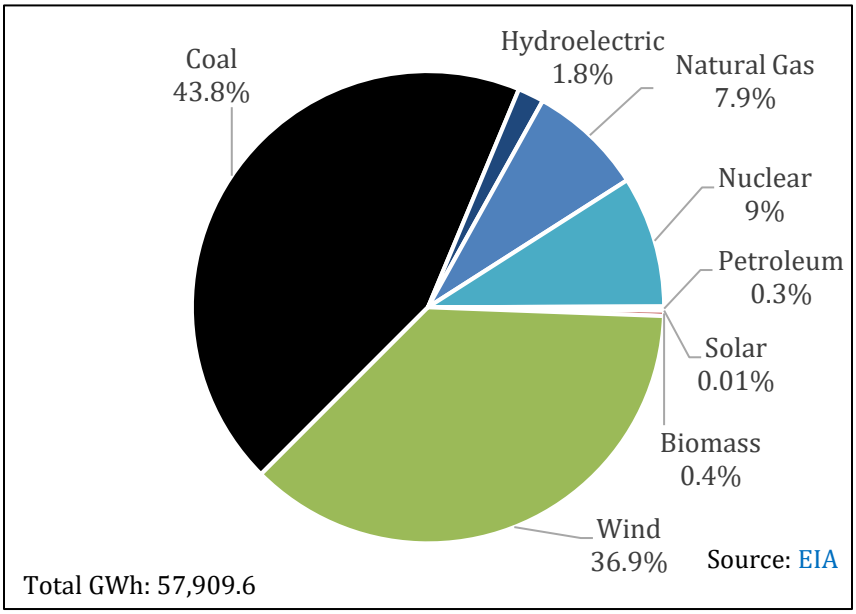
State Brief: Iowa

BACKGROUND

The primary source of electricity for Iowa is imported coal, which supplies nearly half of the state's electric generation. However, coal's contribution has declined recently, as coal provided more than three-quarters of the state's energy in 2008.

Wind energy's contribution to the state's electricity mix has risen dramatically, and the Hawkeye State is the first state in the nation to generate more than 30% of its electricity from wind. Iowa ranks second in the nation for installed wind capacity. Iowa is the largest producer of ethanol and has the second-largest biodiesel production capacity in the U.S.

Iowa's Net Electric Generation, 2017



The Iowa Energy Plan, developed through a statewide stakeholder process, was released in December 2016, and implementation began in 2017. The plan, organized around four central pillars, outlines 15 objectives and 45 strategies to address economic development, energy efficiency and conservation, energy resources, and transportation and infrastructure. The Iowa Energy Center, previously managed by Iowa State University and now based within the Iowa Economic Development Agency (IEDA), creates and administers programs aligning with the Plan's four pillars. The Center's activities are overseen and approved by the Governor-appointed Iowa Energy Center Board.

The Iowa Utilities Board (IUB) regulates the state's two investor-owned utilities (IOU) and has limited authority over municipal utilities and electric cooperatives. The Governor appoints the three members of the bipartisan Board. Currently, the IUB has two Republican members and a Democratic chair. Republican majorities control both chambers of the state legislature, and Republican Governor Kim Reynolds took office in May of 2017.

POLICY STRENGTHS AND OPPORTUNITIES[1]

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[2] an important framework for policymakers to consider. The basic idea behind policy stacking is that there is an interdependency and sequencing of state policy that, when done effectively, can yield greater market certainty, private sector investment, and likelihood of achieving stated public policy objectives.

In theory, but not always in practice, clean energy policies can be categorized into one of three tiers of the policy stack. Tier 1, market preparation policies, remove technical, legal, regulatory, and infrastructure-related barriers to clean energy technology adoption. Tier 2, market creation policies, create a market and/or signal state support for clean energy technologies. Tier 3, market expansion policies, create incentives and other programs to expand an existing clean energy market by encouraging or facilitating technology uptake by additional market participants.

[1] For more information on policy opportunities, please visit the SPOT for Clean Energy. For more information on specific policy actions related to these opportunities, please review the *Clean Energy Policy Guide for State Legislatures*.

