State of Oklahoma
Incentive Evaluation Commission
Tax Credit for Zero Emission Facilities
Draft Report

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Prepared by

The PFM Group
Financial & Investment Advisors

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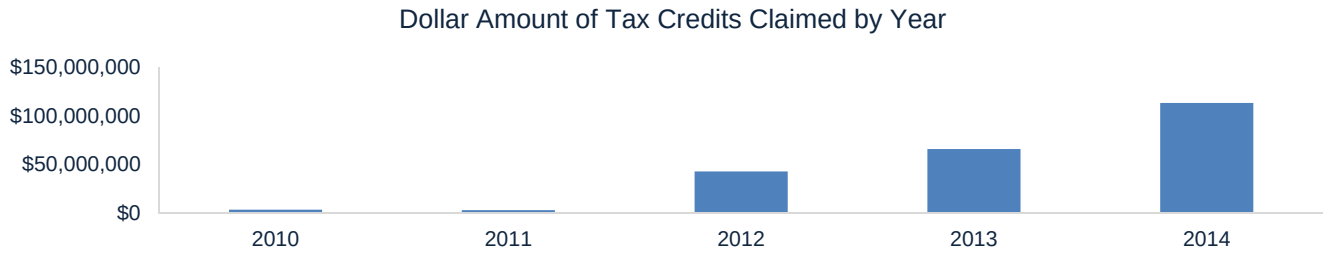
At a Glance: Tax Credit for Zero Emission Facilities (68 O.S. Section 2357.32A)

Program Goals

- Increase state share of electricity generated by renewable energy sources to 15 percent by 2015
- Create capital investment, jobs and income associated with increased numbers of zero emission facilities

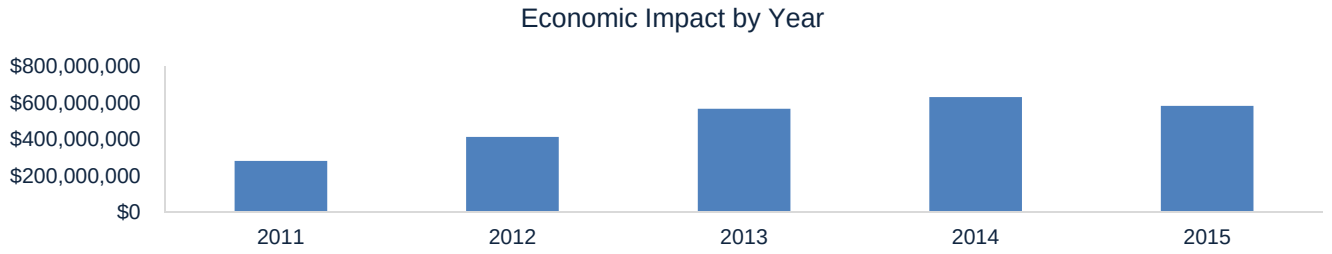
Fiscal Impact

	2010	2011	2012	2013	2014
Dollar Amount	$3,698,962	$3,128,895	$42,910,343	$65,993,892	$113,236,509
Claimants	60	38	114	191	154



Economic Impact

	2011	2012	2013	2014	2015
Output	$281,533,595	$412,348,832	$566,620,892	$630,743,636	$582,208,433
Labor Income	$37,928,411	$55,551,935	$76,335,580	$84,974,243	$78,435,545
Employment	658	964	1,324	1,474	1,361
Total Tax Revenue	$8,496,298	$12,261,948	$17,219,629	$18,630,857	$17,172,783



Adequate Protections for Future Fiscal Impact?

- There has been a significant increase in use of the credit, which may accelerate further in coming years
- While the credit will be closed to new recipients in 2021, the additional possible eligible facilities (and the 10 years of credits for each) create a significant threat to the State budget
- There are not current adequate protections (such as caps) to deal with possible future fiscal impact

Effective Administration?

- Current program administration is straight-forward because of the type of credit
- However, there is concern that the credit reporting is not sufficient for revenue estimating purposes

Achieving its Goals?

- There has been a significant increase in zero emission (particularly wind generating) facilities, and this has assisted the State with reaching its renewable energy goal
- The industry continues to grow (and future expansion is promising), suggesting that the program has achieved its primary goals
- However, the costs associated with achieving these goals are significant – and probably too high

Retain, Reconfigure, Repeal?

- Reconfigure the program to cap program credits or accelerate the closing of the program window (currently January 1, 2021) to January 1, 2018
- Allow non-wind generating zero emission facilities to continue to claim the credit until January 1, 2021

Changes to Improve Future Evaluation?

- Increase reporting requirements related to expected energy generation and use of state credits

Executive Summary

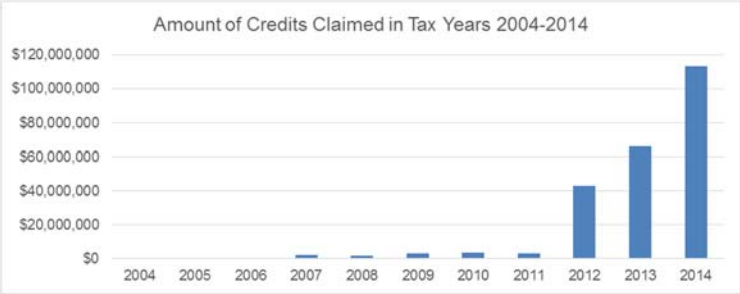
Introduction

Production tax credits have been part of American energy policy for decades. The Federal Production Tax Credit (PTC) began in 1992, and many states have implemented their own incentives to help the capital-intensive renewable energy industry develop within their borders. In 2003, Oklahoma created its version of a PTC for energy generated by zero-emission facilities, which encompass wind, geothermal, solar and hydropower. As with most states, Oklahoma's PTC for electricity generated by zero-emission facilities is provided on a per kilowatt-hour basis. The credits are valid for a 10 year period following the date the facility is placed in operation. In 2013, an end date of December 31, 2020 for facilities to come on-line and qualify for the credit was added to the statute.

The PTC coincided with other State efforts to expand the use of renewable energy sources. In 2011, the Legislature set a renewable energy goal for the year 2015 that 15 percent of electricity generated within the State be generated by renewable energy sources. That goals was attained, and today, electricity from renewable sources accounts for over 19 percent of all electricity generated in Oklahoma, with approximately 90 percent of it coming from wind.

Program Background and Benchmarking

Since its inception, the use of the State PTC has increased significantly. For example, the capacity of facilities eligible for the credit in 2003 was 176 megawatt hours. In the first year the credits were claimed (2005), those credits totaled $2.7 million. Six years later, in 2009, eligible facilities had rated capacity of 1,130 megawatt hours, and the claimed credits totaled $8.8 million. By 2015, eligible facilities had rated capacity of 4,346 megawatt hours, and claimed credits totaled $50.6 million. The graph at right illustrates the dramatic increase in the use of the credit.



According to the US Energy Information Administration, Oklahoma is one of the 10 highest producing states that, in 2015, accounted for 73 percent of the nation's wind energy. In fact, Oklahoma trailed just Texas and Iowa in generation of megawatt hours of electricity from wind. Among the top 10 wind producing states, Oklahoma is the only state with a PTC program that is still accepting new facilities. Five of the six top producing states with PTCs have some form of a program cap in place.

Fiscal Impact

The fiscal impact from the PTC is substantial, and its potential impact in the coming years is also significant. Even with program changes that close the window for new facilities to qualify for the PTC after December 31, 2020, there is significant exposure for the State based on the opportunity for facilities to be placed in service during the remainder of 2016 through the end of calendar year 2020. Given plans for major new transmission lines that can transport Oklahoma wind-generated electricity to out-of-state locations, it is quite possible (perhaps even probable) that the credits per year associated with zero

emission wind facilities will approach $100 million a year by the time the program window closes – and those facilities' payments will continue for up to 10 years.

Economic Impact

There are a variety of economic impacts associated with the construction and operation of the zero emission facilities. To determine these, the project team developed an input-output model using IMPLAN, which assisted in analyzing direct, indirect and induced effects. These multiple economic impacts are then summed to determine overall economic impact. It is notable that economic impact does not directly translate into state tax revenue, and an adjustment must be made to determine how economic impacts translate into revenue.

Some of the economic impacts associated with this credit include the initial construction of the facilities, their operations and maintenance, and lease payments to landowners on which the facilities are constructed. While these are all substantial and important, they do not (in terms of other state revenue that they generate) come close to the State's foregone revenue from the PTC.

Outcomes

While the cost-benefit analysis associated with state revenue is an important consideration, there are other outcomes that should also be considered. These include:

- Development and growth of the renewable energy industry
- Increased property valuation
- Reduced costs of electricity

Without a doubt, there has been impressive development and growth in the renewable energy industry within the State of Oklahoma. However, the legislatively enacted goal, renewable energy comprising at least 15 percent of the state portfolio of electricity generation, has been achieved (and exceeded). Given this fact, it is unclear as to whether there is a need to expend additional resources on this priority.

A valid positive outcome related to this incentive is the increase in local property tax valuation associated with the zero emission facilities. Wind turbines are capital intensive facilities, and this increases the overall property tax base for schools and other local governments in Oklahoma. While local schools may benefit from this outcome, it does not replace state finance formula appropriations for these schools so does not improve the State's budget position. For other local governments, additional assessed valuation may simply reallocate property tax burden rather than increase local tax revenue. To be sure, there is some additional local revenue from leases, but this has been taken into consideration in the economic impact calculations.

Finally, there is evidence that Oklahoma benefits from lower electricity prices in relationship to average prices in the rest of the country. While wind energy may contribute to this factor, it is still a relatively small cohort of the overall mix of sources for electricity within the State. It is likely that plentiful (and

relatively cheap) natural gas is still a more important factor in these calculations. To the extent this is an important factor, it is notable that a significant portion of the expected new development in wind facilities is to provide energy for transmission to users in other states. In this case, there is no real benefit for Oklahoma consumers in subsidizing the generation of this electricity.

