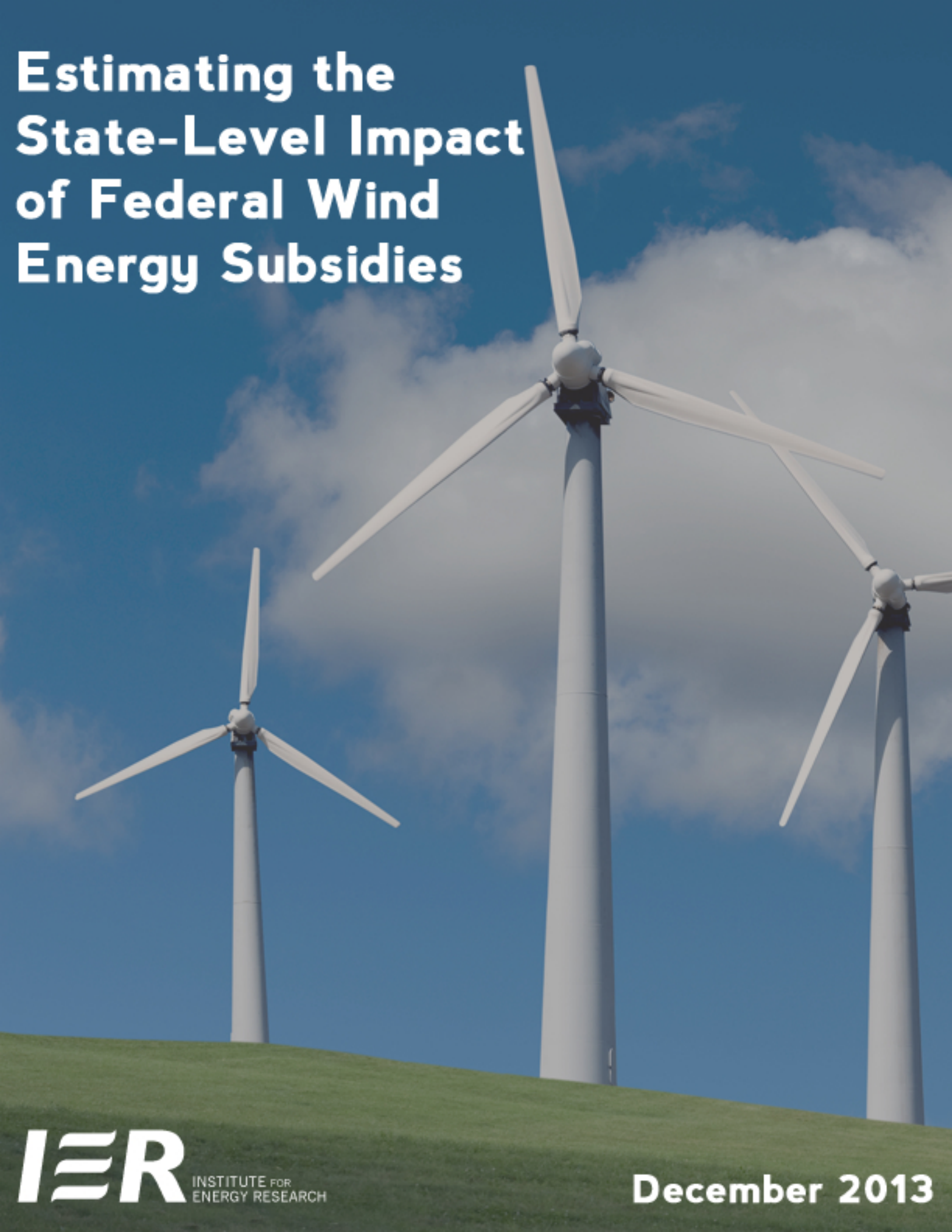


Estimating the State-Level Impact of Federal Wind Energy Subsidies

The background of the entire page is a photograph of three white wind turbines. They are situated on a rolling green hill. The sky is a clear, bright blue with some light, wispy white clouds. The turbines are positioned at different heights and angles, with the largest one in the center foreground and two smaller ones to its left and right.

