Department of Revenue

Wind Energy Production Tax Credit
and
Renewable Energy Tax Credit

Tax Credits Program Evaluation Study

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Preface

Iowa Code Section 2.48 directs the Department of Revenue to review certain tax expenditures it administers. The review shall consist of evaluating the tax credit and assess its equity, simplicity, competitiveness, public purpose, adequacy, and extent of conformance with the original purpose of the legislation that enacted the tax expenditure, as those issues pertain to taxation in Iowa. The schedule provided in Iowa Code Section 2.48 requires a review in 2024 of the Wind Energy Production Tax Credit and the Renewable Energy Tax Credit authorized under sections 476B and 476C. This is the Department of Revenue's third evaluation study completed for the Wind Energy Production Tax Credit and the Renewable Energy Tax Credit expenditures. Prior studies were completed in 2014 and 2019.

As part of the evaluation, an advisory panel was convened to provide input and advice on the study's scope and analysis. We wish to thank the members of the panel:

Kristin Hanks-Bents	Iowa Economic Development Authority
Liesl Eathington	Iowa State University
Tim Johnson	Iowa Farm Bureau
Ryan Lovan	Iowa Utilities Commission

The assistance of an advisory panel implies no responsibility for the content and conclusions of the evaluation study. This report was also reviewed by Robin Anderson, Ph.D., State Chief Economist and Division Administrator of the Research and Policy Division. This study and other evaluations of Iowa tax credits can be found on the evaluation study web page on the Iowa Department of Revenue website.

Table of Contents

Preface 2

Executive Summary 5

I. Introduction 7

II. Background of the Wind Energy Production and Renewable Energy Tax Credits 7

- **A. Wind Energy Production Tax Credit** 8
- **B. Renewable Energy Tax Credit** 9

III. Other State Incentives for Renewable Energy 10

- **A. Overview of Incentives for Renewable Energy** 10
- **B. General Tax Incentives for Renewable Energy** 11
- **C. Production Tax Credits for Renewable Energy** 11

IV. Literature Review 13

V. The Electric Power Industry and Wind Energy in Iowa 14

- **A. Brief Profile of the Electric Power Industry** 14
- **B. Wind Energy Generation by Sector** 15
- **C. Tax Credit Projects** 16
- **D. EIA Data and Tax Credit Data** 16

VI. Wind Energy Production and Renewable Energy Tax Credit Awards and Claims 17

- **A. Tax Credit Awards and Transfers** 17
- **B. State of Residence of Awardees** 18
- **C. Tax Credit Claims by Tax Type** 19

VII. Economic Analysis of the Wind Energy Production and Renewable Wind Energy Tax Credits 19

- **A. Renewable Energy Investment and Energy Production** 19
- **B. Issues Surrounding Transferable Tax Credits** 20
- **C. Property Tax Implications** 21

VIII. Conclusion 23

References 24

Tables and Figures 26

Table 1. Production Tax Credits for Renewable Energy by State 27

Figure 1. Wind Turbines in Iowa..... 28

Table 2. Electricity Generation in Iowa by Sector and Energy Source, 2022 29

Table 3. Number and Aggregate Capacity of Electricity-Generating Plants in Iowa by Sector and Energy Source, 2022..... 30

Table 4. Tax Credit Project Nameplate Capacity in Production and Program Capacity Cap, 2021..... 31

Table 5. Number and Capacity of Wind Energy Plants in Iowa by Sector and Wind Energy Production or Renewable Energy Tax Credit Approval 32

Figure 2. Total Nameplate Capacity of Operational Tax Credit Wind Projects by County..... 33

Table 6a. Renewable Energy Tax Credit Awards and Transfers by Year 34

Table 6b. Wind Energy Production Tax Credit Awards and Transfers by Year..... 35

Table 7. Wind Energy Production and Renewable Energy Tax Credit Awards by Awardee State of Residence, all years 36

Table 8. Renewable Energy and Wind Energy Production Tax Credit Claims by Tax Year..... 37

Table 9a. Renewable Energy Tax Credit Claims by Tax Type, Tax Years 2006 through 2023..... 38

Table 9b. Wind Energy Production Tax Credit Claims by Tax Type, Tax Years 2009 through 2023 38

Table 10. Electricity Generated from Wind Under the Wind Energy Production and Renewable Energy Tax Credit Programs and Total in Iowa by Year 39

Figure 3. Megawatt Hours Generated from Wind Under the Wind Energy Production and Renewable Energy Tax Credit Programs Compared to Sector Totals by Year..... 40

Figure 4. Megawatt Hours Generated from Solar Under the Renewable Energy Tax Credit Program Compared to Sector Totals by Year..... 41

Table 11. Special Valuation of Wind Energy Conversion Property 41

Table 12. Assumptions for Calculating Property Tax Impact Associated with Wind Energy Production and Renewable Energy Tax Credit Wind Projects 42

Table 13. Estimate of Property Tax Impact Associated with the Wind Energy Production and Renewable Energy Tax Credit Wind Projects 43

Executive Summary

The Wind Energy Production Tax Credit and the Renewable Energy Tax Credit are State tax credits awarded for the production of energy from wind and other renewable sources. The Wind Energy Production Tax Credit is equal to $0.01 per kilowatt-hour of electricity generated from wind at facilities located in Iowa. The Renewable Energy Tax Credit is equal to $0.015 per kilowatt-hour of electricity. Different rates apply for other forms of energy production. Note that the terms “facility” and “project” are used interchangeably throughout the evaluation study.

Applications for tax credit eligibility are subject to review and approval by the Iowa Utilities Commission and tax credit certificates are awarded by the Department of Revenue. Under both programs, the tax credits for production by each approved facility are available for a ten-year period starting from the facility’s in-service date. The tax credits are nonrefundable with a seven year carryforward and are also transferable.

No new facilities can be approved after 2012 under the Wind Energy Production Tax Credit program. The program is limited in aggregate to facilities with 50 megawatts nameplate capacity. The Renewable Energy Tax Credit program is limited in aggregate to 363 megawatts nameplate capacity for wind energy facilities and 63 megawatts for facilities based on other forms of energy. The total capacity of currently operational wind projects and non-wind projects are 128 megawatts and 45 megawatts, respectively.

The major findings of the study are these:

Other State Incentives for Renewable Energy

- All fifty states and the District of Columbia offer some form of tax incentive for the production of energy from renewable sources or for improved energy efficiency. Sixteen states, including Iowa, offer incentives affecting individual or corporation income tax. Eleven states offer tax credits that target large-scale energy production or investment in renewable energy production facilities.
- Since the last tax credit evaluation study conducted in 2019, of the six states that offered tax credits for large-scale production of energy, the deadline for placing a new facility in service has passed or the program has sunset for all six states’ programs. In addition to Iowa, these states are Arizona, Florida, Maryland, New Mexico, and Oklahoma.
- New Mexico and Maryland offer fully refundable production tax credits. In Oklahoma, tax credits earned in 2014 and after may be refunded at 85 percent of their value.
- The rate for Iowa’s Renewable Energy Tax Credit, $0.015 per kilowatt hour, is the highest state tax credit rate for energy produced from wind and other non-solar sources.
- Iowa is the only state whose production tax credits are fully transferable.

The Electric Power Industry and Wind Energy in Iowa

- Between 2000 and 2022, growth in wind energy capacity in Iowa increased by a factor of more than 63 and outpaced growth nationally. Approximately nine percent of the United States' wind energy capacity is located in Iowa. Wind is the source of 63 percent of electricity generated in Iowa, the highest of any state.
- As of 2022, there were 155 wind power plants in Iowa, consisting of more than seven thousand individual wind turbines. Seventy-nine plants were operated by investor-owned utilities, municipally-owned utilities or rural electric cooperatives, and 75 were operated by independent power producers. One was operated for commercial or industrial use.
- Wind Energy Production Tax Credits are available to facilities regardless of whether they are owned by utilities or independent power producers. The Renewable Energy Tax Credit is limited to facilities owned by independent power producers or rural electric cooperatives.
- Operational wind energy projects approved for either Wind Energy Production Tax Credits or Renewable Energy Tax Credits are located in 22 counties in Iowa.

Wind Energy Production and Renewable Energy Tax Credit Awards and Claims

- In 2023, the total value of Renewable Energy Tax Credit awards was $2.8 million. The average certificate amount was $15,000. Since its beginning, a total of $68.2 million in tax credits has been awarded under the program. Of this amount, 81.0 percent has been transferred to third parties.
- Since its inception, the Wind Energy Production Tax Credit program has awarded $15.8 million in tax credits. Overall, 91.0 percent of the total program award amount has been transferred.
- 128 MW of the 363 MW of wind energy capacity available for tax credits under the Renewable Energy Tax Credit program are associated with operational projects. As projects must be approved by January 1, 2018, no new projects will be approved.
- Forty-nine percent of Wind Energy Production Tax Credits awarded were to Iowa residents. Sixty-one percent of Renewable Energy Tax Credits awarded were to Iowa residents.
- A total of $55.2 million in Renewable Energy Tax Credits and $14.1 million in Wind Energy Production Tax Credits have been claimed.

Economic Analysis of the Wind Energy and Renewable Energy Tax Credits

- In 2013, wind energy for which tax credits were granted under either the Wind Energy Production and Renewable Energy Tax Credit programs accounted for 6.8 percent of wind energy generated by independent power producers in Iowa and 3.0 percent of the state's total wind-generated electricity, the highest percentages of any year under the programs. In 2022, these percentages decreased to 1.9 percent and 0.5 percent, respectively.

- Renewable Energy Tax Credits were awarded for 216,000 MWh of wind energy generated in 2022.
- The majority of all tax credits awarded under Wind Energy Production Tax Credit and Renewable Energy Tax Credit programs are transferred. Tax credits that are transferred are typically exchanged for less than their face value to third-party purchasers who may then claim the full value of the tax credit against Iowa tax liability.
- Analysis of wind energy projects approved by the Iowa Utilities Commission finds that the estimated average aggregate tax credit awards per project over the 10-year eligibility period is approximately $952,000.
- The increase in property tax revenue as result of facilities for which Wind Energy Production or Renewable Energy Tax Credits have been awarded is estimated to be $2.4 million in FY 2025.
- Iowa Code section 427B.26 provides for special assessment of wind energy conversion property of which the aggregate increase in property tax revenue to local jurisdictions is a result of wind energy facilities.

I. Introduction

The Wind Energy Production Tax Credit and the Renewable Energy Tax Credit programs provide tax credits for the production of energy from wind and other renewable sources by qualified facilities in Iowa. The purpose of this evaluation study is to analyze tax data and other pertinent information in order to assess these two tax credits with particular attention to the nature of their utilization and economic impact.