It is also notable that the State also provides an incentive (related to the Ad Valorem Exemption for Manufacturing Facilities) for these same zero emission facilities. While this eligibility window closes on January 1, 2017, some of the economic and revenue benefit of these facilities must be reduced factoring in this substantial state benefit (which has averaged over $30 million a year over the past three years) as well.

Recommendations

Given the substantial cost associated with this program, the lack of a PTC cap (as exists in all other major wind energy producing states with this credit) and the very real possibility that the obligation associated with this incentive will continue to increase substantially in coming years, the project team recommends that **the program be reconfigured to either establish a program cap or accelerate closing the window for eligibility.** The project team suggests that this cap and/or accelerated date to close the program should primarily apply to wind facilities; it makes sense to allow other zero emission facilities (such as those that use solar energy) to continue to access the credit through the current statutory close of the program.

The project team also recommends that facilities claiming a credit be required to provide monthly data related to generated energy and projections related to use of the credit.

Introduction

Overview

The Oklahoma Incentive Evaluation Commission (the Commission) was established in HB2182, which was enacted and became law in 2015. It requires the Commission to conduct evaluations of all qualified state incentives over a four-year timeframe. The law also provides that criteria specific to each incentive be used for the evaluation. The Tax Credit for Electricity Generated by Zero-Emission Facilities is one of the incentives reviewed in 2016 by the Commission with recommendations to the Governor and the State Legislature.

Introduction

Production tax credits have been part of American energy policy for decades. The Federal Production Tax Credit (PTC) began in 1992,[1] and many states have implemented their own incentives to help the capital-intensive renewable energy industry develop within their borders. In 2003, Oklahoma created its version of a PTC for energy generated by zero-emission facilities, which encompass wind, geothermal, solar and hydropower. That year, the State's first utility-scale wind facility began production. Today, electricity from renewable sources accounts for over 19 percent of all electricity generated in Oklahoma, with approximately 90 percent of it coming from wind.[2]

Oklahoma's PTC for electricity generated by zero-emission facilities is provided on a per kilowatt-hour basis. Facilities placed into operation after June 4, 2001 are eligible for the credit if the facility has a rated production capacity of one megawatt or greater. The Department of Environmental Quality must determine that the construction and operation of the facility will result in no pollution or emissions harmful to the environment. The credits may be claimed in tax years beginning on or after January 1, 2003. The credits are valid for a 10 year period following the date the facility is placed in operation.[3]

The incentive was originally structured with the credit gradually declining from $0.0075 to $0.0025 per kilowatt-hour. While the rationale for the reduction over time was not provided in the originating legislation, there are various examples around the country where the value of a credit declines over time.[4]

In 2006, the program was amended and a one-half cent ($0.005) per kilowatt-hour credit was established for facilities placed in operation on or after January 1, 2007. This credit schedule is still in place today. In

[1] The federal production tax credit is a per-kilowatt-hour tax (kWh) credit for electricity generated using qualified energy resources. The credit can be claimed for a 10-year period once a qualifying facility is placed in service. The maximum credit amount for 2013, 2014, and 2015 is 2.3 cents per kWh. The maximum credit rate, set at 1.5 cents per kWh in statute, has been adjusted annually for inflation. See Congressional Research Service, "The Renewable Electricity Production Tax," Molly F. Sherlock, July 14, 2015, accessed electronically at http://nationalaglawcenter.org/wp-content/uploads/assets/crs/R43453.pdf

[2] EIA, Electric Power Industry Generation by Primary Energy Source Back to 1990, Oklahoma

[3] 68 O.S. Section 2357.32A

[4] For example, it may be argued that early entrants have greater costs of entry, as capital and suppliers may not be as readily available. In other instances, it may be expected that economies of scale will reduce capital or operating costs for later entrants.

2013, an end date of December 31, 2020 for facilities to come on-line and qualify for the credit was added to the statute.

The following table describes the existing credit:

For Facilities Placed in Operation on or after Jan 1, 2003 and before Jan 1, 2007	
Electricity Generated Between	Credit per kilowatt-hour
Jan 1 2003 – Dec 31 2003	$0.0075
Jan 1 2004 – Dec 31 2006	$0.005
Jan 1 2007 – Dec 31 2011	$0.0025
Facilities placed in operation on or after Jan 1, 2007 and before Jan 1, 2021	
Electricity Generated Between	Credit per kilowatt-hour
On or After Jan 1 2007	$0.005

Credits generated prior to Jan 1, 2014 may be carried forward for up to 10 years.[5] Credits generated on or after Jan 1, 2014 are refundable at 85 percent of the face amount of the credit.[6] Nontaxable entities may transfer or sell earned credits to any individual or corporate taxable entity.[7]

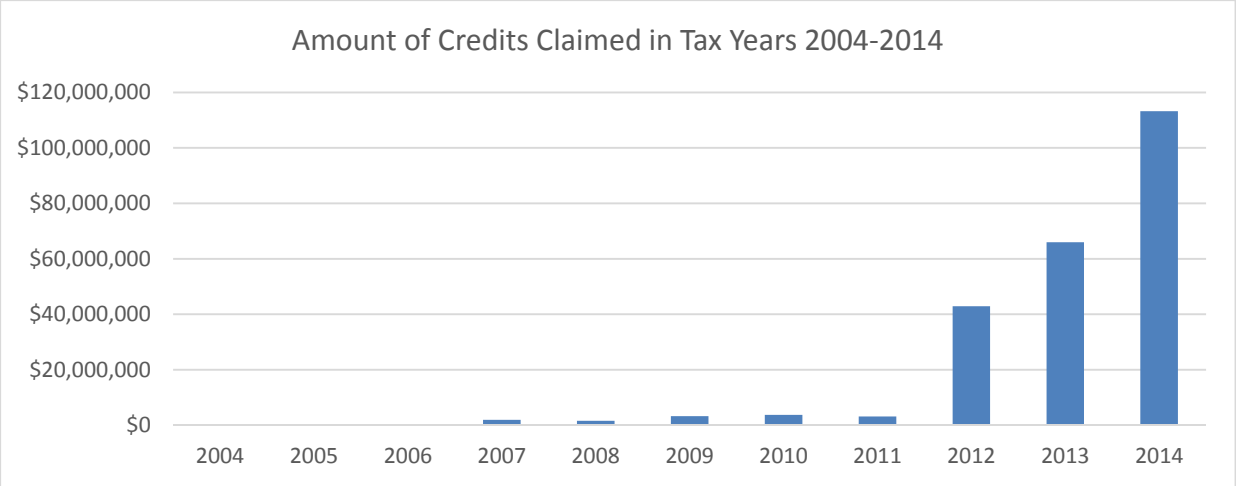
Participation in the program has grown rapidly over the last five years. According to data from the Oklahoma Tax Commission, the amount claimed for the 2014 tax year was over $113.0 million, compared to over $3.0 million in 2010.

The following graph illustrates the dramatic increase in tax credits claimed in recent years:

[5] In other words, if the owner of a facility does not have sufficient income tax liability to offset the entirety of the earned production credit, they may apply that remaining credit to income tax liability for up to 10 additional tax years.

[6] A refundable credit is one where the dollar value of the credit is paid (refunded) to the taxpayer even if they have no income tax liability. In this case, only 85 percent of the value of any refunded credit would be remitted.

[7] Transferred or sold credits are usually subject to a discount, which will vary depending on factors such as supply and demand. According to one recent general discussion of transferable state tax credits, 'Typically, sellers will receive 85 to 90 cents on the dollar for their credit. However, it is quite possible for sellers to receive less.' Journal of Multistate Taxation and Incentives, March/April 2015, "The Transferability and Monetization of State Tax Credits."



Development plans suggest the impact of this incentive will remain high as more wind energy infrastructure is constructed. The most anticipated project is the Plains and Eastern Clean Line, a proposed 700-mile, 3,500 megawatt transmission line that will connect wind energy generated in the Oklahoma panhandle to consumers in the Memphis, Tennessee area. Construction is expected to start on this project in 2017.[8] With this added infrastructure and its ability to connect producers to more consumers (and thus heightening demand), investment in new and existing wind energy facilities should continue to grow.

Criteria for Evaluation

A key factor in evaluating the effectiveness of incentive programs is to determine whether they are meeting the stated goals as established in state statute or legislation. In the case of this credit, the specific goals were not included in the legislation that established it. However, related public policy goals have been articulated. In 2011, the Legislature set a renewable energy goal for the year 2015 that 15 percent of electricity generated within the State be generated by renewable energy sources.[9] As a result, it is logical to determine whether the credit has helped the State in accomplishing this goal.

In addition to this goal, there are other criteria that may be used to evaluate this incentive program. To assist in a determination of program effectiveness, the Incentive Evaluation Commission has adopted the following criteria:

- A comparison to the period prior to the credit of renewable energy and wind's share of renewable energy

[8]Details of the project may be found on the website of the Center for Rural Affairs at http://www.cfra.org/plains-and-eastern and the US Department of Energy, Office of Electricity Delivery & Energy Reliability at http://energy.gov/oe/services/electricity-policy-coordination-and-implementation/transmission-planning/section-1222-0

[9] 17 O.S. 2011, Section 801.4, Section C. It is notable that the identified renewable energy sources include wind, solar, photovoltaic, hydropower, hydrogen, geothermal, biomass and steam.

- A comparison to the period prior to the credit of renewable energy kilowatt hours generated versus all kilowatt hours generated in the state
- Income generated within the State by eligible projects
- Jobs generated within the state by eligible projects
- Connection with other related business incentives
- State return on investment
- Lease revenue generated by zero-emission facilities
- Change in average price of electricity before and after the tax credit

The criteria focus on what are generally considered goals of incentives programs (such as creating jobs and capital investment in the state) as well as more specific objectives related to this program (greater use of renewable energy within the state and maintaining affordable energy prices). Ultimately, incentive programs have to weigh both the benefits (outcomes related to achieving policy goals and objectives) and the costs, and that is also a criteria for evaluation (State return on investment). These will be discussed throughout the balance of the evaluation.

