



Iowa 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 Legislative Tax Expenditure Committee to review all tax expenditures with assistance from the Department of Revenue. This law also provides a schedule for such reviews and requires a review in 2019 of the Wind Energy Production Tax Credit and the Renewable Energy Tax Credit. In addition, the Department was directed to assist the legislature by performing periodic economic studies of tax credit programs. This is the second evaluation study completed for the Wind Energy Production Tax Credit and the Renewable Energy Tax Credit expenditure.

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:

Brent Kreider	Iowa State University
Brian Selinger	Iowa Economic Development Authority
Tim Johnson	Iowa Farm Bureau
Ellen Shaw	Iowa Utilities Board

The assistance of an advisory panel implies no responsibility for the content and conclusions of the evaluation study. 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.

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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.

Applications for tax credit eligibility are subject to review and approval by the Iowa Utilities Board 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 nameplate capacity for facilities based on other forms of energy.

The major findings of the study are these:

Other State Incentives for Renewable Energy

- Forty-five 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. Twenty-nine states, including Iowa, offer incentives affecting individual or corporation income tax. Fifteen states offer tax credits that target large-scale energy production or investment in renewable energy production facilities.
- Six states offer production tax credits for renewable energy that are allocated based on the amount of energy generated, such as per kilowatt hour. 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 Production 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 2018, growth in wind energy capacity in Iowa increased by a factor of more than 43 and outpaced growth nationally. Nearly eight percent of the United States' wind energy capacity is located in Iowa. Wind is the source of 33.7 percent of electricity generated in Iowa, the second highest of any state.
- 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 21 counties in Iowa.

Wind Energy Production and Renewable Energy Tax Credit Awards and Claims

- In 2018, the total value of Renewable Energy Tax Credit awards was \$4.5 million. The average certificate amount was \$9,700. Since its beginning, a total of \$46.6 million in tax credits has been awarded under the program. Of this amount, 86.5 percent has been transferred to third parties.
- Since its inception, the Wind Energy Production Tax Credit program has awarded \$13.3 million in tax credits. Overall, 99.9 percent of the total program award amount has been transferred.
- 56.6 percent of Wind Energy Production Tax Credits awarded through 2018 were to Iowa residents. 80.1 percent of Renewable Energy Tax Credits awarded through 2018 were to Iowa residents.
- A total of \$38.7 million in Renewable Energy Tax Credits and \$12.0 million in Wind Energy Production Tax Credits have been claimed beginning in tax year 2007.
- Wind Energy Production and Renewable Energy Tax Credits were awarded for wind energy generated in 2018 for 151,000 MWh and 562,000 MWh, respectively.
- In 2007, wind energy for which tax credits were granted under either the Wind Energy Production and Renewable Energy Tax Credit program accounted for 2.9 percent of wind energy generated by independent power producers in Iowa and 1.3 percent of the state's total wind-generated electricity. Between 2007 and 2018, these percentages increased to 9.5 percent and 3.3 percent, respectively.

Economic Analysis of the Wind Energy and Renewable Energy Tax Credits

- Virtually 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.

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, including a description of tax credit application and award procedures. Section III provides information about similar tax credits in other states. Section IV provides an overview of the electric power industry in Iowa, with a particular focus on wind energy. Section V presents data regarding Wind Energy Production Tax Credit and the Renewable Energy Tax Credit awards and claims. Section VI provides an analysis of the economic effects of the credits. The final section of this report provides a brief conclusion.

II. History of Iowa's Wind Energy Production and Renewable Energy Tax Credit Programs

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 or heat. Since their initial enactment, both credits have been modified or expanded, although further eligibility for both credits is no longer available. Credits being awarded in current years are associated with the 10-year award window available to projects approved prior to the eligibility deadline.

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 have been approved by the local board of supervisors and the Iowa Utilities Board (IUB). Facility eligibility designations were granted on a first-come, first-served basis by the IUB. Facilities must be placed in service within 18 months of approval by the IUB. 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 megawatt 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. Approved facilities must submit tax credit applications annually within 30 days of the closing of their tax year. Applications are filed online through the Tax Credit Award, Claim & Transfer Administration System (CACTAS). The applications are reviewed by both IUB and the Iowa Department of Revenue (IDR). After successful review, tax credit certificates are awarded by IDR based on annual energy production reported by the facility. As noted above, tax credits for each approved facility are available for a ten-year period from the initial in-service date of the facility.

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 IUB. 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. However, no applications have been submitted for Renewable Energy Tax Credits pursuant to the Small Wind Innovation Zone provision.

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 one that recovers biogas or methane gas. Co-generation facilities, which simultaneously generate electricity and useful heat, are also eligible. Additionally, the renewable energy facility must 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. In addition, a taxpayer can only be approved for 2.5 MW nameplate capacity under the Renewable Energy Tax Credit program.

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 IUB and tax credit certificates are awarded by the IDR based on annual energy production reported by the facility upon a successful application in CACTAS. 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.

