IMPLEMENTING THE INFLATION REDUCTION ACT: A ROADMAP FOR STATE ELECTRICITY POLICY

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EXECUTIVE SUMMARY

The Inflation Reduction Act of 2022 (IRA) is the most significant climate legislation in United States history. Several independent studies find the IRA's $370 billion in climate and clean energy investments could help cut U.S. greenhouse gas (GHG) emissions roughly 40 percent by 2030. Combined with state action and forthcoming federal regulations, the IRA puts the U.S. within reach of its Paris Agreement commitment to cut emissions 50 to 52 percent by 2030.

Energy Innovation Policy and Technology LLC® prepared a series of research notes to detail the IRA's provisions across the electricity, buildings, and transportation sectors. The notes also describe how states and private actors can leverage these provisions to unlock economic, public health, and climate benefits, as well as how the U.S. can help bridge the gap to meet its 2030 climate goals. This note covers the IRA's electricity sector provisions, which could spur a clean energy revolution and amplify emissions reductions by electrifying other sectors.[i]

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This research note is a guide for state policymakers to understand what they can do to secure the IRA's potential benefits. We highlight the most impactful electricity sector policies and examine recent independent modeling investigating the IRA's electricity sector impacts. We explain the mechanics of how state policymakers play a central role in realizing the cost reductions, job growth, and pollution abatement the IRA enables. We conclude by recommending further policy action to achieve the IRA's potential investment and public health benefits, highlighting the role of states and utilities in implementation.

Table 1. Policies covered by this research note

Category	Section	Title
Tax credits – IRA	Sec. 13101	Extension of current production tax credit by technology
	Sec. 13701	New clean electricity production tax credit
	Sec. 13102	Extension of current investment tax credit by technology
	Sec. 13702	New clean electricity investment tax credit
	Sec. 13104	Carbon capture and storage tax credit
	Sec. 13105	Zero-emission nuclear production tax credit
Refinancing – IRA	Sec. 50144	Energy infrastructure reinvestment financing
	Sec. 22004	Funding for rural cooperatives to reduce emissions
Manufacturing – IRA	Sec. 13501	Advanced energy project credit
	Sec. 13502	Advanced manufacturing production credit
Transmission – IRA	Sec. 50151	Transmission facility financing loans
	Sec. 50152	Funding to facilitate transmission siting
	Sec. 50153	Interregional and offshore wind planning
Transmission – IIJA	Sec. 40105	Transmission siting via national interest corridors
	Sec. 40106	Transmission facilitation program
	Sec. 40107	Smart grid investment program

Top-line research findings:

- The IRA's tax credit extensions of at least ten years for clean electricity resources is designed to improve public health, encourage high road labor standards and a just transition, and drive emission reductions that can benefit every state.
- Reinvestment financing for legacy fossil infrastructure provides a path to avoid stranding coal and gas power plant capital, offering value to the customers and shareholders of utilities who use this policy. These provisions are designed with a central goal of increasing community benefit.
- The IRA builds on the grid investments made in the Infrastructure Investment and Jobs Act (IIJA), which had a strong focus on transmission planning, siting, and funding.
- The central estimates of four independent studies find the IRA's clean energy provisions would make 73 to 76 percent clean electricity the lowest-cost pathway for the U.S. by 2030. Most of the cost reductions are attributed to clean energy tax credit provisions that cut the cost of carbon-free electricity technologies.
- Achieving this level of clean electricity could cut household energy bills by hundreds of dollars annually, roughly triple annual wind and solar capacity investments through 2030, create more than a million jobs across the country, and put U.S. climate goals within reach.
- Despite the models' convergence, significant uncertainty remains around the IRA's impact. New state policy is likely needed to realize the IRA's economic potential and guide resources to the communities that need them most. States may also face some persistent barriers around supply-chain and transmission constraints that will require further state and federal coordination.

Top-line state policy recommendations include:

- Public utility commissions (PUCs) have an outsized role implementing IRA incentives because they dramatically reduce the cost of many clean energy technologies. PUCs should prioritize re-examining now-outdated cost assumptions in planning and procurement, enabling competition to drive new investment and retirement, taking a proactive role in community transition, streamlining the clean energy interconnection process, and exercising healthy skepticism on carbon capture technology.
- State legislators can ensure their constituents benefit from IRA provisions by increasing clean energy ambition and requiring agencies (including their PUCs) to proactively plan for the coming energy transition and maximize the dollars coming into their state. Legislators should prioritize increasing clean electricity standard ambition, requiring utilities to invest in electricity storage, creating a transmission authority to enable cost-effective clean energy deployment, pushing for greater regional grid coordination, dedicating resources to

community transition, and providing funding for PUCs and state energy offices to maximize IRA funds.

- Governors and state energy offices play a primary role organizing state and local governmental resources and initiating public-private partnerships to leverage federal funds most effectively. These state energy leaders should prioritize assessing clean energy resource and market potential, supporting a clean energy workforce, while coordinating with the state agencies, utilities, and PUCs that are driving clean electricity deployment.

ACKNOWLEDGEMENTS

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IRA PROVISIONS WILL ACCELERATE CLEAN ELECTRICITY DEPLOYMENT

Though the IRA contains thousands of provisions, policies with the biggest impact on clean electricity costs fall largely into two buckets: clean energy tax credits and government-backed infrastructure financing. To help state policymakers understand how these provisions can strengthen their economies, cut pollution, and reduce energy costs, this section details these two groups of IRA provisions, then summarizes other key provisions and IRA interactions with the IIJA.

CLEAN ENERGY TAX CREDITS

Clean energy tax credits have arguably been the most important federal climate policies to date, helping drive solar and wind growth nationwide. The IRA builds upon this successful policy to make a clean energy transition cost effective for the long term, with Energy Innovation® finding it to be the most impactful IRA provision for decarbonizing the electricity sector. This section discusses IRA tax incentives for new sources of utility-scale clean electricity, existing nuclear power plants, and carbon capture, utilization, and sequestration (CCUS) processes.[ii]

Key policy design features of production and investment tax credits[iii]

The production tax credit (PTC) and the investment tax credit (ITC) are the IRA's two key tax credits for new sources of clean electricity. The PTC has primarily supported wind energy resources, and at its full value, paid approximately $26 per megawatt-hour (MWh) in 2022 dollars over the first ten years of a wind project's commercial operations.[1] The ITC has largely supported solar resources,[iv] and at its full value offered a tax credit for 30 percent of total system cost, paid out when it is first placed in service. Prior to the IRA's passage, the PTC had expired—and the ITC had begun phasing out with a value of 26 percent—for projects starting construction in 2022.[2]

The IRA makes four key changes to these tax credits.

[ii] For a more exhaustive review of the IRA's energy and climate provisions, including tax credits for residential solar projects, see: https://bipartisanpolicy.org/download/?file=/wp-content/uploads/2022/08/Energy-IRA-Brief_R04-9.9.22.pdf

[iii] The production and investment tax credits discussed in this section are found in Sec. 13101 (extension of the current production tax credit by technology), Sec. 13102 (extension of the current investment tax credit by technology), Sec. 13701 (new clean electricity production tax credit), and Sec. 13702 (new clean electricity investment tax credit) of the IRA.

[iv] Both the PTC and ITC also support other resources, though values, timelines, and other details vary by technology. This research note focuses on the rules for wind and solar photovoltaic resources.

Extended timeline and value

The IRA restores the wind PTC and solar ITC to their full values,[v] beginning with projects placed in service in 2022 (including before the IRA was signed into law).[3] These incentives continue for projects beginning construction through either 2032, or the year in which the U.S. Treasury determines the electricity sector emits at least 75 percent fewer GHGs than 2022 levels, whichever comes later. The credits then phase out to 75 percent of their full value the subsequent year and 50 percent the year after, before expiring. This allows new projects to immediately qualify for full-value tax credits and provides utilities and developers with business certainty over at least the next ten years.