Program Background and Benchmarking

Background

As noted in the previous section, since its inception in 2003, the use of the tax credit has increased significantly. For example, the capacity of facilities eligible for the credit in 2003 was 176 megawatt hours. In the first year the credits were claimed (2005), the credits totaled $2.7 million. Six years later, in 2009, eligible facilities had rated capacity of 1,130 megawatt hours, and claimed credits totaled $8.8 million. By 2015, eligible facilities had rated capacity of 4,346 megawatt hours, and claimed credits totaled $50.6 million. The following details this history of use:

Inputs	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Existing Wind Capacity in MW	176.0	176.0	474.0	594.0	689.0	708.0	1,130.0	1,480.0	1,810.8	3,132.9	3,132.9	3,779.5
Capacity in MWh	1,541,760	1,541,760	4,152,240	5,203,440	6,035,640	6,202,080	9,898,800	12,964,800	15,862,608	27,444,204	27,444,204	33,108,420
Actual MWh Generated	54,470	572,744	847,773	1,712,441	1,849,144	2,358,080	2,698,199	3,808,083	5,605,265	8,157,585	11,162,493	11,936,833
Capacity Factor	4%	37%	20%	33%	31%	38%	27%	29%	35%	30%	41%	36%
Credit Per kWh for Facilities in Operation Before Jan 1, 2007	$0.0075	$0.005	$0.005	$0.005	$0.0025	$0.0025	$0.0025	$0.0025	$0.0025	$0.0025	$0.0025	$0.0025
Credit per kWh for Facilities in Operation After Jan 1, 2007					$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005	$0.005

This upward trend in wind energy production is expected to continue. As noted in the previous section, there are substantial new wind energy projects in varying stages of planning and execution. At the same time, the production costs associated with wind energy have fallen substantially, which has helped to make it a competitive energy source.

According to the US Department of Energy, when leveling costs among different methods of generating electricity[10] for plants entering service in 2018, the weighted average (in dollars per megawatt hour) for wind is among the lowest ($51.90), and the federal tax credit available to wind plants reduces the cost to $34.00. By comparison, conventional natural gas-fired plants are $48.70, and advanced combined cycle natural-gas fired plants are $48.00.[11]

Benchmarking

For evaluation purposes, benchmarking provides information related to how peer states use and evaluate similar incentives. At the outset, it should be understood that no states are 'perfect peers' – there will be multiple differences in economic, demographic and political factors that will have to be considered in any analysis; likewise, it is exceedingly rare that any two state incentive programs will be exactly the same.[12] These benchmarking realities must be taken into consideration when making

[10] 'Levelized cost' measures the per-kilowatt hour cost (in real dollars) of building and operating a generating plant over an assumed financial life and duty cycle. The inputs used to calculate this cost include capital, fuel, fixed and variable operations and maintenance and finance costs as well as an assumed utilization rate for each plant type. The assumptions used by the Department of Energy are given in the "Assumptions to the Annual Energy Output," available at http://www.eia.gov/forecasts/aeo/assumptions/.

[11] US Energy Information Administration, "Levelized Cost and Levelized Avoided Cost of New Generation Resources in the Annual Energy Outlook 2016," August 2016, p.

[12] The only real instances of exactly alike state incentive programs occurs when states choose to 'piggyback' onto federal programs.

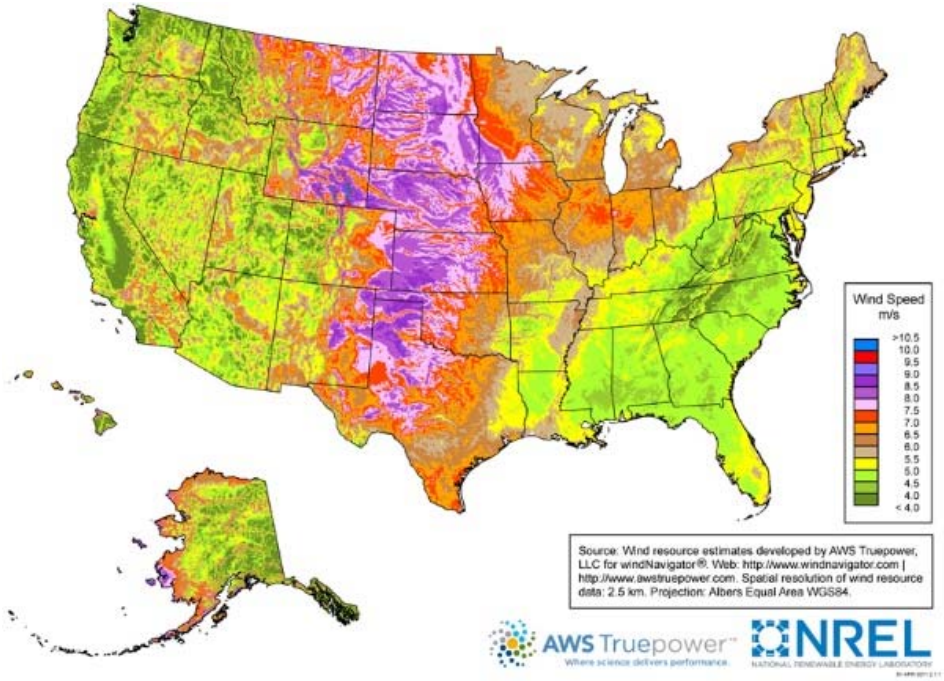
comparisons – and, for the sake of brevity, the report will not continually re-make this point throughout the discussion.

The process of creating a comparison group for incentives typically begins with bordering states. This is generally the starting point, because proximity often leads states to compete for the same regional businesses or business/industry investments. Second, neighboring states often (but not always) have similar economic, demographic or political structures that lend themselves to comparison.

However, the comparison group for certain incentives will be broader than just the neighboring states. In this case (as with several energy-related incentives), the industry the credit seeks to impact is natural resource driven, and the states Oklahoma competes with are those with similar available resources and infrastructure to support the industry.

Although geothermal, solar, and hydropower are also component parts of Oklahoma's renewable energy portfolio, wind was responsible for over 88% of the total renewable energy produced in the State in 2014.[13] Given that it makes up nearly 9/10ths of the existing industry, the following analysis will focus on it.

Many states have potential for wind energy production, but a limited number of states have emerged as the major contributors to production. The following map, which identifies the wind capacity around the country, helps explain why production is concentrated in certain states:[14]



[13] EIA, Electric Power Industry Generation by Primary Energy Source Back to 1990, Oklahoma
[14] US Department of Energy, accessed electronically at http://apps2.eere.energy.gov/wind/windexchange/wind_maps.asp

This map supports the claim that neighboring states are not necessarily the major competitors for an industry. In this case, the Great Plains States – from Texas to North Dakota -- are logical optimal placements for wind electrical generation facilities, while neighboring states to the East are less important.

According to the U.S. Energy Information Administration, the 10 highest producing states accounted for 73 percent of the nation's wind energy in 2015. Besides Oklahoma, the bordering states of Texas (ranked first), Kansas (fifth), and Colorado (seventh) are also in this 10-state cohort.[15]

Net Generation from Wind in 2015		
Rank	State	Megawatt-hours
1	Texas	4,464,000
2	Iowa	1,738,000
3	Oklahoma	1,423,000
4	Illinois	1,268,000
5	Kansas	1,062,000
6	Minnesota	911,000
7	Colorado	780,000
8	California	708,000
9	Indiana	656,000
10	North Dakota	565,000

Since most of the competitive states in this industry fall outside the core group of bordering states, the scope of the comparison group has been expanded to include notable programs in the top ten states.

A review of incentive programs in these states reveals that Oklahoma is the only state in the top 10 of wind energy production with a Production Tax Credit (PTC) program still accepting new applicants. Five of the six other states with PTCs for renewable energy have some form of program cap in place. The program caps range from $10.0 million in Florida to $40.0 million in New Mexico (New Mexico reached its cap in 2015). Among other states, Minnesota and Iowa have used PTCs to support the renewable

[15] "Electric Power Monthly, with Data for January 2016," US Energy Information Administration, March 2016, accessed electronically at http://www.eia.gov/electricity/monthly/current_year/march2016.pdf

energy industry. Minnesota's program, designed for wind facilities of 2 megawatt (MW) capacity or less, was closed to new applicants in 2005, with 225 MW of capacity enrolled, and made its final payments at the end of 2015. Iowa caps its program by total nameplate capacity enrolled in order to limit fiscal impact.[16] Iowa's program reached its cap in 2015.[17] Other states using a PTC include Arizona and Maryland.

Each program has similar features to Oklahoma's PTC. In each state, credits are awarded on a per kilowatt-hour basis. The duration of eligibility for the credit is 10 years following the start of production of the qualified facility in every comparison state (with the exception of Florida, where there is no limit in place).[18]

The following table provides summary data related to the incentive programs for the State of Oklahoma and states with similar programs. It is notable that several of what could be considered competing states for wind generation of electricity do not have similar incentive programs.

[16] It is notable that a dollar cap and cap on nameplate capacity enrolled are essentially the same mechanism expressed in a different way.

[17] "Database of State Incentives for Renewables and Efficiency," DSIRE, North Carolina Clean Energy Technology Center, accessed electronically at http://www.dsireusa.org/

[18] The 10-year duration is understandable, as there is a significant capital expense associated with facility construction.