Section II of this report provides background on the tax credits. Section III provides information about similar tax credits in other states. Section IV provides a review of existing literature concerning markets and tax incentives for renewable energy. Section V provides an overview of the electric power industry in Iowa, with a particular focus on wind energy. Section VI presents data regarding Wind Energy Production Tax Credit and the Renewable Energy Tax Credit awards and claims. Section VII provides an analysis of the economic effects of the credits. The final section of this report provides a brief conclusion.

II. Background of the Wind Energy Production and Renewable Energy Tax Credits

Both the Wind Energy Production Tax Credit and the Renewable Energy Tax Credit became effective on July 1, 2005 to incentivize the production of renewable energy.

The Wind Energy Production Tax Credit was repealed July 1, 2022 but remains active. Only previously awarded tax credits which have been carried forward remain available.

A. Wind Energy Production Tax Credit

Information regarding the Wind Energy Production Tax Credit is provided for in Iowa Code Chapter 476B. The value of the tax credit is equal to $0.01 per kilowatt-hour of electricity sold or generated for on-site consumption. To be eligible for the tax credit, a facility must produce electricity from wind, be located in Iowa, and must be approved by the local board of supervisors and the Iowa Utilities Commission (IUC). Facilities must be placed in service within 18 months of approval by the IUC. This deadline, however, may be extended an additional 12 months upon request. There is no limit to the number of extensions that may be granted. A qualified facility must also have been originally placed in service between July 1, 2005 and July 1, 2012. Accordingly, no new facilities can be approved under this program. Initially set at July 1, 2007, the closing date for the placed-in-service period was extended twice by Iowa lawmakers prior to 2012.

For applications filed on or after March 1, 2008, the facility must consist of one or more wind turbines connected to a common gathering line which has a combined nameplate capacity of between two and thirty megawatts (MW). For applications filed on or after July 1, 2009, eligibility expanded to specified entities which produce electricity for their own use. Specified entities include public and private colleges or universities, public and private elementary and secondary schools, and public hospitals. These facilities must consist of wind turbines with a combined nameplate capacity of three-fourths of a MW or greater.

Wind Energy Production Tax Credit awards are not directly capped. However, the total capacity eligible to be approved for credits is limited. The program's limit was 450 MW when initially enacted. Effective in 2009, it was reduced to 150 MW. In 2011, the Legislature reduced the program limit to 50 MW aggregate nameplate capacity. Facility eligibility designations were granted on a first-come, first-served basis by the IUC. Tax credit certificates are awarded by the Iowa Department of Revenue (IDR) based on annual energy production reported by the facility. Tax credits for each approved facility are available for a ten-year period from the initial in-service date of the facility. Accordingly, as the ten-year period for all approved facilities has ended, no new tax credit awards can be approved under this program.

Wind Energy Production Tax Credits are nonrefundable, which means that while they offset tax liability, any credit amount greater than tax liability in the initial tax year of claim is not paid to the claimant and remains unused. (A refundable tax credit, by contrast, provides a net payment, or "refund," to the taxpayer in the event the credit amount exceeds tax liability.) Unused Wind Energy Production Tax Credit awards can be carried forward for up to seven tax years. The tax credits are also transferable, which means they may be sold by the awardee. Thus, the awardee may elect to sell all or part of the tax credit to one or more other taxpayers, which is beneficial if the awardee does not have sufficient tax liability to fully use the credit. Such an exchange may be desirable to the purchaser since the credit may be purchased at a discount; i.e., for less than its tax value. There is no limit to the number of times the Wind Energy Production Tax Credit may be transferred. The tax credits may be applied against corporation income, individual income, franchise, insurance premium, sales and use, and replacement taxes.

B. Renewable Energy Tax Credit

Information regarding the Renewable Energy Tax Credit is provided for in Iowa Code Chapter 476C. It is available to producers or purchasers of energy from an eligible renewable energy facility approved by the IUC. The tax credit can also be received for renewable energy produced for on-site consumption provided the facility is capable of producing not less than three-fourths megawatts. In addition, under Iowa Code §476.48, Renewable Energy Tax Credits are allowed for wind energy systems of one hundred kilowatts or less in Small Wind Innovation Zones. A Small Wind Innovation Zone is any political subdivision of the State, such as a city, county, or school district, that has declared itself such by adopting a model ordinance as provided in the Code of Iowa.

The value of the tax credit is equal to $0.015 per kilowatt-hour of electricity, $4.50 per million British thermal units (MMBTU) of heat for a commercial purpose, $4.50 per MMBTU of methane gas or other biogas used to generate electricity, or $1.44 per one thousand standard cubic feet (Mcf) of hydrogen fuel generated by and purchased from an eligible renewable energy facility. For purposes of the tax credit, a renewable energy facility may be one that converts wind energy, solar energy, biomass, or refuse, or which recovers biogas or methane gas. Co-generation facilities, which simultaneously generate electricity and useful heat, are also eligible. The renewable energy facility must also be located in Iowa.

In 2014, the deadline by which facilities must be placed in service was extended from January 1, 2015 to January 1, 2017, and two years later, was extended again to January 1, 2018. Since the establishment of the credit in 2005, when it was set at January 1, 2011, the Legislature has extended this deadline a total of three times, however, no new facilities can be approved under the program.

Credits are not directly capped. However, the maximum amount of aggregate generating capacity that can be approved for the credit is limited by law. Originally set at 90 MW for wind projects and 10 MW for other renewable energy projects, these limits have been increased several times. In 2006, they were doubled to 180 MW and 20 MW for wind projects and other renewable projects, respectively, and a limit of 167 billion British thermal units (BTU) was placed on tax credits for heat produced for a commercial purpose by a refuse conversion facility. Effective in 2009, the limit for wind energy was increased to 330 MW. In 2011, the Legislature again increased the limits from 330 MW to 363 MW for wind projects and from 20 MW to 53 MW for other renewable energy projects.

During the 2015 legislative session, the 167 MW cap on tax credits available for heat generation was changed to an annual cap rather than a lifetime cap. The credit is limited to 55 billion BTUs annually for any single applicant. Effective January 1, 2015, the maximum energy production capacity that may be approved for renewable energy tax credits that are facilities other than wind facilities was increased to 63 megawatts. Of those 63 megawatts, 10 megawatts were reserved for solar facilities contracted or owned by utility companies. During the 2016 legislative session, the modifications were made to

the qualifications and ownership requirements for solar facilities to be eligible for the 10 megawatts of generating capacity that is reserved for certain solar facilities.

As with the Wind Energy Production Tax Credit, facility eligibility designations are granted on a first-come, first-served basis by the IUC and tax credit certificates are awarded by the IDR based on annual energy production reported by the facility. Tax credits for each approved facility are available for a ten-year period from the facility's initial in-service date. Tax credits are nonrefundable, but unused credits can be carried forward for up to seven years. The Renewable Energy Tax Credit may be transferred to any person or entity, but each tax credit certificate can only be transferred once. The tax credits may be applied against corporation income, individual income, franchise, insurance premium, sales and use, and replacement taxes.

III. Other State Incentives for Renewable Energy

A. Overview of Incentives for Renewable Energy

The Database of State Incentives for Renewables and Efficiency (DSIRE) is a web-based catalog of state and federal incentives for renewable energy and energy efficiency. Sponsored by the U.S. Department of Energy, it includes information about states' tax credits and other tax incentives for generating power from renewable sources. The following analysis is adapted from the DSIRE database as well as from information published by government agencies of various states.

According to the DSIRE database, all 50 states and the District of Columbia offer some form of incentive for renewable energy or energy efficiency, which may include not only tax-related incentives but also grants, loans, and other forms of industry support. Such incentives vary widely. They include financial incentives to homeowners to install energy-efficient appliances as well as support for major capital investment projects. In addition, they embrace a wide range of energy technologies, including, for example, those based on solar, geothermal, and biomass energy sources.

The example of Iowa illustrates the variety of incentives available among the states. In addition to the Wind Energy Production and Renewable Energy Tax Credits, Iowa provides a state sales tax exemption for wind energy equipment and systems-related materials as well as a five-year property tax exemption for value added by solar and wind energy systems.

Iowa also provides support for renewable energy development in ways that go beyond tax policy. These include energy infrastructure loan programs like the Alternate Energy Revolving Loan Program (AERLP) and the Energy Infrastructure Revolving Loan Program (EIRLP) administered by the Iowa Energy Center. Before the program ended in 2021, AERLP provided zero-interest loans for the development of renewable energy production facilities. Similarly, EIRLP, which replaced AERLP in 2021, provides low-interest financing for innovative energy infrastructure projects. In addition to state-

sponsored incentives, numerous utility-sponsored grant, loan, and rebate programs are also available.

B. General Tax Incentives for Renewable Energy

All fifty states and the District of Columbia offer some form of tax incentive for renewable energy or for investments in improved energy efficiency. In a number of these states these incentives are limited to property tax and sales tax incentives. However, 16 states offer incentives affecting individual or corporation income tax, either in the form of tax credits, deductions or exemptions. Eleven states offer one or more tax credits that incentivize the utilization of renewable energy as well as improved energy efficiency in conventional technologies. Also counted among these credits are those for certain technologies designated by their respective states as “alternative” although they rely on carbon-based sources. For example, Missouri’s Wood Energy Production Credit provides a credit of $5 per ton of processed biomass materials.

Among the 11 states that offer tax credits for renewable energy or energy efficiency, tax credits for the use of wind technologies are available in six states; credits for the use of solar energy (by any of various means) are available in eight states; credits for the use of biomass are available in six states; and credits for the use of anaerobic digestion technology are available in six states. The first of these credits was established in the 1970s and all but four of the credits identified were enacted after 2000.

The nature of these tax credits varies markedly in terms of such aspects as eligible system sizes, credit amounts, and total funding. Eligible systems range in size from those intended for residential use to those intended for commercial or industrial purposes. Several states are distinguished by their targeting of large-scale energy production or investment, whether related to renewable energy or to alternative energy sources. These include, for example, Arizona’s Renewable Energy Investment and Production for Self-Consumption incentive which is available for investments of at least $100 million in renewable energy facilities having a minimum of 20 megawatts of capacity. These credits also include Missouri’s aforementioned Wood Energy Production Credit, which targets biomass material.

C. Production Tax Credits for Renewable Energy

Tax credit programs which allocate tax credits on a per kilowatt hour (kWh) basis are typically called production tax credits. Similar to Iowa, many tax credit programs offered by other states for large-scale production of energy require the energy production facility be placed in service by a specified date to be eligible. Since the last tax credit evaluation study conducted in 2019, of the six states that offered tax credits for large-scale production of energy, the deadline for placing a new facility in service has passed or the program has sunset for all six states’ programs. In addition to Iowa, these states are Arizona, Florida, Maryland, New Mexico, and Oklahoma (see Table 1). In all of these states, the tax credit is allowed for wind- and solar-based power production. All of these states, except Oklahoma, allow the tax credit for biomass; four, including Iowa, allow a tax credit for production based on landfill gas, and three, including Iowa, allow a credit for production using anaerobic digestion technology.