Expanded scope and flexibility

The IRA immediately revives a long-expired option for solar projects placed in service in 2022 or later to elect the PTC instead of the ITC, which may soon be the more lucrative incentive as solar capital costs continue to fall.[4] It also allows energy storage technologies placed in service in 2022 or later to qualify without needing to satisfy prior restrictions of being co-located with and charging primarily from solar energy resources. For projects beginning construction in 2025, the IRA replaces the traditional PTC and ITC with new, zero-emission technology-neutral versions, which may open the door to emerging technologies like clean hydrogen and small modular nuclear reactors.[vi]

Human impact bonuses

The IRA effectively penalizes projects for failing to meet certain worker requirements but offers new bonuses for supporting domestic content and fossil fuel communities.

Table 2. Summary of clean electricity tax credit provisions

Category	PTC[vii]	ITC
Base credit	$5.20/MWh	6%
Full credit (wage + apprenticeship req.)	$26/MWh	30%
Domestic content bonus	+10%	+10 p.p.
Energy community bonus	+10%	+10 p.p.
Maximum value	$31.20/MWh	50%

[v] Conditional on meeting the prevailing wage and apprenticeship requirements discussed later in this research note.
[vi] The Treasury must issue guidance around the "calculation of greenhouse gas emission rates for qualified facilities" no later than January 1, 2025 (i.e., when the new technology-neutral tax credits come into play). Page 457: https://www.democrats.senate.gov/imo/media/doc/inflation_reduction_act_of_2022.pdf.
[vii] PTC values are in 2022 dollars. Values will rise with inflation.

Specifically, the IRA reduces the ITC and PTC to "base credits" of one-fifth their original full values unless project developers ensure their laborers are paid prevailing wages[viii] and a minimum amount of labor hours are performed by apprentices. These requirements are effective for projects of 1 megawatt (MW) or greater.[5] The prevailing wage and apprenticeship provisions are complementary—as employers pay skilled wages, they hire for the skills they're paying for, stimulating a virtuous cycle that fosters a well-paid, trained workforce.[6]

Apprenticeships train the workforce required to build a clean economy and open up a pathway to the middle class for people who either can't afford to take years away from work or can't afford tuition. Apprenticeships allow workers to "earn as you learn," providing on-the-job training for careers that offer higher earnings over their working life—the U.S. Department of Labor reports 93 percent of apprenticeship participants retain their employment after completing their training and earn an average starting salary of $77,000 (compared to the U.S. median wage of about $52,000).

Table 3. Summary of apprenticeship requirements

Project begins construction…	Share of labor hours performed by apprentices
In 2022 or earlier	10%
In 2023	12.5%
In 2024 or later	15%

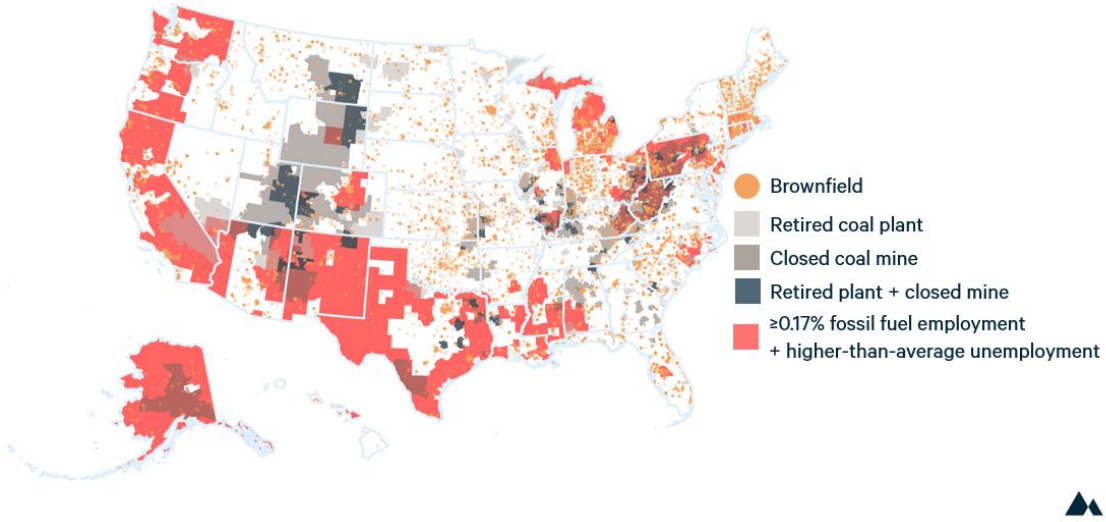
The IRA also offers two bonuses for both the PTC (10 percent above base credit) and the ITC (10 percentage points above base credit)—one for projects that procure a certain share of their content (such as steel, iron, or manufactured products) from domestic sources, and another for projects sited in "energy communities," which relates to brownfield sites, communities with certain employment shares tied to fossil fuels, or areas with coal mine or power plant closures.

[viii] Prevailing wages are defined as "rates not less than the prevailing rates for construction, alteration, or repair of a similar character in the locality in which the facility is located as most recently determined by the Secretary of Labor." Page 245: https://www.democrats.senate.gov/imo/media/doc/inflation_reduction_act_of_2022.pdf.

Table 4. Summary of domestic content requirements

Project construction begins…	Required share of domestic content (general)	Required share of domestic content (offshore wind)
In 2024 or earlier	40%	20%
In 2025	45%	27.5%
In 2026	50%	35%
In 2027	55%	45%
In 2028 or later	55%	55%

Figure 1. Summary of IRA "Energy Community" qualifications



Source: Resources for the Future[7]

These provisions will help develop a robust clean energy workforce and domestic manufacturing base while supporting a clean energy transition in communities historically dependent upon fossil fuels. Individual projects will situationally have access to significantly higher credit values, further improving their competitiveness over competing fossil fuel power plants. Additionally, utilities and developers can be more confident that the workforce and materials they need to build renewable projects will be available over the longer term.

Improved access and efficiency

The IRA shifts how utilities and developers can monetize tax credits, reducing roadblocks to credit uptake and increasing the cost effectiveness of federal spending. Traditionally, private developers have had to leverage the tax appetite of larger financial institutions to monetize tax credits—a complex process that siphons a third of the credits' value at taxpayer and customer expense.[8] Utilities have particularly been locked out of the ITC, lacking the legal flexibility to enter into tax equity structures that can more effectively monetize tax credit cost reductions.

The IRA makes tax credits accessible to nonprofit, tax-exempt utilities by making credits directly **refundable.** Tax-exempt entities such as municipal utilities, rural electric cooperatives, tribal utilities, public universities, pension funds, and federal power administrations like the Tennessee Valley Authority serve about one-third of electricity consumers, and until now could not directly access clean energy tax credits. For tax years beginning after 2022 and before 2033, these entities can be refunded in cash for their tax credits, allowing them to take advantage of the ITC and PTC. Projects beginning construction in 2026 or later must satisfy the domestic content requirement above (or be less than 1 MW in size) to be eligible for direct pay.[ix]

The IRA also improves tax credit effectiveness for for-profit utilities and private developers by making tax credits **transferrable.** For taxable years after 2022, these entities can trade their tax credits to an unrelated party for cash, thereby circumventing the need for complex tax equity partnerships. In the case of regulated monopoly utilities, transferability opens up the previously inaccessible ITC. The IRA's transferability provision opens access to a much greater pool of taxable entities for financing projects, and the simplicity and relatively low-risk nature of the transaction should reduce any haircuts to the credits' value.

Other low-emissions technologies

Nuclear production tax credit[x]

In recent years, nuclear power plants have struggled to remain competitive in the face of new, low-cost renewables and, until recently, cheap natural gas prices. However, they provide approximately 20 percent of all U.S. power generation and make up half of the country's zero-carbon electricity,[9] along with large local economic benefits. Allowing these facilities to retire too soon risks having new clean energy resources replace their zero-carbon electricity instead of offsetting fossil fuel generation, delaying power sector emissions reductions and exacerbating local pollution.