State	Energy Sources	Capacity Requirements	Credit per kWh	Aggregate Cap	Duration	Transferrable?	Carry-forward?	Refundable?
Iowa (476B)	Wind	2 to 30 Megawatt (MW)	$0.01	50 MW of Nameplate Capacity	10 Years	Yes	Yes, 7 years, not to exceed the 10 year pay period	10 Years
Iowa (476C)	Wind, biogas recovery, biomass, methane gas recovery, solar, refuse	Max: 2.5 MW	$0.015	426 MW of Nameplate Capacity[19]	10 Years	Yes	Yes, 7 years, not to exceed the 10 year pay period	10 Years
New Mexico	Wind and biomass	Min:1 MW	$0.01	$20,000,000 per year	10 Years	No	Only credits earned prior to October 1st, 2007, 5 years	10 Years
	Solar	Min:1 MW	$0.027 (average)[20]	$20,000,000 per year				
Minnesota	Hydroelectric, biomass, and wind	Max: 2 MW	$0.02	No Cap	No Cap	Not Specified	Not Specified	Not Specified
Arizona	Wind and Biomass	Min: 5 MW	$0.01	$20,000,000 per year	10 Years	No	Yes, 5 years	No
	Solar	Min: 5 MW	$0.0275 (average)[21]					
Florida	Hydrogen, biomass, solar energy, geothermal energy, wind energy, ocean energy, waste heat, or hydroelectric power	None	$0.01	$10 Million per year	No Limit	In the event of a merger or acquisition	Yes, 5 years	No Limit
Maryland	Solar, Wind, Biomass, hydroelectric, municipal solid waste, landfill gas, tidal, wave, oxygen thermal, anaerobic digestion	None	$0.0085	$25 Million per year, removed in 2016	10 Years	No	No	Yes
Oklahoma	Wind, Moving Water, Solar, Geothermal	Min: 1 MW	$0.005[22]	No Cap	10 Years	Only credits earned prior to January 1st, 2014 are transferrable	Up to 10 years only for credits earned prior to January 1st, 2014	At 85% only for credits earned after January 1st, 2014

[19] 363 MW for wind and 63 MW for all other sources
[20] New Mexico's Solar Incentive Changes throughout the 10-Year pay period
[21] Arizona's solar incentive changes throughout the 10-year pay period
[22] This is the current rate for facilities placed in operation on or after 1/1/2007

Benchmarking Program Evaluations

Among the states with active incentive programs, there are three relevant studies that are useful for comparison. These studies were done by the States of Florida, Iowa and New Mexico. All three are among the states that allocate their credit based on the amount of energy generated. Of the three, the study by New Mexico comes closest to replicating the scope of analysis of the Oklahoma evaluations.

For New Mexico, the goal of its report was to 'comprehensively quantify the costs and benefits of energy tax subsidies and policies.' It is notable that the report recognizes the difficulty in disentangling factors that contribute to project development (what might be considered a 'but for' test of the value of incentives in spurring development), which can include location, renewable portfolio standards, permitting requirements, federal and state financial incentives, power sales opportunities, access to transmission, etc.[23]

One specific area for analysis within the report is the potential for future claims (New Mexico provides for a five-year carry forward of its PTC). The report applies the tax credit amount to production volumes, in Megawatt hours (MWh) of each certified facility's actual generation up to their eligible power generation cap. This 'potential tax expenditure' then is a proxy for the maximum annual tax liability for the State – which they estimate at about the same amount as is being claimed each fiscal year (realized tax expenditures during the period reviewed was $61.6 million, and potential tax expenditures in this same period were $121.6 million).

New Mexico also conducted an economic impact analysis, calculating direct, indirect and induced impacts. The State used an IMPLAN model to generate its estimates. These impacts were categorized related to project and operating expenditures – for both wind and solar facilities. Finally, the report also sought an estimation of the pollution impacts related to volumes and monetary value.[24]

The Iowa report provides more background discussion, which includes a history of the Iowa credit, the federal PTC as well as credits in other states and a review of the renewable energy industry. The report discusses factors related to the credits themselves, including the tax credit awards and transfers, the state of residence of awardees (Iowa residents accounted for 83 percent of the program's recipients and 52 percent of the dollar value of the tax credits awarded), the tax credit claims by tax type (because it is transferrable) and energy production statistics. The key findings focus on an economic analysis of the tax credits. Within that analysis, there were three key areas of analysis:

- **Limitations on the Analysis.** In particular, the report recognized the possible value of moving to renewable energy sources as a way to have a positive impact on global climate change and a reliance on fossil fuels; however, the report noted that this was beyond the scope of the study.

[23] It is notable that New Mexico has a Renewable Portfolio Standard, which requires investor-owned utilities to produce 20 percent of electricity from renewable sources by 2020. This certainly suggests that some renewable energy projects would have to be undertaken even without the credit.
[24] State of New Mexico, "Economic Analysis of the New Mexico Renewable Energy Production Tax Credit, Final Report," February 2015, New Mexico Energy, Minerals and Natural Resources Department.

The study also did not attempt to assess the nature and extent of an 'economic ripple effect' from the credit throughout the Iowa economy.

- **Issues surrounding transferable tax credits.** The report found that 'nearly all tax credits awarded have been transferred.' Interestingly, that report references the State of Oklahoma's decision to shift from transferable credits to refundable (at 85 percent of value) credits. It is notable that the report also discussed the need for tax credits as part of an overall financing strategy to make projects work. The report accepted the premise that 'substantial upfront capital is generally required to finance renewable energy products and that tax credits are a critical source of investment capital for these projects.'

- **Property tax implications.** The report notes that these facilities result in increases in property tax revenues to local taxing jurisdictions. Based on estimates of acquisition costs (including the costs for turbines, towers, foundations, installation and connection), wind system acquisition costs totaled $1.65 million per megawatt in 2006 constant dollars and remained at that level at least through 2010. Based on these cost assumptions and the megawatt capacity of wind turbine systems entering service, it is estimated that the aggregate property tax for these facilities will reach $1.8 million by FY2021.[25]

Of the three, the State of Florida analysis is the least extensive. For purposes of analyzing impact, the report determined that the program supported the production of 1,000,000,000 kilowatt-hours of electricity in the 2015 production period, computed a state average price (10.64 cents per kilowatt-hours during the prior 24 months) and determined that this amounted to an estimated $106.4 million in revenue from the sale of electricity. This revenue was entered into the State's IMPLAN model. The study determined that the $10.0 million program investment produced an estimated total output contribution of $167.9 million, total value added contribution of $94.7 million and total labor income contribution of $34.0 million. It estimated the program supported or created nearly 120 direct jobs and 399 jobs in related or supporting industries. The study also estimated state and local taxes to total $15.2 million. The report used two forms of return on investment analysis that were both considered positive.[26]

[25] State of Iowa, "Wind Energy Production Tax Credit and Renewable Energy Tax Credit, Tax Credits Program Evaluation Study," December 2014, Anthony Girardi, PhD, Tax Research and Program Analysis Section, Iowa Department of Revenue.

[26] State of Florida, "2015 Analysis of the Economic Contribution of the Renewable Energy Tax Incentives," Florida Department of Agriculture and Consumer Services.

Fiscal Impact

For this evaluation, fiscal impact is considered to be the directly attributable impact of the credit on State revenues and expenditures. The evaluation will discuss but not quantify revenue and expenditure impacts on local governments. There is far less attenuation from these local impacts for a discussion of a state incentive program – for a variety of reasons (including the impact of local decision making outside the State's control on local revenues and expenditures and the widely divergent impacts throughout the State).

As has been noted, the fiscal impact from this tax credit (mostly because of reduced/refunded tax revenue) is substantial, and its potential impact in the coming years is also significant. Based on program changes adopted by the State Legislature in SB343 in 2013, to qualify for the credit, a facility must be placed in service by December 31, 2020 (at which point they would be able to generate the credits for 10 years – and have 10 years to carry forward and use those credits). However, given the recent levels of activity for this credit, there is significant exposure for the State based on the opportunity for facilities to be placed in service during the remainder of 2016 through the end of calendar year 2020.

The following table identifies the claimed and potentially claimed credits for this program, both historic and projected into the future, using historic growth rates and conservative assumptions for future growth rates:

Year	Capacity in Megawatts (MW)	Annual % Growth	Annual Added Capacity (MW)	Generation of New Capacity in Megawatt hours (MWh)	Added Per Year Cost	Cumulative Annual Cost
Actuals						
2003	176	-	-	-	-	-
2004	176	0%	-	-	-	-
2005	474	169%	298	532,988	$2,664,940	$2,664,940
2006	594	25%	120	345,948	$1,729,738	$4,394,679
2007	689	16%	95	254,962	$1,274,809	$3,472,148
2008	708	3%	19	63,282	$316,409	$3,788,557
2009	1,130	60%	422	1,007,646	$5,038,230	$8,826,787
2010	1,480	31%	350	900,560	$4,502,801	$13,329,588
2011	1,811	22%	331	1,023,979	$5,119,896	$18,449,485
2012	3,133	73%	1,322	3,442,543	$17,212,715	$35,662,200
2013	3,133	0%	-	-	-	$35,662,200
2014	3,780	21%	647	2,042,163	$8,679,194	$44,341,394
2015	4,346	15%	567	1,790,525	$7,609,731	$50,618,655
2016	4,998	15%	652	2,059,104	$8,751,191	$58,504,976
2017	5,748	15%	750	2,367,969	$10,063,869	$67,294,037
2018	6,610	15%	862	2,723,165	$11,573,450	$78,551,077
2019	7,271	10%	661	2,087,760	$8,872,978	$82,385,825
2020	7,999	10%	727	2,296,536	$9,760,276	$87,643,300
2021	7,999	0%	0	0	$0	$82,523,404

Year	Capacity in Megawatts (MW)	Annual % Growth	Annual Added Capacity (MW)	Generation of New Capacity in Megawatt hours (MWh)	Added Per Year Cost	Cumulative Annual Cost
2022	7,999	0%	0	0	$0	$65,310,689
2023	7,999	0%	0	0	$0	$65,310,689
2024	7,999	0%	0	0	$0	$56,631,495
2025	7,999	0%	0	0	$0	$49,021,764
2026	7,999	0%	0	0	$0	$40,270,573
2027	7,999	0%	0	0	$0	$30,206,704
2028	7,999	0%	0	0	$0	$18,633,254
2029	7,999	0%	0	0	$0	$9,760,276
2030	7,999	0%	0	0	$0	$0

As previously noted, there is also concern that new facilities associated with the Clean Line Project might add considerably to the financial projections for the impact in future years. The following table provides an estimate of this impact, which would significantly exceed historic growth rate assumptions:

Potential Clean Line Impact	
2014 Existing Wind Capacity	3,779.5
Capacity in MWh	33,108,420
Actual MWh Generated	11,936,833
2014 Capacity Factor	36%
Projected Added Capacity from Clean Line Project	3,500
Capacity in MWh	30,660,000
MWh Generated at 2014 Capacity Factor	11,054,085
Credit per kWh	$0.005
Total Credit Expense Per Year at Different Completion Percentages	
100%	**$55,270,427**
75%	**$41,452,820**
50%	**$27,635,213**
25%	**$13,817,607**

In short, the financial impacts associated with the generated tax credit are substantial and would impact the revenue structure for an additional 10 years thereafter. There is, of course, some additional revenue that would be generated from economic activity associated with this credit, and this will be discussed in the following chapter.