State production tax credit rates vary by the form of energy as well as by the generator's year of service. Rates vary by year of service in three states, including Arizona, New Mexico, and Oklahoma. New Mexico's Renewable Energy Production Tax Credit provides $0.015 per kWh for solar-based energy starting in the first year the generator is placed in service; the rate rises to $0.04 per kWh in the sixth year of generator service, and then decreases to $0.02 in year ten. Arizona's Renewable Energy Production Tax Credit is similar, except that its schedule begins at $0.04 per kWh and stairsteps down to $0.02 per kWh in year ten. Over the course of a decade, the New Mexico and Arizona programs provide an annual average credit rate of $0.027 per kWh for solar-based electricity. The amount of Oklahoma's credit varies by the calendar year of production. For electricity generated in 2003, its rate was $0.0075 per kWh; for electricity generated between 2004 and 2006, the rate was $0.0050 per kWh; and for electricity produced in 2007 and after, the rate is $0.0025 per kWh.

Tax credit rates vary by form of energy source in four states, including Iowa, Arizona, Maryland, and New Mexico. As noted above, Arizona and New Mexico provide tax credits of $0.027 per kWh, on average, for electricity produced from solar energy. Under the programs in these same two states, electricity produced from wind or biomass receives a credit equal to $0.01 per kWh. Maryland provides tax credits at a rate of $0.0085 per kWh of production from all sources except co-generation, for which the tax credit is $0.005 per kWh. Iowa offers different rates for production of commercial heat and hydrogen fuel. Overall, tax credit rates are higher for solar energy than for other forms and tax credit rates are somewhat lower for co-generated electricity.

Tax credit rates also vary among the states. The lowest tax credit rates are offered in Oklahoma, whose Zero-Emission Facilities Production Tax Credit provides a maximum of $0.0075 per kWh. Maryland's production tax credit is $0.0085 per kWh (except for co-generated power). In four states, including Iowa under the Wind Energy Production Tax Credit, the credit is $0.01 per kWh. Iowa's Renewable Energy Tax Credit rate, at $0.015 per kWh for wind power, is the highest available state credit for non-solar energy in the country.

Five of the states specify aggregate limits on program awards. Arizona, Florida, Maryland, and New Mexico place annual caps on the dollar amount of awards in aggregate and on a per taxpayer basis. New Mexico's aggregate limits are the highest, with awards for wind and biomass capped at $20 million and $4 million per taxpayer. Its tax credit for solar energy production is capped at $20 million statewide and $8 million per taxpayer. With wind, biomass, and solar combined, New Mexico's aggregate limit is $40 million. Maryland's program is limited to $25 million per year and $2.5 million per taxpayer; Arizona's is limited to $20 million and $2 million per taxpayer and Florida's limit is $10 million and $1 million per taxpayer. Program amounts are limited less directly in the other states. Iowa limits both the Wind Energy Production Tax Credit and the Renewable Energy Tax Credit in terms of aggregate megawatt nameplate capacity eligible for awards over the life of the program. Oklahoma does not specify a limit on awards, however its rates are the lowest in the country.

In the event that awarded tax credits exceed tax liability, states make various provisions for their refundability or carryforward. Two states, New Mexico and Maryland, offer fully refundable credits. In Iowa, nonrefundable credits may be carried forward seven years. In Arizona and Florida, the carryforward limitations are set at five years. In Oklahoma, unused credits earned through 2013 may be carried forward ten years; credits earned in 2014 and after may be refunded at 85 percent of their value.

Iowa is the only state whose production tax credits are fully transferable. In Florida, credits may be transferred only in cases of corporate mergers or acquisitions. Tax credits awarded under Oklahoma's program prior to January 1, 2014 were transferable. Tax credits awarded after this date are not transferrable but may be refunded at 85 percent of their value.

IV. Literature Review

Despite the interest in wind and renewable energy, there is limited literature focusing on the relationship between state tax policy and renewable energy production. Most of the available research focuses on the outcomes associated with the Federal Renewable Electricity Production Tax Credit (PTC). Since being enacted in 1992, the PTC has been extended numerous times, most recently by the Inflation Reduction Act of 2022. Under this legislation, the PTC is set to be phased out at the end of 2024 and replaced with a new tax credit, the Clean Energy Production Tax Credit (Database of State Incentives for Renewables & Efficiency, 2023).

The literature concerning the PTC includes both criticism and advocacy. A study by Wiser, et al (2016), evaluates the cost and environmental impacts of multiple scenarios for various levels of wind deployment. The study also assessed these scenarios in terms of their broader economic impact and energy-related job creation. Their findings suggest that various incentives, such as federal tax incentives including the PTC, will need to continue in order to overcome cost barriers associated with renewable energy and to facilitate continued growth of wind deployment.

Bersalli, et al (2020), however, found that renewable energy policies have varying degrees of effectiveness. Using data from 50 countries, the authors examined the effects of various kinds of policies, including tax incentives, investment in renewable energy, and reduction in carbon dioxide emissions. The authors found that price-based incentives were not as effective as quantity-based requirements. That is, production-focused policies, such as renewable portfolio standards (RPSs) which require a specific percentage of electricity to come from renewable sources, were found to be more effective compared to financial subsidies. These findings are consistent with what appears to be consensus concerning the impact of RPSs. By some accounts, much of the growth of wind energy in the U.S. is associated with RPSs (National Conference of State Legislatures, 2020).

Logan and Kaplan (2008) identified four basic characteristics surrounding the economics of wind energy production. Specifically, it is characterized by 1) high fixed costs, 2) low operating and maintenance costs, 3) the variable nature of wind as an energy resource, and 4) high costs for system integration. While states have little to no control over such factors, the authors conclude tax incentives, among other policies, may help overcome barriers and positively affect wind energy development.

Parvin and Mayyas (2023) also identify important challenges for wind energy, the intermittent availability of such a resource and technological barriers, such as energy storage and transmission infrastructure, notable among them. Their research suggested that any limitations on the production of wind energy can be overcome with further technological advancements and effective government policies promoting wind production. Similar challenges were also identified by Liebensteiner and Wrienz (2020), noting that obstacles of wind and other renewable energy sources may limit their expanding use. Due to their uncontrollable nature, traditional power sources may continue to be necessary to balance fluctuations in the electrical supply. The authors suggest doing so would lead to better levels of resource allocation. Additionally, large-scale expansion of storage infrastructure may also mitigate the inherent volatility of renewable energy production, a view supported by Denholm, et al. (2020).

V. The Electric Power Industry and Wind Energy in Iowa

As of 2023, installed wind-generated electrical capacity of the United States is just over 150 gigawatts (GW) (American Clean Power Association [ACP], 2023). U.S. wind power capacity has almost tripled in the last 10 years and is 36 times larger than what it was 20 years ago (ACP, 2023). Iowa has an installed wind energy capacity of 12.5 GW, approximately nine percent of national wind energy capacity (U.S. Energy Information Administration [EIA], 2023a). Moreover, Iowa leads the nation in share of electricity generated from wind (EIA, 2023b). Wind accounts for 62.7 percent of electricity generated in Iowa; by comparison, it makes up approximately 11 percent of total electricity generated by wind in the U.S. (EIA, 2023b). See Figure 1 for the location of wind turbines in Iowa.

A. Brief Profile of the Electric Power Industry

The U.S. Energy Information Administration (EIA) collects information about electric power plants with its annual electric generator report, the *EIA-860*. The most recent data available from this report concerns plants that were operational in 2022. Power plants with a generating capacity of at least 1 MW are required to provide information for this report. Based on data from the *EIA-860*, in 2022, the aggregate electric output of all facilities located in Iowa was 73 million MWh (see Table 2). 80.7 percent of this electricity was produced by the electric utilities sector, which includes municipally-owned utilities and rural electric cooperatives as well as investor-owned utilities. An additional three percent was produced by generators which produce electricity primarily to support the activities of commercial or industrial establishments rather than for sale to consumers.

The remaining 16.2 percent of electricity produced in 2022 was generated by the independent power production sector. Each of these sectors is described below.

Utilities are entities that are aligned with distribution facilities for delivering electricity primarily for public use (EIA, 2024). That is, utilities maintain the infrastructure for providing electricity to consumers. Utilities include investor-owned utilities (IOUs), municipally-owned utilities (MOUs), and rural electric cooperatives (RECs).

In Iowa, the rates and services of IOUs that serve more than 10,000 customers are regulated by the Iowa Utilities Commission (IUC) under Iowa Code Chapter 476. Although three IOUs operate in Iowa, one serves a small number of customers and is not rate-regulated (IUC, 2022). The IUC regulates the rates of the other two IOUs, MidAmerican Energy Company and Interstate Power and Light Company. These two IOUs serve 72 percent of Iowa customers (IUC, 2024). MOUs are city-owned utilities and are operated by the city it serves. The IUC does not regulate rates or services of MOUs but does regulate MOUs with respect to certain other matters specified by Iowa Code. RECs are private, nonprofit entities governed by customer-elected boards. Similar to MOUs, the IUC has limited regulatory authority of RECs (IUC, 2022).

Independent Power Producers (IPPs) are distinct from utilities. IPPs generate electricity for sale to utilities, whether directly or through the Regional Transmission Organization (EIA, 2024).

B. Wind Energy Generation by Sector

The electric utilities sector (which includes IOUs, MOUs, and RECs) generates nearly 81 percent of the electricity produced in the state. Of this total, 58 percent is produced from wind (see Table 2). By contrast, 97 percent of electricity produced by IPPs in 2022 was generated from wind, accounting for 25 percent of the state's wind-generated electricity.

Based on the *EIA-860*, there were 155 wind power plants in Iowa in 2022, consisting of nearly seven thousand individual wind turbines. Of this total, 79 plants were utility-owned and 75 were operated by IPPs. One was operated for commercial or industrial use.

In general, utility-owned power plants are much larger in terms of generating capacity than plants owned by IPPs (see Table 3). As of 2022, the 79 utility-owned power plants had an average nameplate capacity of 114 MW. Only 17 had a capacity of less than 30 MW. By contrast, the 75 plants operated by IPPs had an average nameplate capacity of 47.2 MW. More than half of these plants had a capacity of less than 30 MW.

Wind Energy Production Tax Credits are available to facilities regardless of their ownership sector (i.e., whether they are owned by utilities or by IPPs). However, tax credits are for wind energy that is sold on the basis of either a power purchase agreement with a utility or via an interconnection agreement for sale in a wholesale power pool market, except where a credit may be provided for electricity generated for on-site consumption. Therefore, the tax credit offers an incentive primarily for plants operated by cooperatives and IPPs. This is because Iowa's IOUs generate electricity principally for

sale to retail consumers and are assured a reasonable return by means of the rate-regulation process (Regulatory Assistance Project, 2016). The Renewable Energy Tax Credit is limited by statute to facilities owned by IPPs and cooperatives.

