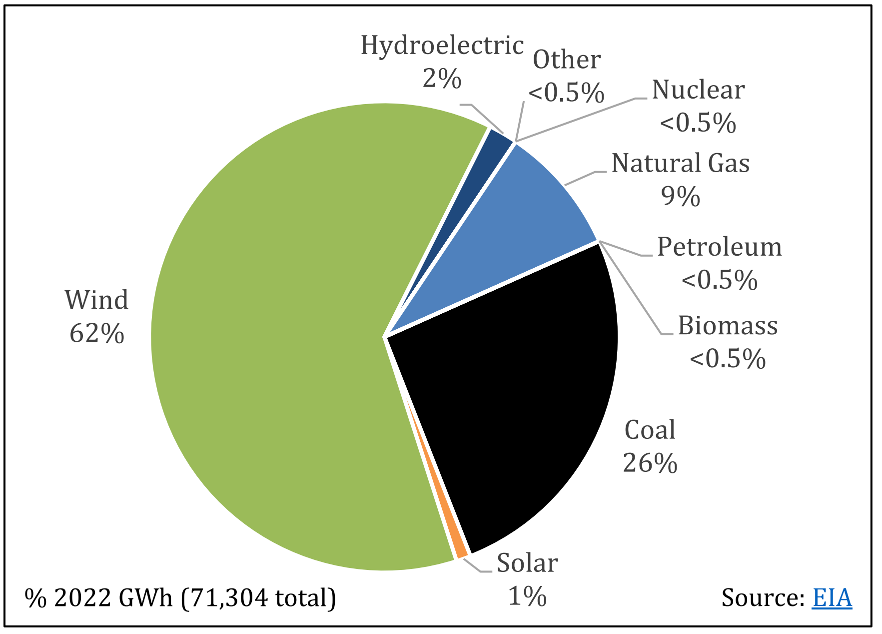
State Brief: Iowa

BACKGROUND



Iowa relies upon imports from other states for electricity generation from coal. Generation from coal-fired resources has decreased from nearly half (46%) of Iowa's electricity mix in 2015 to approximately one-quarter in 2022. This shift has coincided with a rapid adoption of wind generation, which surpassed coal's contribution to the generation mix for the first time in 2019 and accounted for over 60% of Iowa's net generation in 2022.

The first state to adopt a renewable energy standard, Iowa's Alternative Energy Production Law set a 105-megawatt (MW) target for the state's two investor-owned utilities (IOUs) in 1983. The Hawkeye State ranks second (after Texas) in the nation for wind power. Iowa is also the largest producer of ethanol and biodiesel in the U.S. In 2022, the Solar Energy Industries Association (SEIA) ranked the state 22nd in the country in terms of installed solar capacity (658 MW).

The 2023 U.S. Energy and Employment Report found that Iowa had an estimated 84,737 energy workers (5.5% of total state employment), which includes 19,343 workers employed in energy efficiency. In a 2022 report, Iowa ranked 30th nationally for clean energy jobs, with approximately 30,393 Iowans employed by the industry.

The Iowa Energy Plan, developed through a statewide public 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 Office administers programs aligned with the Plan, which include research and development, workforce development, support for rural and underserved areas, biomass conversion, natural gas expansion, grid modernization, and alternative fuel vehicles.

In 2023, Iowa entered an agreement with Nebraska and Missouri to apply for federal funds to establish the Mid-Continent Clean Hydrogen Hub, with the ultimate goal of becoming a global leader in renewable hydrogen energy production. Iowa is uniquely equipped to become a leader in hydrogen energy due to its existing robust agrichemical industry and high demand for hydrogen intensive products.

The Iowa Utilities Board (IUB) regulates the state's two IOUs 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, one of whom serves as chair. Republican majorities control both chambers of the state legislature, and Republican Governor Kim Reynolds took office in May 2017.

POLICY STRENGTHS AND OPPORTUNITIES

The National Renewable Energy Laboratory (NREL) developed the notion of "policy stacking,"[1] 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.

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.

INVESTING IN THE WORKFORCE

In 2022, there were nearly 3.1 million net-zero aligned jobs in the U.S., comprising over 40% of total energy jobs. However, a lack of qualified candidates across occupations and education levels could impede states' abilities to modernize their grids and deploy clean energy resources. To ensure that the workforce can meet industry demand, policymakers can consider several policies to educate and train qualified candidates. This can simultaneously enhance industry employment and provide economic opportunity to individuals and local communities.

The policies states can explore to address workforce development include:

1. **Incentive Programs –** States can attract new workers to the field by providing financial and other incentives to students who pursue education in specified trades or in the science, technology, engineering, and math (STEM) fields. States might require that graduating students remain and work in the state for a given time to remain eligible for the incentive. In conjunction with this, states might also provide economic development incentives to companies employing students with training in specified STEM and trades fields. To ensure safety in the workplace, states can adopt programs that will cover the costs of OSHA training.

   Initiatives to improve access to broadband and public transportation in underserved communities can boost access to educational and employment opportunities.

2. **Education and Continuing Education** – Existing electrician training and mentorship programs can be expanded to encourage more young people to enter the industry. Policymakers can direct public colleges and universities, with input from industry, offices of economic and workforce development, and other interested parties, to create new trades and STEM programs. This could include the development of "green" credentialing programs. States can also provide financial resources to organizations that educate or retrain students in STEM and trades professions.

   For the state's existing energy workforce, policymakers might direct state departments of workforce services or their equivalent to work with utilities and other interested parties to develop continuing education and training programs for existing utility employees to remain in their field or to transition to a new role. Incentive programs might also be developed for employers that design roles that include ongoing skills development and continuous learning to help keep pace with evolving roles.

3. **Utilizing the Office of Workforce Development** – The Iowa State Energy Plan includes a goal to increase the talent pool for and promote employment and training opportunities in the energy sector. Policymakers might

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

consider using the programs available through the Office of Workforce Development to address training needs. Iowa's office of workforce development also offers incentives to encourage students in STEM fields to study and work in the state, but policymakers might consider developing incentives specific to energy.