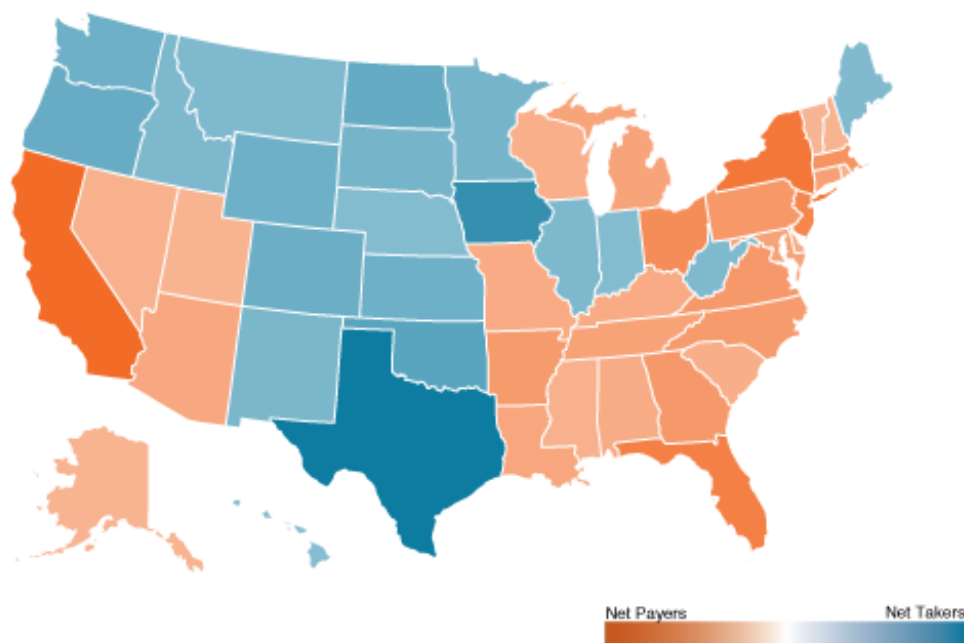
Executive Summary

This paper examines the distributional impacts of the wind production tax credit (PTC). The obvious difficulty of this examination is the fact that over the past 10 years (the life of the PTC) some eligible wind facilities have elected to take the investment tax credit (ITC) and the Section 1603 grant program instead of the PTC. As we explain below, this does not change the distributional nature of federal wind subsidies, but merely the timing.¹ For the purposes of this paper, we assume that all wind production built over the last 10 years in the United States elected to take the PTC. We call this the proxy PTC to differentiate this metric from the actual PTC. The proxy PTC is a one-year snapshot based on state-level wind generation data for 2012. It does not look at the full value of the PTC over a 10 year period.

We find that the distributional impacts of the PTC are striking. The top ten proxy PTC-taking states in 2012 received over 72 percent of the total PTC subsidy transfers for 2012. These top 10 states include Texas, Iowa, Oklahoma, Illinois, Minnesota, Washington, California, Colorado, Oregon, and North Dakota.

The net proxy PTC transfers are also striking. To calculate the net impact of federal wind subsidies on each state (whether each state is a net taker or net payer of federal wind subsidies), we compare each state's proxy PTC payment to its share of the tax burden related to federal wind subsidies.

Proxy PTC Transfers Among the States



1 Estimating the State-Level Impact of Federal Wind Energy Subsidies

According to our calculations, taxpayers in 30 states and the District of Columbia paid more to the federal government in 2012 to support wind subsidies than wind producers in those states received. Of those 30 net losing states, 11 states² and the District of Columbia had no wind production and received zero subsidies but still paid their share of the tax burden related to federal wind subsidies.

We estimate that five states are net payers of more than \$100 million: California, New York, Florida, New Jersey, and Ohio. We also estimate that the wind producers in four states are net takers of at least \$100 million: Texas, Iowa, Oklahoma, and North Dakota.

State	Net Impact
Net Payers	
California	(195,849,979.44)
New York	(162,554,909.54)
Florida	(138,141,406.15)
New Jersey	(125,585,386.93)
Ohio	(103,847,353.90)
Net Takers	
North Dakota	110,663,105.34
Oklahoma	150,598,297.94
Iowa	265,448,788.48
Texas	394,451,907.04

California's share of the proxy PTC tax burden is \$330.8 million, while wind producers in the state received \$134.9 million in proxy PTC subsidies, indicating a net payment of just under \$196 million in 2012—the largest net payment we estimated. Texas, on the other hand, was the largest net taker of subsidies—wind producers took in \$642.5 million in proxy PTC subsidies in 2012, while taxpayers in Texas contributed \$248 million toward the related tax burden for a net transfer of \$394.5 million.

On the regional level, the Northeast and Southeast were the biggest net payers, subsidizing other areas with net losses of \$591.8 million and \$559.3 million, respectively. Notably, every state in the Southeast region was a net payer with respect to the proxy PTC. The biggest net

2 Estimating the State-Level Impact of Federal Wind Energy Subsidies

takers on the regional level were the Southwest and Midwest, pulling in \$551.4 million and \$426.9 million, respectively. The West took in about \$183 million in net subsidies.

Region	Net Impact
Northeast	(591,835,449.40)
Southeast	(559,316,532.06)
West	182,964,525.17
Midwest	426,911,720.48
Southwest	551,412,868.88

Although we discuss states and regions as “net takers” and “net payers,” we note that the ultimate takers are actually the owners of wind facilities—a very concentrated group³—while the ultimate payers of the subsidies are all Americans who pay federal taxes. The payments to the wind producers come at the expense of all taxpayers everywhere. In other words, federal wind subsidies do not make all citizens of a “net taker” state better off.

Introduction

The federal production tax credit (PTC) for renewable electricity is one of the federal government's primary policy tools for subsidizing and promoting renewable energy development. The PTC gives electricity producers a tax credit for each kilowatt-hour of electricity generated from qualifying renewable energy sources (currently 2.3 cents per kilowatt-hour) for the next ten years of operation, regardless of real-time market signals such as negative prices that indicate that electricity is unwanted.

Relative to the wholesale price of electricity, which hovered between 3 and 5 cents per kilowatt-hour for most markets in 2012,⁴ the PTC represents a lucrative direct subsidy of around 50 to 75 percent of the wholesale price of electricity. In terms of pre-tax value, the PTC is worth approximately 3.4 to 3.7 cents per kilowatt-hour,⁵ often making the federal subsidy 100 percent as valuable to the owner of wind facilities as the market price of electricity. Further, because the PTC is not tied to the wholesale price of electricity, owners of wind facilities can afford to pay the electrical grid up to 3.4 to 3.7 cents per kilowatt-hour to take their power.

The PTC was enacted as part of the Energy Policy Act of 1992⁶ and “provided an inflation-adjusted tax credit of 1.5 cents per kilowatt-hour for generation sold from qualifying facilities during the first 10 years of operation,” according to the Energy Information Administration (EIA).⁷

In 2009, the American Recovery and Reinvestment Act (ARRA) gave project owners the option of receiving a 30 percent Investment Tax Credit (ITC) rather than the PTC, where wind producers can deduct 30 percent of the investment cost on their taxes. ARRA also created the section 1603 program, which allowed developers to receive cash grants in lieu of tax credits for 30 percent of the investment cost, but only if construction had begun before the end of 2011.