C. Tax Credit Projects

Based on information published by the Iowa Utilities Commission, there are four wind energy projects operating with approval for Wind Energy Production Tax Credits under Iowa Code Chapter 476B as of 2021. Note that a qualified facility must have been originally placed in service between July 1, 2005 and July 1, 2012. The four projects approved were for a combined nameplate capacity of 50 MW, the maximum available for the tax credit (see Table 4).

Under the Renewable Energy Tax Credit program, awards for wind energy production are limited to projects with a combined 363 MW generating nameplate capacity; awards for energy production based on other forms of renewable energy are limited to projects with an additional 63 MW aggregate nameplate capacity and 167 billion BTU of heat for a commercial purpose. Thus, the Renewable Energy Tax Credit provides for awards in any of three categories, which for ease of reference can be labeled “476C wind,” “476C other,” and “476C 167 Billion BTU.”

A total of 70 wind energy projects have been approved and are operational under the Renewable Energy Tax Credit wind program. As projects must be approved by January 1, 2018, no new facilities will be approved under this program. The combined capacity of the approved projects is 128 MW.

D. EIA Data and Tax Credit Data

In the context of the *EIA-860*, a wind power plant is one or more wind turbines interconnected to a common utility system through, in general, a single substation (EIA, 2024). This definition is consistent with that of an eligible wind energy production facility as defined for the Wind Energy Production Tax Credit under Iowa Code Section 476B.1, except that this code section limits the generating capacity of eligible facilities. In general, eligible facilities are one or more wind turbines connected to a common gathering line which have a combined nameplate capacity of between two and thirty megawatts. Note that projects eligible for this tax credit may be a part of a larger single facility. For example, a 20 MW project that is eligible for a Wind Energy Production Tax Credit may be part of a facility with 100 MW total nameplate capacity. In such instances, the energy production eligible for the tax credit is a pro-rated percentage of the total electrical output of the plant.

Under Iowa Code Chapter 476C, Renewable Energy Tax Credit wind energy conversion facilities are defined as systems that collect and convert wind into energy to generate electricity. Wind energy facilities may be a single wind turbine that transmits power to a single substation along with other wind turbines. Under this tax credit program, projects are limited to 2.5 MW capacity for each owner. A single wind power plant, as defined for the *EIA-860,* may consist of multiple individual projects approved for tax credits under the Renewable Energy Tax Credit program.

Although EIA plant-level data and IUC project-level data are not directly comparable in general, EIA plant data can be cross-referenced based on the name of the plant to public information concerning operational plants eligible to receive Wind Energy Production and Renewable Energy Tax Credits. However, the 2022 *EIA-860* does not contain data for all wind power plants in Iowa for which tax credits have been awarded. Of the approximately 178 MW of capacity approved for tax credits under both tax credit programs, *EIA-860* report data could be identified for plants that account for 151 MW. Those tax credit-recipient projects are associated with 38 separate wind energy plants for which data was available from the EIA in 2022 (see Table 5). Note that, based on EIA data, the total MW capacity of these 38 plants was 566 MW, a much larger total than the 178 MW of aggregate capacity approved for tax credits. This is because a single wind power plant as defined for the *EIA-860* typically consists of multiple individual generators, only some of which may have been approved for tax credits. In addition, tax credits may be approved only for a share of the total MW capacity of a larger facility.

Wind energy projects approved for either Wind Energy Production Tax Credits or Renewable Energy Tax Credits are located in 22 counties in Iowa (see Figure 2). Broadly speaking, the bulk of the capacity of approved tax credits is located in the western half of the state from as far south as Taylor County to the state's border with Minnesota. In 13 counties, wind energy projects approved for tax credits amount to less than 5 MW. More than 5 MW are located in each of nine Iowa counties. Four of these counties, including Crawford, Greene, Palo Alto, and Story each contain more than 20 MW of capacity.

An additional 24 non-wind renewable energy projects have been approved for the Renewable Energy Tax Credit. These include 21 projects under the 476C other category which utilize eligible technologies including biomass conversion and solar energy. Altogether, these 21 projects have been approved for 45 MW of electrical capacity and are operational.

The other three non-wind projects are facilities that produce commercial heat. Each has been approved for a one-time credit for production of 55 billion BTU, or a combined 165 billion BTU, under the 476C 167 Billion BTU commercial heat category of the program. Iowa Code specifies that the maximum amount of heat energy production capacity for which a single entity is eligible is 55 billion BTU. Therefore, these facilities only receive one tax credit award under the program, unlike the 476C wind and 476C other facilities that can receive tax credit awards for ten consecutive years.

VI. Wind Energy Production and Renewable Energy Tax Credit Awards and Claims

A. Tax Credit Awards and Transfers

Since the beginning of these programs, a combined total of $84 million Wind Energy Production and Renewable Energy Tax Credits have been awarded. Distinctively among the State's tax credits, Iowa Code requires that certificates for both programs be issued directly to facility owners, including individual shareholders in the case of facilities owned by pass-through entities. Certificates are issued based on production during the tax year

for which a credit is claimed, except that in the first full tax year for which a facility is eligible, awards may be claimed for more than 12 months of production stretching back to the first month of production.

In 2007, the first year of awards for the Renewable Energy Tax Credit, the Iowa Department of Revenue awarded 22 tax credit certificates for $1.5 million; these credits were awarded to 19 distinct projects, including wind, other, and 167 Billion BTU projects. The average award for each project was $79,000 and the average certificate was only slightly lower at $68,000, indicating that comparatively few certificates were issued for each project. The total amount of awards grew to $2.6 million in the subsequent year and remained below $3 million until 2011. In 2023, the most recent complete year for which award data is available, the value of awards was $2.8 million and the average tax credit certificate was $15,000. Since 2007, a total of $68.2 million in tax credits has been awarded under the program. Of this amount, $55.1 million, or 81 percent, has been transferred to third parties. Ninety-six percent of credits issued in years prior to 2013 have been transferred (see Table 6a).

Under the Wind Energy Production Tax Credit program, the Iowa Department of Revenue has issued fewer certificates for fewer projects than under the Renewable Energy Tax credit. In order to maintain confidentiality of taxpayer information, the number of certificates awarded under the Wind Energy Production Tax Credit and average certificate amounts are not reported by year. Wind Energy Production Tax Credit awards were first made in 2009 and the final awards were made in 2021. Since its inception, the program has awarded $15.8 million in tax credits (see Table 6b). As with the Renewable Energy Tax Credit, virtually all of the tax credits have been transferred. Overall, 91.4 percent of program awards have been transferred.

B. State of Residence of Awardees

Tax credit certificates issued through these two programs are issued directly to facility owners including individual shareholders; therefore, it is possible to identify the state of residence of tax credit recipients in both programs. Under the Wind Energy Production program, tax credits were issued to 66 individual owners totaling $13.8 million for award years through 2023 (see Table 7). Note that for both programs, residency information is not available for all tax credit recipients. For this reason, total award amounts reported in Table 7 do not exactly match awards as shown in Table 6a and Table 6b. Of the owners identified, 38, or 58 percent, were Iowa residents and 28 were residents of other states. The distribution of amounts awarded was approximately proportionate; 49 percent of the total amount awarded was to Iowa residents and 51 percent was to nonresidents.

Of the 4,565 recipients of Renewable Energy Tax Credit awards, 3,951 were Iowa residents. Iowa residents therefore accounted for 87 percent of this program's recipients and $33.9 million (61%) of the approximately $55.7 million of tax credits awarded under the program and nonresidents received $21.8 million (39%). The high proportion of awards received by nonresidents under both tax credits, which are nonrefundable, may partly explain why such a high percentage of awards are transferred.

C. Tax Credit Claims by Tax Type

A total of $55.2 million in Renewable Energy Tax Credits have been claimed for tax years 2006 through 2023 (see Table 8). Note that certificates awarded in a given year may be claimed for a prior tax year in the case of entities that file tax returns on a fiscal year basis; conversely tax credits can be claimed against insurance premium pre-payments due prior to the end of a tax year. Claims for tax year 2006 were $961,000. Claims for tax year 2013 reached $5 million before declining to $1.1 million in 2022 and $225,000 in 2023 under this program.

Wind Energy Production Tax Credits were first claimed in tax year 2009. Claims under this program exceeded $1 million in 2012. Since 2009, a total of $14.1 million in Wind Energy Production Tax Credits have been claimed.

Awards made under the Renewable Energy and Wind Energy Production Tax Credit programs are claimed against various tax types. Recall that nearly all of the tax credits were transferred, so claimants are typically not the original taxpayers who were awarded the tax credits. Considering all claims to date for Renewable Energy Tax Credits (see Table 9a), 33 percent were against insurance premium tax; 27 percent of the total claimed amount was against corporation income tax; 14 percent was against franchise tax; and 22 percent was against individual income tax. The average claim varies by tax type as well, ranging from $78,000 for franchise tax to $3,600 for individual income tax. There have been 4,182 claims for Renewable Energy Tax Credits. For all claims to date for Wind Energy Production Tax Credits (see Table 9b), 34 percent were against corporation income tax and 54 percent were against replacement tax, which is a form of excise tax paid by gas, electric, and water utilities in lieu of property tax. The average claim also varies by tax type, ranging from $346,000 for replacement tax to $1,500 for individual income tax. There have been 109 claims for Wind Energy Production Tax Credits.

VII. Economic Analysis of the Wind Energy Production and Renewable Wind Energy Tax Credits

A. Renewable Energy Investment and Energy Production

Investment in renewable energy can be measured as a reflection of the energy produced, both within Iowa and by the Wind Energy Production and the Renewable Energy Tax Credit programs. Awards for both programs are based on the amount of energy produced by the approved facilities. Thus, awards are tied to the productivity of those facilities. Based on tax credit awards, incentivized wind energy production is compared to EIA wind energy production statistics for all independent power producers (IPPs) in Iowa, as well as total wind energy production in the state (see Table 10).

Renewable Energy Tax Credits were first awarded in 2007 while Wind Energy Production Tax Credits were first awarded in 2009. Therefore, wind energy for which Renewable Energy Tax Credits were awarded totaled 35,000 MWh in 2007, or 2.9 percent of wind energy generated by IPPs in Iowa and 1.3 percent of the total wind-generated electricity produced in the state. In the subsequent six years, with Wind Energy Production Tax Credits first awarded in 2009, the wind energy produced under both tax credit programs

increased by a multiple of more than thirteen, to 473,000 MWh in 2013. Production for which tax credits were awarded in 2013 accounted for 6.8 percent of wind energy generated by IPPs and 3.0 percent of the total wind-generated electricity produced in the state, the highest percentages of any year under the programs (see Figure 3). In 2022, these percentages decreased to 1.9 percent and 0.5 percent, respectively. It should be emphasized that, whether or not it was also eligible for either the Wind Energy Production Tax Credit or Renewable Energy Tax Credit, electricity generated from wind during this period was also generally eligible for the federal PTC.