The Interstate Renewable Energy Council (IREC) developed a set of Career Maps to demonstrate the various types of careers offered in the clean energy industry. The Green Buildings Career Map, the Solar Career Map, and the HVAC/R Map are helpful tools for anyone from job seekers and employers to policymakers looking to explore the employment opportunities presented by the industry. IREC also created a Registered Apprentices Toolkit for Clean Energy Employers, which provides information about and resources for implementing Registered Apprenticeship Programs (RAPs) to spur the development of a clean energy workforce.

MODERNIZING UTILITIES AND EMPOWERING CONSUMERS

The electric grid is a complex system of generation, transmission, and distribution. Aging infrastructure and emerging technologies are forcing the grid to modernize to keep pace with historic and emerging expectations. Grid modernization encompasses a broad range of actions intended to make the electrical system more resilient, interactive, and capable of meeting current and future demand.

The transition to a digital economy requires affordable, sustainable, and reliable electricity and creates challenges and opportunities for grid management. Emerging physical and cybersecurity threats and increased demand for faster outage response times require, at minimum, real-time incident tracking and response capabilities. Increased grid penetration of distributed energy resources (DERs) such as renewable energy coupled with increasing adoption of energy efficiency, energy storage, microgrids, and other technologies will provide economic benefits, increase security, and ensure more reliable, resilient, and clean energy. Utility-scale renewable energy may require expanded transmission capabilities. As adoption of these innovations increases, so too will the need for modern grid technology to strengthen the grid, the implementation of which will require substantial planning and investment by states and utilities.

By allowing a two-way flow of information between the electric grid and grid operators and between utilities and their customers, new technologies enable utilities to better manage the grid and provide opportunities for consumers to customize their services to fit their priorities and to reduce their electric bills. By enabling better tracking and management of resources, emerging technologies improve system reliability and resiliency. These technologies also allow grid operators to incorporate central and distributed energy resources, energy storage technologies, and electric vehicles (EVs). This all assists in addressing the challenges associated with planning, congestion, asset utilization, and energy and system efficiency.

On the customer's side of the meter, dynamic pricing, advanced metering infrastructure (AMI), and other technologies allow a more dynamic exchange of information and electricity between a consumer and their electric provider. Grid modernization is associated with greater consumer choice by allowing customers to meet their energy priorities by producing and storing their own energy or through contracting for innovative clean energy services from different providers.

Grid modernization will require a suite of policy changes to support advancements in grid technologies, grid management, and utility regulation.

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, Iowa State University's (ISU) Macrogrid study demonstrated the benefits of connecting grids across the country to facilitate the transmission of regional renewable generation to improve reliability and resilience, while reducing costs. In 2020, DOE awarded researchers at ISU another three-year, $729,349 grant to find solutions for restoring wind-dominant electric grids after blackouts. The Iowa Energy Office, as part of the implementation of the Iowa Energy Plan, offers low-interest loans for projects that support grid modernization.

In February 2021, several utilities operating in Alabama, Georgia, Kentucky, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, and Tennessee filed plans with the Federal Energy Regulatory Commission (FERC) to establish the Southeast Energy Exchange Market (SEEM) aimed at improving their ability to trade power across the region. SEEM began operations in November 2022 and now includes a total of 23 entities across 12 states (adding service territories in Florida, Iowa, and Virginia). Proponents of renewable energy and FERC raised concerns about the market's lack of transparency, and some have argued that it will not incentivize the development of clean energy resources or reduce costs to ratepayers. On the other hand, some argue that SEEM is an important first step in increasing renewable energy integration in the southeast. In June 2021, the utilities amended the proposal to create greater transparency and provide for additional oversight by FERC. However, this has not ameliorated concerns that SEEM favors powerful utilities and does not capture the full range of benefits of a true wholesale market. In July 2023, a federal appeals court directed FERC to reconsider several aspects of its 2021 approval of SEEM.

The Infrastructure Investment and Jobs Act of 2021 (IIJA) is a landmark federal spending bill that includes funding earmarked for grid modernization projects. This includes $11 billion for DOE grants directed specifically towards electric infrastructure resiliency projects (including grid hardening against severe weather and cybersecurity improvements), $2.5 billion for transmission development, and $3 billion for the Smart Grid Investment Matching Grant Program.[2] Enacted August 2022, the Inflation Reduction Act (IRA) set aside $2 billion for loans for constructing new high-capacity transmission lines and upgrading interties. The bill includes funding for technical assistance and grants for states and tribal governments, which includes assistance for siting transmission projects. The bill also directs DOE to undertake interregional transmission planning, modeling, and analysis, including analysis of transmission for offshore wind and the use of grid-enhancing technologies (GETs).[3]

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

1. Build upon the Iowa Energy Plan by developing a detailed grid modernization strategy through a public process. States may also decide to require that utilities propose ten-year grid modernization plans 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.

2. States might also provide incentives or cost recovery mechanisms for utilities to 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.

3. 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.

4. State policy should include measures to protect data regarding customer behavior but can also encourage the use of this information to facilitate additional improvements in grid management and customer service. To address this, policymakers can develop legislation or direct commissions to promulgate rules that clarify that the customer owns the energy data associated with their 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. States could establish customer access to energy data through the Green Button Connect program, for example.

The adoption of incentives for or a requirement to integrate a certain amount of renewable energy and energy storage on the grid alongside enhanced building energy standards and electric vehicle policies can support grid modernization efforts.

[2] For more information on the grid-related earmarks included in the IIJA, see Potomac Law Group's January 2022 analysis: "The Infrastructure, Investment & Jobs Act of 2021: What's in It for You? (Part V: Grid Infrastructure and Resiliency)" https://www.potomaclaw.com/news-Infrastructure-Investment-Jobs-Act-of-2021-Whats-In-It-For-You-Part-V-Grid-Infrastructure-and-Resiliency.

[3] J. Runyon and J. Engel. 2022. "The Inflation Reduction Act is Signed into Law." *PowerGrid International*. 16 August. Available: https://www.power-grid.com/td/the-inflation-reduction-act-is-signed-into-law/#gref.