At least one project has been awarded part of a tax credit for electricity generated for on-site consumption. In that case, the electricity consumed on site represented just 0.2 percent of the total production eligible for the credit. A small number of other projects produce electricity that is likely primarily for use on site. However, because such electricity is sold to a utility under an agreement whereby the consumer receives credit for the electricity generated, the tax credit is awarded in view of the sale rather than on the basis of the on-site consumption provision of either tax credit program. No project has been awarded either a Wind Energy Production Tax Credit or Renewable Energy Tax Credit solely on the basis of generation for on-site consumption.

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. TaxCreditResearch.Com is an additional comprehensive source of information regarding state tax credits of all kinds including those related to renewable energy. The following analysis is adapted from these two sources 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 inducements to homeowners to installed energy-efficient appliances as well as negotiated support to industry 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 a Geothermal Heat Pump Tax Credit equal to 20 percent of the federal residential energy efficient property tax credit allowed for geothermal heat pumps. Moreover, as do other states, Iowa provides support for renewable energy development in ways that go beyond tax policy. These include loan programs like the Alternate Energy Revolving Loan Program (AERLP). This program, administered by the Iowa Energy Center and funded by the state's investor-owned utilities, provides loans to build renewable energy production facilities in Iowa. Available to non-rate-regulated utilities since 2009, this program has been cited by Iowa wind energy experts as instrumental in the promotion of wind energy production in the state. In addition to state-sponsored incentives, numerous utility-sponsored grant, loan, and rebate programs are available.

B. General Tax Incentives for Renewable Energy

Forty-five states and the District of Columbia offer some form of tax incentive for the production of renewable energy or for investments in improved energy efficiency. In a number of these states, the incentives are limited to the domains of property tax and sales tax. However, 29 states, including Iowa, offer incentives affecting individual or corporation income tax, either in the form of tax credits or deductions. Twenty-two 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 feedstock. For example, Montana offers a tax credit for the use of wood-burning stoves and Kentucky provides incentives for processes that use oil shale, tar sands, or coal as their primary raw material.

Among the 22 states that offer tax credits for renewable energy or energy efficiency, tax credits for the use of wind technologies are available in 17 states; credits for the use of solar energy (by any of

various means) are available in 20 states; credits for the use of biomass are available in 16 states; and credits for the use of anaerobic digestion technology are available in nine states. The first of these credits was established in 1977. However, all but five 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. Fifteen states offer tax credits 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, the tax credits provided for in Kentucky's Incentives for Energy Independence Act. Available on a negotiated basis to companies that construct or upgrade renewable or alternative energy facilities, the value of these credits may extend to 100 percent of corporation income tax arising from a given project. Montana's Alternative Energy Investment Tax Credit provides a credit of up to 35 percent of the tax on income from investment in facilities that produce renewable or alternative energy. These credits also include Missouri's Wood Energy Production Credit, which provides a credit of \$5 per ton of processed biomass materials.

C. Production Tax Credits for Renewable Energy

In six of the 15 states that offer tax credits for large-scale production of energy, the tax credits are allocated on a per kilowatt hour (kWh) basis (see Table 1). This approach sets such programs apart as what are typically called production tax credits. In addition to Iowa, these states are Arizona, Florida, Maryland, New Mexico, and Oklahoma. (This list does not include Missouri whose "Wood Energy Production Credit," despite its name, is not based on amount of energy produced but on the amount of biomass consumed.) 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 for the federal PTC and in four states, including Iowa, Arizona, Maryland, and New Mexico. Indexed to inflation from a base amount specified by the original statute, in 2014 the federal credit equaled \$0.023 per kWh for electricity derived from wind, closed-loop biomass, and geothermal sources during the calendar year, and \$0.011 per kWh for other qualified sources. 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 Production 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. These limits represent an upper bound for overall costs of the program and the program outlay is limited by the productive efficiency of approved generators. Oklahoma does not specify a limit on awards, however its rates are the lowest in the country. No limit was specified for the federal credit.

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. Unused credits from the federal PTC can be carried forward for 20 years.

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. The Electric Power Industry and Wind Energy in Iowa

As of 2019, installed wind-generated electrical capacity of the United States is just over 98.0 gigawatts (GW) (American Wind Energy Association [AWEA], 2019). U.S. wind power has more than tripled over the past decade, and today is the largest source of renewable generating capacity in the country (American Wind Energy Association [AWEA], 2019). Iowa has an installed wind energy capacity of 8.9 GW, second highest of the fifty states, behind Texas (AWEA, 2019). Iowa accounts for approximately eight percent of national wind energy capacity (AWEA, 2019). Moreover, Iowa is second in the nation in the share of electricity generated from wind (EIA, 2018). Wind accounts for 33.7 percent of electricity generated in Iowa; by comparison, it makes up approximately seven percent of total electricity generated in the U.S. (EIA, 2018).

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 2018. 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 2018, the aggregate electric output of all facilities located in Iowa was 63.4 million MWh (see Table 2). 78.1 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 3.7 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 18.2 percent of electricity produced in 2018 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. That is, utilities maintain the infrastructure for providing electricity to consumers. Utilities include investor-owned utilities, municipally-owned utilities (MOUs), and rural electric cooperatives (RECs).