[ix] Some exemptions exist, such as if domestic materials are unavailable or meet a threshold of being too expensive. Projects beginning construction in 2024 and 2025 that fail to meet domestic content requirements will only be refunded for 90 and 85 percent of their tax credit values, respectively.

[x] Section 13105 of the IRA.

The IRA supports existing U.S. nuclear power plants, helping the current fleet stay afloat for at least the next decade. These facilities will be able to earn $15/MWh tax credits from 2024 through 2032. To ensure nuclear power plants don't earn profit margins above what's needed to stay competitive, the credits fall in value when energy market revenues and other policy incentives exceed $25/MWh, and stop paying out entirely when these revenues exceed $44/MWh.[xi] Facilities must also meet the prevailing wage and apprenticeship conditions detailed above to earn the full credit.

CCUS tax credit[xii]

The IRA boosts the existing tax credit for CCUS, increasing the value from $50/ton of carbon dioxide to $85/ton for storage in geologic formations and from $35/ton to $60/ton for use in products and enhanced oil recovery.[xiii] It also extends the deadline for the construction of CCUS technology on power plants through the end of 2032, and reduces the annual carbon capture eligibility requirement from 500,000 to 18,750 metric tons for power plants, so long as they are technically capable of capturing at least 75 percent of each unit's CO_2 emissions.

However, even with these tax credit enhancements, studies find clean electricity to be much cheaper than CCUS. Models tasked with investigating the lowest-cost electricity sector deploy hundreds of GWs of new renewables through 2030 and minimal to no CCUS.[xiv] Further, CCUS demonstration projects on coal- or gas-fired power plants have struggled to get built, perform up to standards, and remain operational.[10] Still, the IRA's relatively large tax credits mean that utilities will likely give fossil power with CCUS a harder look in the coming decade.

REINVESTMENT FINANCING

While tax credits incentivize new clean energy technology investments, new policy is also needed to deal with existing fossil fuel infrastructure. Prior to the IRA, renewable energy was already cheaper to build than operating the vast majority of existing coal-fired power plants,[11] but only around 5 percent have retired annually in recent years.[12] Many utilities have recently invested in pollution controls and owe investors and creditors tens of millions in returns. Since most of these coal plants are owned by monopoly utilities, they are largely insulated from competition. Public finance can be the difference between a decade of running these uneconomic plants, or retiring and replacing them with new clean energy technologies.

IRA provisions will speed the shift from coal to clean[13] and support a just transition through two provisions. First, through the energy infrastructure reinvestment financing provision (section

[xi] These values are in 2023 dollars and tied to inflation thereafter.
[xii] Section 13104 of the IRA.
[xiii] The IRA also increases the tax credit for direct air capture facilities from $50/ton to $180/ton for storage in geologic formations and from $35/ton to $130/ton for use in products or enhanced oil recovery.
[xiv] See "Impacts" section, below, at page 18.

50144), the IRA provides authority to guarantee up to $250 billion in loans through 2026 to finance both the reduction in fossil infrastructure debt and new infrastructure to reduce emissions and replace power plants. Second, grants for rural electric cooperatives (section 22004) provide these utilities $9.7 billion in grants and financing to retire coal plants and invest in replacement energy and economic revitalization. These programs offer enough financing to substantially reduce the cost of transitioning from coal to clean, nationwide.

Energy infrastructure reinvestment financing

The IRA appropriates $5 billion to the U.S. Department of Energy's (DOE) Loan Programs Office (LPO) to support $250 billion in loan-making authority. This means the LPO now has enough capital to effectively pay down all $176 billion[14] in regulated utility fossil debt at below-market interest rates. LPO's new loan authority combined with clean energy tax credits has the potential to manifest rapid deployment of clean energy and a reduction in fossil fuels. As the program only lasts until 2026, states and utilities must run through the open door to capture these consumer benefits.

The IRA allows refinancing two types of projects—either replacing energy infrastructure or reducing emissions from energy infrastructure that will remain operational.

To access funds under the first type of project, utilities will need to "retool, repower, repurpose, or replace energy infrastructure that has ceased operations," rather than simply shutting the plants down. This will provide a lifeline to workers in those communities who would otherwise risk losing their livelihoods, and ensure a new source of tax revenue for public services. This reinvestment requirement is also good for business—as utilities refinance, they can build new infrastructure to maintain a healthy balance sheet.

The second use of the funding, to "enable operating energy infrastructure to avoid, reduce, utilize, or sequester" emissions from fossil plants that continue to run, is also central to a just transition. Not all plants will be able to retire at once, for example due to specific roles a plant may play meeting reliability requirements. However, refinancing these plants will free up capital for utilities to build new, clean resources even as they reduce generation from old fossil plants.

The LPO provides the following non-exhaustive list of potential projects on its website, demonstrating the breadth of projects that will qualify:[xv]

"Ceased operations"

- Replacing fossil electricity generation with established cleaner sources
- Replacing fossil electricity generation with emerging clean firm power sources
- Repowering or replacing older renewable assets with more efficient/state-of-the-art renewable assets

[xv] https://www.energy.gov/lpo/articles/deploydeploydeploy-2-energy-infrastructure-reinvestment-eir-program

- Retooling fossil-based energy infrastructure for manufacturing
- Replacing fossil-based industrial processes with decarbonized industrial processes
- Repurposing oil pipelines for clean hydrogen or CO2 transport
- Site remediation

"Operating"

- Retrofitting existing fossil assets
- Refinancing, upgrading, uprating existing nuclear or hydropower facilities
- Fuel switching at operating power plants
- Transmission upgrades
- Refinery upgrades
- Site remediation

Because the refinancing program funds emissions reduction and reinvestment in the same transaction, it creates maximum benefit for both communities and utilities in transition. These projects may also include remediating old fossil sites in the refinancing process, a key driver toward ensuring timely clean-up and creating local jobs. Depending on the final solicitations designed by the LPO, the new infrastructure that could use this funding may range from new energy infrastructure to more economically diverse uses, such as manufacturing facilities, community transition planning, or office space to revitalize communities.[15]

Grants for rural electric cooperatives

While the newly created LPO authorization can be used across the energy industry, the IRA has a second program specifically for rural electric cooperatives through the U.S. Department of Agriculture. Rural electric co-ops provide electricity to more than 40 million people, and their generation is disproportionately coal heavy, with coal composing 28 percent of their generation in 2020[16] compared to 19 percent nationwide.[17] Surrounding rural communities bear a disproportionate burden of coal-related pollution, though shutdowns could cost jobs. The bill provides $9.7 billion in grants or loans for rural electric co-ops to purchase or deploy renewable energy systems, other zero-emission systems, or carbon-capture and sequestration systems. It would also allow co-ops to make efficiency improvements to generation and transmission to reduce GHG emissions.

OTHER KEY PROVISIONS AND INTERACTIONS WITH INFRASTRUCTURE LAW

Several other IRA provisions will affect the power sector. These include tax credits for manufacturing clean energy components, funding for facilities that can manufacture clean energy components, and funding for transmission siting, analysis, and planning.[18]

Advanced manufacturing tax credits[xvi]

The advanced manufacturing production tax credit dovetails with the domestic content requirements in the electricity production and investment tax credits. These credits support manufacturing that can reduce one of the biggest risks to a speedy transition: supply-chain constraints. The COVID-19 pandemic and recent geopolitical disruptions have demonstrated the U.S. should not assume that global supply chains for clean energy technologies are up to the task. New tax credits ease the cost of onshoring clean energy manufacturing and potentially revitalize economies in all states.

These credits, detailed in Table 5, are available to wind turbine, solar cell, and battery manufacturers, as well as refiners of minerals critical to the clean energy industry including lithium, graphite, cobalt, nickel, and rare-earth elements. The tax credits will be available for manufacturing components, completed equipment, and other necessary infrastructure, supporting domestic manufacturing up and down the supply chain.