MAINSTREAMING RENEWABLES

Renewable energy is increasingly seen as the least cost and lowest risk form of energy (excluding energy efficiency). 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 integrating distributed renewable energy resources. In the U.S., the expansion of renewable energy has been one of the most consequential shifts in electricity generation over the last decade. According to the EIA, renewable energy generation surpassed coal and nuclear generation in 2022, and more than half of all new generation capacity in 2023 is expected to be solar. As of 2022, there were more than 470,000 jobs in the wind and solar industry. Accordingly, it is in the interest of policymakers to ensure that their states are well positioned to benefit from this shift.

While the IIJA doesn't provide money for specific renewable energy projects, the energy funding in the Act will benefit renewable energy development as grid resiliency, increased deployment of energy storage, and modernized transmission are all essential to the successful integration of renewable energy generation. The IRA appropriated $369 billion to fund a variety of energy and climate initiatives – the largest climate investment in U.S. history. The bill also extended the investment tax credit (ITC) and the production tax credit (PTC) through the end of 2024 and revived the PTC for solar projects. For projects placed in service in 2025, the bill "effectively extended" the ITC and PTC by creating new tax credits for zero emission facilities. The bill also extended the residential energy property tax credit through 2034 and created a new advanced manufacturing production credit, to apply to sales of components for constructing wind and solar energy facilities beginning in 2023. [4]

The IRA also includes several provisions related to energy equity, including $3 billion to the Environmental Protection Agency (EPA) for grants for community-led projects in disadvantaged communities and $27 billion for nonprofit, state, and local climate finance institutions supporting the deployment of low- and zero-emission technologies. In support of rural communities, the bill also includes a $1 billion appropriation to the U.S. Department of Agriculture (USDA) for loans to finance renewable energy projects, $1 billion for USDA's Rural Energy for America Programs, and $9.7 billion to USDA to finance rural electric cooperatives' purchases of renewable energy. The IRA is expected to bring an estimated $24.6 billion in investments in large-scale clean energy generation and storage to Iowa by 2030.

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

Customer-Oriented Policies

1. **Interconnection, Net Energy Metering (NEM), and Streamlined Permitting** – In general, customers want a clear, streamlined, affordable, and predictable system for connecting renewable energy systems to the grid. While Iowa's current NEM policy does not place a limit on the size of net metered systems, rule waivers have allowed MidAmerican and Interstate Power and Light (IPL) to impose 1 MW limits on individual systems. Customers with existing third-party power purchase agreements for on-site renewable systems are ineligible for NEM through these two utilities. Senate File 583, enacted in 2020, made a number of substantial changes to the state's NEM policy, requiring utilities to propose a Value of Solar Methodology to the IUB by 2027 or when distributed generation penetration reaches 5%, whichever is sooner. Until the value of solar is established, the compensation rate for net-metering is set at the retail rate. 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. In May 2021, NREL launched the SolarAPP+, an online platform designed to automate the solar permitting process. By running compliance checks and processing permit approvals, the service is intended to drastically reduce permit wait

[4] For a detailed discussion of the IRA's tax provisions, see: A.S. Levin-Nussbaum. 2022. "Update: President Biden Signs Historic Legislation Providing Expansive Clean Energy Tax Incentives." *The National Law Review*. 17 August. Available: https://www.natlawreview.com/article/update-president-biden-signs-historic-legislation-providing-expansive-clean-energy

times. Currently restricted to rooftop solar, thirty-two communities in five states have adopted the platform, processing over 15,000 permits for more than 100 MW of generation with an estimated 15,000 hours saved in permit review time.

2. **Shared Renewables** – Due to building and property attributes and ownership issues, many customers are unable to install renewable energy technologies where they live or work. Allowing shared, or community, renewable energy projects addresses these barriers. These projects have multiple owners or subscribers who pay for a portion of the project, or the generation provided by the system. Iowa does not have a statewide shared renewables program, but some programs have been established or are under development by municipalities, electric cooperatives, 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 (LMI) households' adoption of renewable energy solutions. Supportive policies for shared renewables can be designed to encourage participation by LMI households; this can increase adoption of renewable technologies and reduce energy costs. Low-income participation can be encouraged either through 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 LMI customers. States that have a shared renewables program may want to coordinate this program with implementation of the federal Weatherization Assistance Program (WAP) to provide recipients of assistance with access to participation in a shared system.

3. **Adapt Energy Assistance Programs –** Programs such as the Low-Income Home Energy Assistance Program (LIHEAP) and WAP provide assistance for paying utility bills and reducing household energy costs. Including distributed energy resources as eligible for funding under these programs can reduce energy costs and increase energy security for those LMI families who are able to benefit from WAP and LIHEAP. Colorado, for example, includes rooftop solar in their WAP program. For approval to add solar to a state's implementation of WAP, a state must show that the investment would be cost-effective – achieving a Savings to Investment Ratio (SIR) of 1.0 or more.[5] Since 2015, Iowa has received $42.8 million from WAP and $5.6 million from the State Energy Program (SEP), which has helped to fund a number of energy initiatives in the state.

4. **Fund Distributed Generation (DG) for Community Organizations –** Organizations or groups that provide support services for LMI communities can be provided funding to install solar or other distributed energy resources. Sites such as homeless shelters, food banks, clinics, and community centers often have enough rooftop area for solar installations. After installation, these resources can reduce an organization's utility bills, freeing up funds for other activities that support the community.

5. **On-Bill Financing/Pay As You Save (PAYS) –** On-bill Financing and Repayment programs enable consumers to invest in energy upgrades with no upfront payment. The utility or a third party will pay the initial costs to install the upgrade with the cost of that upgrade recovered through the utility bill. Because repayment includes consideration of the cost savings resulting from the energy upgrade, customers can see monetary benefits almost immediately. Once equipment costs are recovered, the equipment belongs to the customer. State policies that reduce lending risk by creating a loan loss reserve and/or a credit enhancement fund can encourage lending to customers that might otherwise not qualify for a loan and can keep interest rates low.