[2] V.A. Krasko and E. Doris, *National Renewable Energy Laboratory*, 2012. Strategic Sequencing for State Distributed PV Policies: A Quantitative Analysis of Policy Impacts and Interactions. http://www.nrel.gov/docs/fy13osti/56428.pdf.

For example, before financial incentives for combined heat and power (CHP) will be successful, two key considerations for deployment are having clear interconnection standards and favorable stand-by rates for customers who opt to add CHP. In this example, states should adopt policies to address interconnection and stand-by rates before adopting financial incentive programs.

GRID MODERNIZATION

The transition to a digital economy requires affordable, sustainable, and reliable electricity and presents challenges and opportunities to the grid. Emerging physical and cyber security threats, along with increased demand for faster outage response times, require - at minimum - real-time incident tracking and response capabilities. Increased grid penetration of renewable energy coupled with the adoption of advanced metering, energy storage, microgrids, electric vehicles, and other technologies to modernize our electric system can provide economic benefits, increase security, and ensure more reliable, resilient, and clean electricity. These innovations will require substantial planning and investment in grid technologies.

Grid modernization will require a suite of state and federal policy changes to support advancements in grid technologies, grid management, and utility regulation. Grid modernization strategies, while recognizing regional and inter-state diversity and avoiding one-size-fits-all plans, should take a holistic view of the electric system. The Iowa Energy Plan's transportation and infrastructure pillar includes strategies to advance grid modernization.

The GridWise Alliance's latest Grid Modernization Index ranks Iowa in the bottom 10 states for overall grid modernization efforts. The state is in a good position to improve this ranking. The Iowa Energy Plan's transportation and infrastructure pillar includes strategies to advance grid modernization through planning and pilot projects. As part of a $220 million Grid Modernization Initiative announced by the Department of Energy (DOE) in 2016, a research team at Iowa State University is researching grid improvements that will support renewable energy generation and transmission across major eastern and western U.S. grids. The Iowa Energy Center, as part of the implementation of the Iowa Energy Plan, provides grants for projects that engage in new energy technologies research and development, and for projects that will contribute to a modernized grid. Alliant Energy plans to invest $1.3 billion in projects that will modernize Iowa's grid over the next five years. In February 2018, the IUB approved a settlement allowing Alliant Energy to increase its rates. The order requires that the utility file new grid modernization plans.

There are policies that Iowa's policymakers could adopt to support in-state modernization efforts.

1. Build upon the Iowa Energy Plan by developing a detailed grid modernization strategy through a stakeholder process. States may also decide to require that utilities propose a ten-year grid modernization plan within a specified timeframe. Legislation could require plans to outline a clear set of grid modernization goals and describe methods to measure, report, verify, and enforce progress towards those goals. States might also provide incentives or cost recovery mechanisms for utilities to meet grid modernization goals.

1. States might also provide incentives or cost recovery mechanisms for utilities that meet grid modernization goals. Policymakers could consider directing the IPUC to evaluate alternative ratemaking mechanisms, performance-based regulation, and/or new utility business models that support grid modernization.

2. Require that utilities develop plans to enhance cybersecurity, integrate distributed energy resources (including electric vehicles and energy storage), increase smart meter deployment and demand response and/or demand-side management (DSM) programs, and measure and report on the results of grid modernization efforts.

3. Iowa does not have clear state policies governing customer data access and privacy protections. To address this, policymakers could develop legislation or rules that, at minimum, do the following: clarify who owns the energy data associated with consumer energy usage; protect customer privacy; outline the process for allowing direct access to data by third parties; and promote access to the highest resolution of data possible. While the Iowa Energy Plan notes the increasing role of consumer control over their energy usage, the state could establish customer access to energy data through a program like Green Button.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand while maximizing the value of grid resources. By deploying storage in strategic locations, utilities can more effectively manage their energy portfolios. First, storage provides management of intermittent demand, helping to flatten peak demand requirements for the utility. Second, the responsiveness of energy storage can allow the utility to implement voltage regulation and other ancillary services, which are useful for improving system efficiency. Third, storage can dispatch power to better integrate intermittent resources like renewable energy.