It is also possible that the various requirements for the Clean Line to become operational will not come to fruition prior to the tax credit trigger date of December 31, 2020. That said, there will be significant

incentive for the power producers to get the facilities up and running by that point in time, given that the tax credit generated by the facilities stays in place for 10 years.

As previously discussed, these estimates do not take into consideration new local property (sometimes referred to as ad valorem) tax revenue. The significant capital investment associated with wind facilities increases the overall assessed value of property within a taxing jurisdiction, and in some cases the change is substantial. This provides for a broader base upon which the property tax levy is applied. However, the benefits of that expanded property tax base are primarily local, and, depending on local decisions related to budgets and levies, it may only redistribute the property tax burden rather than actually increase local tax revenue. Those decisions generally fall outside of the discussion of state policy (and are mostly beyond the control of state policymakers), at least related to this evaluation.

It has been suggested that this additional assessed value will increase property revenue for local schools – and, based on the way that state school funding is allocated among school districts, may also benefit school districts that do not have wind facilities within their district. This may well be the case, but it does not reduce the size of the State's appropriation to school aid – as with local property taxes, it may simply change how those state dollars are allocated among school districts. As a result, it is an issue with local rather that State budget impact.

As previously noted, Oklahoma is in the minority of large wind energy producing states in not having a cap on its credit. It could be argued that these other states have reached the conclusion that, when wind energy generation is already substantial and the industry has taken root, the financial risk to the state is larger than the economic benefit the incentive generates.

One of the requirements of HB2182 is that each evaluation should determine "whether adequate protections are in place to ensure the fiscal impact of the incentive does not increase substantially beyond the state's expectations in future years."

Given the significant – and growing – share of the State energy portfolio and the risks associated with significant new wind energy generation, the project team concludes that, absent a compelling argument of economic impact that generates sufficient additional state revenue (or reduces expenditures), there are not adequate safeguards in place to balance the financial risk to the State from this incentive.

Economic Impact

Methodology

Economists use a number of statistics to describe regional economic activity. Four common measures are "Output" which describes total economic activity and is generally equivalent to a firm's gross sales; "Value Added" which equals gross output of an industry or a sector less its intermediate inputs; "Labor Income" which corresponds to wages and benefits; and "Employment" which refers to jobs that have been created in the local economy.

In an input-output analysis of new economic activity, it is useful to distinguish three types of expenditure effects: direct, indirect, and induced:

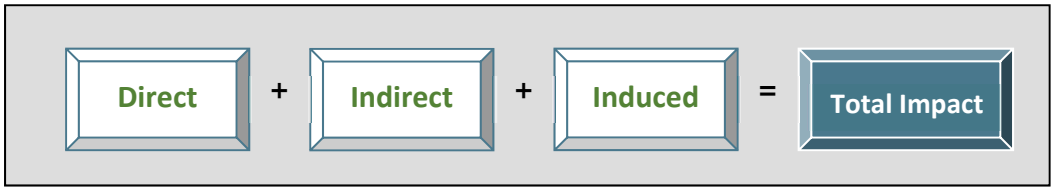
- Direct effects are production changes associated with the immediate effects or final demand changes. The payment made by an out-of-town visitor to a hotel operator or the taxi fare paid for transportation while in town are examples of direct effects.

- Indirect effects are production changes in backward-linked industries caused by the changing input needs of directly affected industries – typically, additional purchases to produce additional output. Satisfying the demand for an overnight stay will require the hotel operator to purchase additional cleaning supplies and services. The taxi driver will have to replace the gasoline consumed during the trip from the airport. These downstream purchases affect the economic output of other local merchants.

- Induced effects are the changes in regional household spending patterns caused by changes in household income generated from the direct and indirect effects. Both the hotel operator and taxi driver experience increased income from the visitor's stay, as do the cleaning supplies outlet and the gas station proprietor. Induced effects capture the way in which increased income is spent in the local economy.

A multiplier reflects the interaction between different sectors of the economy. An output multiplier of 1.4, for example, means that for every $1,000 injected into the economy, all other sectors produce an additional $400 in output. The larger the multiplier, the greater the impact will be in the regional economy.

The Flow of Economic Impacts



For this analysis, the project team used the IMPLAN online economic impact model with the dataset for the State of Oklahoma (2014 Model).

State of Oklahoma Tax Revenue Estimate Methodology

To provide an "order of magnitude" estimate for state tax revenue attributable to the incentive being evaluated, the project team focused on the ratio of state government tax collections to Oklahoma Gross Domestic Product (GDP). Two datasets were used to derive the ratio: 1) U.S. Department of Commerce Bureau of Economic Analysis GDP estimates by state;[27] and 2) the Oklahoma Tax Commission's *Annual Report of the Oklahoma Tax Commission* reports.[28] Over the past ten years, the state tax revenue as a percent of state GDP was 5.5 percent.

State of Oklahoma Tax Revenue as a Percent of State GDP

Year	Oklahoma Tax Revenue*	Oklahoma GDP	Ratio
2005-06	$8,435,214,025	$136,804,000,000	6.2%
2006-07	$8,685,842,682	$144,171,000,000	6.0%
2007-08	$9,008,981,280	$155,015,000,000	5.8%
2008-09	$8,783,165,581	$143,380,000,000	6.1%
2009-10	$7,774,910,000	$151,318,000,000	5.1%
2010-11	$8,367,871,162	$165,278,000,000	5.1%
2011-12	$8,998,362,975	$173,911,000,000	5.2%
2012-13	$9,175,334,979	$182,447,000,000	5.0%
2013-14	$9,550,183,790	$190,171,000,000	5.0%
2014-15	$9,778,654,182	$180,425,000,000	5.4%
Average	$8,855,852,065	$162,292,000,000	5.5%

Source: U.S. Department of Commerce Bureau of Economic Analysis and Oklahoma Tax Commission

* Gross collections from state-levied taxes, licenses and fees, exclusive of city/county sales and use taxes and county lodging taxes

The value added of an industry, also referred to as gross domestic product (GDP)-by-industry, is the contribution of a private industry or government sector to overall GDP. The components of value added consist of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus. Changes in value added components such as employee compensation have a direct impact on taxes such as income and sales tax. Other tax revenues such as alcoholic beverage and cigarette taxes are also positively correlated to changes in income.

Because of the highly correlated relationship between changes in the GDP by industry and most taxes collected by the state, the ratio of government tax collections to Oklahoma GDP forms the evaluation basis of the fiscal implications of different incentive programs offered by the State. The broader the basis of taxation (i.e., income and sales taxes) the stronger the correlation; with certain taxes on specific activity, such as the gross production (severance) tax, there may be some variation in the ratio year-to-year, although these fluctuations tend to smooth out over a period of several years. This ratio approach is

[27] http://www.bea.gov/regional/

[28] https://www.ok.gov/tax/Forms_&_Publications/Publications/Annual_Reports/index.html

somewhat standard practice, and is consistent with what IMPLAN and other economic modeling software programs use to estimate changes in tax revenue.

Data Collection, Model Inputs, and Other Issues

The project team performed the following steps to derive the economic and tax revenue impact:

1. The project team collected existing data and studies from State of Oklahoma agencies including the Oklahoma Tax Commission and Oklahoma Department of Commerce.

2. The project team collected and analyzed studies performed or commissioned by other organizations such as the State Chamber of Oklahoma and Economic Impact Group, LLC.

3. Data on Oklahoma annual wind capacity installed and generation was obtained from the U.S. Energy Information Administration (EIA) [29] for the years 2013 to 2015.

4. Retail and wholesale electric utility data for the State of Oklahoma and surrounding power regions were downloaded from the EIA website.

5. Based on EIA reported wind generation (not capacity) and estimates on the wholesale price charged by wind companies, it was possible to estimate the annual revenue of Oklahoma windfarms.

6. IMPLAN sector 45 Electric Power Generation – Wind was used to model the economic impact.

7. The National Renewable Energy Laboratory JEDI (Jobs and Economic Development Impact) Model[30] was utilized to compare and assess the IMPLAN results.

8. There was not sufficient detail available to model the economic impact of constructing and installing the windfarms. While some studies have made this calculation, there is a tremendous amount of variation between the impacts reported. For example, the JEDI model uses default assumptions regarding if input purchases are made within the region and state. Based on research and conversations with industry representatives, the project team determined that it was not possible to determine the level of instate input purchase. To accurately make this calculation, each windfarm developer would need to be surveyed regarding construction and equipment purchases. Therefore, the project team decided not to calculate the economic impact of construction.

[29] http://www.eia.gov/
[30] http://www.nrel.gov/analysis/jedi/about_jedi.html

9. According to employment data obtained from the Oklahoma Employment Security Commission[31] and US Bureau of Labor Statistic[32], State of Oklahoma sector NAICS 221115 – Wind Electric Power Generation employed 154 workers in 2015. These figures are consistent with the direct employment values derived from the IMPLAN model.

10. Based on existing studies and conversations, the wind industry pays land owners about $10,000 per year per turbine to lease the land. This additional household income is included was factored in to the economic impact analysis.