6. **Corporate Procurement –** Many Fortune 100 and 500 companies have established either climate goals or commitments to purchase renewable energy. Since 2014, over 70 gigawatts (GW) of renewable energy has been procured by corporate entities. In the first half of 2022, corporations entered contracts for 21 GW. This is leading policymakers to provide additional avenues for businesses to procure renewable energy. Google, Meta, and Apple are major corporate customers of renewable energy projects in Iowa. This is supported by Iowa's policy,

[5] For guidance on the state approval process, see WAP Memorandum 024 (2017), the Solar Template for Incorporating Solar Photovoltaics into WAP, and the Preliminary Assessment Guide for Integrating Renewable Energy into Weatherization (2019).

which 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.

Utility-Oriented Policies

Some states have created programs that aim to reduce greenhouse gas (GHG) emissions and increase investments in clean energy resources. Utilities are also setting their own GHG reduction goals and are increasingly investing in clean energy resources. Iowa's 1983 Alternative Energy Production Law set a 105 MW minimum renewable energy target for the state's two IOUs. MidAmerican has set a net-zero GHG emissions by 2050 goal and a 100% renewable energy target. In 2021, the utility reported that 88.5% of its annual generation was supplied by renewable resources. Aliant Energy has also announced a handful of goals, which include reducing the generation fleet's CO_2 emissions 50% below 2005 levels by 2030, eliminating coal by 2040, and net-zero CO_2 emissions by 2050.

To increase utility adoption of clean energy technologies, Iowa's policymakers might consider the following:

1. **Emissions Standards** – Emissions targets can take a technology neutral approach that looks at the total emissions of the utility portfolio and drives emissions down with a combination of renewables, traditional fuels, efficiency, and technological advances. Emissions reductions can be achieved through 1) a carbon portfolio standard approach, or 2) a market-based approach. A portfolio emissions standard sets emissions reduction targets to be achieved over time. This can be implemented through the IRP process or by establishing a maximum allowable rate of emissions per unit. Under a market-based approach, a state or a group of states might set a certain emissions reduction target, for example, 50% below 2005 levels by 2030. This reduction is achieved by the distribution of annual emission allowances that decrease to the point that the standard is met in 2030. One of the advantages of a market-based program is that it is designed to reduce emissions in the most economically efficient manner possible. Such a standard can also address other concerns such as pollution, asthma risk, environmental justice, and water use.

2. **Accelerating and Amending Renewable Portfolio Standards –** One of the oldest and most successful advanced energy policy tools, renewable portfolio standards (RPSs), usually set a target for a specific percentage of renewable electric generation to be achieved by a specific date (for example, 50% renewable energy by 2030). The RPS was designed to build the market for renewable energy, which, at the time when most states were adopting these standards, was more expensive than conventional electricity sources. Today, states and utilities are in a much different situation for most land-based, utility-scale renewable energy resources (primarily wind and solar). These technologies are increasingly economical on a direct kilowatt hour (kWh) cost and are being aggressively pursued by most utilities for this reason. In general, RPSs require utilities to procure the lowest-cost qualifying resources and cap expenses under the program, which has helped deployment of more mature wind and solar technologies. However, this does not automatically promote resource diversity necessary to enhance system resilience and invest in emerging but promising clean energy technologies of the future like offshore wind, storage, and others.

   States can update existing RPSs to increase targets and/or accelerate target dates to continue to spur the development of renewable resources and save ratepayers money. States might add one or more carve-outs to incentivize the development of distributed and offshore resources. Embedding an RPS within a broader clean electricity or emissions standard can allow technological flexibility.

3. **Transmission Development Policies** – Renewable energy resources rely heavily on robust transmission networks that connect generation to demand. For states within regional transmission organizations (RTOs), like Iowa, state governments can fund utility commission and energy office engagement in RTO processes, and generally support transmission build-out through these channels. In non-RTO states or single-state RTOs like New York and California, one successful model has been the creation of a state transmission authority, which handles state transmission planning in cooperation with incumbent utilities. New Mexico's Renewable Energy Transmission Authority provides an instructive example – it informs transmission investments to push forward key transmission projects that achieve the state's clean energy goals cost-effectively.

4. **Competitive Procurement Requirements** – In most states, consumers have little choice about where their electricity comes from. As utilities find that renewable energy is increasingly the lowest-cost electricity source,

they have to decide how much they should buy and when. Unfortunately for customers, utilities may have either a vested interest in continuing to operate fossil plants, or they doubt the efficacy of new renewable resources. States can overcome reluctance to renewable energy by requiring utility procurement decisions to undergo a competitive process, revealing the lowest cost alternatives to the utility's existing contracts and fleet of power plants. A best practice is "all-source procurement," a process that allows all resources to compete to fill a system need identified by the utility.

States can start by requiring PUCs to begin a participative planning process that links planning outcomes to procurement decisions and ensures that state policy objectives are included in system planning. For some states, like Iowa, this might mean setting up a planning process. For others, it might involve revisiting planning and procurement rules and asking whether the current process results in policy-aligned procurement. States might amend existing rules to require utility commission approval of utility plans or require consideration of public comments. Regulators may need explicit direction to consider objectives beyond reliability, affordability, and safety.

ENERGY STORAGE

Energy storage offers a unique opportunity to dynamically manage supply and demand while also maximizing the value of grid resources. By deploying storage to strategic locations, utilities can more effectively manage their energy portfolios. First, storage allows utilities to manage intermittent demand – helping reduce peak demand requirements. Because the generation resources that provide peak power are the system's most expensive, reducing peak demand can save consumers money. Second, the responsiveness of energy storage can allow utilities to implement voltage regulation and other ancillary services, which improve system efficiency. Third, because storage technologies can both store and dispatch power, storage enables better integration of intermittent power generation resources, like wind and solar, to the grid.

The flexibility of battery storage combined with advanced metering infrastructure can allow customers to control 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 standalone 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 also lead to a number of economic and environmental gains.

Energy storage can also help the commercial sector avoid demand charges, which establish an incremental cost above energy usage based on the highest period (highest 15 minutes, for example) of demand during the month. Eliminating spikes in demand with storage can reduce these costly charges for businesses. As utilities around the country consider implementing or extending demand charges to other sectors, energy storage will become more relevant as both a customer cost-saving investment and a system efficiency measure.

Declining costs and technological advancements in battery storage have contributed to increased deployment. The EIA expects total battery storage deployment to nearly triple from 7.8 GW in 2022 to 30 GW in 2025. State policies can further encourage this by establishing both a framework for easy integration of energy storage resources onto the grid and a marketplace that monetizes the benefits of energy storage for cost-effective investment.