The flexibility of battery storage combined with advanced metering infrastructure allows customers to control, for instance, how and when they use energy from the grid or from solar panels installed on their home or business. In most cases, this can provide greater cost savings than stand-alone solar systems. Combined with time-varying rates or real-time pricing programs, state policy can further support customer choice and open a new market for energy services. Prices that better reflect the time-varying and location-dependent costs of producing and delivering electricity can lead to a number of economic and environmental gains.

Two major trends have enabled increased deployment of energy storage: declining costs and technological advances. State policy can help maximize these benefits through a combination of establishing a framework for easy integration of energy storage into the grid and establishing a marketplace that monetizes the benefits of energy storage for cost-effective investment.

With assistance from the Interstate Renewable Energy Council (IREC), the IUB adopted improved interconnection rules in 2017, which define battery storage systems as distributed generation technologies, streamlining the process for customers to install energy storage on their property. There are currently a few energy storage projects underway in the state, and Iowa State University is involved in the research and development of glassy solid electrolytes - a key component for designing long lifecycle batteries.

A 2017 report from the National Renewable Energy Laboratory (NREL) finds significant potential for the expansion of Iowa's battery storage market. In May of 2019, the IEDA released the Energy Storage Action Plan with recommendations for ways to improve energy storage deployment in Iowa. There are several opportunities to develop supportive state policies for energy storage in Iowa:

1. Instruct utilities to evaluate the value of energy storage in multiple strategic locations across the utility system. In addition, consider a requirement to deploy storage where it will be cost effective or identify the price point at which it will become cost-effective.

2. Require the inclusion of energy storage as a critical piece of the energy system as both a demand and supply management resource. Some states have required that utilities evaluate the cost effectiveness of non-wires alternatives (NWAs) to large transmission and generation investments. Alternatively, states might want to require utilities to develop a distribution investment plan that identifies the locations on the distribution system where energy storage or other distributed resources would offer the greatest value.

3. Consider creating a mandatory energy storage procurement target or requirement for energy storage with a documented process for periodic review of progress towards that goal. Procurement targets can limit the amount of utility owned storage; require that a certain amount of storage be targeted to low-income customers; and create carve-outs for storage at the transmission, distribution, and customer levels. Procurement targets can jump-start market creation, spur fast learning, and guide the development of a regulatory framework.

4. Finance and incentivize energy storage for customers and utilities. Incentives could enable customers to use storage to manage their electric load and store locally produced renewable energy. Incentives in the form of rebates, grants, and tax credits can provide a bridge to scalable deployment for storage. Incentives can be designed to decline as storage values become more readily monetized and/or as the cost of storage decreases. Policymakers could allow utilities that provide incentives to customers to recover the costs of installing smart meters. This would enable dynamic and time-varying energy management from multiple distributed battery systems. This should signal to customers the value of leveraging storage while better aligning customer costs with system costs. Financing energy storage installations for commercial customers could help reduce their demand charges. Policymakers might want to start first with a policy that provides grants to pilot projects.

Policies might also target solar system owners. Financial incentives can be designed to ensure that the state has a better chance of meeting other goals, including emissions and peak demand reductions, and equitable access to clean energy. Iowa's existing solar energy tax credits for residential and commercial customers could be expanded to include storage.

5. Clear data access policies that allow third parties to provide energy management services (based on signals from the utility) can greatly increase the importance of efforts to monetize the value stream offered by energy storage. (See discussion above, under Grid Modernization.)

MAINSTREAMING RENEWABLES

As the renewable energy industry has matured, technology has improved, and global production of generating equipment has increased, renewable energy sources are increasingly the least cost forms of energy (excluding energy efficiency). A 2019 Bloomberg New Energy Finance report predicts that renewable resources will generate at least 60% of total global electricity, and 43% of U.S. electricity by 2050. With increased deployment, utilities are learning more about how to integrate renewables effectively, investors are becoming more comfortable with the technologies, and building code officials are recognizing common standards and best practices. For these reasons, it is in the interest of policymakers to ensure that their states are well positioned to benefit from the transition to clean energy resources.