The provision includes varying amounts for solar cells, solar modules, battery cells, and battery modules. For wind, the credits apply to blades, nacelles, towers, and foundations for both fixed and floating turbines. They also support manufacturing offshore wind vessels, which are one of the most significant barriers to offshore wind deployment. Finally, the manufacturing tax credits support inverter production needed to convert electricity produced from clean energy and inject it onto the grid.

These credits will incentivize efficiency because they are tied to equipment output and not the manufacturing cost. The full value of the credits runs through 2029, with direct payments, regardless of tax liability, available for the first five years. Therefore, even companies that don't have enough tax liability will be able to claim the full credit, with no losses incurred by selling credits to a third party.

[xvi] Section 13502 of the IRA.

Table 5. Summary of advanced manufacturing tax credit values

Technology class	Component	Credit
Solar	Thin film or crystalline solar cell	$0.04/W
	Solar cell wafer	$12/m^2
	Solar grade polysilicon	$3/kg
	Polymeric solar cell backsheet	$0.40/m^2
	Solar module	$0.07/W
	Torque tube	$0.87/kg
	Structural fastener	$2.28/kg
Wind	Offshore wind vessel component	10% of sales price
	Wind turbine blade	$0.02/W full turbine
	Wind turbine nacelle	$0.05/W full turbine
	Wind turbine tower	$0.03/W full turbine
	Offshore foundation (fixed)	$0.02/W full turbine
	Offshore foundation (floating)	$0.04/W full turbine
Inverters	Central inverter	$0.0025/W
	Utility inverter	$0.015/W
	Commercial inverter	$0.02/W
	Residential inverter	$0.065/W
	Micro/distributed wind inverter	$0.11/W
Batteries	Battery module	$10/kWh
	Battery module, no cells	$45/kWh
	Critical minerals	10% of production cost

Advanced energy project tax credit[xvii]

The IRA also expands the 48C tax credit for direct investment in advanced energy facilities. Similar to the clean energy investment tax credit, the base credit value is 6 percent of the investment, with a five-fold multiplier for projects that meet prevailing wage requirements. The credit can be claimed for investment in projects that "re-equip, expand, or establish an industrial or manufacturing facility" used for production or recycling of a wide range of clean energy technologies.

Most relevant for the power sector, the credits can be used for facilities that produce renewable energy technologies including solar cells, wind turbines, geothermal energy equipment, and energy storage systems. Facilities that produce grid modernization equipment, carbon capture equipment, or renewable fuel electrolyzers also qualify, as do those that refine or recycle critical minerals. This credit is available for other uses outside the power sector, including for zero-emission vehicles, low- and zero-carbon heat systems, and industrial applications. A total of $10 billion is available with this provision, with $4 billion set aside for energy communities.[xviii]

Transmission provisions in the IRA and IIJA

The IRA also contains several key provisions to facilitate the buildout of new transmission lines to transport the new clean electricity produced as a result of tax credits and other incentives, supplementing transmission provisions in the IIJA. These include $2 billion for transmission facility financing, $760 million for grants to facilitate the siting of interstate transmission lines, and $100 million for interregional and offshore transmission line planning and analysis. As discussed later in this research note, realizing the potential savings and job growth the IRA offers states and utilities will require additional state and federal transmission policy and investment.

- Section 50151 of the IRA details a **transmission facility financing loan fund** with a $2 billion appropriation. The fund will be available for DOE to make direct loans for construction and modification of transmission lines or other transmission facilities. The loans would be available only for projects that are in "National Interest Electric Transmission Corridors." DOE has not yet designated these corridors, which will have to meet criteria like promoting energy security, reducing electricity costs for customers, diversifying electricity supply, or meeting national energy policy interests.
- Section 50152 of the IRA appropriates $760 million for **grants to facilitate siting of onshore and offshore interstate transmission lines**. While the federal government does not have authority over transmission line siting, the state, local, and Tribal governments that do often lack the resources needed to identify and analyze sites. This funding can be used to assess project impacts, examine alternative sites, participate in regulatory proceedings or

[xvii] Section 13501 of the IRA.
[xviii] The section above on clean energy tax credits provides a definition of energy communities.

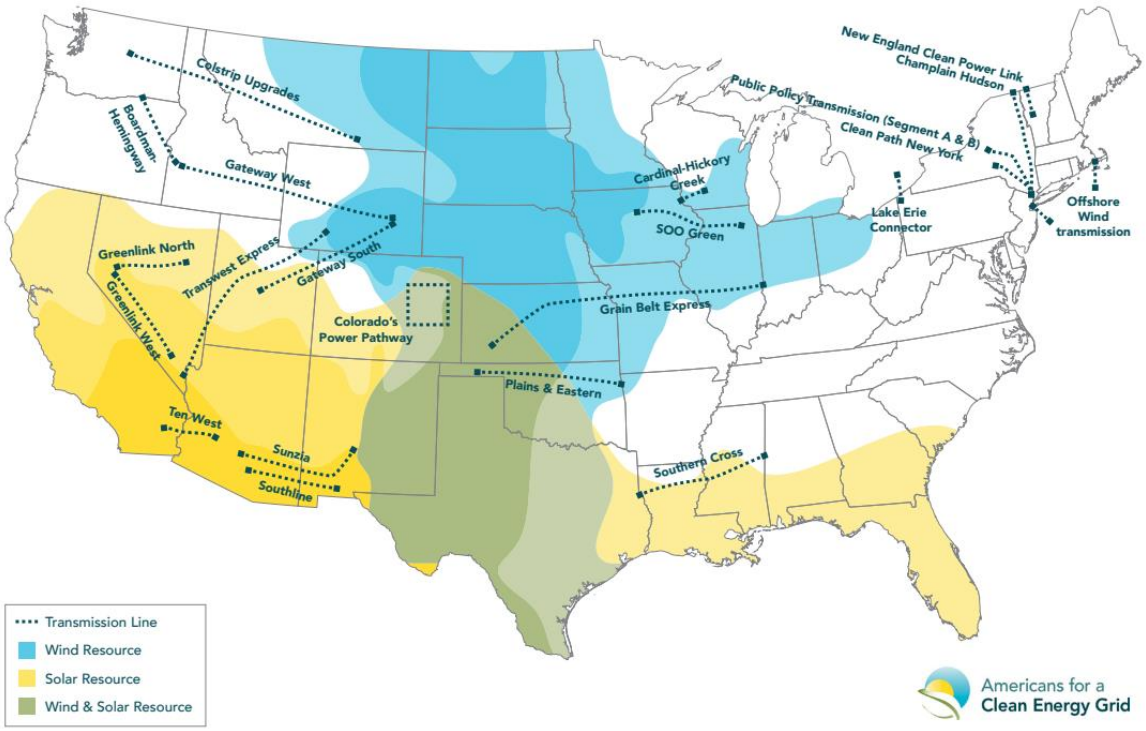
negotiations, or anything else that may speed approval of a transmission project. The funds may also be used for economic development in communities affected by the transmission line.

- Section 50153 of the IRA provides $100 million for **expenses and planning related to interregional and offshore transmission lines**. These two transmission applications can benefit from particular care taken in planning and analysis phases as they have potential to decrease costs from the electricity system overall via systemwide optimization. They also require more complex negotiations and tend to suffer from higher levels of resistance. Therefore, this funding, available to DOE for convening stakeholders and conducting planning will be essential to creating and carrying out a clear vision for the interregional and offshore grid. Funding can be used for planning and analysis related to a wide variety of topics including clean energy integration, cost allocation, benefits of increased regional interties, evaluation of transmission corridors and rights-of-way, and a planned national transmission grid that includes a streamlined offshore transmission system.