The PTC has expired and been renewed several times. Most recently, the PTC expired at the end of 2012, but was renewed in January 2013 as part of the American Taxpayer Relief Act of 2012. It is set to expire once again at the end of 2013.

Earlier this year, Congress and the Internal Revenue Service (IRS) increased the size and scope of the PTC, boosting the value of the PTC from 2.2 cents per kilowatt-hour to 2.3 cents. If the Joint Committee on Taxation's estimate of \$12 billion cost for the 2013 extension is correct, this increase represents a \$500 million boost⁸ for the wind industry at current production levels.

Moreover, Congress changed the eligibility requirements for the PTC at the beginning of the year, changing the requirements from a “placed in service” requirement to a “begin construction” requirement.⁹ Under new guidance from the IRS,¹⁰ wind facilities are eligible to claim the PTC for 10 years after initial operation if either “physical work of a significant nature” begins in 2013 or by committing just five percent of the total cost of the project before the end of 2013. Projects that do not begin construction by the end of 2013 but have 5 percent of the total cost committed before the end of 2013 are eligible for the PTC if they are placed in service before January 1, 2016.

In 2012, wind installations generated 3.5 percent of the U.S. electricity supply. In the same year, total wind capacity increased by 13.1 gigawatts,¹¹ adding more capacity than any other generation source.¹² Natural gas, however, added 11 times more actual electrical generation than wind.¹³ Although wind generation is still small in percentage terms, subsidies to the industry are significant. The Joint Committee on Taxation estimated that a one-year extension of the PTC in 2013 would cost American taxpayers more than \$12 billion and if it is extended again at the end of this year, it would cost American taxpayers an additional \$6 billion.¹⁴

Methodology

In this report we examine which states are net payers and net takers of federal wind subsidies. At the outset, it should be noted that the “states” themselves are not net payers or net takers of subsidies, but the “benefits” are much more concentrated. The recipients of these subsidies are in fact the companies that own the wind facilities—not the state as a whole—while the cost of the subsidies are spread among all Americans who pay federal taxes.

There are a few challenges to estimating the state-by-state breakdown of recipients of wind subsidies. First, the federal government does not provide a state-by-state breakdown of the recipients of federal wind subsidies. Second, some wind producers elected to receive subsidies other than the PTC that preclude them from also receiving PTC payments. The ARRA, for example, allowed wind producers to receive the ITC or Section 1603 grant from the U.S. Treasury in lieu of the PTC if they begin construction on a facility before the end of 2011.¹⁵

While these alternative tax incentives reduce actual PTC payments, they do not reduce the total subsidy transfer to wind producers. The fact that many wind producers elected to take the ITC or Section 1603 grants instead of the PTC provides *prima facie* evidence that the ITC and Section 1603 grants were more valuable than the PTC at that time for those specific wind developers.¹⁶ In this analysis, we estimate “proxy PTC” payments, i.e., the payments that would have occurred if all of the wind companies had taken the PTC instead of the other options.

To calculate the value to wind producers generating electricity in 2012 if they had all taken the PTC in lieu of the other subsidies, we start with the actual wind generation data from the EIA for that calendar year, broken down by state. From that we subtract wind generated in 2002 for each state because the PTC only provides subsidies to wind developers for a given wind facility's first 10 years of operation. Since some portion of wind generation in 2012 was in operation for more than 10 years, the owners of those older generators are no longer eligible to receive the PTC in 2012. For that reason, we net out older generation by subtracting the level of generation by state in 2002, as reported by the EIA, from the 2012 generation data.

After netting out ineligible generation, we estimate the total amount of proxy PTC subsidies going to wind producers in each state in 2012 by multiplying each eligible kilowatt-hour produced in 2012 by the then-current PTC rate of 2.2 cents per kilowatt-hour (the IRS increased the PTC to 2.3 cents per kilowatt-hour for 2013). We use this proxy PTC estimation because accurate and comprehensive data on the exact amount of PTC payments by state are not available.

To estimate each state's share of the cost of the proxy PTC, we use data¹⁷ from the IRS that show the share of the federal tax burden borne by each state. From there, we multiply each state's share of the total federal tax burden by our estimate of the sum total of all proxy PTC subsidy payments to arrive at that state's share of the cost of federal wind subsidies. For the purposes of this study, we assume the administrative costs of implementing subsidies are negligible compared to the subsidies themselves (i.e. payments in equal payments out). Our estimate of the total proxy PTC subsidy in 2012 is \$2.85 billion. It should be noted that this figure represents a snapshot of federal wind subsidies in a single year. The cumulative impact of wind subsidies is of course much higher.

To estimate the net impact of the proxy PTC on each state, we subtract the proxy PTC-related tax burden in each state from the subsidies to wind producers in each state. For example, we estimate that California's share of the proxy PTC tax burden is \$330.8 million, while wind producers in the state receive \$134.9 million in PTC subsidies, indicating a net loss to the state taxpayers of about \$196 million that went to support wind producers in other states.