IOUs are private companies financed by shareholder equity and bondholder debt; nationally, most are financially sizable, multi-state operations. Because utilities are natural monopolies, IOUs are subject to state regulation. In Iowa, the rates and services of investor-owned utilities that serve more than 10,000 customers are regulated by the Iowa Utilities Board (IUB). Although three IOUs operate in Iowa, one serves a small number of customers. The IUB regulates the rates of two IOUs, MidAmerican Energy Company and Interstate Power and Light Company¹ These two IOUs serve 72 percent of Iowa customers (IUB, 2017).

MOUs are city-owned and governed by local elected officials. The IUB 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. With the exception of a single REC which has opted for rate regulation, the rates of RECs in Iowa are not regulated. As customer demand varies, utilities may purchase needed power or sell excess power via a wholesale market. In Iowa, this process is facilitated by a Regional Transmission Organization.

Independent Power Producers (IPPs) are distinct from utilities. IPPs generate electricity for sale to utilities, whether directly or through the Regional Transmission Organization. Such sales are governed by a power purchase agreement between each IPP and the power purchaser. Power purchase

¹ Interstate Power and Light (IPL) is the utility subsidiary of Alliant Energy Company serving Iowa.

agreements, which are subject to regulation by the Federal Energy Regulatory Commission, stipulate terms of sale, including price, for a period of several years. Federal law requires utilities to purchase power produced by IPPs at their wholesale rate.²

B. Wind Energy Generation by Sector

As noted above, the electric utilities sector (which includes IOUs, MOUs, and RECs) generates more than 75.0 percent of the electricity produced in the state. Of this total, 30.0 percent is produced from wind (see Table 2) accounting for 69.5 percent of the state's wind-generated electricity. By contrast, 56.4 percent of electricity produced by IPPs in 2018 was generated from wind, accounting for 30.5 percent of the state's wind-generated electricity.

Based on the *EIA-860*, there were 127 wind power plants in Iowa in 2018, consisting of more than five thousand individual wind turbines. Forty-eight plants were operated by one of Iowa's two rate-regulated investor-owned utilities, thirteen were owned by municipally-owned utilities or cooperatives, and 65 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 2018, IOUs operated 50 wind power plants in Iowa. These had an average nameplate capacity of 109.9 MW. Only seven had a capacity of less than 30 MW. The nameplate capacity of the remaining 43 plants ranged from 35 MW to 444 MW. The 65 plants operated by IPPs, by contrast, had an average nameplate capacity of 42 MW. Nearly two-thirds 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. As a practical matter, then, the tax credit offers an incentive primarily for plants operated by cooperatives and IPPs. This is because Iowa's rate-regulated 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, 2011). 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 Board, there are four wind energy projects operating with approval for Wind Energy Production Tax Credits under Iowa Code Chapter 476B as of 2019. These four projects were approved 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 Non-wind," and "476C 167 Billion BTU Commercial Heat."

² Public Utility Regulatory Policy Act (PURPA) of 1978

As of December 2019, a total of 384 wind energy project awards have been approved under the Renewable Energy Tax Credit wind program.

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, 2014c). 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.

Wind energy projects approved for either Wind Energy Production Tax Credits or Renewable Energy Tax Credits are located in 21 counties in Iowa (see Figure 1). 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 Adair and Cass counties to the state's border with Minnesota. In twelve counties, wind energy projects approved for tax credits amount to less than 5 MW. More than 10 MW are located in each of eight Iowa counties. Four of these counties, including Crawford, Greene, Palo Alto, and Story each contain more than 20 MW of capacity.

V. 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 \$59.9 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 2018, the most recent complete year for which award data is available, the value of awards was \$4.5 million and the average tax credit per project was \$62,000. Since 2007, a total of \$46.6 million in tax credits has been awarded under the program. Of this amount, \$40.3 million, or 86.5 percent, has been transferred to third parties. Over ninety-seven percent of credits issued in years prior to 2012 have been transferred (see Table 5a).

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 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. In 2018, awards totaled \$1.5 million for four projects. Since its inception, the program has awarded \$13.4 million in tax credits (see Table 5b). As with the Renewable Energy Tax Credit, virtually all of the tax credits issued have been transferred. Overall, including certificates issued in 2018, 90.5 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 59 individual recipients totaling \$11.2 million for award years up to 2018 (see Table 6). Of these owners, 35, or 59.3 percent, were Iowa residents and 24 were residents of other states representing 40.7 percent of credit recipients. The distribution of amounts awarded was approximately proportionate; 56.6 percent of the total amount awarded up to TY 2018 was to Iowa residents and 43.4 percent was to nonresidents.

Of the 2,781 recipients of Renewable Energy Tax Credit awards, 2,214 were Iowa residents. Iowa residents thus accounted for 79.6 percent of this program's recipients and \$19.8 million (57.1 percent) of the approximately \$34.6 million of tax credits awarded under the program and nonresidents received \$14.9 million (42.9 percent). 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 \$38.7 million in Renewable Energy Tax Credits have been claimed for tax years 2006 through 2018 (see Table 7). 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 2017 and 2018 reached \$3.7 million and \$2.3 million under this program.

Wind Energy Production Tax Credits were first claimed in tax year 2009. With the small number of claims, annual information cannot be presented. Claims under this program exceeded \$1 million in 2012. Since 2009, a total of \$12.0 million in Wind Energy Production Tax Credits have been claimed.