Annual Economic Impact of Wind Farm Operations in the State of Oklahoma

Year		Output	Value Added	Labor Income	Employment	Estimated OK Tax Revenue
2011	Direct Effect	$186,377,754	$118,695,707	$7,537,540	70	
	Indirect Effect	$72,130,053	$34,091,681	$23,274,852	414	
	Induced Effect	$23,025,788	$12,570,524	$7,116,019	174	
	Total Effect	$281,533,595	$165,357,912	$37,928,411	658	$8,496,298
2012	Direct Effect	$272,978,610	$173,847,942	$11,039,876	102	
	Indirect Effect	$105,645,449	$49,932,459	$34,089,566	606	
	Induced Effect	$33,724,774	$18,411,448	$10,422,494	255	
	Total Effect	$412,348,832	$242,191,849	$55,551,935	964	$12,261,948
2013	Direct Effect	$375,108,091	$238,889,669	$15,170,224	141	
	Indirect Effect	$145,170,578	$68,613,689	$46,843,494	833	
	Induced Effect	$46,342,222	$25,299,722	$14,321,861	351	
	Total Effect	$566,620,892	$332,803,080	$76,335,580	1,324	$17,219,629
2014	Direct Effect	$417,557,921	$265,924,078	$16,886,992	156	
	Indirect Effect	$161,599,086	$76,378,490	$52,144,628	927	
	Induced Effect	$51,586,629	$28,162,814	$15,942,622	390	
	Total Effect	$630,743,636	$370,465,381	$84,974,243	1,474	$18,630,857
2015	Direct Effect	$385,427,183	$245,461,439	$15,587,552	144	
	Indirect Effect	$149,164,169	$70,501,228	$48,132,142	856	
	Induced Effect	$47,617,081	$25,995,709	$14,715,851	360	
	Total Effect	$582,208,433	$341,958,375	$78,435,545	1,361	$17,172,783

Source: TXP, Inc.

This information is an important component part of the analysis related to several of the criteria for evaluation. First, it is evident that criteria related to employment and labor income associated with this incentive are relatively small. To date, the jobs associated with the credit in the last year with data available are less than 1,400, and the payroll less than $80 million. Second, the additional income generated by the credit (primarily through leases of the land for the wind turbine facilities) is useful but

[31] http://www.oesc.state.ok.us/lmi/QCEWHistorical/Default.aspx
[32] http://www.bls.gov/

not, in the context of the overall state economy, all that substantial, from an aggregate economic impact standpoint. These factors will be considered in the Outcomes chapter.

Technical and Administrative Issues

Overview

The general operation of this credit is relatively straightforward. There are essentially three components to overall program administration:

1. **Eligibility.** The facility must have a rated production capacity of one megawatt or greater and use wind, moving water, sun, or geothermal energy as its fuel source. It is notable that production capacity is largely a function of the size of the turbine rotor blades. The larger commercial grade blades generally have rotor diameter of 100 feet to more than 325 feet, with a hub height of 164 to more than 260 feet.

   The facility must also qualify as a 'Zero Emission Facility.' The Oklahoma Department of Environmental Quality must determine that the construction and operation of the facility will result in no pollution or emissions harmful to the environment.

   As amended in 2014, the facility must also be placed into operation by December 31, 2020.

2. **Determining the Credit.** The corporate entity claims the credit on its Oklahoma corporate income tax return, and the Tax Commission is responsible for determining the eligibility for the credit and, if, necessary, administering any refund based on that credit.[33]

3. **Reporting.** Once the tax year is completed and timely returns have been filed and processed, the Tax Commission is the source for data associated with the use of the tax credit.

Determining eligibility for each of these requirements is the responsibility of the taxpayer claiming the credit (with, as previously noted, a requirement that the Department of Environmental Quality ; ultimately, the Tax Commission is responsible for determining whether the facilities comply with the requirements for claiming the credit – and then claim the proper amount.

Reporting

There is no specific requirement for facility reporting related to the electricity generated that is eligible for the credit. As a result, the only information available for determining its use (or potential financial impact going forward) is from the filed tax returns.

This is complicated by the fact that the mechanisms for determining the amount and use of the credit have changed on more than one occasion. As noted in the introduction, the value of the credit has changed, as has the ability to either transfer the credit or claim a refund above the amount of tax owed.

[33] For tax year 2015, for example, those claiming the credit must also file form 511CR, which is Oklahoma's Other Credits Form. Line 15 of that form requires the taxpayer to enter three numbers: unused credit carried over from prior years, credit established during the current tax year, and total available credit.

The primary complication at present relates to the change in the credit for tax year 2014 and beyond compared to prior years. For credits earned prior to January 1, 2014 these credits may be transferred at any time during the 10 years following qualification of the facility to any taxpayer by filing a transfer agreement and getting acknowledgement by the Tax Commission of the credits earned. To obtain acknowledgement, the taxpayer would enclose a schedule showing the number of kilowatt hours of electricity generated during each month of the taxable year and the calculation of the credit.

Any credit generated, but not used, on or after January 1, 2014 may be partially refunded, at 85 percent of the value of the credit, by filing form 578. As a result, it is likely that the amount of credit generated in each tax year from 2014 onward is more readily estimated than to tax years prior to 2014.

There are also questions as to whether the extent of the use of the transferred credits is readily understood. While there is a requirement that the transfer be reported and the amount of the earned credit acknowledged, the actual use of the credit by the taxpayer who purchases it applies it against other taxes. As a result, the data reported on tax collections by type of tax is distorted by this transfer, and it is difficult to ascertain the amount of the zero emissions tax credit used (and remaining to be used) in any tax year. It is notable, of course, that this relates to use of credits earned prior to January 1, 2014, so it will be a declining issue in all succeeding years.

Administration

The legislation that created the credit did not provide for a significant State department role in the overall administration of the credit. As noted, other than determining that a facility has a rated capacity of over 1 megawatts and is a 'zero emission' facility, there are no up-front eligibility requirements. Likewise, determining the amount of the tax credit requires to only know the amount of the energy generated by the facility – there are no job, payroll, capital investment or other requirements. As a result, administration is not a material aspect of the existing program.

Outcomes

Overview

From the prior discussion, the following have been identified as key issues for evaluation of the Zero Emission Tax Credit:

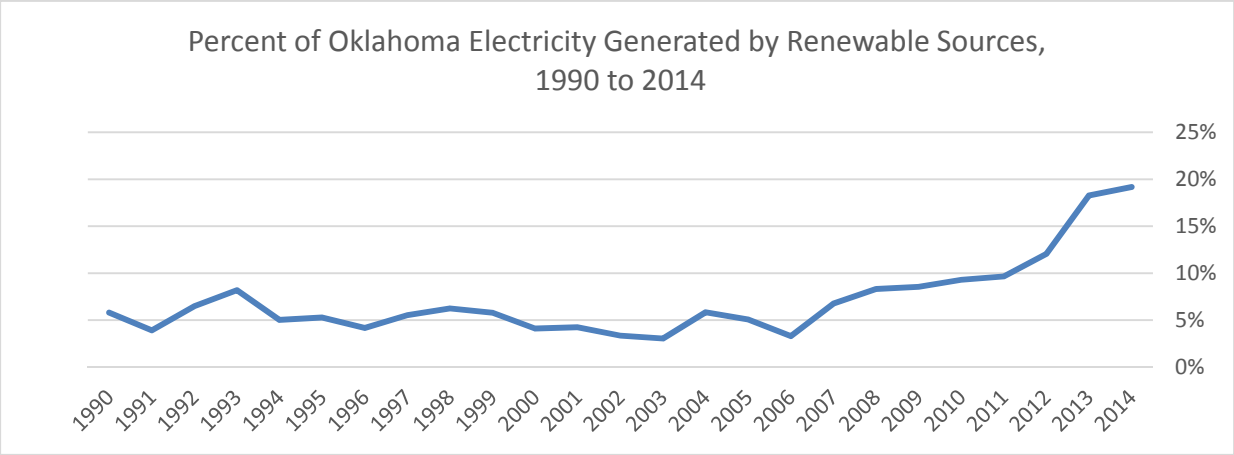
1. What has been the impact of the credit on identified goals?

2. How does Oklahoma's experience compare to the nation as a whole and other states?

3. How should the identified costs be weighed against the benefits (both quantitative and qualitative)?

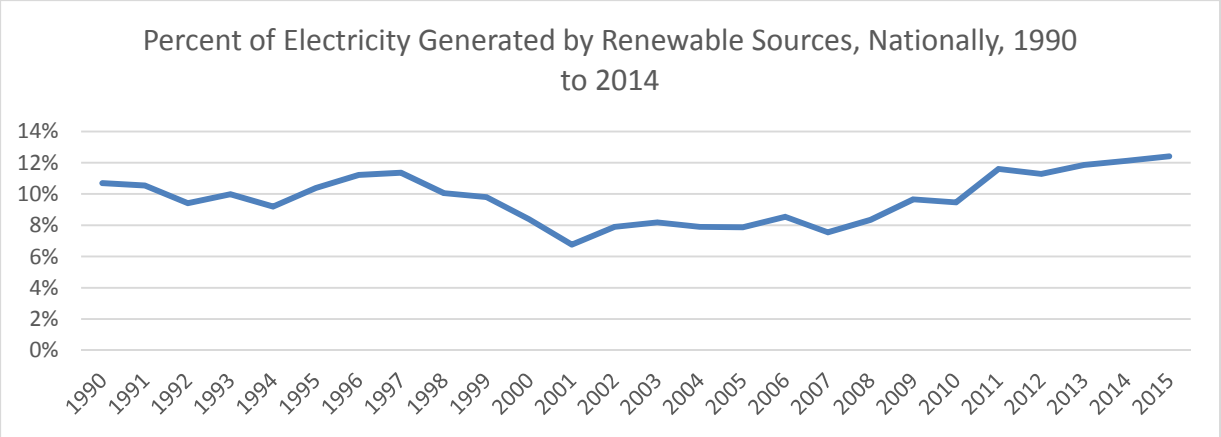
Impact on Identified Goals: Renewable Energy

As already noted, Oklahoma has made significant progress in renewable energy sources as a percent of total electricity generation. While the percentage remained relatively constant from 1990 to 2005, there has been significant positive change, particularly in the past few years. The following chart reflects the share of Oklahoma electricity generated by renewable sources since 1990:



	2010	2011	2012	2013	2014
Percent of Oklahoma Electricity Generated using Renewable Sources	9.29%	9.65%	12.06%	18.28%	19.18%