Solar energy for which Renewable Energy Tax Credits were awarded totaled 4,000 MWh in 2016, or 6.5 percent of the total solar generated electricity produced in the state. In the subsequent six years, solar energy produced under the Renewable Energy Tax Credit program more than tripled to 14,000 MWh in 2022, while accounting for 2.0 percent of the solar generated electricity produced in the state (see Figure 4).

B. Issues Surrounding Transferable Tax Credits

Tax credits awarded under both the Wind Energy Production Tax Credit and Renewable Energy Tax Credit programs are transferable. As described in Section II, this means that tax credit recipients may sell the credit to third parties who may then use the purchased credit to offset their own Iowa tax liability. Because the tax credit may be purchased at a discount from its face value, it is attractive to buyers. Likewise, for tax credit awardees whose tax liability is limited, the exchange is appealing because they would otherwise lose the benefit from the nonrefundable tax credit.

As described in Section VI, the majority of tax credits awarded under the Wind Energy Production Tax Credit and Renewable Energy Tax Credit programs have been transferred. As transfers are private transactions, information about transfer sale prices are not available. Based on general information published about tax credit exchanges, credits are generally sold at a discount of 5 to 15 percent of their face value (see, for example, Congressional Research Service, 2024; O'Brien, 2024; Antonache, et al., 2022). This indicates tax credit recipients receive $0.85 to $0.95 of each dollar foregone by the State in the interest of subsidizing renewable energy production. In addition, the exchange of tax credits at a discount not only provides a tax benefit to the tax credit purchaser, it also reduces transparency in the programs as they are not the original recipient, which is surely unintended by the program. The purchaser of nonrefundable tax credits may also not be associated with the renewable energy industry, which the Wind Energy Production Tax Credit and Renewable Energy Tax Credit programs are targeting. The authors of an article published by the Research Division of the Federal Reserve Bank of St. Louis (Rothstein and Wineinger, 2007, p. 66) state their concern with credits that are transferable but not refundable as follows:

> A potential problem with credits that are just transferable is straightforward: A $1 tax credit does not sell for $1, but the credit will cost the taxpayers of [the State] that amount when it is redeemed. Money that was supposed to support public programs ends up as profit to the buyer of the credits. In contrast, if the tax

credits were *also* refundable, then every tax dollar spent on the tax credit would go toward the intended activity.

Nevertheless, tax credits are a critical source of investment capital once they are transferred even if the value of the credit is somewhat diminished as a result. Substantial upfront capital is generally required to finance renewable energy projects. Although the Wind Energy Production Tax Credit and the Renewable Energy Tax Credit are awarded for energy that is generated and sold, State financial incentives, including tax credits, are used to offset these upfront costs (Iowa Environmental Council, 2011). The amount of upfront costs offset by the Wind Energy Production Tax Credit and Renewable Energy Tax Credit programs can be estimated based on project information published by the Iowa Utilities Commission and tax credits awarded for wind projects under each program. Of the 74 wind projects approved under the Wind Energy Production Tax Credit and Renewable Energy Tax Credit programs, these projects account for $68.3 million in tax credit awards through 2023. Analysis of these projects and awards estimates each project receives approximately $95,200 per year, or $952,000 over the entire 10-year period of eligibility for each program which can be used to offset the initial investment.

C. Property Tax Implications

One consideration of the economic impact of the Wind Energy Production and Renewable Energy Tax Credits is the property tax revenue impact of incentivized wind energy projects. Iowa Code section 427B.26 allows cities and counties to adopt ordinances to provide for special valuation of wind energy conversion property for property tax purposes. Under this code section, wind energy conversion property is assessed at a graduated percentage of its net acquisition cost. In the first year after installation, the wind energy conversion property is assessed at zero percent of its net acquisition cost. The assessment increases by five percent each subsequent year until the seventh year, when it remains at thirty percent of the net acquisition cost. Therefore, Iowa law provides a tax break of 100 percent for wind energy conversion property in the first year after it is acquired, 95 percent in the second year, and so on (see Table 11).

Information and assumptions used for estimating property tax for wind energy conversion property projects under the Wind Energy Production Tax Credit and Renewable Energy Tax Credit programs are summarized in Table 12. These assumptions include the aggregate megawatt capacity of turbines entering into service, estimates of the acquisition costs associated with the wind energy conversion property, and estimates of the applicable tax rates. Given these elements, estimated property tax for wind energy conversion property entering into service in each year can be computed according to the special assessment schedule. Such an analysis assumes the special valuation ordinances are applicable for all property approved under each program.

Estimates of the number of megawatts entering into service in each year are based on tax credit program records. For purposes of this estimate, it is assumed that each project's first year of operation and its first year of assessment is one year from the date of its respective approval for the tax credit program. Since acquisition cost estimates are

expressed on a per megawatt basis, property tax impact estimates are based on the aggregate megawatt capacity of wind turbines entering into service under the program in each assessment year.

Estimates of wind turbine acquisition costs are based on cost projections published by the U.S. Department of Energy for land-based wind systems installed in years 2005 through 2030 (U.S. Department of Energy, 2008) and construction cost data for years 2013 through 2019 (EIA, 2021). These estimates include costs for turbines, towers, foundations, installation, and connection. According to these estimates, wind system acquisition costs totaled $1.65 million per megawatt in 2006, $1.9 million in 2013 and $1.47 million in 2018.

Based on these cost assumptions and on the megawatt capacity of wind turbine systems entering into service, it is estimated that the aggregate acquisition cost of wind energy conversion property for which tax credits were awarded under the Wind Energy Production and Renewable Energy Tax Credit programs was $58.9 million in 2006 (see Table 12). The aggregate value of systems entering into service in subsequent years varied from zero to $55.8 million. The estimated applicable property tax levy rate for this analysis is the statewide average of consolidated rates in rural taxing districts for applicable assessment years; consolidated rates for years after 2022 are assumed to remain constant at levels applicable to the 2022 assessment year. Note that no projects for the Wind Energy Production Tax Credit program were approved after July 1, 2012 or after January 1, 2018 for the Renewable Energy Tax Credit program.

Given the assumptions outlined above, an increase in property tax revenue first occurred in FY 2009 (see Table 13). Note that taxes on property assessed in a given year are due in the fiscal year that begins in the following calendar year. For example, taxes on property assessed in 2006 are due in fiscal year 2008. According to the schedule in Chapter 427B.26, wind energy conversion property is assessed at zero percent of its acquisition cost in its first assessment year. The aggregate amount of property tax revenue to local jurisdictions was estimated to be $80,000 in FY 2009. This estimate is calculated by taking the 2006 estimated aggregate acquisition cost of $58.9 million and multiplying it by the special valuation rate of 5 percent, resulting in the estimated aggregate assessed value of $2.9 million. The property tax revenue is then the result of the estimated aggregate assessed value multiplied by the estimated property tax levy rate of $27.2335, expressed as dollars per one thousand dollars of assessed value. As of FY 2025, the property tax revenue increase is estimated to be $2.4 million. Altogether, for fiscal years 2009 through 2025, the property tax impact is estimated to be $23.1 million. This analysis does not account for any property tax revenue increase as a result of wind energy conversion property that was not awarded a tax credit under the Wind Energy Production or Renewable Energy Tax Credit programs.

VIII. Conclusion

This evaluation study provides detailed information about the Wind Energy Production and Renewable Energy Tax Credit programs, along with providing updates to the programs that have occurred since the last evaluation study conducted in 2019.

Although Iowa Code does not include language concerning the legislature's intent in enacting the Wind Energy Production Tax Credit or the Renewable Energy Tax Credit programs, each are clearly intended to promote production of energy from wind and other renewable sources in Iowa. Adopted under Iowa Governor Tom Vilsack, both programs were elements of an administration goal to achieve 1,000 MW capacity from renewable sources (Vilsack, 2003).

Under the Wind Energy Production Tax Credit program, a facility must consist of one or more wind turbines which has a combined nameplate capacity between 2 MW and 30 MW, while the Renewable Energy Tax Credit program is limited to 2.5 MW capacity for each owner, which incentivizes small-scale operators. Furthermore, the Renewable Energy Tax Credit is limited to facilities owned by independent power producers or rural electric cooperatives. Investor-owned utilities are not eligible.

A total of 74 wind energy projects have been approved under both the Wind Energy Production and Renewable Energy Tax Credit programs. These projects represent approximately 178 MW of combined nameplate capacity and are located in 22 counties across Iowa. In addition, all projects approved under both programs have been awarded a combined total of $84 million in tax credits. Of these awards, $55.2 million in Renewable Energy Tax Credits and $14.1 million in Wind Energy Production Tax Credits have been claimed.

Property tax revenue to local jurisdictions is estimated to be $2.4 million for fiscal year 2025 as a direct result of wind projects approved under both programs. Altogether, for fiscal years 2009 through 2025, the property tax impact is estimated to be $23.1 million.

It is clear both programs have had the intended effect on small-scale facilities but is diminished over time.

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Wind Energy Production Tax Credit and