With assistance from the Interstate Renewable Energy Council (IREC), the IUB updated its interconnection rules in 2017. The updated rules define battery storage systems as distributed generation technologies, streamlining the process for customers to install energy storage on their property. In May 2019, the Iowa Economic Development Authority's (IEDA) Energy Office released the Energy Storage Action Plan, which outlines policy recommendations for supporting energy storage deployment in the state. This plan was followed by the 2020 Energy Storage in Iowa Report, which outlines the current state of storage technology, potential benefits for the state, barriers to storage in Iowa, and policies other states have adopted to increase storage adoption. The Iowa Environmental Council published an Energy Storage Fact Sheet in 2022, highlighting the economic and reliability benefits of increased energy storage deployment in the state. In August 2022, Alliant Energy more than doubled their battery storage capacity in the state, from 3.5 MW to 8.5 MW.

In 2021, Alliant Energy announced plans for acquiring 200 MW of solar and 75 MW of battery storage from NextEra's Duane Arnold project, which will "repurpose" land and transmission infrastructure at the former Duane Arnold nuclear facility. The IUB approved the proposal in April 2023.

The IIJA provides a unique opportunity for funding energy storage projects. The IIJA provides $505 million for grants to support energy storage demonstration projects, more than $7 billion for building out the U.S. battery supply chain, and $14 billion for grid resilience programs that include energy storage as a qualified technology. The IRA extended the ITC to include standalone energy storage systems. When the ITC is replaced by the technology neutral Clean Electricity Investment Tax Credit (CEITC) in 2025, qualified storage facilities placed in service after 2024 will remain eligible. The advanced manufacturing production credit will apply to battery cells and modules and the critical minerals used in their production. The $27 billion GHG Reduction Fund, also established by the bill, will provide funding enabling low-income or disadvantaged communities to adopt zero-emission technologies including energy storage.

There are several policy opportunities to take advantage of the growing technological advances in and declining costs of energy storage and build upon recent federal initiatives. The recommendations here draw heavily from IREC's 2017 report, "Charging Ahead – An Energy Storage Guide for Policymakers." Policymakers in Iowa could consider the following:

1. Instruct the utilities commission to evaluate the value of energy storage in multiple strategic locations across the utility system and consider a requirement to deploy storage where it is cost-effective or identify the price point at which it will be cost-effective. Ensure that cost-effectiveness calculations include all the benefits storage can deliver to the system, including frequency regulation and avoided investments in new infrastructure.

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 to large transmission and generation investments. Alternatively, states might want to require that utilities 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. Add energy storage as an eligible technology under existing clean energy policies like renewable portfolio standards or energy efficiency programs. Massachusetts was the first state in the nation to include energy storage in its three-year energy efficiency plan in 2019.

5. Finance and incentivize energy storage for customers and utilities. Incentives can 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 of 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 could also signal to customers the value of leveraging storage and better align 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. Incentive programs might also target solar system owners. Financial incentives should be designed to ensure that the state will meet other goals including emissions and peak demand reductions, and equitable access to clean energy.

6. Clear data access policies that allow third parties to provide energy management services based on signals from the utility can greatly increase the value of efforts to monetize the value stream offered by energy storage. State policy should include measures to protect customer data, while also encouraging the use of this information to facilitate additional improvements to grid management and customer services. To address this, policymakers can develop legislation or rules that clarify who owns the energy data associated with customer 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.

7. Consider taking advantage of the "direct pay" option available to state and local governments for energy storage investment tax credits (ITC) available in the IRA. The direct pay option allows states (or other qualified entities without tax obligations) to be directly refunded a 30% ITC from the federal government after the project is online. The IRA also allows for up to a 70% credit for projects that incorporate domestic components, serve low-moderate income communities, and/or are located in energy communities.

THE BUILT ENVIRONMENT

In the U.S., buildings consume nearly 40% of total energy used.[6] Because it reduces energy demand and emissions and creates savings for utility customers, energy efficiency[7] often plays a prominent role in state energy and climate policies. Coupled with beneficial electrification, which involves replacing direct fossil fuel use with electricity, there is even greater potential to reduce energy costs and pollution, and provide more resilient, comfortable, and healthy buildings. This is especially the case in states where increasing levels of low carbon resources are supplying the electric grid. When policies are adopted to shift energy sources for such things as space and water heating to highly efficient electric alternatives, states can maximize achieving the dual objectives of increased energy efficiency and reduced emissions. In some cases, this can also result in lower energy costs.

The American Council for an Energy Efficient Economy (ACEEE) publishes a State Energy Efficiency Scorecard that evaluates states' energy efficiency programs and policies in six policy areas, focusing on equity and policies that assist low-income and disadvantaged households. Iowa is ranked 35th in the 2022 report. In addition to its Energy Efficiency Scorecard, ACEEE tracks how states are incorporating equity into their energy efficiency and clean energy programs and policies. The Iowa State Energy Plan includes explicit goals of supporting energy efficiency in underserved communities, provides a low-income housing credit, and expands workforce development programs to address the unique problems associated with the energy transition.

The IIJA provides $500 million for grants to fund energy efficiency and renewable energy upgrades in public schools, $3.5 billion for the Weatherization Assistance Program, and increases funding for the Energy Efficiency and Conservation Block Grant program by $550 million and the State Energy Program by $500 million. The IRA appropriates $4.3 billion to DOE for an energy efficiency rebate program that will be administered through state energy offices. Another $4.3 billion appropriation will fund electrification rebates for single- and multi-family homes. The bill also extends the tax credits for residential energy efficiency improvements and new efficient home construction and increases the maximum deduction for energy efficient commercial buildings. A $837.5 million appropriation will be used by the Department of Housing and Urban Development (HUD) for resiliency, energy efficiency, renewable energy, and grid integration projects at public housing units.