Awards made under the Wind Energy Production and Renewable Energy Tax Credit programs are claimed against various tax types (see Table 8). Considering all claims to date for both programs combined, 27.4 percent were against insurance premium tax; 29.1 percent of the total claimed amount was against corporation income tax; 11.9 percent was against franchise tax; and just 12.5 percent was against individual income tax. 14.2 percent of the total claimed amount was 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 varies by tax type as well, ranging from \$220,000 for replacement tax to \$3,200 for individual income tax. There have been 2,728 claims for Wind Energy Production and Renewable Energy Tax Credits. Recall that nearly all of the tax credits were transferred, so claimants are typically not the original taxpayers who were awarded the tax credits.

D. Energy Production Statistics

Both the Wind Energy Production and the Renewable Energy Tax Credit awards 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 9).

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 to 867,000 MWh in 2013. Production for which tax credits were awarded in 2013 accounted for 12.4 percent of wind energy generated by IPPs and 5.6 percent of the total wind-generated electricity produced in the state (see Figure 2). 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 8,800 MWh in 2016, or 14.7 percent of the total solar-generated electricity produced in the state. In the subsequent two years, solar energy produced under the Renewable Energy Tax Credits increased to 24,100 MWh in 2018 (see Figure 3). It should be emphasized that, whether or not it was also eligible for the Renewable Energy Tax Credit, electricity generated from solar during this period was also generally eligible for the federal PTC.

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

A. Delimitations of the Analysis of Renewable Energy

Examination of virtually any aspect of renewable energy invariably touches on a number of other serious and topical issues. Foremost among these are concerns around global climate change and the consumption of carbon-based feedstocks to which renewable energy offers an alternative. However, analysis of the extent to which the Wind Energy Production and Renewable Energy Tax Credits contribute to a broader shift away from reliance on fossil fuels is beyond the scope of this evaluation study.

Other important questions around renewable energy relate to its underlying practicality. Of particular note is whether and in what manner renewable capacity might be scaled up to meet base load demands, since the prospects for large-scale utilization of renewables are premised on certain tentative technical contingencies. For example, a key challenge for wind energy is that wind is variable and somewhat unpredictable. A description of the technical and practical conditions for fuller reliance on renewable energy is beyond the scope of this study.

Finally, wind energy is at the heart of a broad network of industry in Iowa. The state is home to major manufacturers of wind energy machinery and related systems including turbines, blades, towers, and control components. These enterprises, along with the construction and maintenance of wind facilities and associated business activity, account for considerable investment in the state. The industry's impact ripples through the economy in countless ways. This evaluation study does not attempt to assess the nature and extent of this economic ripple effect nor measure the economic impact that results from the Wind Energy Production and Renewable Energy Tax Credit programs.

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 I, 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 be unable to benefit from the nonrefundable tax credit.

Transfers are private transactions. Information about transfer sales prices is not available. Based on general information published about tax credit exchanges, credits are generally sold at a discount of 5 to 15 percent. The average price for transferred Renewable Energy Tax Credits has settled at around \$0.93 on the dollar.

As reported above, virtually all tax credits awarded under the Wind Energy Production Tax Credit and Renewable Energy Tax Credit programs have been transferred. The finding has implications for the value of the programs' support for wind and other forms of renewable energy. Specifically, it indicates that tax credit recipients receive approximately \$0.94 of each dollar foregone by the State in the interest of subsidizing renewable energy production. Secondly, the exchange of tax credits at a discount provides a tax benefit to the tax credit purchaser that is surely unintended by the program. 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.

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). Published accounts indicate that 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.

In a presentation describing a single wind farm composed of several projects approved for the Renewable Energy Tax Credit (Wind, 2006), one of the projects' associates outlined the enterprise's investment strategy. Funding elements included United States Department of Agriculture Section 9006 grants to several owners and zero interest loans for renewable energy development, like those available from the Iowa Alternate Energy Revolving Loan Program. According to the presentation, "all of these were necessary [for the project] to be competitive" (Wind, 2006).

Reference Page

- American Wind Energy Association. (2019). *State Wind Energy Statistics: Iowa*.
<http://awea.rd.net/Resources/state.aspx?ItemNumber=5224>
- Iowa Environmental Council. (2011). *Renewable Energy Incentive Rates: Potential Opportunities for Iowa Farmers*.
<http://www.iaenvironment.org/documents/energy/RenewableEnergyIncentiveRates.pdf>
- Iowa Utilities Board. (2019). *Iowa Utility Electric Profile*.
http://www.state.ia.us/government/com/util/energy/electric_profile.html
- Regulatory Assistance Project. (2011). *Electricity Regulation in the US: A Guide*.
www.raponline.org
- Rothstein, Paul; & Wineinger, Nathan. (2007). "Transferable Tax Credits in Missouri: An Analytical Review." *Regional Economic Development*, 3(2), 53-74.
<https://research.stlouisfed.org/publications/red/2007/02/Rothstein.pdf>
- U.S. Department of Energy. (2019). *DSIRE RPS Data Spreadsheet*. Database of State Incentives for Renewable Energy: <http://www.dsireusa.org/rpsdata/index.cfm>
- U.S. Department of Energy. (2019). *Database of State Incentives for Renewables and Efficiency*. Iowa Alternative Energy Law (AEL).
http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=IA01R&re=0&ee=0
- U.S. Energy Information Administration. (2019). *Existing Nameplate and Net Summer Capacity by Energy Source, Producer Type and State*. Existing Capacity 1990-2018 Final.
<http://www.eia.gov/electricity/data/state/>
- U.S. Energy Information Administration. (2019). *Form EIA-860 Instructions Annual Electric Generator Report*. http://www.eia.gov/survey/form/eia_860/instructions.pdf
- Wind, Thomas A. (2006). *Hardin Hilltop Wind Farm... An Example of Community Wind in Iowa*. Presentation, Cloud County Community College, Kansas Community Wind Workshop, Concordia, Kansas.
www.kcc.state.ks.us/energy/comm_wind/cw_thomas_wind_103106.ppt