State-Level Impact of Federal Wind Subsidies in 2012				
All States	Proxy PTC-eligible MWh	\$Proxy PTC Subsidies	\$Proxy PTC Tax Burden	\$Proxy PTC Net Effect
AK	14,454.85	318,006.70	5,422,906.44	(5,104,899.74)
AL	0.00	0.00	23,689,538.66	(23,689,538.66)
AR	0.00	0.00	28,541,612.84	(28,541,612.84)
AZ	255,319.75	5,617,034.50	39,387,425.72	(33,770,391.22)
CA	6,133,968.79	134,947,313.38	330,797,292.82	(195,849,979.44)
CO	5,905,657.14	129,924,457.08	46,522,828.93	83,401,628.15
CT	0.00	0.00	53,372,816.01	(53,372,816.01)
DC	0.00	0.00	28,307,026.33	(28,307,026.33)
DE	4,976.62	109,485.64	24,831,203.17	(24,721,717.53)
FL	0.00	0.00	138,141,406.15	(138,141,406.15)
GA	0.00	0.00	73,922,777.26	(73,922,777.26)
HI	365,506.61	8,041,145.42	7,420,819.34	620,326.08
IA	13,025,890.09	286,569,581.98	21,120,793.50	265,448,788.48
ID	1,821,257.30	40,067,660.60	8,562,483.85	31,505,176.75
IL	7,708,245.47	169,581,400.34	140,710,151.30	28,871,249.04
IN	3,163,065.07	69,587,431.54	57,939,474.07	11,647,957.47
KS	4,651,951.10	102,342,924.20	24,831,203.17	77,511,721.03
KY	0.00	0.00	28,256,196.71	(28,256,196.71)
LA	0.00	0.00	39,387,425.72	(39,387,425.72)
MA	85,414.89	1,879,127.58	90,191,496.58	(88,312,369.00)
MD	313,590.48	6,898,990.56	54,514,480.53	(47,615,489.97)
ME	884,415.27	19,457,135.94	7,135,403.21	12,321,732.73
MI	1,107,718.71	24,369,811.62	67,072,790.17	(42,702,978.55)
MN	6,623,251.50	145,711,533.00	89,049,832.06	56,661,700.94
MO	1,245,481.91	27,400,602.02	54,799,896.65	(27,399,294.63)
MS	0.00	0.00	11,702,061.26	(11,702,061.26)
MT	1,237,844.60	27,232,581.20	4,852,074.18	22,380,507.02
NC	0.00	0.00	69,641,535.33	(69,641,535.33)
ND	5,315,557.28	116,942,260.16	6,279,154.82	110,663,105.34
NE	1,266,816.01	27,869,952.22	22,262,458.02	5,607,494.20

NH	260,297.15	5,726,537.30	9,989,564.49	(4,263,027.19)
NJ	12,869.35	283,125.70	125,868,512.63	(125,585,386.93)
NM	2,226,407.05	48,980,955.10	8,847,899.98	40,133,055.12
NV	128,788.00	2,833,336.00	15,412,470.93	(12,579,134.93)
NY	2,950,988.40	64,921,744.80	227,476,654.34	(162,554,909.54)
OH	987,988.30	21,735,742.60	125,583,096.50	(103,847,353.90)
OK	8,233,537.44	181,137,823.68	30,539,525.74	150,598,297.94
OR	5,689,576.07	125,170,673.54	25,687,451.56	99,483,221.98
PA	2,150,621.26	47,313,667.72	123,299,767.47	(75,986,099.75)
RI	3,181.83	70,000.26	12,558,309.65	(12,488,309.39)
SC	0.00	0.00	21,120,793.50	(21,120,793.50)
SD	2,907,501.43	63,965,031.46	5,708,322.57	58,256,708.89
TN	43,424.00	955,328.00	53,087,399.88	(52,132,071.88)
TX	29,203,569.21	642,478,522.62	248,026,615.58	394,451,907.04
UT	711,881.09	15,661,383.98	17,695,799.96	(2,034,415.98)
VA	0.00	0.00	72,781,112.74	(72,781,112.74)
VT	98,822.12	2,174,086.64	3,995,825.80	(1,821,739.16)
WA	6,270,953.08	137,960,967.76	59,366,554.71	78,594,413.05
WI	1,500,039.42	33,000,867.24	46,808,245.06	(13,807,377.82)
WV	1,277,001.00	28,094,022.00	7,420,819.34	20,673,202.66
WY	3,946,769.28	86,828,924.16	4,281,241.93	82,547,682.23
US (Total)	129,734,603.82	2,854,161,284.04		

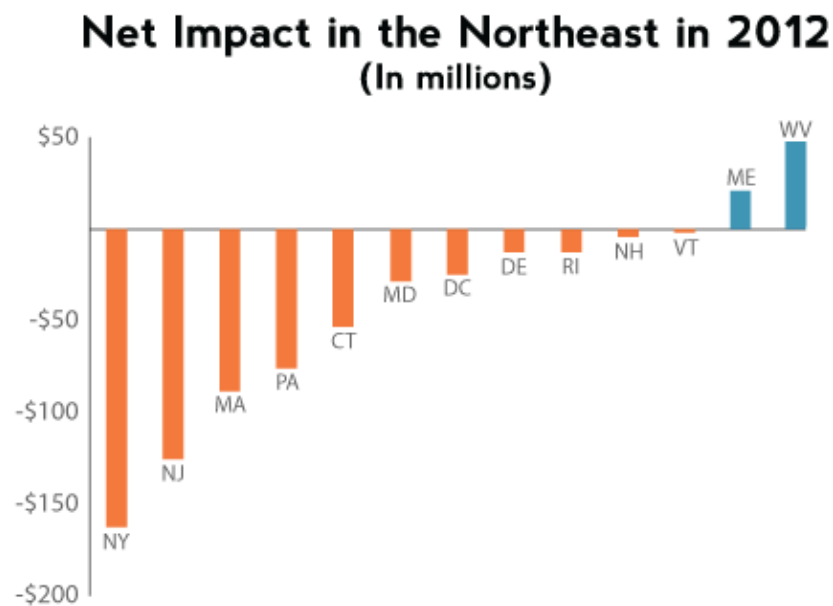
Regional Analysis

Federal wind subsidies impact every state and region in the country. As has been shown in previous articles,¹⁸ studies,¹⁹ and testimony before Congress,²⁰ subsidies such as the wind PTC are inefficient²¹ policies that distort energy markets, threaten grid reliability,²² and encourage rent-seeking,²³ rather than energy production. This report shows that federal wind subsidies are also terribly inequitable. A majority of U.S. states—generally states that lack the geography and wind supply to support wind power—unfairly shoulder the burden of these subsidies. IER has highlighted²⁴ the pitfalls of having a one-size-fits-all federal energy policy that takes from some states and gives to others. This study estimates the amount of this inequity.