Policymakers in Iowa can consider a variety of policies to encourage energy efficiency and beneficial electrification:

Energy Efficiency Policies

1. **Building Codes** – The DOE projects that, over time, improvements in building codes can have the greatest single impact on energy efficiency within the built environment. On average, commercial buildings waste 30% of energy used.[8] Because buildings will be around for generations, energy efficiency within the built environment is a matter of statewide and long-term importance. States can set requirements for energy systems, require statements of energy use, and set performance standards for energy use or emissions. Building codes can be required by state legislation or implemented through 'home rule', where local governments set their own standards or adopt more strict building codes than those mandated by the state.

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[6] For additional information, see ACEEE Building Policies and Codes.

[7] Energy efficiency includes a multitude of measures to reduce energy consumption. These measures range from behavioral changes to installing energy efficient appliances to full building renovations, including updating a building's envelope.

[8] For more information, see the Office of Energy Efficiency & Renewable Energy's Commercial Buildings Integration (CBI) Program.

The IIJA includes a $225 million appropriation for a competitive grant program to support the "sustained cost-effective implementation of updated building energy codes." The grant program will run for five years, through fiscal years 2022 – 2026. In December 2022, DOE issued the Resilient and Efficient Codes Implementation Funding Opportunity Announcement to support the adoption of updated building energy codes. Approximately $45 million is available for this competitive grant program. The program requires the participation of a "relevant state agency" and projects must be tied to "an updated building energy code."

Iowa is not a home rule state, and the Iowa Department of Public Safety has adopted, as a mandatory building code, the International Energy Conservation Code (IECC) 2012 Edition, with amendments. The code contains requirements for commercial and residential energy efficiency and conservation. Jurisdictions are free to adopt stricter commercial and residential codes.

2. **Appliance Efficiency Standards** – Appliance efficiency standards set minimum requirements for efficiency in everything from water heaters to washing machines. Efficiency standards save consumers money on utility bills and reduce energy demand on the grid, most importantly reducing peak energy demand. Some states have elected to adopt the federal appliance standards that were in effect on January 1, 2017.[9] These include, among other things, standards for metal halide lamp fixtures, residential furnaces and boilers, and external AC to DC power supplies.

3. **Energy Saving Performance Contracts (ESPCs)** – ESPCs are a financing mechanism for energy efficiency upgrades. ESPCs are often used within large institutions, such as college or government campuses, allowing them to meet their energy and environmental goals. An energy service company will pay the upfront cost of efficiency upgrades and execute the project, often guaranteeing the projected energy savings. The large institution will then pay back the service company with savings from their utility bills. This allows institutions to pay for their upgrades from their operating budget, instead of finding new financing, such as loans or bonds, for capital upgrades. Essentially, they pay their upgrade costs with their energy savings. Iowa can adopt ESPC enabling legislation, allowing this financing mechanism to be used.

4. **Low-Income Energy Efficiency Programs** – While equity should be incorporated into all policy development, it is often necessary to ensure that specific programs are targeted towards historically underserved populations. Recent research suggests that weatherization improvements can reduce energy use by 25-35%, allowing households to reduce their financial energy burden. The federal WAP program provides energy efficiency upgrades for income qualified homeowners. However, there might be difficulty in reaching individuals who are eligible. Policymakers might require outreach and education programs targeted at eligible groups.

   Iowa requires that IOUs offer low-income programs and LIHEAP and weatherization assistance to qualified households.

5. **Energy Efficiency Resource Standards (EERS)** – EERSs require utilities to demonstrate a reduction in energy demand from programs offered to their consumers. Because this means selling less energy and reducing revenues, there is not always an incentive for the utility to make their consumers more productive or efficient users of energy. If legislatures want to ensure a more productive and efficient energy distribution system that takes advantage of the latest technological innovations, they may want to require that a utility demonstrate a percent reduction in demand through efficiency or "demand side" programs. Legislators can also instruct their utility commissions to consider energy efficiency when approving rate cases by allowing cost-recovery of energy efficiency improvements through utility bills.

   In 2018, Senate File 18-2311 capped energy efficiency program costs to 2% of an electric utility's expected annual retail rate revenue and 1.5% of a natural gas utility's expected revenue. The bill also removed the IUB's oversight authority over small (fewer than 10,000 customers) and cooperative utility's energy efficiency plans, allowed customers to opt-out of energy efficiency programs and charges, and subjected energy efficiency programs to an additional, more stringent cost-effectiveness test. For the 2019 – 2023 planning period, Iowa's electric utilities set targets that will result in an average savings of .89% annually. The state's natural gas utilities' plans are expected to save between .10% and .29% of annual retail sales. Following the bill's adoption, MidAmerican reported savings that were 64% lower than those achieved in 2017. Alliant Energy's savings were

[9] Based upon research conducted by the Center for the New Energy Economy.

down 40%. ACEEE's annual ranking of states dropped Iowa 12 places – from 24th in 2018 to 36th nationally in 2020, citing the impacts of the new law.[10]

6. **Revenue Decoupling and Performance-Based Incentives** – Utilities earn revenue by selling energy. As a result, there is little to no incentive for them to promote energy efficiency because it leads to a reduction in sales, and therefore a reduction in revenue. Revenue decoupling disconnects revenue from the amount of energy sold. This provides utilities a set amount of revenue regardless of the amount of energy sold. While this does not directly incentivize energy efficiency, it does remove the inherent disincentive to promote energy efficiency.

   Incentive policies can be layered on top of a decoupling policy. For example, if a utility meets set energy reduction targets, then performance-based incentives can provide monetary rewards for meeting those targets.

Electrification Policies

1. **Strategically Target Beneficial Electrification** – Target areas of beneficial electrification in buildings include space and water heating systems and other systems and appliances that typically use natural gas or another fossil fuel as an energy source. According to the Environment and Energy Study Institute, new electric heat pump technology can heat space and water at efficiencies of 200 to 300 percent, compared to 67 percent efficiency in typical Energy Star gas water heaters.[11] This not only allows savings on energy bills, it also results in reduced GHG emissions and improved indoor air quality.