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	Transferability	Eligible System Size	Refundability	Carry-forward	Initial Year
Federal	Renewable Electricity	C	W, S, B, O	\$0.023/kWh for wind, geothermal, closed-loop biomass; \$0.011/kWh for other eligible technologies	None	No	150 kW minimum	No	20 years	1992
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 – 50 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); TaxCreditResearch.Com

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.

Table 2. Electricity Generation in Iowa by Sector and Energy Source, 2018

Sector	Energy Source	MWh Produced in 2018	Percent of Sector Total MWh	Percent of Energy Source Total MWh
Commercial or Industrial ¹	Wind	3,430	0.1%	0.0%
	All Other ²	2,346,041	99.9%	5.6%
	Total	2,349,471	100.0%	3.7%
Electric Utilities (IOUs, MOUs, and RECs ³)	Wind	14,833,797	30.0%	69.5%
	All Other	34,679,299	70.0%	82.5%
	Total	49,513,096	100.0%	78.1%
Independent Power Producers	Wind	6,496,826	56.4%	30.5%
	All Other	5,021,173	43.6%	11.9%
	Total	11,517,999	100.0%	18.2%
All Sectors	Wind	21,334,053	33.7%	100.0%
	All Other	42,046,513	66.3%	100.0%
	Total	63,380,566	100.0%	100.0%

* Commercial and industrial sectors include generators that produce electricity primarily to support the activities of commercial or industrial establishments.

** Includes coal, conventional hydroelectric, natural gas, nuclear, other biomass, and petroleum.

*** IOUs are investor owned utilities. MOUs are municipally owned utilities. RECs are rural electric cooperatives.

Source: U.S. Energy Information Administration

Table 3. Number and Aggregate Capacity of Electricity-Generating Plants in Iowa by Sector and Energy Source, 2018

Sector	Energy Source	Number of Plants	Nameplate Capacity (MW)	Average Nameplate Capacity
Commercial or Industrial ¹	Wind	1	1	1.0
	All Other ²	29	106	3.7
	Total	30	107	3.6
Rate-Regulated Investor Owned Utilities	Wind	50	5,497	109.9
	All Other	82	8,413	102.6
	Total	132	13,910	105.4
Municipally Owned Utilities and Rural Electric Cooperatives	Wind	11	159	14.5
	All Other	318	1,748	5.5
	Total	329	1,908	5.8
Independent Power Producers	Wind	65	2,729	42.0
	All Other	70	801	11.4
	Total	135	3,530	26.1
All Sectors	Wind	75	8,386	111.8
	All Other	558	11,069	19.8
	Total	633	19,455	30.7

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, and petroleum.