MidAmerican Energy has received approval for several large projects. Alliant Energy, after receiving approval to add 500 megawatts (MW) of wind in Iowa, announced in April 2018 that wind would constitute almost one-third of its in-state capacity by 2020. Solar power's contribution to in-state generation is minimal, with a few utility-scale projects.

To reduce barriers to customer and utility participation in the renewable energy market, policymakers in Iowa might consider several options.

Customer-Oriented Policies

1. Interconnection, net metering, and streamlined permitting – In general, customers want a clear, streamlined, affordable, and predictable system for connecting renewable energy systems to the grid. To ensure this, Iowa's policymakers could consider removing the net metering system size limitation, which was amended in 2016 to one MW, or up to 100% of a customer's load. Allowing aggregated net metering would be especially beneficial to the state's agricultural and manufacturing operations. Other applications for aggregated net metering include commercial properties and public entities like state and local governments, universities, and schools. The state might also consider establishing either statewide standards for streamlined solar permitting processes, or resources to support local governments that voluntarily implement a streamlined program, as Linn County has done. State incentives, such as tax credits, financial incentives, or loans can be tied to systems that are established within a designated streamlined permitting jurisdiction. Iowa already offers a range of incentives for residential and commercial customers, including a property tax exemption for renewable energy systems, a sales tax exemption for renewable equipment purchases, and a personal tax credit for solar installations.

2. Shared Renewables – Due to building and property attributes as well as ownership issues, many customers are unable to install renewable energy technologies on their homes. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the generation provided by the system. Iowa currently has no statewide community solar or shared renewables program, but some programs have been established or are under development by municipalities, electric co-operatives, and Alliant Energy. The state might consider adopting a virtual net metering policy to support the growth of community solar. Virtual net metering allows a customer to receive credits from a shared system as if the generation were on site. Virtual net metering is different from a power purchase agreement (PPA), which pays the customer for the proportion of power they produce. Because it is treated as a credit on the customer's bill, the customer can avoid the tax implications of a PPA payment - which can adversely affect the economics of the system (and may come as a surprise to the participant).

   Low credit ratings often deter participation in renewable energy markets; this can affect low- and moderate-income households' adoption of renewable energy solutions. Shared renewables policies can be designed to encourage participation by low- and moderate-income households; this can increase adoption of renewable

technologies and reduce energy costs. Low-income participation can be ensured through either a percentage mandate for the overall annual contracted capacity, or by offering a higher rate of payment for the portion of shared solar capacity attributed to low- and medium-income customers. States that have a shared renewable program may want to coordinate this program with implementation of the federal Weatherization Assistance Program or the Low Income Home Energy Assistance Program to provide recipients of assistance with participation in a shared renewable system.

There are several additional policy options that Iowa might consider to promote renewable energy uptake by low- and moderate-income consumers. Generally, successful state policies should be tailored to these customers, be cost-effective and financially sustainable, have measurable performance indicators, and be flexible enough to allow later changes in design.

3. Corporate Procurement – Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Over the last five years, over 16 gigawatts (GW) of renewable contracts have been announced by corporate entities. This is leading policymakers to provide additional avenues for businesses to procure renewable energy. In 2017, Iowa ranked first in the Corporate Clean Energy Procurement Index for the ease with which companies located in the state can procure renewable energy. Iowa received the highest score in part because it is a top wind energy-producing state. Google, Microsoft, Facebook, and more recently Apple, have constructed or are planning to build data centers in Iowa that rely 100% on renewable energy.

   Iowa's policy allows companies to purchase renewable energy certificates (RECs); access renewable energy through the wholesale market; and develop, lease, or enter into a power purchase agreement for an onsite renewable energy project. The products available in Iowa meet five out of six of the Corporate Renewable Energy Buyers' Principles. The state could improve cost-competitiveness of renewable energy systems by implementing a standard tariff as an alternative contractual arrangement; at present, there are only individual deals between utility companies and corporate buyers.

Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas emissions and increase investments in clean energy resources. States might see an emissions or clean peak standard as the next step in a progression from renewable portfolio standards (RPSs). Iowa was the first state in the nation to establish a renewable energy requirement. The 1983 Alternative Energy Production Law set a minimum target for renewable capacity for the state's two IOUs at 105 MW total. Utilities are taking the lead on setting more aggressive renewable energy targets. MidAmerican has a 100% renewable energy vision by 2021. The utility has already passed 50% renewable energy generation and has over 26 operational wind farms. Alliant Energy also has five additional wind projects planned for completion by 2020.

In addition to updating its RPS requirement, Iowa's policy makers might consider the following actions to increase utility adoption of clean energy technologies:

1. Emission standards are designed to drive emission reductions through either 1) a carbon portfolio standard or 2) a market-based approach. Both types can take a technology neutral stance that drives emissions down with a combination of renewables, traditional fuels, efficiency, and technological advances. These policies can also address other concerns such as pollution, asthma risk, environmental justice, and water use.

   A portfolio emissions standard sets emissions reduction targets to be achieved over time. This can be implemented through the utility planning process or by establishing a maximum allowable rate of emissions per unit.

   Market-based approaches can take the form of an emissions trading regime or a tax. Under a market-based approach, a state or a group of states might set a certain emissions reduction target, for example, 40% below 1990 levels by 2030. This reduction is achieved by the distribution of annual emission allowances that decrease over time until the goal is met. Allowances can be bought and sold on a market that allows utilities and other emitting firms flexibility in reaching total emissions goals. Revenue generated by these markets can be used to support the development of renewable energy, energy storage, and energy efficiency programs. There are emissions trading markets in operation today that states can join. The other pathway to reaching emissions

targets is through a tax on fossil fuel use that can be used to generate revenue to fund emissions reductions policies and technologies and to incentivize the reduction of emissions over time. One of the advantages of a market-based program is that these are designed to reduce emissions in the most economically efficient manner possible.

2. Clean Peak Standards aim to increase the share of clean energy resources used to meet peak demand and decrease energy bills over the long-term by reducing peak demand in the hours when energy costs are highest. These objectives can be met through different policy options including: planning and procurement requirements that focus on peak demand; a moratorium on the construction of new peaking units, or a phase out of existing units; incentives for clean energy resources delivered during peak times; and/or adopting a new clean peak standard that sets a target for clean energy deliveries during peak times.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

Bloomberg New Energy Finance estimates that 57% of all new passenger vehicle sales will be electric by 2040 and that price parity with conventional vehicles will be met for most segments in the mid-2020s. Designing infrastructure that will facilitate easy connection of EVs to the grid is a key part of building a modernized grid. The relationship between the increased adoption of EVs and the availability of EV charging stations is complicated. On the one hand, consumer range anxiety creates a barrier to increased adoption. On the other hand, while greater availability of charging stations would ease this anxiety, the relatively low numbers of vehicles on the road provides little incentive to install and make these stations available to the public. The good news is that both supportive policies for developing charging infrastructure and advancements in technology have eased range anxiety.

The Iowa Energy Center, as part of the implementation of the Iowa Energy Plan, offers grants for projects that engage in new energy technologies research and development, and for projects that would encourage the adoption of EVs and EV supply equipment (EVSE). Customers in Alliant Energy's service territory may receive a rebate for purchasing EV charging equipment. Alliant Energy also offers a rebate for the purchase or lease of plug-in electric vehicle (PEV).