While federal wind energy subsidies are a losing proposition for a majority of states and their taxpayers, some states lose much more than others. On a regional level, the Northeast and Southeast are the biggest “net payers,” subsidizing wind companies in other areas to the tune of \$591.8 million and \$559.3 million, respectively. The regions whose wind producers are the highest “net takers” are the Southwest and Midwest, receiving \$551.4 million and \$426.9 million in net subsidies, respectively.

The Northeast

The Northeast is the biggest net payer, paying more than \$591.8 million more in taxes in 2012 than wind producers in their states received in federal wind subsidies. For the purposes of this study, states in the Northeast include Connecticut, District of Columbia, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia. Figure 1 below highlights net subsidies and net losses for each state in the Northeast.



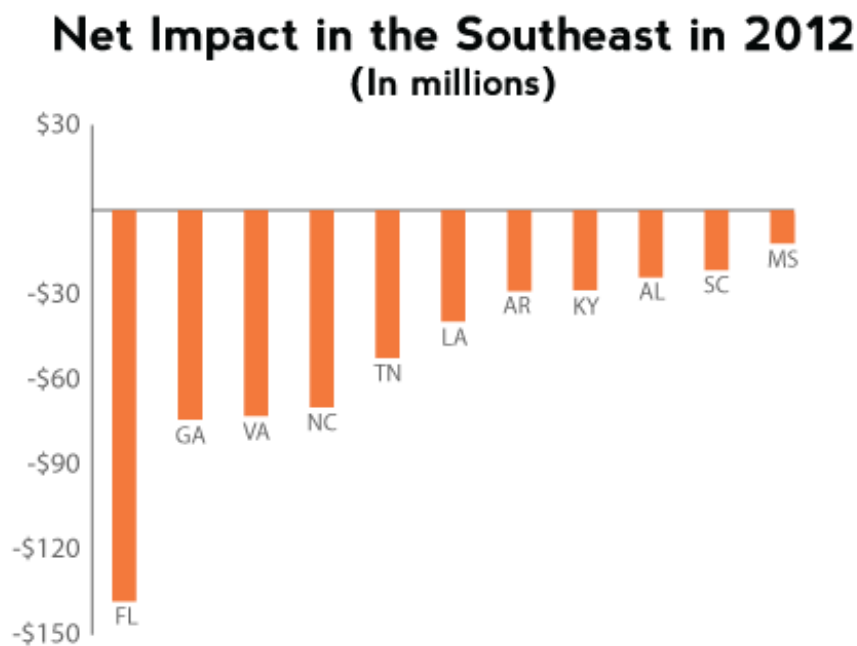
As figure 1 shows, all but two states in the Northeast last year paid more in federal taxes to support federal wind subsidies than wind producers in their state received in subsidies. Two states in the Northeast—New York and New Jersey—have net losses that exceed \$100 million each.

State focus: New York is the second biggest net payer in the country, shouldering net losses of more than \$162.5 million in 2012. Despite producing the most electricity from wind of all

the states in the Northeast region (about 3 million megawatt-hours of federal subsidy-eligible generation, driven by a high renewable energy mandate²⁵ as well as participating in the Regional Greenhouse Gas Initiative), New York is the largest net payer in the region. New York's high wind power production and the related subsidies of about \$64.9 million are trumped by its \$227.5 million share of the federal wind subsidy-related tax burden.

The Southeast

The Southeast region is the second largest net payer in terms of federal wind subsidies. States in the Southeast paid, in total, \$559.3 million more in taxes in 2012 than wind producers in their states received in federal wind subsidies. In this study, the Southeast region includes Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. Figure 2 below highlights net subsidies and net losses for each state in the Southeast.



As Figure 2 shows, every state in the Southeast region is a net payer in terms of federal wind subsidies. Of the 11 states in the region, the largest losses go to Florida (\$138.1 million), Georgia (\$73.9 million), Virginia (\$72.8 million), and North Carolina (\$69.6 million).

The Southeast is a net payer because it simply does not have the wind availability of other regions. Because the Southeast does not have quality wind resources, the states in the region generally do not have Renewable Portfolio Standards (RPS) that require utilities to generate a

certain percentage of their electricity from renewable sources. If lawmakers in Southeastern states were to impose renewable electricity mandates, these states would likely be forced to buy renewable energy credits (RECs) from states with higher wind potential, providing additional subsidies to wind producers in other states.²⁶

State focus: Florida is the third biggest net payer nationwide and the biggest net payer in the Southeast. Its net losses of \$138.1 million in 2012 represent the all-pain, no-gain prospect of federal wind subsidies in the Southeast. Because the state of Florida had zero wind generation in 2012 but a high share of the federal wind subsidy-related tax burden, federal subsidies to wind power imposed a heavy tax on Floridians without conferring “benefits” to anyone in the state.