Renewable Energy Tax Credit

Tax Credits Program Evaluation Study

Tables and Figures

Table 1. Production Tax Credits for Renewable Energy by State

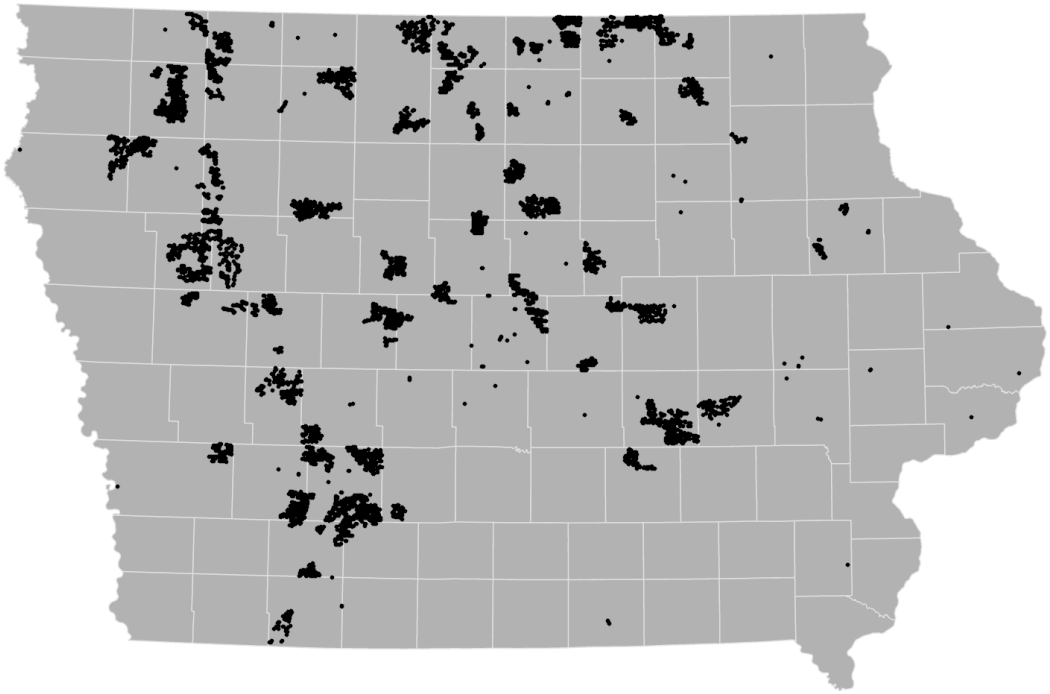
State	Production Tax Credit Program	Tax Type C: Corporation Income I: Individual Income	Eligible Technologies W: Wind S: Solar B: Biomass AD: Anaerobic Digestion O: Other[1]	Credit Amount	Maximum Incentive	Transfer-ability	Eligible System Size	Refund-ability	Carry-forward	Initial Year
Arizona	Renewable Energy	C, I	W, S, B, O	Solar: Varies by year of service from $0.01/kWh - $0.04/kWh Wind and Other: $0.01/kWh	$2 million per taxpayer per year; $20 million total per year	No	5 MW minimum	No	5 years	2011
Florida	Renewable Energy	C	W, S, B, O	$0.01/kWh	$1 million per taxpayer per year; $10 million total per year	Yes, after merger or acquisition	Not specified	No	5 years	2012
Iowa	Renewable Energy	C, I	W, S, B, AD, O	$0.015/kWh $4.50/MMBTU commercial heat $1.44/Mcf hydrogen fuel	363 MW for wind; 53 MW for other renewable energy	Yes	2.5 MW per qualifying owner. Other limitations apply.	No	7 years	2005
	Wind Energy	C, I	W	$0.01/kWh	50 MW	Yes	2 MW – 30 MW in general.	No	7 years	2005
Maryland	Clean Energy	C, I	W, S, B, AD, O	$0.0085/kWh $0.005/kWh for co-fired electricity	$2.5 million per taxpayer per year; $25 million total per year	No	Not specified	Yes	None	2006
New Mexico	Renewable Energy	C	W, S, B, AD, O	Solar: Varies by year of service from $0.015/kWh - $0.04/kWh Wind and Other: $0.01/kWh	Wind, biomass: $4 million per taxpayer and $20 million total per year; Solar: varies up to $8 million per taxpayer and $20 million total per year	No	Minimum of 1 MW	Yes	None	2002
Oklahoma	Zero-Emission Facilities	C	W, S, O	Varies by year of production from $0.0025/kWh - $0.0075/kWh	Not specified	Only credits awarded before 2014 may be transferred.	Minimum of 1 MW	Yes, at 85%	None	2003

1. "Other" eligible technologies may include those based on or employed to generate the following: co-generation, geothermal electric, hydrogen, hydrokinetic energy, hydropower, landfill gas, ocean thermal energy, small irrigation power, tidal energy, and wave energy.

Sources: U.S. Department of Energy Database of State Incentives for Renewables and Efficiency (DSIRE)

Note: Only includes production tax credits; i.e., programs for which the credit amount is based on production per kWh. It excludes other forms of incentive such as investment tax credits, tax credits whose purposes pertain only to energy efficiency, and tax exemptions. The deadline for placing new facilities in service has passed for all programs; no new facilities will be eligible.

Figure 1. Wind Turbines in Iowa



Source: FAA Digital Obstacle File, Released August 6, 2024

Table 2. Electricity Generation in Iowa by Sector and Energy Source, 2022

Sector	Energy Source	MWh Produced in 2022	Percent of Sector Total MWh	Percent of Energy Source Total MWh
Commercial or Industrial[1]	Wind	4,595	0.2%	0.0%
	All Other[2]	2,275,702	99.8%	8.4%
	Total	2,280,297	100.0%	3.1%
Electric Utilities (IOUs, MOUs, and RECs[3])	Wind	34,299,363	58.2%	75.0%
	All Other	24,613,442	41.8%	90.4%
	Total	58,912,805	100.0%	80.7%
Independent Power Producers	Wind	11,457,412	97.2%	25.0%
	All Other	331,685	2.8%	1.2%
	Total	11,789,096	100.0%	16.2%
All Sectors	Wind	45,761,370	62.7%	100.0%
	All Other	27,220,828	37.3%	100.0%
	Total	72,982,198	100.0%	100.0%

Source: U.S. Energy Information Administration

1. Commercial and industrial sectors include generators that produce electricity primarily to support the activities of commercial or industrial establishments.
2. “All other” includes coal, conventional hydroelectric, natural gas, nuclear, other biomass, petroleum and solar.
3. IOUs are investor owned utilities. MOUs are municipally owned utilities. RECs are rural electric cooperatives.

Table 3. Number and Aggregate Capacity of Electricity-Generating Plants in Iowa by Sector and Energy Source, 2022

Sector	Energy Source	Number of Plants	Nameplate Capacity (MW)	Average Nameplate Capacity
Commercial or Industrial[1]	Wind	1	2	1.7
	All Other[2]	56	756	13.5
	Total	57	758	13.3
Electric Utilities (IOUs, MOUs, and RECs[3])	Wind	79	9,004	114.0
	All Other	406	10,291	25.3
	Total	485	19,295	39.8
Independent Power Producers	Wind	75	3,537	47.2
	All Other	84	219	2.6
	Total	159	3,756	23.6
All Sectors	Wind	155	12,543	80.9
	All Other	547	11,266	20.6
	Total	702	23,809	33.9

Source: U.S. Energy Information Administration

1. Commercial and industrial sectors include generators that produce electricity primarily to support the activities of commercial or industrial establishments.
2. “All other” includes coal, conventional hydroelectric, natural gas, nuclear, other biomass, petroleum, and solar.
3. IOUs are investor owned utilities. MOUs are municipally owned utilities. RECs are rural electric cooperatives.

Table 4. Tax Credit Project Nameplate Capacity in Production and Program Capacity Cap, 2021

	Wind Energy Production Tax Credit		Renewable Energy Tax Credit Wind Projects		Renewable Energy Tax Credit Non-Wind Projects	
Year	MW Capacity in Production	Total Program Capacity Cap	MW Capacity in Production	Total Program Capacity Cap	MW Capacity in Production	Total Program Capacity Cap
2021	50	50	128	363	45	63

Source: Iowa Utilities Commission
Note: The table indicates capacity as of the end of the calendar year.

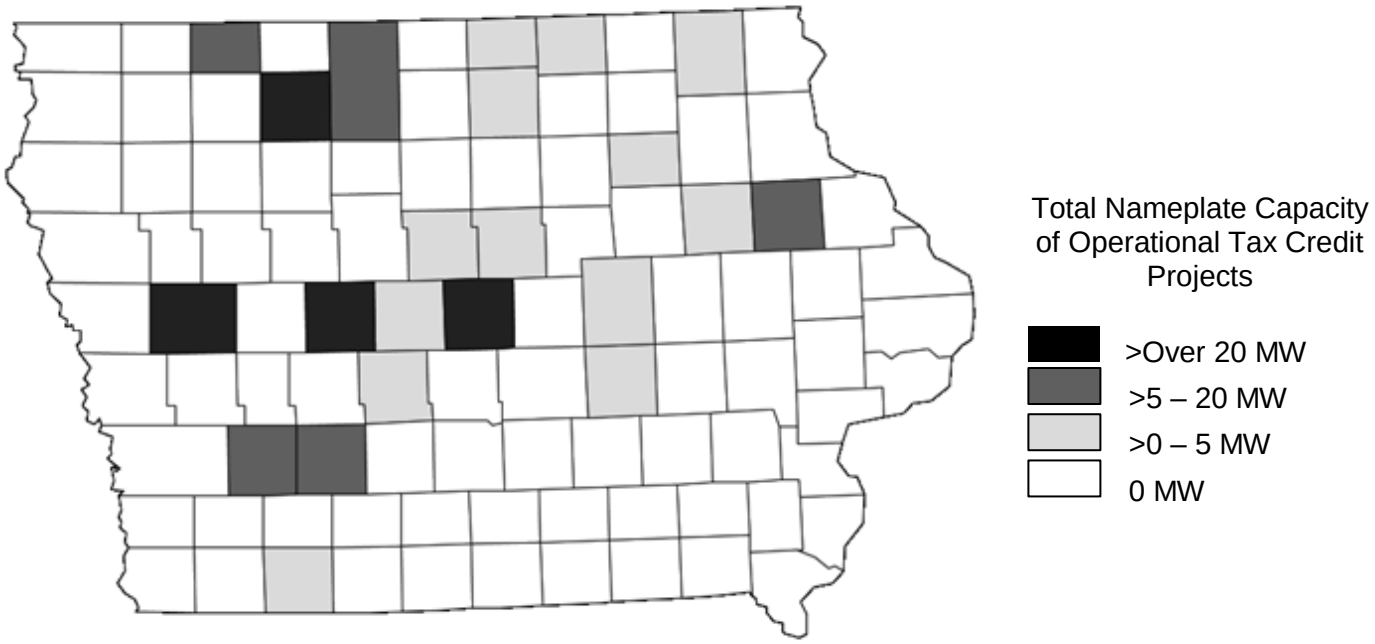
Table 5. Number and Capacity of Wind Energy Plants in Iowa by Sector and Wind Energy Production or Renewable Energy Tax Credit Approval

Sector	Plants that Include Projects Approved for Tax Credit		Plants that *Do Not* Include Projects Approved for Tax Credit		Total	
	Number of Plants	Plant Total MW Capacity	Number of Plants	Plant Total MW Capacity	Number of Plants	Plant Total MW Capacity
Commercial or Industrial	0	0	1	2	1	2
Electric Utilities (IOUs, MOUs, and RECs)	3	23	76	8,981	79	9,004
Independent Power Producers	35	544	40	2,994	75	3,537
All Sectors	38	566	117	11,976	155	12,543

Sources: Iowa Utilities Commission and U.S. Energy Information Administration

Note: Based on data available from the U.S. Energy Information Administration for 2022 matched by plant name to data published by the Iowa Utilities Commission. The plant total MW capacity may be greater than the capacity approved for tax credits. A plant may consist of more than a single project approved for a tax credit. EIA plant level data is not available for all projects for which tax credits have been approved to date.