House File 767, signed by the Governor in May this year, dis-incentivizes the purchase of EVs and other alternative fuel vehicles. This bill creates an additional registration fee on EVs starting at $65 in 2020 and rising to $130 in 2022. There are several policy opportunities to encourage and prepare for increased market penetration of EVs in the state, including:

1. EV and EV Supply Equipment (EVSE) Financing and Financial Incentives – Iowa does not provide incentives for citizens to purchase EVs or incentives for citizens to install EVSE. Providing financial incentives and innovative financing options can help spur greater market penetration of EVs. Sales, property, and income tax credits are some of the simplest methods for addressing high up-front costs of EVs and EVSE. While sales tax credits are typically applied at the time of purchase, property and income tax credits may do less to address upfront cost barriers as the credit is not applied at the time of purchase.[3] States have adopted other financial incentives including low-interest loans, grants, vouchers and rebates. A handful of states qualify EVSE under their property assessed clean energy (PACE) programs. A simple solution is to increase and expand existing tax credits to incentivize commercial, publicly available charging stations.

2. Charging Infrastructure Plan – Locating charging infrastructure is different from locating conventional fueling stations. For the most part, EVs are cars used for commuting and local trips. Furthermore, while a driver of a conventional vehicle stops only briefly at a gas station for the specific purpose of filling up, a driver of an EV is generally looking to refuel when they are parked for a longer period of time, for example when going shopping, going to a restaurant, or going to work. Charging infrastructure plans should attempt to pair the appropriate level of charging with a reasonable amount of time a person will be at that location. Legislation could direct a state agency to develop an infrastructure plan through a stakeholder process. As a result of 2018's Senate File 2311, the IEDA released the report, Charging Forward: Iowa's Opportunities for Electric Vehicle Infrastructure Support, to evaluate the costs and benefits associated with different options for EV infrastructure support.

[3] A study by the Congressional Budget Office however suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

Regional collaborations are emerging around the U.S. to coordinate the development of EV infrastructure. The REV West Plan and the Transportation and Climate Initiative (TCI) are evaluating programs to promote EVs and reduce transportation sector carbon emissions. Iowa could consider working with similar organizations in the Midwest. Charge Up Midwest is a partnership of several environmental and clean energy groups in the Midwest whose purpose is to accelerate EV adoption by designing incentives and investing in charging infrastructure. Iowa is in the Midcontinent Transportation Electrification Collaborative (M-TEC) region, which consists of a variety of stakeholders including auto manufacturers, electric utility companies, state agencies, and environmental organizations working to speed the adoption of EVs in the region.

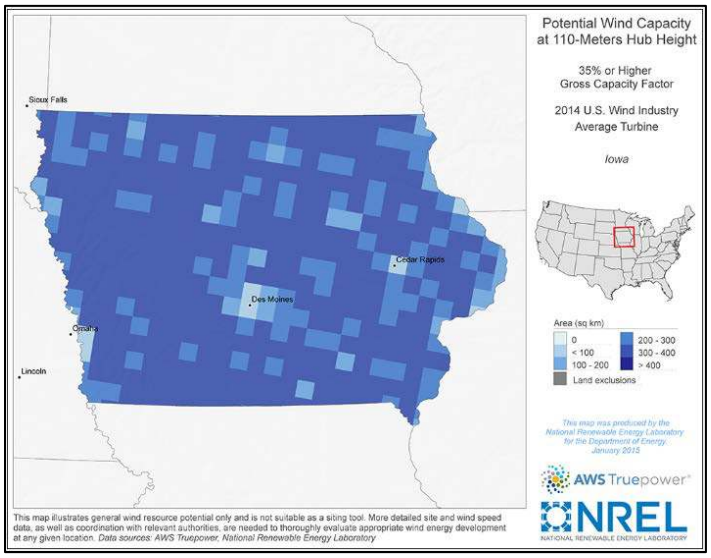
3. Parking Infrastructure Requirements – In tandem with the development of a statewide plan, legislation could set requirements for EV parking infrastructure. Some states have adopted permitting standards for parking lots, requiring, for instance, that for every 100 parking spaces, there must be at least one EV charging space. Legislation could also incentivize utilities to develop make-ready locations. These locations supply power to the point where a utility or third party developer might install an EV charging station. Iowa's building energy code could also be updated to include requirements for EV charging infrastructure.