The Midwest

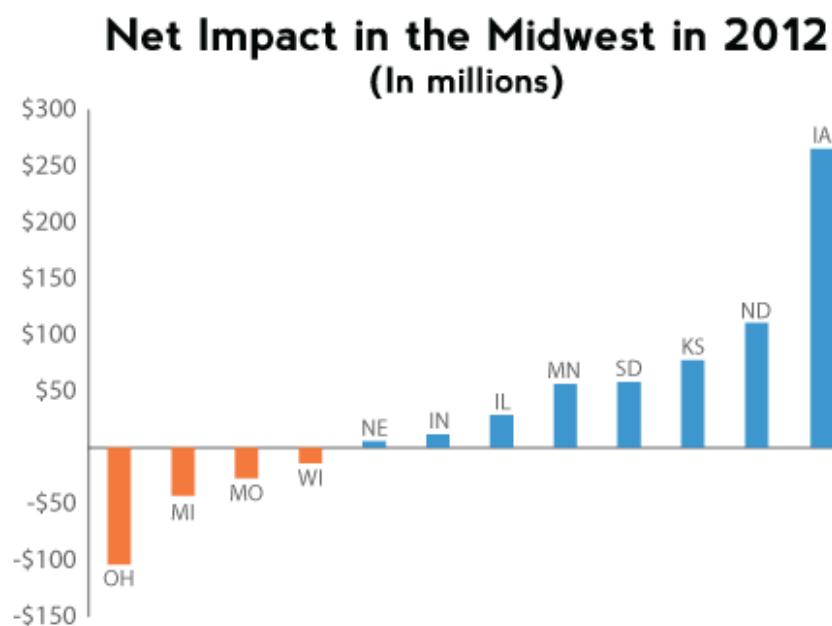
The Midwest is the second largest net taker of federal wind subsidies. Wind producers in Midwest states received, in total, about \$427 million more in federal wind subsidies in 2012 than their states paid in taxes to support those federal wind subsidies. For the purposes of this study, states in the Midwest region include Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. Figure 3 below highlights net subsidies and net losses for each state in the Midwest.

As figure 3 shows, wind producers in 8 out of 12 Midwestern states receive more federal wind subsidies than taxpayers in those states

contribute to their share of the wind subsidy tax burden.

Wind producers in Iowa receive \$265.4 million in net subsidies, making Iowa second only to Texas as the largest net taker of federal wind subsidies nationwide.

Ohio, on the other hand, fares the worst out of all states in the Midwest, suffering net losses of \$103.8 million.

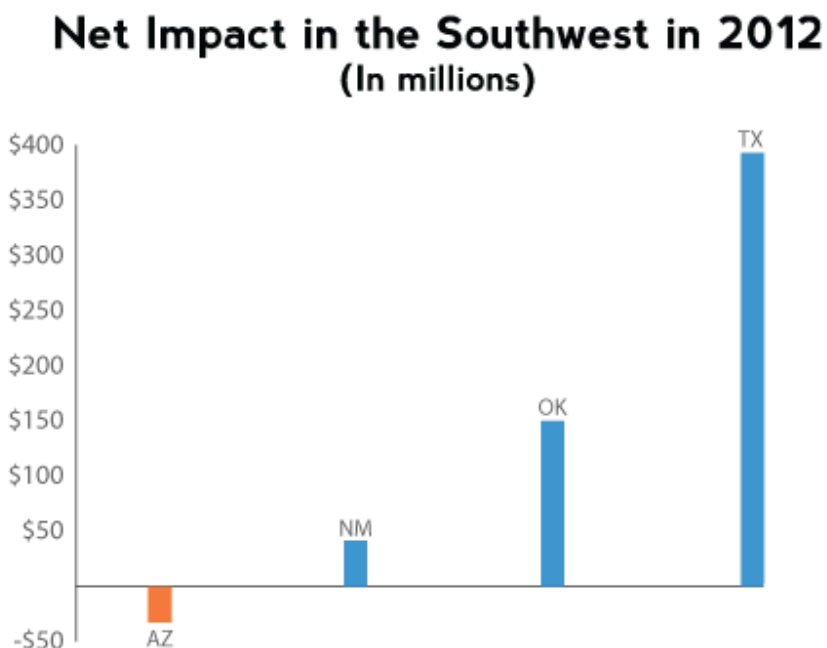


Despite the Midwest region being a net taker of federal wind subsidies, Michigan, Missouri, Ohio, and Wisconsin are net payers. Each of these states also has Renewable Portfolio Standards (RPS) that require electric utilities to generate a certain percentage of their electricity from renewable sources. Given that these states do not produce much wind but are still required to add renewables like wind to their generation mix, these states are most likely buying wind from states whose wind producers are net takers of federal wind subsidies.

State focus: Ohio provides a case study for how state renewable electricity mandates can force taxpayers to bestow additional subsidies on wind producers in other states. Ohio’s RPS requires utilities to generate 12.5 percent of their electricity from renewable sources like wind by 2024. In annual compliance filings,²⁷ Duke Energy Ohio, a utility that provides electricity to much of the Cincinnati area, reported that they met one half of their total non-solar renewable energy requirements for 2012 by purchasing RECs from “adjacent states.” Similarly, FirstEnergy Ohio Utilities,²⁸ which includes subsidiaries²⁹ that provide electricity to Akron, Cleveland, and Toledo, also purchased renewables from “other states deliverable into Ohio” to comply with the RPS in 2012. In other words, Ohio taxpayers subsidize wind producers in net taker states not only through their federal tax dollars, but also through the state RPS—which utilities cannot meet without purchasing electricity from wind producers in neighboring states.

The Southwest

The Southwest is the largest net taker of federal wind subsidies, driven primarily by Texas. As a whole, wind producers in the Southwest received more than \$551.4 million more in federal wind subsidies than taxpayers in their states paid in taxes in 2012 to support federal wind subsidies. For the purposes of this study, states in the Southwest include Arizona, New Mexico, Oklahoma, and Texas. Figure 4 highlights the net subsidies and net losses of each state in the Southwest.