Figure 2. Total Nameplate Capacity of Operational Tax Credit Wind Projects by County



Source: Iowa Utilities Commission

Table 6a. Renewable Energy Tax Credit Awards and Transfers by Year

Renewable Energy Tax Credit					
Award Year	Number of Tax Credit Certificates	Total Award Amount	Average Certificate Amount	Transfers	Percent Transferred
2007	22	$1,492,897	$67,859	$1,492,897	100.0%
2008	25	$2,570,197	$102,808	$2,563,960	99.8%
2009	22	$2,398,784	$109,036	$2,398,784	100.0%
2010	24	$2,503,361	$104,307	$2,455,105	98.1%
2011	101	$3,011,408	$29,816	$2,974,365	98.8%
2012	145	$4,219,009	$29,097	$4,050,796	96.0%
2013	355	$5,650,536	$15,917	$4,899,398	86.7%
2014	342	$5,471,168	$15,998	$4,560,899	83.4%
2015	338	$4,811,827	$14,236	$4,000,578	83.1%
2016	379	$5,207,638	$13,740	$4,299,504	82.6%
2017	504	$4,792,924	$9,510	$3,636,123	75.9%
2018	469	$4,588,505	$9,784	$3,637,347	79.3%
2019	486	$4,935,683	$10,156	$3,750,606	76.0%
2020	489	$4,724,143	$9,661	$3,520,069	74.5%
2021	450	$4,493,492	$9,986	$2,949,156	65.6%
2022	447	$4,527,874	$10,129	$2,273,363	50.2%
2023	183	$2,823,981	$15,432	$1,615,836	57.2%
Total	4,781	$68,223,427	$14,270	$55,078,786	80.7%

Source: Iowa Department of Revenue

Table 6b. Wind Energy Production Tax Credit Awards and Transfers by Year

Wind Energy Production Tax Credit					
Award Year	Number of Tax Credit Certificates	Total Award Amount	Average Certificate Amount	Transfers	Percent Transferred
2007	--	$ --	$ --	$ --	--
2008	--	$ --	$ --	$ --	--
2009	*	$516,821	*	$516,821	100.0%
2010	*	$726,025	*	$726,025	100.0%
2011	*	$763,797	*	$763,797	100.0%
2012	*	$1,582,498	*	$1,579,366	99.8%
2013	*	$1,577,165	*	$1,573,678	99.8%
2014	*	$1,669,737	*	$1,669,737	100.0%
2015	*	$1,650,877	*	$1,650,877	100.0%
2016	*	$1,657,604	*	$1,657,604	100.0%
2017	*	$1,601,299	*	$1,601,299	100.0%
2018	*	$1,505,870	*	$1,505,870	100.0%
2019	*	$1,019,931	*	$1,019,931	100.0%
2020	*	$854,928	*	$139,937	16.4%
2021	*	$630,165	*	$ --	--
2022	--	$ --	$ --	$ --	--
2023	--	$ --	$ --	$ --	--
Total	72	$15,756,717	$218,843	$14,404,942	91.4%

Source: Iowa Department of Revenue
Note: To maintain confidentiality of taxpayer information, the number of certificates awarded and average certificate amounts are not reported by year.

Table 7. Wind Energy Production and Renewable Energy Tax Credit Awards by Awardee State of Residence, all years

	Iowa				Other States				Total			
	Recipients		Awards		Recipients		Awards		Recipients		Awards	
Tax Credit Program	Number	Percent of Total	Amount	Percent of Total	Number	Percent of Total	Amount	Percent of Total	Number	Percent of Total	Amount	Percent of Total
Wind Energy Production	38	57.6%	$6,686,408	48.6%	28	42.4%	$7,063,666	51.4%	66	100%	$13,750,074	100%
Renewable Energy	3,951	86.5%	$33,939,024	60.9%	614	13.5%	$21,774,719	39.1%	4,565	100%	$55,713,742	100%
Total	3,989	86.1%	$40,625,432	58.5%	642	13.9%	$28,838,385	41.5%	4,631	100%	$69,463,816	100%

Source: Iowa Department of Revenue

Table 8. Renewable Energy and Wind Energy Production Tax Credit Claims by Tax Year

Tax Year	Renewable Energy Tax Credit	Wind Energy Production Tax Credit
2006	$960,970	$ --
2007	$721,571	$ --
2008	$1,594,930	$ --
2009	$3,010,442	$516,821
2010	$2,390,420	$726,025
2011	$2,451,204	$763,797
2012	$3,575,902	$1,014,531
2013	$4,982,232	$1,059,987
2014	$4,677,780	$1,072,166
2015	$4,585,028	$1,328,996
2016	$4,717,173	$1,094,643
2017	$4,106,786	$3,671,388
2018	$3,711,513	$1,505,870
2019	$4,688,166	$1,037,512
2020	$5,046,584	$183,929
2021	$2,711,000	$140,198
2022	$1,079,191	$ --
2023	$224,759	$13,051
Total	$55,235,651	$14,128,914

Source: Iowa Department of Revenue, IA 148 Tax Credits Schedule

Table 9a. Renewable Energy Tax Credit Claims by Tax Type, Tax Years 2006 through 2023

	Renewable Energy Tax Credits			
Tax Type	Number of Claims	Total Claim Amount	Percentage of Total Claims	Average Claim Amount
Corporation	230	$14,667,724	27%	$63,773
Franchise	100	$7,823,356	14%	$78,234
Individual	3,467	$12,412,810	22%	$3,580
Insurance Premium	322	$18,251,735	33%	$56,682
Replacement	25	$121,391	0%	$4,856
Sales & Use	38	$1,958,635	4%	$51,543
Total	4,182	$55,235,651	100%	$13,208

Source: Iowa Department of Revenue, IA 148 Tax Credits Schedule

Table 9b. Wind Energy Production Tax Credit Claims by Tax Type, Tax Years 2009 through 2023

	Wind Energy Production Tax Credits			
Tax Type	Number of Claims	Total Claim Amount	Percentage of Total Claims	Average Claim Amount
Corporation	15	$4,831,017	34%	$322,068
Franchise	--	$ --	--	$ --
Individual	26	$40,281	0%	$1,549
Insurance Premium	--	$ --	--	$ --
Replacement	22	$7,601,724	54%	$345,533
Sales & Use	46	$1,655,892	12%	$35,998
Total	109	$14,128,914	100%	$129,623

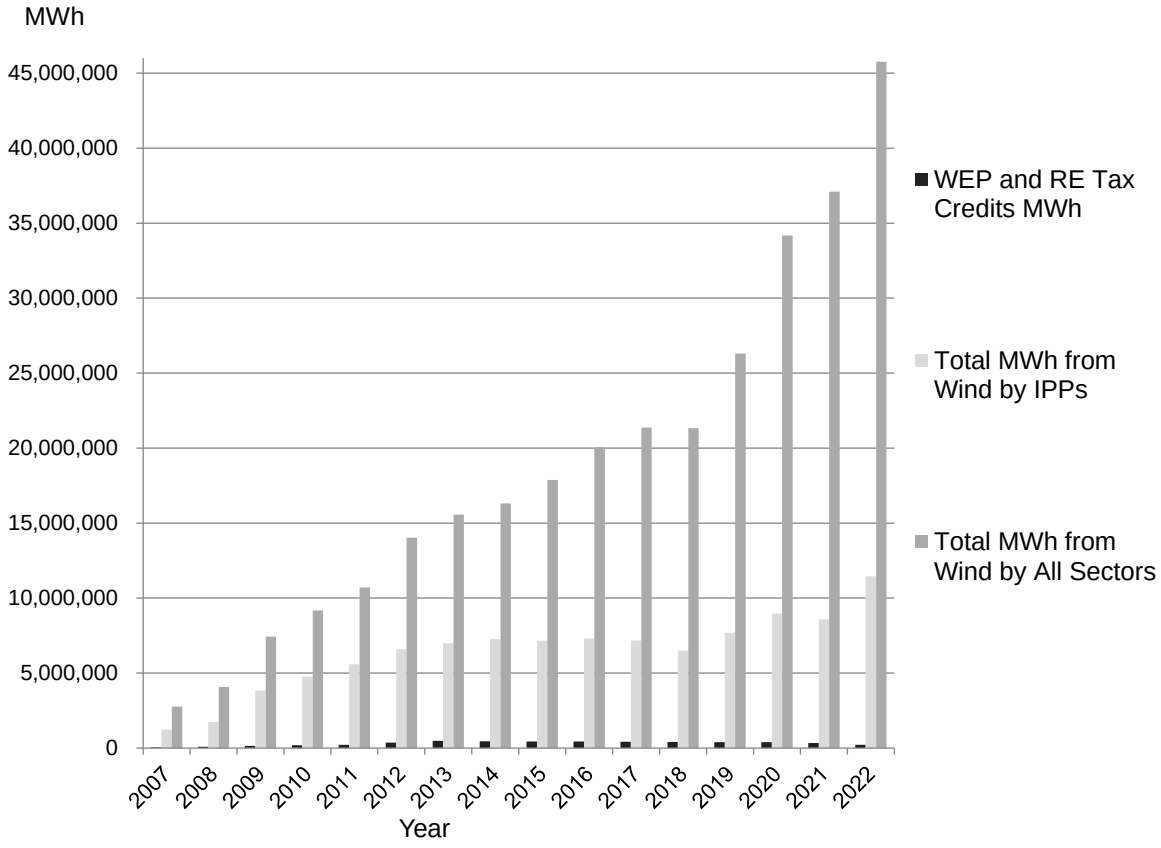
Source: Iowa Department of Revenue, IA 148 Tax Credits Schedule

Table 10. Electricity Generated from Wind Under the Wind Energy Production and Renewable Energy Tax Credit Programs and Total in Iowa by Year

Year	Wind Energy Production (WEP) and Renewable Energy (RE) Tax Credits MWh	MWh Electricity Generated from Wind by Independent Power Producers (IPPs)	Total MWh Electricity Generated from Wind	Percentage of IPP-Generated Wind Energy awarded WEP and RE Tax Credits	Percentage of Total Wind Energy awarded WEP and RE Tax Credits
2007	35,462	1,226,201	2,756,676	2.9%	1.3%
2008	74,641	1,729,503	4,083,787	4.3%	1.8%
2009	142,276	3,822,460	7,420,520	3.7%	1.9%
2010	178,674	4,763,532	9,170,337	3.8%	1.9%
2011	216,088	5,583,457	10,709,177	3.9%	2.0%
2012	359,097	6,577,714	14,032,492	5.5%	2.6%
2013	473,135	6,989,066	15,568,406	6.8%	3.0%
2014	453,226	7,269,061	16,306,755	6.2%	2.8%
2015	434,935	7,145,949	17,872,632	6.1%	2.4%
2016	439,774	7,297,596	20,071,999	6.0%	2.2%
2017	418,644	7,162,683	21,372,752	5.8%	2.0%
2018	400,202	6,496,826	21,334,057	6.2%	1.9%
2019	386,747	7,673,073	26,304,990	5.0%	1.5%
2020	383,122	8,969,698	34,182,302	4.3%	1.1%
2021	327,668	8,565,887	37,098,274	3.8%	0.9%
2022	216,010	11,457,412	45,761,370	1.9%	0.5%