2. **Adopt Tools for Advancing Electrification** – Building codes and financial incentive programs can be used to advance beneficial electrification. While in some states, local governments are primarily responsible for adopting and implementing building energy codes, in other states, a state legislature, or a code commission tasked by the legislature, adopts and implements statewide standards. Incentive programs established and implemented by states, local governments, or utilities can target replacing systems and appliances that traditionally rely on fossil fuel resources with high efficiency electric systems and appliances including water heaters, furnaces, ovens, and ranges. As an example, heat pump water heaters and space heating systems can serve as high efficiency replacements for traditionally fossil-based equipment. In conjunction with utility regulatory policy, these technologies can also serve as demand response tools.

   As a note, cities across the country are implementing new building codes promoting beneficial electrification by limiting or banning the installation of natural gas in new construction. State legislatures can pass enabling legislation, allowing municipalities to make independent decisions on beneficial electrification. On the other hand, some states have adopted pre-emptive legislation, banning local governments from adopting policies that limit utility service.[12]

Programmatically, there will always be greatest benefit by combining measures – incentives that bundle improvements will generate greater gains than individual measures. For example, a high efficiency heat pump will be much more effective and efficient when coupled with improved building insulation. Rather than only realizing the gains of the new mechanical component, this combination of measures will increase the efficiency of the entire system.

ELECTRIFICATION OF THE TRANSPORTATION SECTOR

Bloomberg New Energy Finance estimates that nearly 80% of new car sales in the U.S. will be electric by 2040. Therefore, a key part of building a modernized grid involves designing infrastructure that will facilitate easy connection of electric vehicles (EVs) to the grid. One of the most important barriers to increased adoption of EVs is the consumer's awareness of the availability of EV charging stations. Ultimately, drivers want to be sure that their

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[10] K. Uhlenhuth. 2021. "Since 2018 Law, Iowa Utilities Are Doing a Lot Less to Help Customers Save Energy." *Energy News Network*. 7 July. Available: https://energynews.us/2021/07/07/since-2018-law-iowa-utilities-are-doing-a-lot-less-to-help-customers-save-energy/

[11] For more information, see EESI's Beneficial Electrification.

[12] See: "States that Outlaw Gas Bans Account for 31% of US Residential/Commercial Gas Use." S&P Global, 9 June 2022. Available: https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/states-that-outlaw-gas-bans-account-for-31-of-us-residential-commercial-gas-use-70749584.

car will get them where they need to go. The good news is that both supportive policies for developing charging infrastructure and technological advancements have eased this "range anxiety."

ACEEE publishes a State Transportation Electrification Scorecard that evaluates states' progress in electrifying transportation in six key policy areas and offers nationally applicable policy recommendations. The 2023 report ranks Iowa 33rd in the country and provides an overview of the current state of Iowa's EV policies and infrastructure.

The Iowa Energy Office, as part of the implementation of the Iowa Energy Plan, offers grants for projects that aid in implementing one of the key focus areas of the plan. Such projects include those supporting the adoption of alternative-fueled vehicles, including EVs, in the state. Business customers in Alliant Energy's service territory may be eligible to receive a rebate for purchasing EV charging equipment. House File 767, signed by the Governor in May 2019, established annual registration fees starting at $65 for EVs and $32.50 for plug-in hybrids which increased to $130 and $65, respectively, in 2022.

The IIJA provides nearly $5 billion over the next five years to support the electrification of the transportation sector. In 2022, $615 million was made available for the installation of charging stations along designated alternative fuel corridors, through the National Electric Vehicle Infrastructure (NEVI) formula grant program. To be eligible to receive this funding, states must have submitted a NEVI plan to the Federal Highway Administration (FHWA) by August 2022. All 50 states plus D.C. and Puerto Rico submitted a NEVI plan. Iowa will receive an estimated $10,942,483 in Fiscal Year 2023.

The Act also provides approximately $1.1 billion for grants to state and local governments to assist with the purchase or lease of low- or no-emission vehicles for transportation fleets. To be eligible, a state must have a Zero-Emission Fleet Transition Plan in place.

The IRA extended the $7,500 EV tax credit for purchases of new plug-in EVs through 2032 and removed the eligibility cap based on number of vehicles sold by manufacturers. The Act includes requirements for material sourcing that must be met by manufacturers starting in 2027. The IRA also created a new $4,000 refundable tax credit for the purchase of used EVs and a new credit for commercial EVs. Appropriations in the Act include $1 billion for replacing medium- and heavy-duty vehicles with EVs, $3 billion to fund projects to reduce transportation sector emissions, and $3 billion to procure alternatively fueled vehicles for the federal fleet.

There are several policy opportunities to further encourage and prepare for increased market penetration of EVs in the state, including:

1. **Utility Investment in "Make-Ready" Infrastructure and Utility-Run Programs** – "Make-ready" means building and upgrading the infrastructure necessary for the installation of a charging station. RMI recommends that policies providing incentives for utilities to invest in make-ready infrastructure or charging infrastructure itself should be performance-based and encourage investments in locations that are unlikely to be targeted by the private sector, such as low-income and multi-unit dwellings. Additionally, utilities can incentivize EVs by incorporating charging rate incentives and time of use rates to reduce the cost of electricity used for charging. Eligibility for a charging rate incentive may be limited to users with separate or advanced metering systems. Some utilities also offer financial incentives for the purchase of EVs or EV charging equipment. In some states, enabling legislation might be required to direct or authorize a public utilities commission to allow regulated utilities to recover the costs of providing these incentives.

2. **Parking Infrastructure Requirements** – In tandem with the implementation of Iowa's NEVI plan, legislation could set requirements for parking lots and other 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. Iowa's Statewide Building Energy Codes could also be updated to include requirements for EV charging infrastructure.

3. **Rental Properties and HOAs** – Legislation can also make it easier for lessees, renters, and members of a homeowners' association (HOA) to install charging equipment. Typically, lessors are directed to allow lessees, at their own cost, to install charging systems. In some cases, lessees are required to maintain additional insurance for the system. Legislation related to HOAs typically directs these organizations to avoid restrictions that would inhibit the installation of charging equipment.

4. **EV and Charging Equipment Financing and Financial Incentives** – 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 the high up-front costs of EVs and EV charging equipment. 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.[13] States have adopted other financial incentives including low-interest loans, grants, vouchers, and rebates. A handful of states qualify EV charging equipment 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.