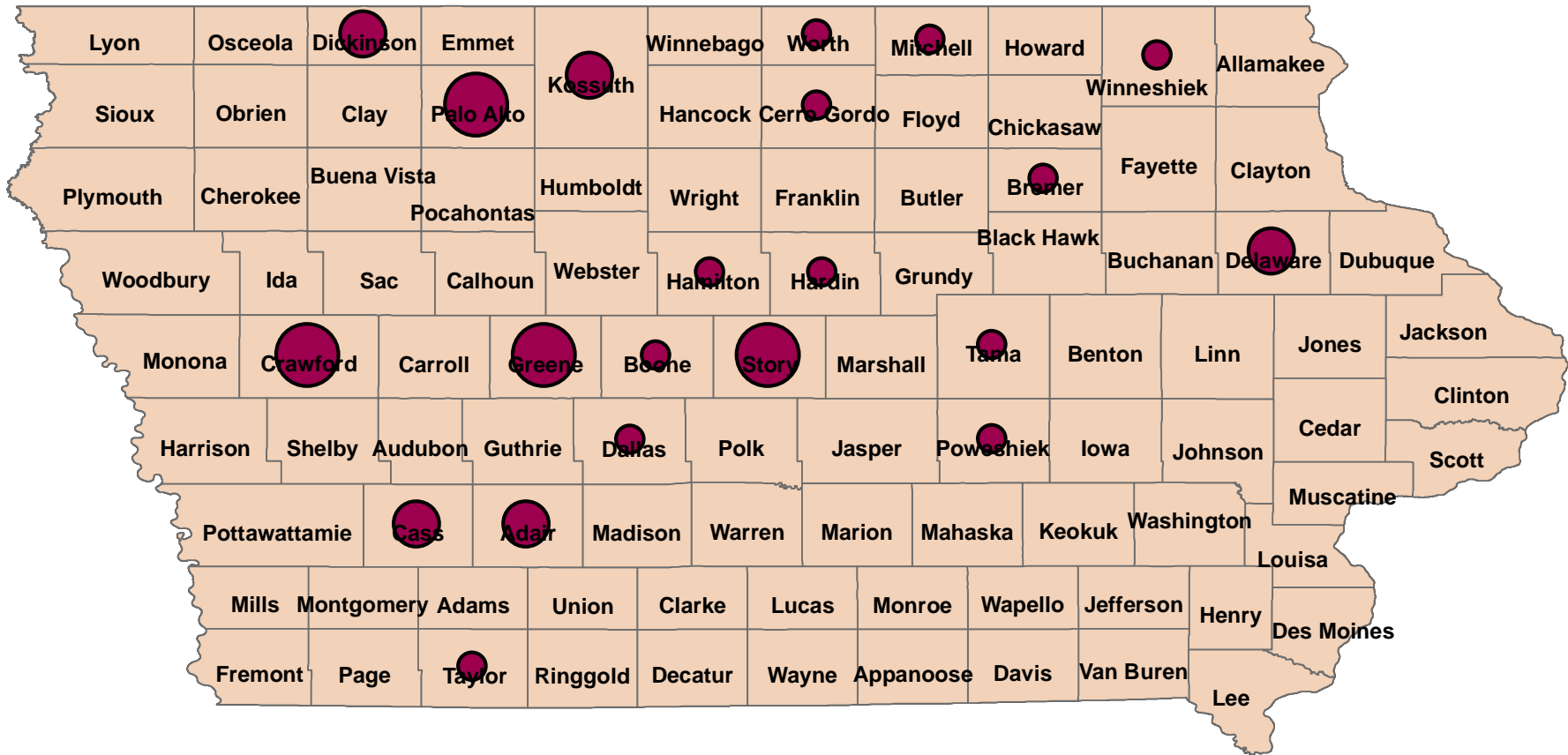
Table 4. Tax Credit Project Nameplate Capacity in Production and Program Capacity Cap, 2019

Year	Wind Energy Production Tax Credit		Renewable Energy Tax Credit Wind Projects		Renewable Energy Tax Credit Non-Wind Projects	
	MW Capacity in Production	Total Program Capacity Cap	MW Capacity in Production	Total Program Capacity Cap	MW Capacity in Production	Total Program Capacity Cap
2019	50	50	128	363	45	63

Source: Iowa Utilities Board

Note: Data reflect capacity as of the end of each calendar year.

Figure 1. Location and MW Capacity of Wind Energy Plants in Iowa



Source: Iowa Utilities Board

- Less than 5 MWh
- Between 5 MWh and 20 MWh
- Over 20 MWh

Table 5a. Renewable Energy Tax Credit Awards and Transfers by Year

Renewable Energy Tax Credit						
Award Year	Number of Projects	Number of Tax Credit Certificates	Total Award Amount	Average Total Award for Project	Transfers	Percent Transferred
2007	19	22	\$1,492,897	\$78,574	\$1,492,897	100%
2008	21	25	\$2,570,197	\$122,390	\$2,563,960	100%
2009	21	22	\$2,398,784	\$114,228	\$2,398,784	100%
2010	22	24	\$2,503,361	\$113,789	\$2,455,105	98%
2011	31	101	\$3,011,408	\$97,142	\$2,974,365	99%
2012	41	145	\$4,219,009	\$102,903	\$4,103,597	97%
2013	61	355	\$5,650,536	\$92,632	\$4,921,075	87%
2014	62	342	\$5,471,168	\$88,245	\$4,627,669	85%
2015	59	338	\$4,811,827	\$81,556	\$3,946,027	82%
2016	63	379	\$5,207,638	\$82,661	\$4,418,006	85%
2017	89	503	\$4,729,437	\$53,140	\$3,554,959	75%
2018	73	469	\$4,530,933	\$62,068	\$2,867,688	63%
Total	562	2,725	\$46,597,195	\$82,913	\$40,324,132	86.5%

Source: Iowa Department of Revenue

Table 5b. Wind Energy Production Tax Credit Awards and Transfers, 2009 through 2018

Renewable Energy Tax Credit				
Number of Tax Credit Certificates	Total Award Amount	Average Total Award for Project	Transfers	Percent Transferred
65	\$13,251,693	\$203,872	\$13,245,074	99.95%

Source: Iowa Department of Revenue

Note: To maintain confidentiality of taxpayer information, program statistics are reported for years 2009 through 2018 combined.