These IRA programs build off three programs created by the IIJA: siting assistance for interstate transmission facilities, a transmission facilitation program, and a smart grid investment program. FERC and DOE are already acting on these provisions, with FERC undertaking several rulemakings to streamline transmission planning,[19] and DOE restructuring its offices to undertake the "Building a Better Grid Initiative."[20]

- Section 40105 of the IIJA **addresses the siting of interstate transmission**, focusing on prioritizing certain regions of the U.S. for transmission build-out, and directs DOE to designate the National Interest Electric Transmission Corridors that are required for the new transmission facility financing loans made available by the IRA.
- Section 40106 creates the **Transmission Facilitation Program**, including a $2.5 billion capitalization for a revolving loan fund for transmission projects. At least 22 transmission projects across the country are shovel ready and could add 60,000 MW of renewable capacity to the grid, with an investment of approximately $33.2 billion.[21] Beyond this, an estimated $90 billion in additional investment,[22] over the current $15 billion we spend annually, is needed in grid upgrades by 2030 to enable clean electricity, making this a vital provision. While this funding will not pay for all needed transmission, allowing DOE to co-own lines can provide certainty needed by developers to invest in these bigger, riskier projects. Unlike IRA funding, lines do not have to be sited in specific areas.
- Section 40107 of the IIJA bolsters the **Smart Grid Investment Program** to increase short-term transmission capacity as larger projects develop. It authorizes $3 billion for current transmission line upgrades like dynamic line ratings and reconductoring. These upgrades can take as little to 18 to 24 months, allowing for new renewable resources to be added in a much shorter time frame.[23]

Figure 2. Summary of proposed transmission projects



Source: Americans for a Clean Energy Grid, Transmission Projects Ready to Go: Plugging into America's Untapped Renewable Resources (2021)[24]

However, even the combined transmission provisions of the IRA and IIJA likely fall short in developing the transmission needed to cost-effectively facilitate a 70 to 80 percent clean electricity system by 2030. Though modeling analyses discussed in the next section converge on rapid clean energy deployment resulting from IRA, they also assume transmission can increase much faster than in recent history.[25] States and utilities can get a jump on much-needed transmission development by applying for the IRA and IIJA transmission programs, but new state and federal policy can support transmission development to unlock the IRA's investment, health, and cost benefits.

IMPACTS OF THE INFLATION REDUCTION ACT

This section discusses what several independent studies suggest the IRA's electricity sector provisions may accomplish by 2030. It first reviews the studies' estimates on the degree to which these provisions can reduce the power grid's carbon intensity by 2030, including conditions for success and explanations of any variance. It then summarizes findings on the economic benefits

available to states and communities that choose to reduce barriers to clean energy deployment and capitalize on these provisions. The models converge in forecasting large emissions reductions in the electricity sector from the IRA. However, they generally assume states proactively pursue the economic transformation that the IRA makes possible.

CLEAN ENERGY

To estimate the IRA's electricity sector emissions reduction potential, several independent organizations modeled the law's provisions, forecasting the market impact of the IRA's many financial incentives to adopt clean energy technologies. The models are essentially giant equations that use policy inputs such as subsidies for clean technologies to estimate changes in the market. Chief among the equations' objectives is minimizing cost—each model projects the impact of policy support like clean energy tax credits by ascertaining the least-cost economic system pre- and post-IRA.

The U.S. electricity market is particularly complex to model because of its combination of competitive markets, non-competitive monopoly utilities, and overlapping federal, state, and local regulatory jurisdiction. Each model contains constraints intended to reflect this complexity, but they must simplify many dynamics to keep the models running efficiently.

At the time of writing, at least four institutions—Energy Innovation®,[xix,26] Princeton University,[xx,27] Rhodium Group,[xxi,28] and Resources for the Future (RFF)[xxii,29]—have modeled the IRA's impacts. The studies' central estimates converge to find **the U.S. may reach 73 to 76 percent clean electricity by 2030 and reduce electricity sector GHG emissions 67 to 78 percent by 2030 from 2005 levels.**[xxiii]

[xix] Energy Innovation® finds the U.S. could reach 72 to 86 percent clean electricity by 2030, reducing electricity sector GHG emissions 72 to 86 percent by 2030 from 2005 levels.

[xx] Princeton's REPEAT Project finds the U.S. could reach approximately 75 percent clean electricity by 2030, reducing electricity sector GHG emissions approximately 72 percent by 2030 from 2005 levels. Forthcoming revised modeling may see roughly an additional 1 percentage point of clean electricity and electricity sector GHG emissions reductions. Data are from an email conversation with study author Jesse Jenkins.

[xxi] Rhodium Group finds the U.S. could reach 60 to 81 percent clean electricity by 2030, reducing electricity sector GHG emissions 69 to 80 percent by 2030 from 2005 levels.

[xxii] RFF finds the U.S. could reach 69 to 75 percent clean electricity by 2030, reducing electricity sector GHG emissions 65 to 68 percent by 2030 from 2005 levels across its three natural gas price scenarios.

[xxiii] DOE also modeled the IRA's impacts, finding the IRA would help reduce U.S. GHG emissions 40 percent by 2030 from 2005 levels, including removing approximately 700 MMT CO_2e from the electricity sector relative to business-as-usual (estimated from figure on page 3). The study doesn't provide enough information to report on other metrics covered in this research note. See https://www.energy.gov/sites/default/files/2022-08/8.18%20InflationReductionAct_Factsheet_Final.pdf.