   States might consider adopting programs to incentivize the purchase of used EVs. With increasing battery capacities and falling prices, there are an increasing number of EVs with relatively low mileage that are being traded in. States might also consider programs that target low- and moderate-income (LMI) customers that may not qualify for a loan directly. Such a program could facilitate sales through such things as loan loss reserve and interest buy down programs.

5. **HOV and HOT Incentives** – Allowing EVs to use high-occupancy vehicle (HOV) or high-occupancy toll (HOT) lanes, regardless of number of passengers and without paying the toll, may make EV ownership more attractive. Most states require that EVs using these lanes display a decal or a particular license plate; others also limit eligibility to certain types of vehicles or to a certain number of vehicles.

6. **Fleet Mandates** – Some states require state agencies to acquire a fixed or growing percentage of electric, hybrid, and/or alternative fuel vehicles. For instance, Massachusetts required that its state fleet be no less than 50% hybrid or alternative fuel vehicles by 2018 and set the following state fleet targets for zero emission vehicles (ZEVs): 5% by 2025; 20% by 2030; 75% by 2040; and 100% by 2050. A City of Seattle study found that the city could save millions by switching to EVs.

7. **Federal Congestion Mitigation and Air Quality (CMAQ) Funds** – CMAQ funds (almost $2.6 billion in fiscal year 2023) are available to states to assist them in meeting Clean Air Act requirements. State funds can be used to deploy EV charging infrastructure. There may be a unique opportunity to pair a request for CMAQ funds with a commitment from utilities to invest in charging infrastructure as a public/private partnership that would leverage the federal investment.

NEWS

- July 17, 2023: Iowa Reaches Milestone on Wind-Energy Production
- May 3, 2023: After Initial Denial, Iowa Utility Board Preapproves Duane Arnold Solar Projects
- April 26, 2023: Iowa Regulator Approves Solar-Plus-Storage Project with 50MW BESS
- April 13, 2023: Iowa, Nebraska, Missouri Partner for Application to Create Clean Hydrogen Hub
- April 12, 2023: Alliant Energy Partners with YMCA-YWCA to Install Solar Panel Array
- March 13, 2023: MidAmerican Energy Becomes First Iowa Utility to Advance Electrification of Heavy-Duty Service Fleet
- February 27, 2023: Iowa to Study if Crops and Solar Panels can Coexist
- February 23, 2023: Iowa Energy Center Board Approves Awards for New Solar Projects
- January 11, 2023: Duke Energy Powers Up 207MW Iowa Wind Project

OTHER RESOURCES

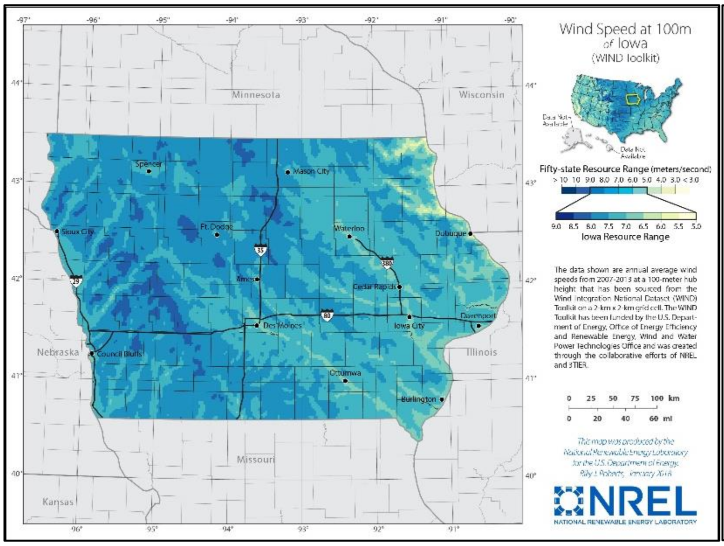
- Iowa Environmental Council: https://www.iaenvironment.org/
- Iowa Conservative Energy Forum: https://www.iowacef.org/
- The American Council for an Energy-Efficient Economy, State and Local Policy Database, Iowa: https://database.aceee.org/state/iowa
- The Database of State Incentives for Renewables and Efficiency, Iowa: https://programs.dsireusa.org/system/program/ia
- U.S. Department of Energy's Alternative Fuels Data Center, Iowa: https://www.afdc.energy.gov/states/ia

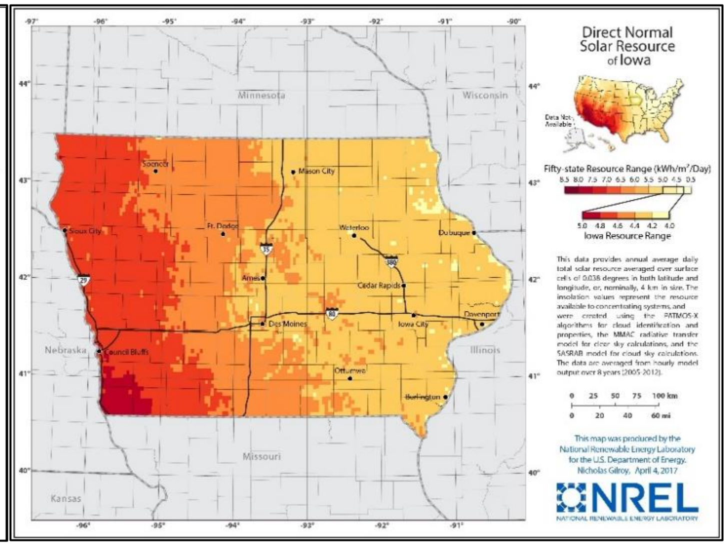
[13] A study by the Congressional Research Service suggests that tax credits are important tools for ensuring increased adoption of alternative-fueled vehicles.

- U.S. Energy Information Administration, Iowa: https://www.eia.gov/state/?sid=IA
- American Clean Power Association, State Fact Sheets: https://cleanpower.org/facts/state-fact-sheets/
- SPOT for Clean Energy, Iowa: https://spotforcleanenergy.org/state/iowa/

IOWA'S WIND AND SOLAR RESOURCES

WIND: https://windexchange.energy.gov/states/ia





Our Resources

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

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

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

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