Table 6. Wind Energy Production and Renewable Energy Tax Credit Awards by Awardee State of Residence, all years

Tax Credit Program	Iowa				Other States				Total			
	Recipients		Awards		Recipients		Awards		Recipients		Awards	
	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	35	59.3%	\$6,368,199	56.6%	24	40.7%	\$4,876,851	43.4%	59	100%	\$11,245,050	100%
Renewable Energy	2,179	80.1%	\$19,764,958	57.1%	543	19.9%	\$14,855,590	42.9%	2,722	100%	\$34,620,548	100%
Total	2,214	79.6%	\$26,133,157	57.0%	567	20.4%	\$19,732,441	43.0%	2,781	100%	\$45,865,598	100%

Source: Iowa Department of Revenue

Table 7. Renewable Energy and Wind Energy Production Tax Credit Claims by Tax Year

<u>Tax Year</u>	<u>Renewable Energy Tax Credit</u>	<u>Wind Energy Production Tax Credit</u>
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	\$3,575,811	\$1,014,356
2013	\$4,982,232	\$1,059,987
2014	\$4,639,200	\$1,066,206
2015	\$3,570,769	\$1,328,996
2016	\$4,734,421	\$1,094,643
2017	\$3,733,989	\$3,500,706
2018	\$2,319,845	\$920,949
Total	\$38,685,804	\$11,992,486

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

Table 8. Tax Credit Claims by Tax Type, Tax Years 2007 through 2018

Wind Energy Production and Renewable Energy Tax Credits				
Tax Type	Number of Claims	Total Claim Amount	Percentage of Total Claims	Average Claim Amount
Corporation	191	\$15,348,146	29.1%	\$80,357
Franchise	84	\$6,298,375	11.9%	\$74,981
Individual	2,072	\$6,590,654	12.5%	\$3,181
Insurance Premium	288	\$14,432,489	27.4%	\$50,113
Replacement	34	\$7,494,769	14.2%	\$220,434
Sales & Use	59	\$2,585,127	4.9%	\$43,816
Total	2,728	\$52,749,560	100%	\$19,336

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

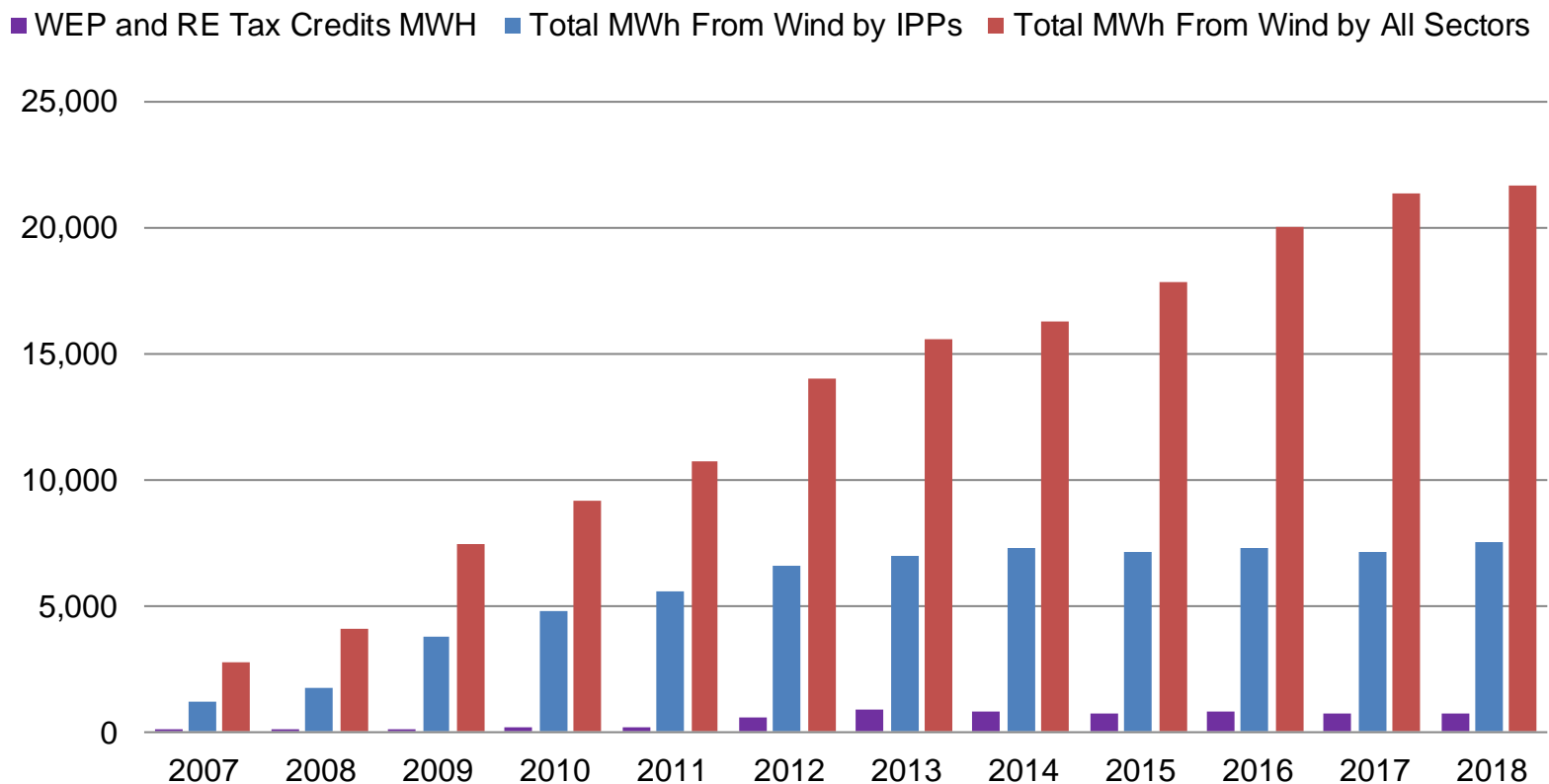
Table 9. Electricity Generated from Wind Under the Wind Energy Production and Renewable Energy Tax Credit Programs and Total in Iowa by Year