Figure 3. U.S. clean electricity by 2030

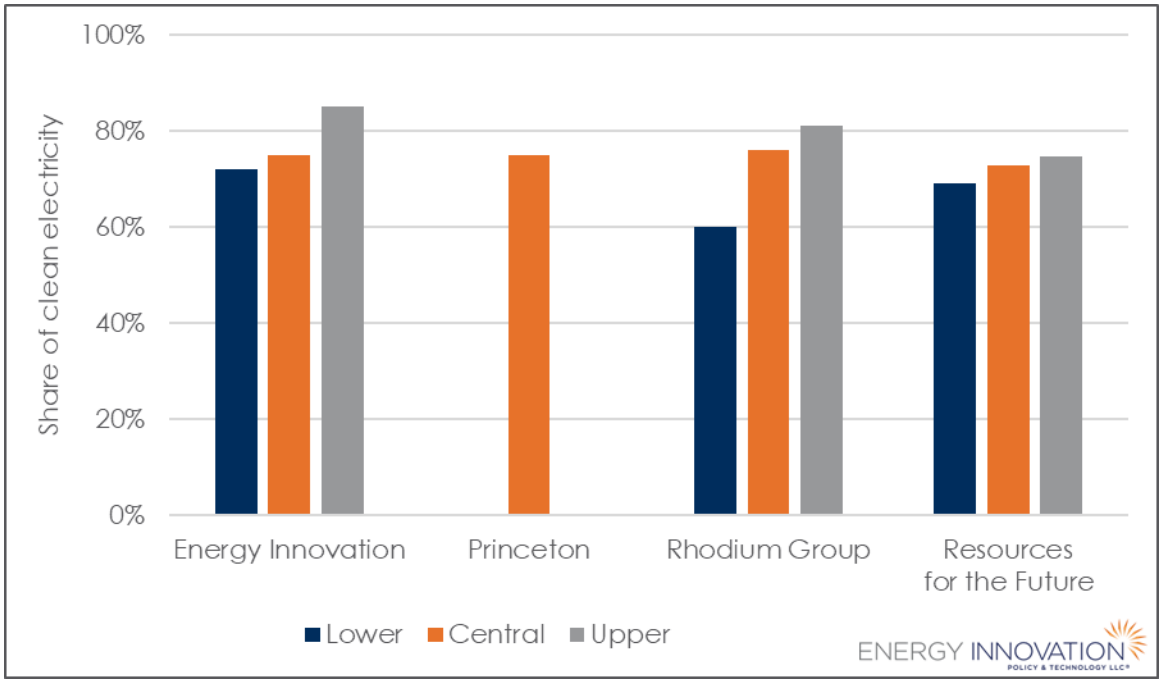
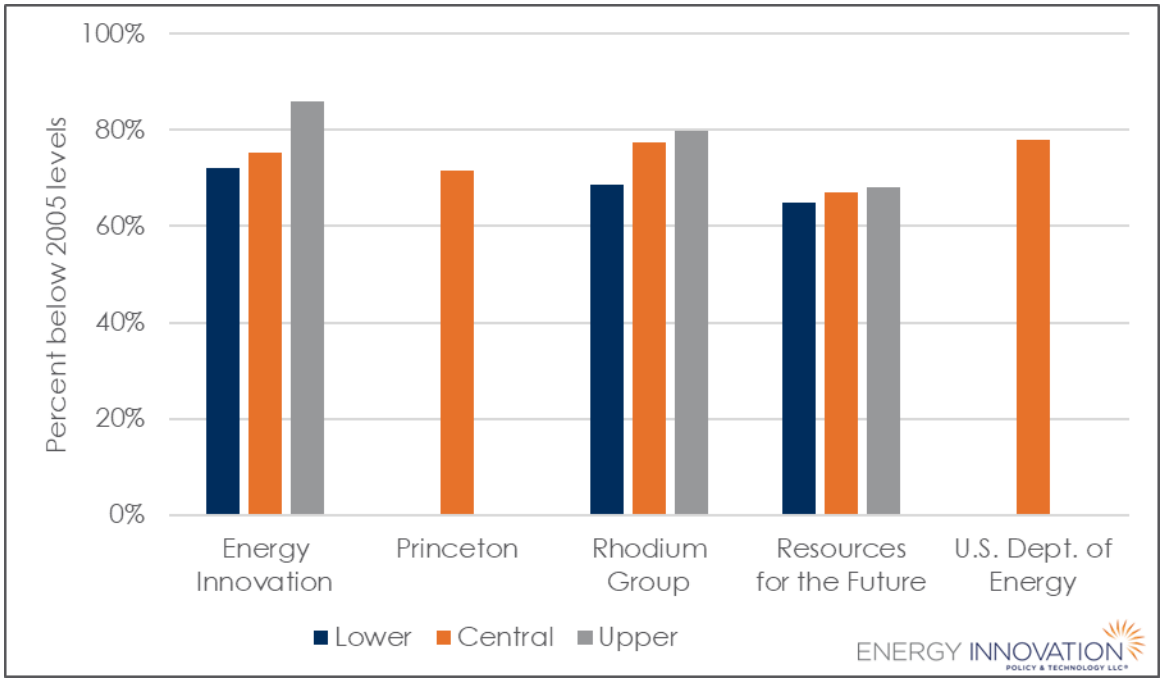


Figure 4. U.S. power sector GHG emissions cuts by 2030



As each study explores and explains, there is substantial uncertainty around these findings, especially due to uncertain future costs of technology and fuel.

The four studies employ state-of-the-art economic optimization models to forecast the IRA's impact on the U.S. electricity sector, with all accounting for the IRA's clean energy tax credit provisions. However, differences in the models and assumptions explain the variance in their findings while bolstering the integrity of their common conclusions.

Modeling tools and assumptions

The four studies employ four different modeling tools[xxiv] and differ in their assumptions. While the tools explain some differences, the assumptions explain more of the divergence. For example, technology and fuel cost assumptions affect the relative shares of new wind, solar, and carbon capture resources built by the models. While all studies model the IRA's clean energy tax credits, they make differing assumptions around the share of projects qualifying for varying credit values. They also account for other IRA provisions in different ways, such as estimating additional coal power plant retirements that may result from the energy infrastructure reinvestment program (Energy Innovation®) or assuming the program will help facilitate electricity sector changes the model forecasts from the tax credit provisions (Princeton).

The models also face limitations. They generally do not meaningfully represent real-world barriers to transmission and renewable development,[xxv] though a subsequent analysis by Princeton shows transmission restrictions could limit renewable deployment significantly.[30] Reaching these shares of clean electricity require roughly tripling the current pace of wind, solar, and transmission deployment until 2030. Infrastructure and supply chain constraints are real, but so are knock-on innovation effects of rapid technology adoption—meaning while 70 to 80 percent clean electricity will be difficult to achieve in practice, it could still be within reach.

What makes a "high" and "low" case

The four studies take different approaches to investigating future uncertainty. Energy Innovation® varies assumptions on the efficacy of the IRA's provisions, including the share of new clean energy projects that qualify for bonus tax credits and the effectiveness of fossil infrastructure refinancing support. Princeton compares its business-as-usual (BAU) case against one IRA case but provides highly granular output data. Rhodium Group subjects its BAU and IRA cases to three sets of

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[xxiv] Energy Innovation® used the National Renewable Energy Laboratory's ReEDS model and its in-house Energy Policy Simulator, Princeton uses Evolved Energy Research's tools paired with its own suite of models, Rhodium Group uses its adapted version of the U.S. Energy Information Administration's NEMS model, and RFF uses its in-house Haiku model.

[xxv] RFF applies a "heuristic constraint on capacity growth that relies on historical capacity additions at the state level to represent regional differences in how major capacity is built." The appendix of the RFF study provides more detail: https://www.rff.org/publications/reports/beyond-clean-energy-the-financial-incidence-and-health-effects-of-the-ira/

assumptions around future economic growth, clean energy technology costs, and fossil fuel prices. RFF tests a BAU case and an IRA case against three sets of natural gas prices.[xxvi]

Convergence lends confidence

These studies all agree the IRA will make clean electricity incredibly cheap in the U.S., setting the stage for new renewables and battery storage to outcompete most remaining coal-fired power plants and proposed natural gas plants. However, the studies' forecasts are not guaranteed to play out—they generally do not capture potential delays from institutional roadblocks, infrastructure delays, supply chain constraints, and the influence of entrenched interests. The IRA will undoubtedly accelerate the clean energy transition, but realizing the economically optimal portfolios revealed by these studies will depend on state and federal action.

STATE AND COMMUNITY IMPACTS

The IRA is designed to do much more than encourage clean electricity uptake—it can bring economic development and modern infrastructure to all corners of the U.S. The states that deploy clean energy will benefit from lower electricity rates, greater private investment, job growth, higher labor standards, and well-managed community transitions from aging fossil fuel power plants to new, sustainable economies.

Household savings

The IRA makes low-cost renewables and battery storage even cheaper, driving electric rate relief for customers and helping to reduce inflation. RFF projects the IRA will save average U.S. households $270 to $320 annually in 2030 relative to BAU.[xxvii] Rhodium Group projects the IRA will save households up to $112 annually in energy bills by 2030 relative to BAU,[31] with Princeton also forecasting "hundreds" in annual savings.[32] RMI forecasts U.S. households will save a total of $5 billion in electricity costs by the end of 2024 due to the IRA's clean energy tax credit provisions alone.[33] Since renewable "fuel" is free once projects are built, these investments also help insulate electricity prices from the volatility of global fossil fuel trade.