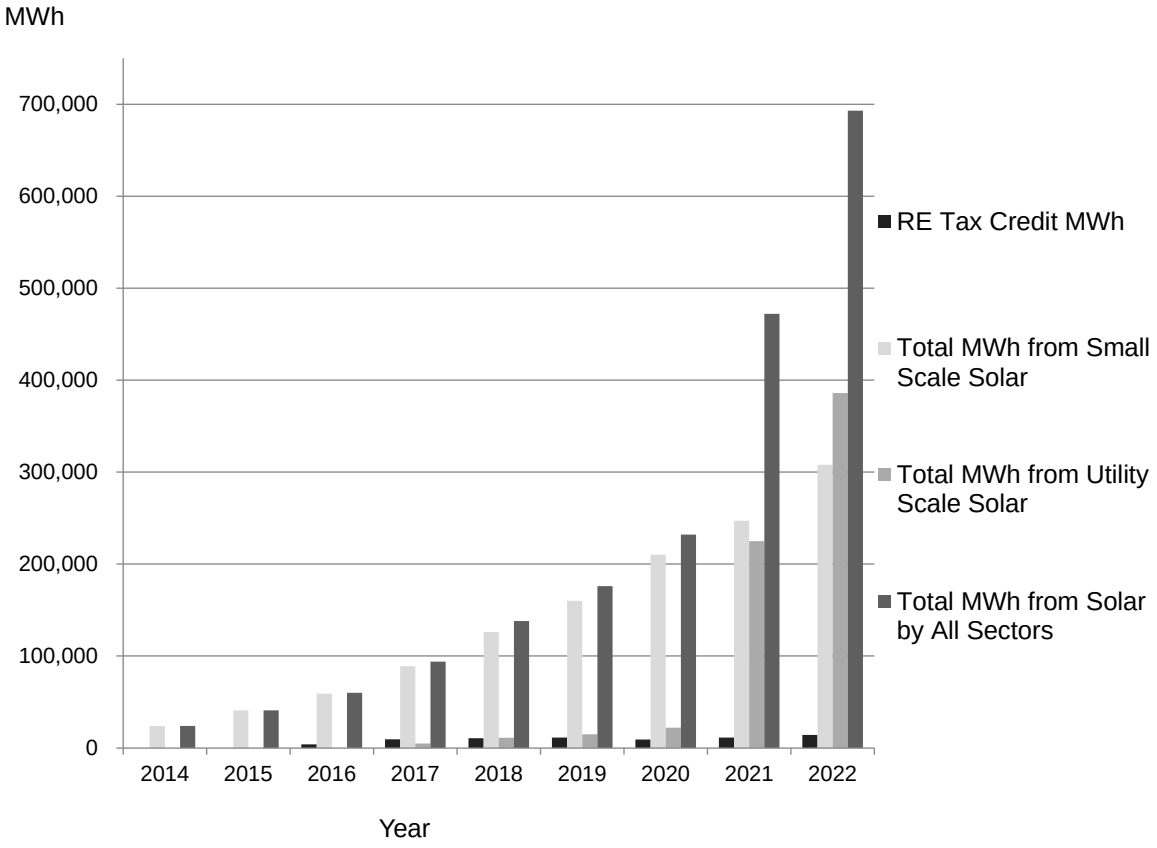
Sources: Iowa Department of Revenue and U.S. Energy Information Administration
Note: Megawatt hours generated from wind under the Wind Energy Production and Renewable Energy Tax Credit programs are based on tax credits awarded and are presented in the table by award year. As of the publication of this evaluation study, U.S. Energy Information Administration data on electricity production is available *at the sector level* for years through 2022.

Figure 3. Megawatt Hours Generated from Wind Under the Wind Energy Production and Renewable Energy Tax Credit Programs Compared to Sector Totals by Year



Sources: Iowa Department of Revenue and U.S. Energy Information Administration.
Note: Data on megawatt hours generated from wind under the Wind Energy Production (WEP) and Renewable Energy (RE) Tax Credit programs is based on tax credits awarded.

Figure 4. Megawatt Hours Generated from Solar Under the Renewable Energy Tax Credit Program Compared to Sector Totals by Year



Sources: Iowa Department of Revenue and U.S. Energy Information Administration.
Note: Data on megawatt hours generated from wind under the Renewable Energy (RE) Tax Credit program is based on tax credits awarded.

Table 11. Special Valuation of Wind Energy Conversion Property

Assessment Year	Percentage of Net Acquisition Cost that Comprises Special Valuation
1st	0%
2nd	5%
3rd	10%
4th	15%
5th	20%
6th	25%
7th and Subsequent	30%

Source: Iowa Code Section 427B.26
Note: Special valuation is the amount subject to tax.

Table 12. Assumptions for Calculating Property Tax Impact Associated with Wind Energy Production and Renewable Energy Tax Credit Wind Projects

Year Entering Service/Assess-ment Year	Estimated MW Entering into Service	Estimated Acquisition Cost Per MW	Estimated Aggregate Acquisition Cost	Estimated Applicable Property Tax Levy Rate
2006	35.7	$1,650,000	$58,910,000	27.20
2007	0.0	1,683,594	--	27.23
2008	0.9	1,717,872	1,550,000	27.36
2009	21.0	1,752,848	36,810,000	27.68
2010	31.2	1,788,536	55,800,000	27.46
2011	1.7	1,824,950	3,080,000	26.82
2012	27.7	1,862,106	51,580,000	26.23
2013	11.9	1,900,000	22,530,000	26.08
2014	29.0	1,805,722	52,370,000	26.20
2015	10.0	1,716,122	17,160,000	26.06
2016	0.0	1,630,968	--	25.90
2017	3.7	1,550,039	5,660,000	25.79
2018	5.4	1,473,127	7,910,000	25.69
2019	0.0	--	--	25.67
2020	0.0	--	--	25.50
2021	0.0	--	--	25.07
2022	0.0	--	--	25.32
2023	0.0	--	--	25.32

Source: Iowa Department of Revenue

Table 13. Estimate of Property Tax Impact Associated with the Wind Energy Production and Renewable Energy Tax Credit Wind Projects

Special Assessment Schedule

	Year of Turbine Service																	
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Est. Levy Rate	27.2335	27.2335	27.3637	27.6827	27.4605	26.8212	26.2334	26.0850	26.1952	26.0607	25.8996	25.7875	25.6945	25.6679	25.4970	25.0744	25.3242	25.3242
2006	0%	5%	10%	15%	20%	25%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
2007		0%	5%	10%	15%	20%	25%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
2008			0%	5%	10%	15%	20%	25%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
2009				0%	5%	10%	15%	20%	25%	30%	30%	30%	30%	30%	30%	30%	30%	30%
2010					0%	5%	10%	15%	20%	25%	30%	30%	30%	30%	30%	30%	30%	30%
2011						0%	5%	10%	15%	20%	25%	30%	30%	30%	30%	30%	30%	30%
2012							0%	5%	10%	15%	20%	25%	30%	30%	30%	30%	30%	30%
2013								0%	5%	10%	15%	20%	25%	30%	30%	30%	30%	30%
2014									0%	5%	10%	15%	20%	25%	30%	30%	30%	30%
2015										0%	5%	10%	15%	20%	25%	30%	30%	30%
2016											0%	5%	10%	15%	20%	25%	30%	30%
2017												0%	5%	10%	15%	20%	25%	30%
2018													0%	5%	10%	15%	20%	25%

Estimated Aggregate Assessed Value

	Year of Turbine Service																	
Assessment Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
2006	$ -	$ 2,945,250	$ 5,890,500	$ 8,835,750	$ 11,781,000	$ 14,726,250	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500	$ 17,671,500
2007			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2008				77,304	154,608	231,913	309,217	386,521	463,825	463,825	463,825	463,825	463,825	463,825	463,825	463,825	463,825	463,825
2009					1,840,490	3,680,980	5,521,471	7,361,961	9,202,451	11,042,941	11,042,941	11,042,941	11,042,941	11,042,941	11,042,941	11,042,941	11,042,941	11,042,941
2010						2,790,116	5,580,232	8,370,348	11,160,464	13,950,579	16,740,695	16,740,695	16,740,695	16,740,695	16,740,695	16,740,695	16,740,695	16,740,695
2011							154,208	308,417	462,625	616,833	771,042	925,250	925,250	925,250	925,250	925,250	925,250	925,250
2012								2,579,017	5,158,035	7,737,052	10,316,070	12,895,087	15,474,104	15,474,104	15,474,104	15,474,104	15,474,104	15,474,104
2013									1,126,700	2,253,400	3,380,100	4,506,800	5,633,500	6,760,200	6,760,200	6,760,200	6,760,200	6,760,200
2014										2,618,297	5,236,594	7,854,891	10,473,188	13,091,485	15,709,781	15,709,781	15,709,781	15,709,781
2015											858,061	1,716,122	2,574,183	3,432,244	4,290,305	5,148,366	5,148,366	5,148,366
2016												-	-	-	-	-	-	-
2017													282,882	565,764	848,647	1,131,529	1,414,411	1,697,293
2018														395,534	791,069	1,186,603	1,582,138	1,977,672

Estimated Aggregate Property Tax

	Fiscal Year																	
	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25
	$ -	$ 80,210	$ 161,186	$ 244,597	$ 323,512	$ 394,976	$ 463,583	$ 460,961	$ 462,908	$ 460,532	$ 457,685	$ 455,704	$ 454,060	$ 453,590	$ 450,570	$ 443,102	$ 447,517	$ 447,517
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	-	2,140	4,246	6,220	8,112	10,082	12,150	12,088	12,013	11,961	11,918	11,905	11,826	11,630	11,746	11,746
		-	-	-	50,541	98,728	144,847	192,037	241,060	287,787	286,008	284,770	283,743	283,449	281,562	276,895	279,654	279,654
		-	-	-	-	74,834	146,388	218,340	292,351	363,562	433,577	431,701	430,144	429,698	426,838	419,763	423,945	423,945
		-	-	-	-	-	4,045	8,045	12,119	16,075	19,970	23,860	23,774	23,749	23,591	23,200	23,431	23,431
		-	-	-	-	-	-	67,274	135,116	201,633	267,182	332,532	397,599	397,188	394,543	388,004	391,869	391,869
		-	-	-	-	-	-	-	29,514	58,725	87,543	116,219	144,750	173,520	172,365	169,508	171,197	171,197
		-	-	-	-	-	-	-	-	68,235	135,626	202,558	269,103	336,031	400,552	393,913	397,838	397,838
		-	-	-	-	-	-	-	-	-	22,223	44,254	66,142	88,098	109,390	129,092	130,378	130,378
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-	7,269	14,522	21,638	28,372	35,819	42,983
		-	-	-	-	-	-	-	-	-	-	-	-	10,153	20,170	29,753	40,066	50,083
Total	$ -	$ 80,210	$ 161,186	$ 246,737	$ 378,299	$ 574,759	$ 766,975	$ 956,739	$ 1,185,218	$ 1,468,636	$ 1,721,827	$ 1,903,559	$ 2,088,502	$ 2,221,904	$ 2,313,045	$ 2,313,234	$ 2,353,459	$ 2,370,640

Source: Iowa Department of Revenue