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	610,157	6,577,712	14,032,491	9.3%	4.3%
2013	867,407	6,989,066	15,568,406	12.4%	5.6%
2014	811,041	7,269,061	16,306,755	11.2%	5.0%
2015	772,244	7,145,949	17,872,632	10.8%	4.3%
2016	782,292	7,297,596	20,071,999	10.7%	3.9%
2017	741,787	7,162,683	21,372,752	10.4%	3.5%
2018	712,222	6,496,826	21,334,053	11.0%	3.3%

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 2018.

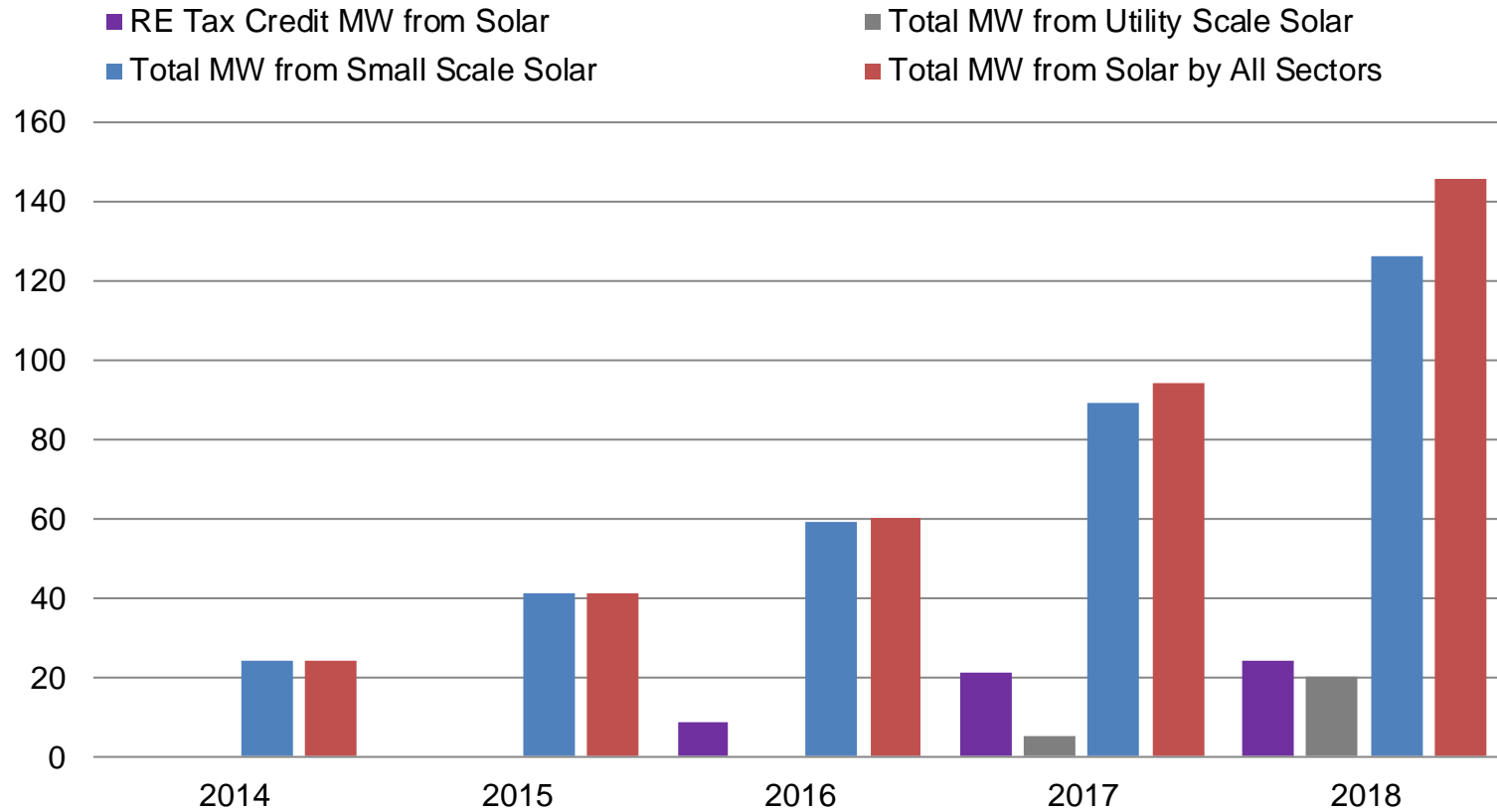
Figure 2. Megawatt Hours Generated from Wind Under the Wind Energy Production and Renewable Energy Tax Credit Programs Compared to Sector Totals by Year



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 3. Megawatt Hours Generated from Solar Under the 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 solar under the Renewable Energy (RE) Tax Credit program is based on tax credits awarded