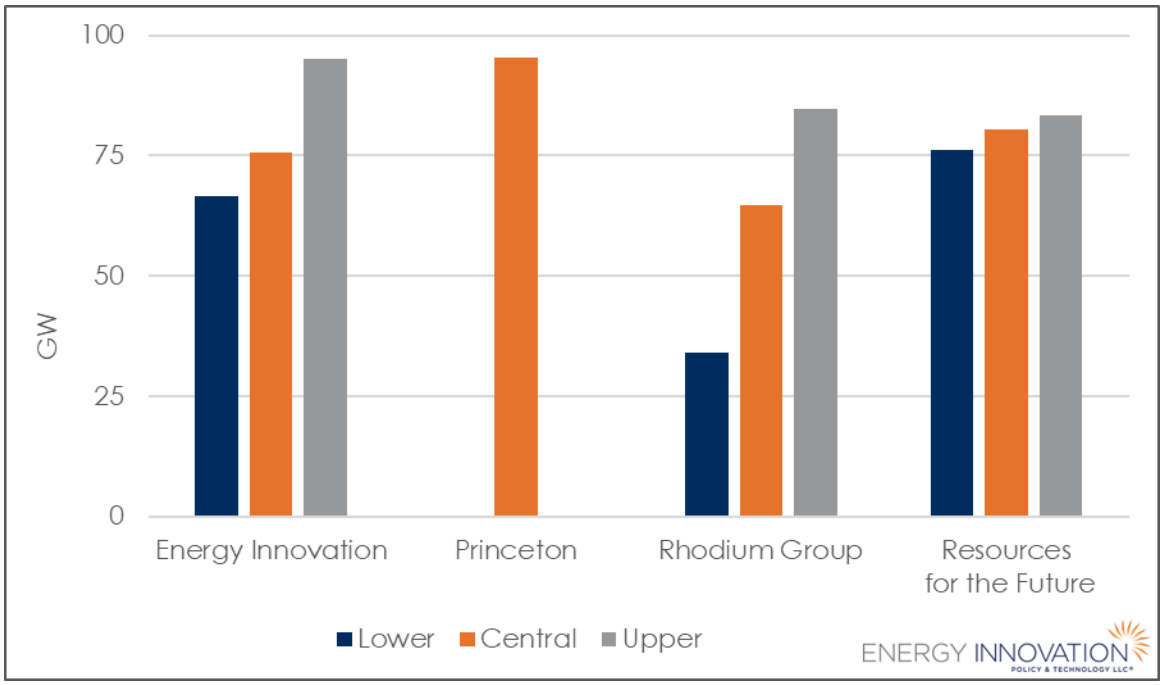
Investment

The IRA could unleash unprecedented levels of deployment and private investment in renewables and battery storage. The four studies find the IRA could help drive average annual additions of 65 to 95 GW of solar and wind capacity through 2030,[xxviii] a rough tripling of recent record wind and

[xxvi] RFF's study also includes a "high demand" IRA case that, for simplicity, was not included in this research note.
[xxvii] These savings include direct reductions in electricity bills for households as well as indirect savings through lower prices of products and services throughout the economy that benefit from lower electricity prices.
[xxviii] These deployment numbers are inclusive of what would have occurred without the IRA. Rhodium Group's "high emissions" scenario is an outlier among the four studies' cases, finding an average annual utility-scale wind and solar deployment rate of just 34 GW through 2030.

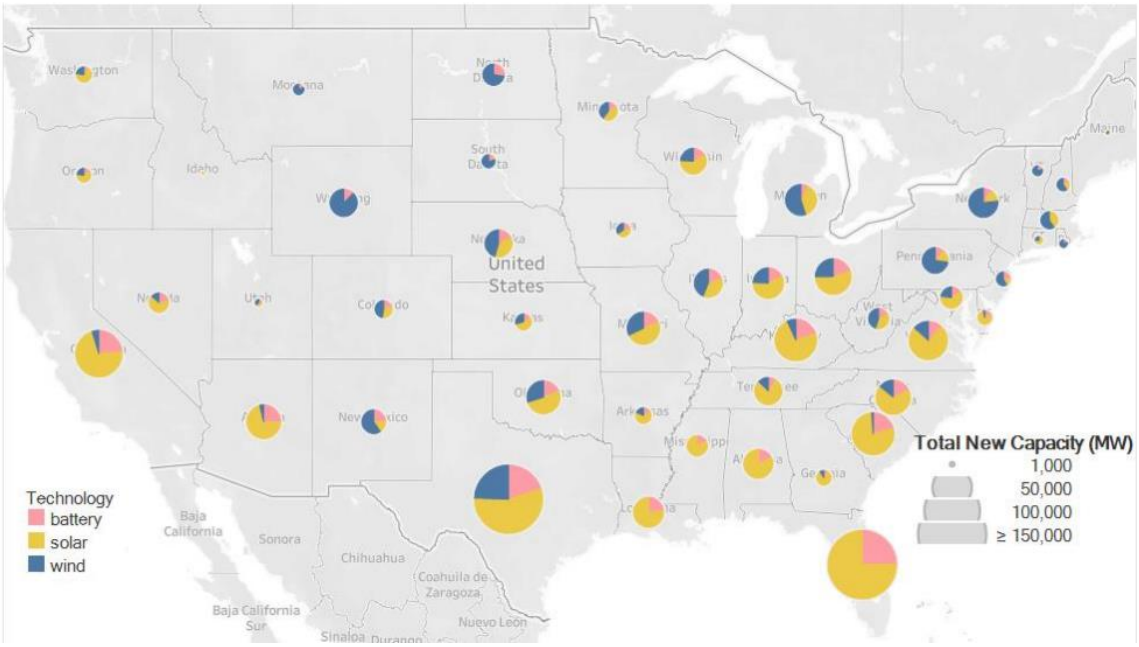
solar deployments.[34] Energy Innovation® and Princeton find this level of deployment would spur tens to hundreds of billions in additional annual capital investment in wind and solar capacity in 2030 relative to BAU. These resource builds alone could bring substantial economic benefits to every corner of the U.S.

Figure 5. U.S. annual average utility-scale wind and solar capacity additions, 2022-2030[xxix]



[xxix] Deployment numbers were obtained from or confirmed by the studies' authors via email conversations.

Figure 6. New U.S. capacity additions resulting from 80 percent clean electricity by 2030



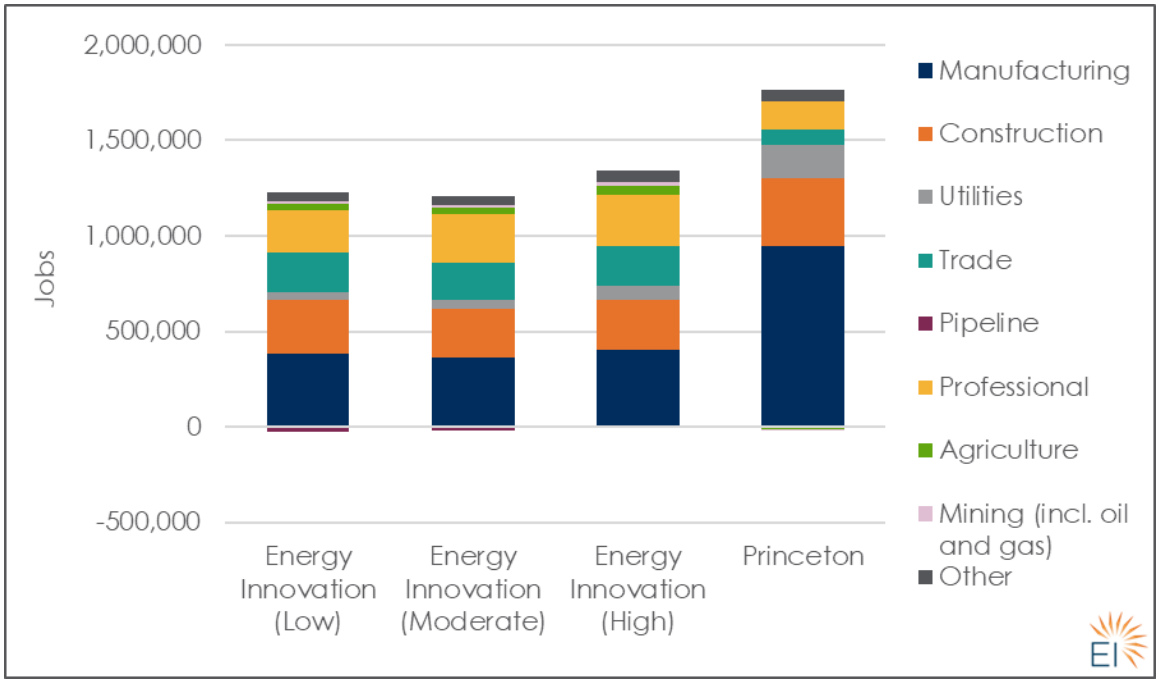
Source: University of California, Berkeley, GridLab, and Energy Innovation® [35]

Job growth and labor standards

Energy Innovation® and Princeton both find the IRA greatly enhances job growth. Analysis by Energy Innovation® finds the IRA will create 1.2 to 1.4 million new jobs in 2030, while the Princeton modeling estimates 1.7 million new jobs in 2030. In both models, new jobs are concentrated in the manufacturing, construction, and utility sectors.