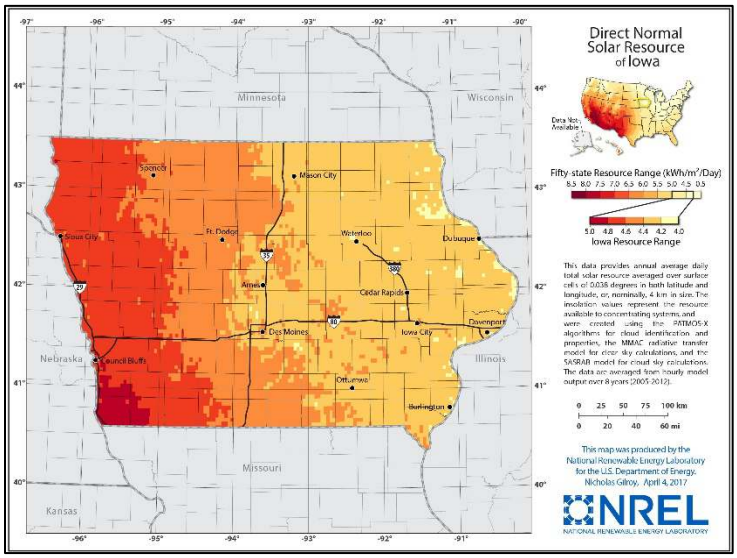
NEWS

- August 15, 2019: Governor Kim Reynolds Emphasizes Renewable Energy Policy
- August 13, 2019: Wind Energy Offers Growth for Iowa in Many Sectors
- August 7, 2019: Ideal Energy Ranks in the Top 20 Solar and Storage Contractors in the Nation
- July 31, 2019: MidAmerican says a New Network of 15 Fast-Charging Stations could Jump-Start Iowa Electric Car Sales
- July 20, 2019: Wind Farm with Ties to Google Boosts Cherokee County's Economy, Tax Rolls
- June 13, 2019: Iowa Officials Consider Energy Storage Tax Credit, 'Value of Storage' Study"
- March 28, 2019: Iowa Approves Alliant's Scaled-back Efficiency Program in Wake of 2018 Law

IOWA'S WIND AND SOLAR RESOURCES

WIND: https://windexchange.energy.gov/states/ia
SOLAR: https://www.nrel.gov/gis/solar.html





OTHER RESOURCES

- Iowa Economic Development Authority - Iowa Energy Office: https://www.iowaeconomicdevelopment.com/energy
- Iowa Energy Plan http://iowaenergyplan.org/
- Iowa Energy Center https://www.iowaeconomicdevelopment.com/energycenter
- The American Council for an Energy-Efficient Economy, State and Local Policy Database, Iowa: https://database.aceee.org/state/iowa

- The Database of State Incentives for Renewables and Efficiency, Iowa: http://programs.dsireusa.org/system/program?fromSir=0&state=IA
- U.S. Energy Information Administration, Iowa: https://www.eia.gov/state/?sid=IA
- American Wind Energy Association (AWEA): https://www.awea.org/resources/fact-sheets/state-facts-sheets
- National Renewable Energy Laboratory Biomass Maps: https://www.nrel.gov/gis/biomass.html
- U.S. Department of Energy's Alternative Fuels Data Center, Iowa: https://www.afdc.energy.gov/states/ia
- SPOT for Clean Energy, Iowa: https://spotforcleanenergy.org/state/iowa/
- The Rocky Mountain Institute: From Gas to Grid – Building Charging Infrastructure to Power EV Demand
- The GridWise Alliance: EVs - Driving Adoption, Capturing Benefits
- The Regulatory Assistance Project: Performance-Based Regulation

Our Resources

CNEE Homepage: http://cnee.colostate.edu/

The SPOT for Clean Energy: https://spotforcleanenergy.org/

The Advanced Energy Legislation (AEL) Tracker: https://www.aeltracker.org/

Clean Energy Policy Guide for State Legislatures: http://cnee.colostate.edu/cleanenergypolicyguide/

The Energy Policy Podcast: http://energypodcast.colostate.edu/

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