While this is an impressive improvement – and has helped the State achieve its goal of 15 percent of electricity generated by renewable sources – it (at least partially) mirrors trends across the country. There are a variety of differing energy alternatives that have regional applicability (such as hydroelectric power in some portions of the country as well as wind and solar in others), but nationally, the trend has been toward a greater portion of electricity generated by renewable sources:



Within the wind generation field, there has also been strong growth nationally, and most of that growth has been concentrated in a handful of states. In 2015, there was a surge of new wind power added nationally, totaling 8,598 Megawatts of new capacity. This brings the total for the US to nearly 74,000 Megawatts.[34] Texas added the most wind capacity (42 percent of total wind additions), followed by Oklahoma, Kansas, Iowa, and North Dakota. Notably, the wind power capacity installed in Iowa, South Dakota and Kansas supplied more than 31 percent, 25 percent and 24 percent, respectively, of all in-state electricity generation in 2015. A total of 12 states have achieved wind penetration levels of 10 percent or higher. All of these states are located in the central part of the country, where wind resources are most plentiful – new generation capacity in the interior region of the US over the last decade totaled 54 percent. In Texas, new wind power records are continuously being set.[35]

An important factor is the continued availability of the federal PTC. That credit, $0.023 per kilowatt hour, is far more substantial than any of the state PTCs. As a result, its impact on the determination of whether to go forward with an eligible project is likely far greater than for any of the state credits. This is important when noting that not all of the states within this region use state production tax credits – Texas is the most notable example of that, and it is the clear national leader in this industry. Texas has certain unique characteristics – including extremely strong winds in West Texas and a mostly self-contained power grid – but is certainly a counterpoint to the claim that PTCs are the primary factor in location of wind facilities.

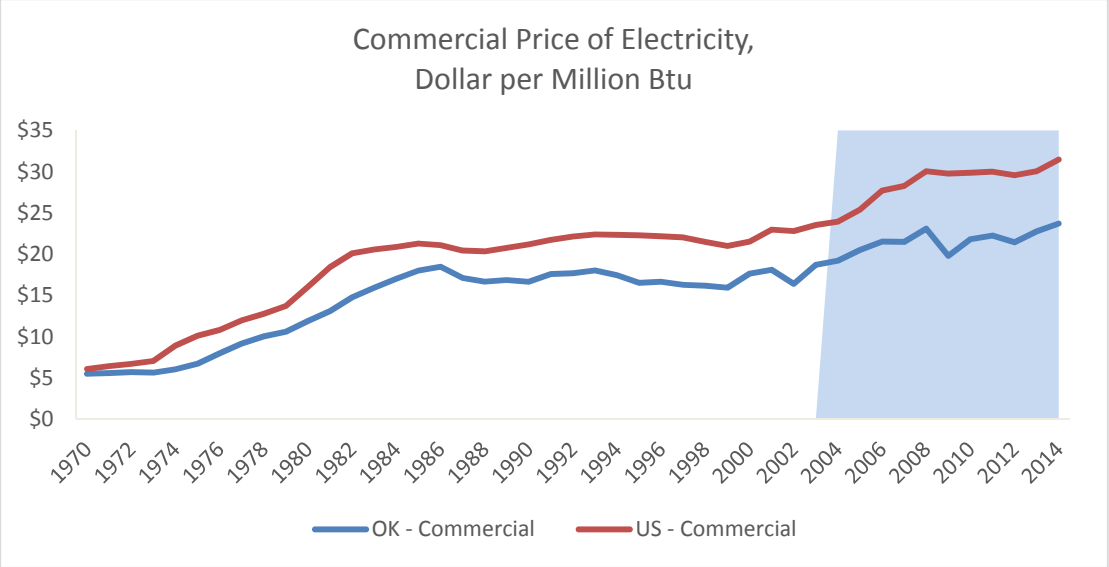
Impact on Identified Goals: Cost of Electricity

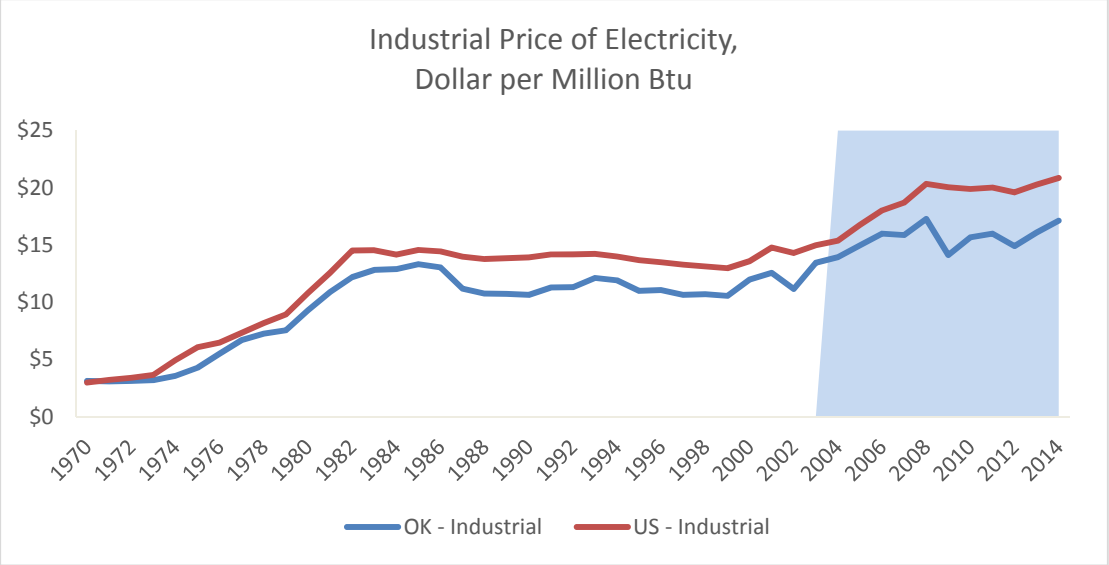
One of the outcomes identified from the growth in the use of renewable energy is its impact on the cost of electricity within the state. The general argument is that renewable sources have lower operating costs (including no or minimal fuel cost and being generally less labor-intensive than other types of facilities), and this lowers the average cost of electricity. It has been pointed out that Oklahoma has among the lowest costs for electricity in the country. In this regard, the State benefits both from its

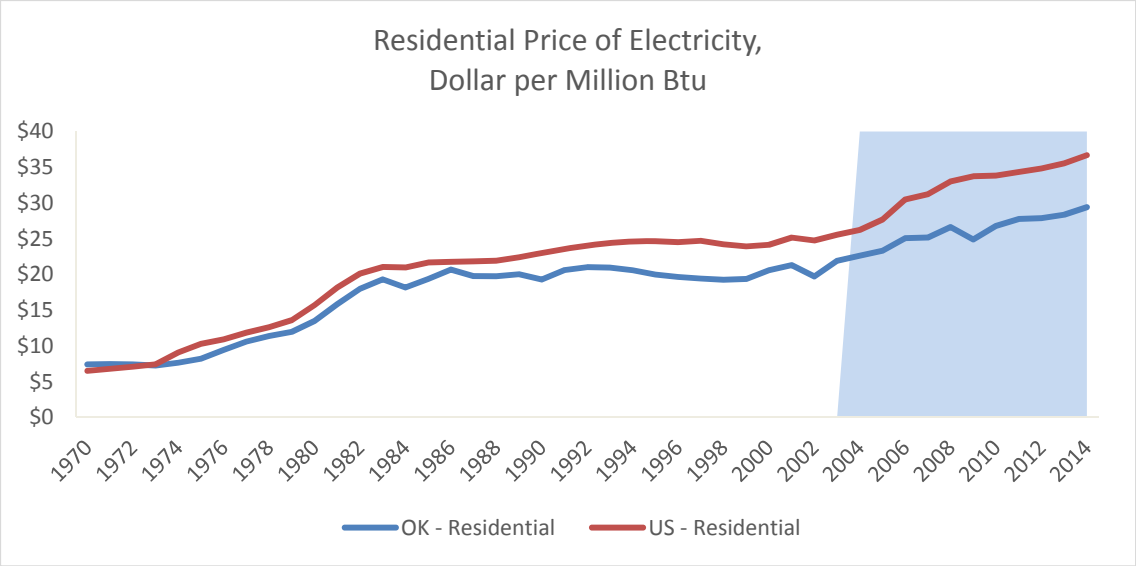
[34] "2015 Wind Technologies Market Report," US Department of Energy, August 2016, p. 3.
[35] Ibid., pp. 7-9.

wind/solar and its natural gas industries, as readily available natural gas is a perfect complement to wind/solar for when the wind isn't blowing and the sun isn't shining.

The following chart tracks the price of electricity in both Oklahoma and the nation as a whole for the years 1970 through 2014 for commercial, industrial and residential users:







The charts suggest that the price of electricity (for all three sectors) has generally been below the US average since the 1970s. There has been a gradual spread away from the average for the State – which in particular grew in the time around 2010. While this would appear to support the argument that renewable sources have contributed to this relative improvement versus the US as a whole, renewables are a much smaller share of the overall mix than the primary sources – particularly natural gas. In that respect, basic statistics suggests that natural gas (and its low price levels versus historic averages) is likely a larger factor in this recent growing spread.

One of the important considerations related to this industry and the cost of electricity relates to the projected development of the Clean Line: as discussed, that project will transport the generated power out of Oklahoma to the Memphis, Tennessee region. In essence, State tax credits will incent the production of electricity that does not benefit Oklahoma electricity consumers. In this case, these projects provide no spin-off benefit other than the capital investment, lease payments and any construction and ongoing operations and maintenance jobs related to these facilities.

Impact on Identified Goals: the 'But For' Test

An important factor in considering the efficacy of incentives is consideration of whether the incentive is necessary to spur the initial investment. In the theory of incentives, the 'but for' test refers to the argument that a project or a capital investment would not be made without the incentive ('but for the incentive' the zero emission facility would not be built in Oklahoma). In the case of many projects, the existence of incentives in other states can be cited as a need for the Oklahoma incentive – 'but for' the Oklahoma incentive, the project will occur in another state. In the case of this tax credit, there are arguments that this is not the case. Among them are the location of renewable power facilities in specific areas of the country, including in states (like Texas) that do not have similar state credits.