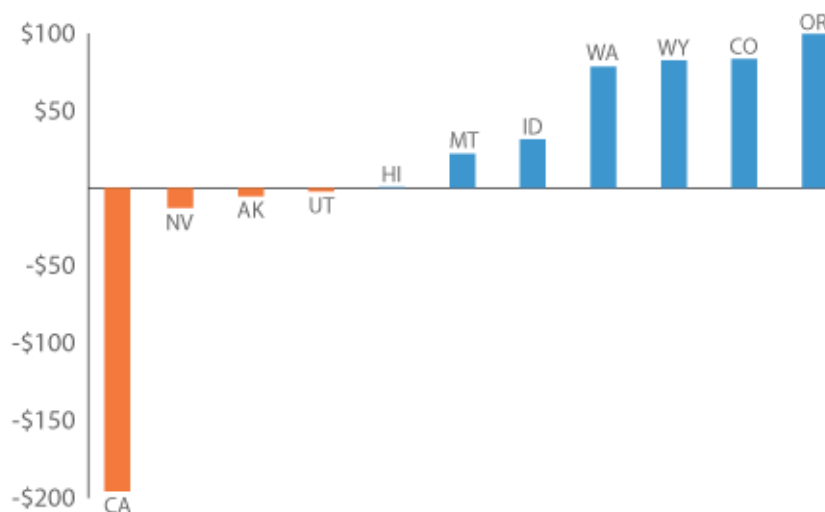
As figure 4 shows, wind producers in all but one Southwestern state received more federal wind subsidies in 2012 than taxpayers in their states contributed to their share of the wind subsidy tax burden. The only state in the Southwest whose taxpayers paid more in taxes than their wind producers took in subsidies was Arizona, with net losses of about \$33.7 million.

State focus: Texas is the biggest net taker of federal wind subsidies nationwide, raking in \$394.5 million more in wind subsidies than its share of the federal wind subsidy-related tax burden. In 2012, Texas produced more than 29 million megawatt-hours of federal subsidy-eligible wind generation, more than double the second highest state’s eligible wind generation. Texas has exceeded its renewable portfolio standard due to particularly good wind corridors within the state. States whose geography is not as conducive to wind generation as Texas—such as Ohio—have much more difficulty meeting their state renewable electricity mandates without importing wind energy from other states.

The West

The West is the third largest net taker of federal wind subsidies. Wind producers in Western states received, in total, almost \$183 million more in wind subsidies than their states’ taxpayers paid to support the wind subsidy tax burden in 2012. For the purposes of this study, Western states include Alaska, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming. Figure 5 highlights the net subsidies and net losses of each state in the West.

Net Impact in the West in 2012
(In millions)



As Figure 5 shows, wind producers in 7 out of 11 Western states are net takers. Wind producers in Oregon are the biggest net takers, at more than \$99 million, while taxpayers in California suffer the most net losses, at more than \$195.8 million.

State focus: In 2012, California had the second highest installed wind capacity in the country³⁰ and was the seventh largest taker in terms of gross subsidies, receiving a total of almost \$135 million in our one-year snapshot. However, because California taxpayers contribute the largest share of the federal tax burden—11 percent of the total—California is actually the biggest net payer of federal wind subsidies.

Issues for Further Analysis

This analysis evaluates the impacts of wind subsidies without adjusting the PTC-related tax burden for imports of wind-generated electricity. Likewise, our analysis does not adjust for exports of wind-generated electricity from states such as Iowa, which generates about 20 percent of its electricity from wind due to its large wind resource availability, but also exports a major portion of that electricity.

This study is a snapshot analysis of federal wind subsidies for a single year—2012. The actual value of the federal wind PTC is much larger than documented in this report because of the 10-year life of the subsidy for a given wind facility. Another analysis could evaluate federal wind subsidies over a longer time period.

Finally, another study would break down the impacts of each subsidy type—PTC, ITC, and 1603 grant. For the purposes of this white paper, we used a one-year PTC calculation as a proxy.

Conclusion

As this report highlights, federal wind subsidies such as the PTC provide net subsidies to wind producers in a few states, but those subsidies to wind producers come at the expense of taxpayers everywhere. Further, subsidies to wind producers in the relatively few states with excellent wind resources represent losses to the majority of the states within the U.S. Even in states that seem to accrue net “benefits” from federal wind subsidies, these subsidies merely redistribute wealth from taxpayers to wind energy companies. Federal wind subsidies—beyond being inefficient policies that distort energy markets, threaten grid reliability, and encourage rent-seeking—create an unfair redistribution of wealth across state lines that enriches wind companies in select “net taker” states at the expense of taxpayers in other states.

¹ See Footnote 17.

² The 11 states with zero wind production in 2012 are Alabama, Arkansas, Connecticut, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Virginia.

³ As IER has explained, federal wind subsidies often support foreign industries rather than U.S. industries. See <http://www.instituteforenergyresearch.org/2012/09/07/obamas-energy-tax-proposals-wind-vs-oil-and-gas/>

⁴ Energy Information Administration, *2012 Brief: Average wholesale electricity prices down compared to last year*, Jan. 9, 2013, <http://www.eia.gov/todayinenergy/detail.cfm?id=9510>.

⁵ See e.g. Lisa Linowes, *Wind Energy Without the PTC*, Master Resource, May 12, 2012, <http://www.masterresource.org/2012/05/wind-energy-without-ptc/>. Jonathan A. Lesser, *Wind Intermittency and the Production Tax Credit: A High Cost Subsidy for Low Value Power*, Oct. 2012, http://www.continentalecon.com/publications/cebp/Lesser_PTC_Report_Final_October-2012.pdf.

⁶ Energy Information Administration, *EPACT2005 Summary*, http://www.eia.gov/oiaf/aeo/otheranalysis/aeo_2006analysispapers/epa2005_summary.html.