Another 'but for' argument relates to the significant capital costs associated with these facilities. It is generally agreed that the ongoing costs of zero emission facilities are lower than other sources of electricity, but the upfront capital costs are much higher. This is the crux of the argument for the need

for a multi-year production credit. While it is likely that this has been the case, a case can be made that this dynamic is changing.

For example, wind turbine prices are well below prior year levels. While turbine prices were roughly $750 per kilowatt from 2000 to 2002, and then increased to approximately $1,500 per kilowatt by the end of 2008, they have dropped substantially, and current pricing is in the $850–$1,250 per kilowatt range. These price reductions, coupled with improved turbine technology, have exerted downward pressure on project costs and wind power prices. As a result, the installed project cost in a US Department of Energy sample averaged about $1,690 per kilowatt — down $640 per kilowatt from the peak in average reported costs in 2009 and 2010. It appears that costs in 2016 are about the same as for 2015.[36] It is also notable that for projects built in 2015, the (windy) Interior region of the country was the lowest-cost region, with a capacity-weighted average cost of $1,640 per kilowatt. This provides further evidence that there are factors (primarily wind-related) that are critical to the success of wind power projects in this region.

There is also an argument that can be made that the 'but for' test for wind power facilities will be impacted by exogenous variables. For example, wind power prices remain very low. After topping out at nearly $70 per megawatt for power purchase agreements (PPAs) executed in 2009, the national average level-through price of wind PPAs has dropped to around the $20 per megawatt level, inclusive of the federal PTC, though this latest nationwide average is admittedly focused on a sample of projects that largely hail from the lowest-priced Interior region of the country, where most of the new capacity built in recent years is located. Today's low PPA prices have been enabled by the combination of higher capacity factors, declining costs, and record-low interest rates.

As a result, the relative economic competitiveness of wind power declined in 2015 with the drop in wholesale power prices. A sharp drop in wholesale power prices in 2015 made it somewhat harder for wind power to compete, notwithstanding the low wind energy PPA prices available to purchasers. This is particularly true in light of the continued expansion of wind development in the Interior region of the U.S., where wholesale power prices are among the lowest in the nation.

Business Attraction

Incentives are frequently created and used to attract a specific industry (in this case the renewable energy industry) and related firms that may be suppliers to or customers of that industry. In the case of renewable fuels, there are major companies that are attracted to States with plentiful renewable energy resources. This claim was made by state economic development professionals, and, as corroboration, it has been cited by major firms as a component of their location decision making. While this provides support for maintaining the renewable energy industry, it could also be argued that the benefit of a strong renewable fuels presence in the State has been achieved with the use of the credits to date, and additional renewable energy may not be needed to make that case to firms considering locating in Oklahoma. This argument is buttressed by the fact that the Clean Line development would not supply the State with additional renewable energy but would transport that electricity to out-of-state users.

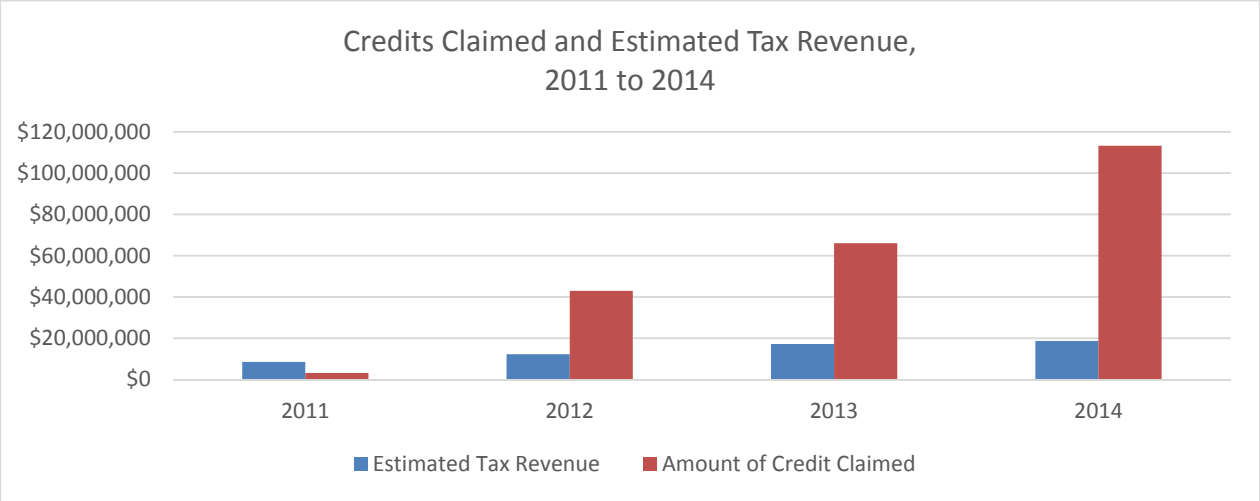
[36] Ibid., p. 9.

Connection with other State Incentive Programs

An important topic for discussion is how this program interacts with other State incentive programs. The program with the most intersection is the Ad Valorem Tax Exemption for Qualifying Manufacturing Concerns. Facilities that qualify for the Zero Emission PTC may also qualify for the Exemption for Qualifying Manufacturing Concerns.[37] Data from that program indicates that for 2012 through 2016, 213 exemptions under the program were granted, totaling $117.2 million in State appropriations to replace exempted local ad valorem taxes. While not included in the cost benefit analysis for this specific program, those additional costs should be taken into consideration when determining the fiscal costs and economic impact of both programs.

Cost Benefit Analysis

The financial analysis suggest that the costs of providing the Zero Emission Tax Credit are substantial, and likely to continue to grow in the near future. The economic impact analysis suggests that while there are positive economic impacts associated with the activity generated by the credit, it does not approach the level of the tax incentive. The following chart demonstrates the quantitative components of the cost benefit analysis:



Of course, these are aggregate impacts; there likely are counties in the State where the economic activity (such as the lease revenue) are vitally important for the local economy. However, when viewed from the perspective of the State as a whole, this is not the case.

Besides the quantitative measures as captured in the IMPLAN input-output model, there are factors – such as reduced cost of electricity – that should be taken into consideration as well. However, given the still relatively small portion of the overall energy supply provided by renewable sources, it is difficult to make the case that this is the significant driver in lower priced electricity. Even accepting that this benefit exists, it raises equity issues, as the benefit to large consumers of electricity may be borne by the larger

[37] Qualifying concerns receive a five-year ad valorem (property) tax exemption for all real and personal property.

share of overall state tax revenue shouldered by smaller residential consumers of electricity through personal income taxes.

Summary and Recommendations

Recommendation: Partially Repeal and Reconfigure

The renewable fuel industry in Oklahoma has made substantial gains in recent years. Most of the analysis has focused on the wind industry, as it makes up approximately 90 percent of the use of the tax credit for zero emission facilities – but other facilities, particularly solar facilities – should not be entirely overlooked, particularly for how the credit might function in the future.

Within the renewable fuel industry, there has been substantial new investment and new facilities in the years since the enactment of this credit. A reasonable case can be made that the credit has helped to spur the growth of the industry, and this has helped the State achieve its legislative goal of 15 percent of electricity generated from renewable sources.

There have been benefits to the State from the growth of the renewable energy industry: there are jobs and payroll associated with the facilities, as well as lease payments for owners of the land where the facilities are located. Beyond these direct benefits, there is the advantage of a more diversified energy portfolio for the State – although given its abundant energy resources, this may not be as substantial an issue as in some energy importing states. Finally, there may well be an impact on the overall costs for electricity in the State, although given its still relatively small share of the amount of electricity generated in Oklahoma, it certainly cannot be the primary reason for price competitiveness.

Of more substantial concern is the magnitude of the tax benefit. The financial analysis suggests that the impact of the tax credit will continue to grow – and, once facilities are in operation, those credits are available for 10 years. Given the substantial new projects under development (some of which will supply power only to out-of-state consumers), there is substantial risk of continuing the existing credit without some form of cap.

There are also concerns that the information available to state policymakers about the extent of the financial impact from the credit on a year-to-year basis (given the ability for credits earned prior to January 1, 2014 to be transferred to other taxpayers). It is difficult to determine exactly when those earned credits will be used, which complicates budget forecasting and planning.

Recommendations for the Commission:

- **Reconfigure the Existing Credit.**
  While the existing credit will not be available to facilities in operation after December 31, 2020, that currently provides over a three year window for additional facilities to be put into operation, including those that may become part of the Clean Line. Given the substantial cost – and less substantial State financial benefit - the project team recommends one of two approaches related to wind facilities and another recommendation for non-wind qualifying facilities. As it relates to wind, the State could cap the amount of new credits for these facilities that are operational after January 1, 2018 at an amount that is considered financially acceptable to the State; this would allow facilities that are currently under construction (and thus having an expectation of receiving credits) to be completed and receive the full benefit of the credit. Those facilities that will not be operational prior to January 1, 2018 are put on notice that they may not receive the full benefit of the existing credit. The alternative would be to accelerate the date where facilities are no

longer eligible for the credit – changing it from January 1, 2021 to January 1, 2018. This would still allow those facilities that are under construction to get into operation by January 1, 2018 (over one year), but would signal that the state credit will not be available to facilities that are operational after that date.

As it relates to other facilities, it may well be in the long-term interest of the State to continue to offer the credit for non-wind generating facilities up to the existing cut-off date of December 31, 2021. These industries (such as solar) are still in their formative stages, and this continued assistance may provide for further diversification of the State's energy sources.

- **Increase Reporting for the Credit.**
  The project team recommends that the statute also be revised to require that, if the credit is maintained, facilities that receive approval as a Zero Emission Facility (and thus eligible for the credit) be required to annually report to the Tax Commission on a schedule developed by the Tax Commission the energy generated by qualified facilities and subject to the credit by month for the tax year.