⁷ Energy Information Administration, *Tax Credits and Renewable Generation*, http://www.eia.gov/oiaf/aeo/otheranalysis/aeo_2009analysispapers/tcrg.html

⁸ Institute for Energy Research, *Breaking News: IRS Gives Big Cash to Big Wind*, Apr. 3, 2013, <http://www.instituteforenergyresearch.org/2013/04/03/breaking-news-irs-gives-big-cash-to-big-wind/>.

⁹ See Internal Revenue Service, *Clarification of Notice 2013-29*, <http://www.irs.gov/pub/irs-drop/n-13-60.pdf>

¹⁰ *Id.*

¹¹ Department of Energy, *America's Wind Industry Reaches Record Highs*, Aug. 6, 2013, <http://energy.gov/articles/americas-wind-industry-reaches-record-highs>.

¹² See Lawrence Berkley National Laboratory, *2012 Wind Technologies Market Report*, Table 2, Aug. 2013, <http://emp.lbl.gov/sites/all/files/lbnl-6356e.pdf>.

¹³ From 2011 to 2012, natural gas added 217,019,000 MWh of electricity produced, compared to 19,912,000 MWh of added electricity produced by wind. See, Energy Information Administration, *Monthly Energy Review, Table 7.2a Electricity Net Generation: Total (All Sectors)*, Nov. 2013, http://www.eia.gov/totalenergy/data/monthly/pdf/sec7_5.pdf.

¹⁴ Thomas A. Barthold, Joint Committee on Taxation, Sept. 24, 2013, <http://www.instituteforenergyresearch.org/wp-content/uploads/2013/10/JCT-wind-PTC-cost-estimate-temporary-extension.pdf>.

¹⁵ Internal Revenue Service, *1603 Program: Payments for Specified Energy Property in Lieu of Tax Credits*, Mar. 4, 2013, <http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx>.

¹⁶ For a few years, wind companies could choose between the PTC, the ITC, or Section 1603 grants. The fact that wind companies chose the ITC or Section 1603 grants mean that for those companies, at that specific time, the ITC or the Section 1603 grants were the best choice. This choice implies that the proxy PTC is a lower-bound estimate of the cost of federal wind subsidies. After all, if the PTC was more valuable, the companies would have chosen the PTC and not the ITC or Section 1603 grants. The ITC and the Section 1603 were more valuable, but they also change the timing of the payments for the companies. For many companies it receiving the money up front, as happened with Section 1603 grants, was the most valuable choice.

¹⁷ Internal Revenue Service, *SOI Tax Stats - Gross Collections, by Type of Tax and State, Fiscal Year - IRS Data Book Table 5*, <http://www.irs.gov/uac/SOI-Tax-Stats-Gross-Collections,-by-Type-of-Tax-and-State,-Fiscal-Year-IRS-Data-Book-Table-5>.

¹⁸ Robin Millican, *Wind PTC Proponents Misconstrue the Facts*, Institute for Energy Research, Dec. 5. 2012, <http://www.instituteforenergyresearch.org/2012/12/05/ptc-proponents-misconstrue-the-facts/>.

¹⁹ David E. Dismukes, *Removing Big Wind's "Training Wheels,"* American Energy Alliance, Nov. 1, 2012, <http://www.americanenergyalliance.org/wp-content/uploads/2012/10/Dismukes-Removing-Big-Winds-Training-Wheels.pdf>.

²⁰ Institute for Energy Research, *IER's Robert Michaels to Testify on the Wind PTC*, Oct. 1, 2013, <http://www.instituteforenergyresearch.org/2013/10/01/iers-robert-michaels-to-testify-on-the-wind-ptc/>.

²¹ Robert Murphy, *Assessing the Production Tax Credit*, Apr. 24, 2013, <http://www.instituteforenergyresearch.org/2012/04/24/assessing-the-production-tax-credit/>.

²² Travis Fisher & Alex Fitzsimmons, *Wind PTC Threatens Grid Reliability*, Institute for Energy Research, Sept. 19, 2013, <http://www.instituteforenergyresearch.org/2013/09/19/wind-ptc-threatens-grid-reliability/>.

²³ Institute for Energy Research, *The Wind Giveaway*, <http://www.instituteforenergyresearch.org/windptc/>.

²⁴ Robin Millican, *Wind PTC Proponents Misconstrue the Facts*, Institute for Energy Research, Dec. 5. 2012, <http://www.instituteforenergyresearch.org/2012/12/05/ptc-proponents-misconstrue-the-facts/>.

²⁵ See Database of Energy Efficiency, Renewable Energy, *New York*, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC09Rhttp://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NY03R

²⁶ North Carolina already has a renewable energy mandate requiring that 12.5 percent of electricity generation by investor-owned utilities in the state come from renewable sources by 2021. See Database of Energy Efficiency, Renewable Energy, *North Carolina*, http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=NC09R.

²⁷ <http://dis.puc.state.oh.us/TiffToPdf/A1001001A13E28B53949C83933.pdf>

²⁸ FirstEnergy Service Company, *In the Matter of the Annual Alternative Energy Status Report of Ohio Edison Company, The Cleveland Electric Illuminating Company and The Toledo Edison, Case No. 13-9013-EL-ACP*, <http://dis.puc.state.oh.us/TiffToPdf/A1001001A13D15B0283616206.pdf>

²⁹ Public Utilities Commission of Ohio, *Electric Service Areas of Ohio*, <http://www.puco.ohio.gov/pucogis/esa/index.cfm>.

³⁰ Department of Energy, *Installed Wind Capacity*, http://www.windpoweringamerica.gov/wind_installed_capacity.asp.