The models may underestimate job increases because they do not account for manufacturing tax credits or the domestic content tax credit booster for clean technologies meant to increase manufacturing and construction within the U.S. For instance, a 10-percentage point increase in the share of solar and wind projects manufactured domestically has been shown to create up to 45,000 jobs each year.[36]

Figure 7. U.S. net annual change in jobs by 2030



Coal retirements

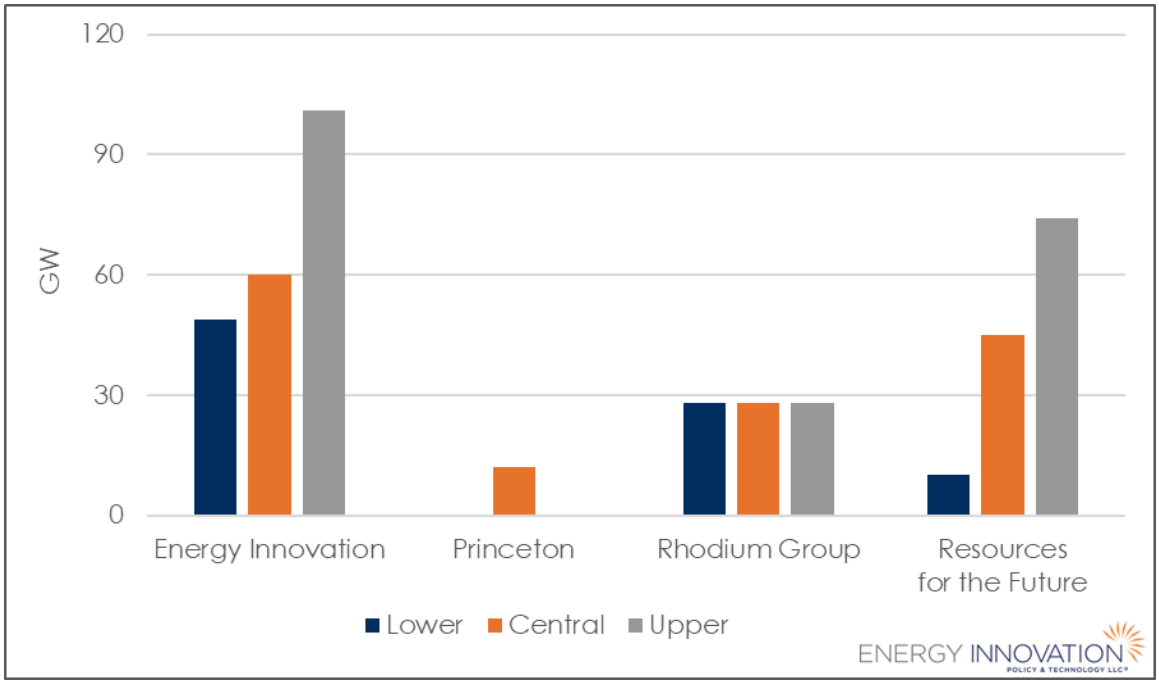
The four studies agree the IRA will accelerate coal retirements relative to BAU, improving local air quality and helping fund community transitions to new, sustainable economies. However, the models differ greatly in the total coal capacity they forecast to shut down due to the IRA: Energy Innovation® sees the highest amount of coal retirements across its three scenarios, ranging from an additional 49 GW to 101 GW of shutdowns relative to BAU, while RFF's "high natural gas price" case and Princeton see the least at only 10 GW to 12 GW of retirements, respectively.[xxx]

These differences are primarily due to assumptions around the IRA's financial assistance programs that can help replace fossil fuel power plants with new clean energy.[xxxi] Coal retirements in the Energy Innovation® analysis come largely through assumptions about how effective these financial assistance programs will be. Rhodium Group accounts for funding targeted to rural electric cooperatives but not the energy infrastructure reinvestment program.[xxxii] Princeton and RFF do not explicitly account for either, with Princeton instead qualitatively discussing the impact these

[xxx] Forthcoming revised Princeton modeling may see up to 9 GW in additional coal retirements, per an email conversation with study author Jesse Jenkins.
[xxxi] See "Reinvestment Financing" section, above.
[xxxii] Confirmed in an email conversation with the Rhodium Group study authors.

programs might have. Another factor is how much coal retires in each model's BAU scenarios—a figure that is not consistent across models.[xxxiii]

Figure 8. U.S. coal retirements from the IRA relative to BAU in 2030[xxxiv]



To a much lesser degree, assumptions around the cost of CCS equipment also play a role—Energy Innovation® and Rhodium Group find no CCS additions through 2030, while Princeton and RFF find marginal but non-zero CCS in this decade.[xxxv]

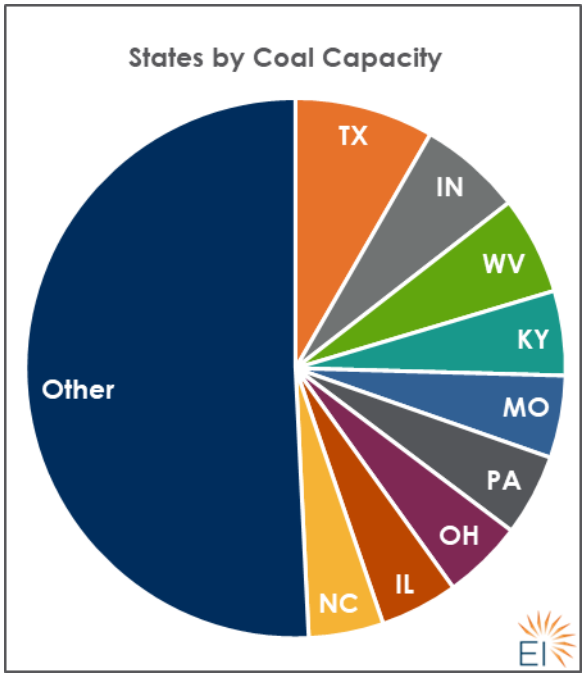
However, which coal plants will retire is highly uncertain because it depends on utility and state actions to take advantage of short-duration, voluntary federal programs. Thirty-nine states still have coal capacity online in 2022, but 80 percent of coal plants were uneconomic in 2019 compared to new local wind and solar projects—a number that only grows with the 10-year

[xxxiii] For example, Energy Innovation's model retires 88 GW of coal capacity through 2030 in its BAU scenario, while Rhodium Group's model retires 85 GW to 111 GW across its three BAU scenarios.
[xxxiv] Retirement numbers were obtained from or confirmed by the studies' authors via email conversations. Forthcoming revised modeling may see up to 9 GW in additional coal retirements, per an email conversation with study author Jesse Jenkins.
[xxxv] Rhodium Group confirmed its model builds no CCS through 2030 in an email conversation.

extension of IRA clean energy tax credits, bonus credits, and loan guarantees for coal communities.[37]

Rural electric cooperatives in particular could retire coal generation through IRA funds, with Energy Innovation® finding 20 GW more retirements over BAU, based on the $9.7 billion in available funding and $12 billion remaining in rural co-op debt. By using publicly available data on remaining plant balances, Energy Innovation® finds that 28 plants across the Midwest, South, and West are likely to retire with these funds.

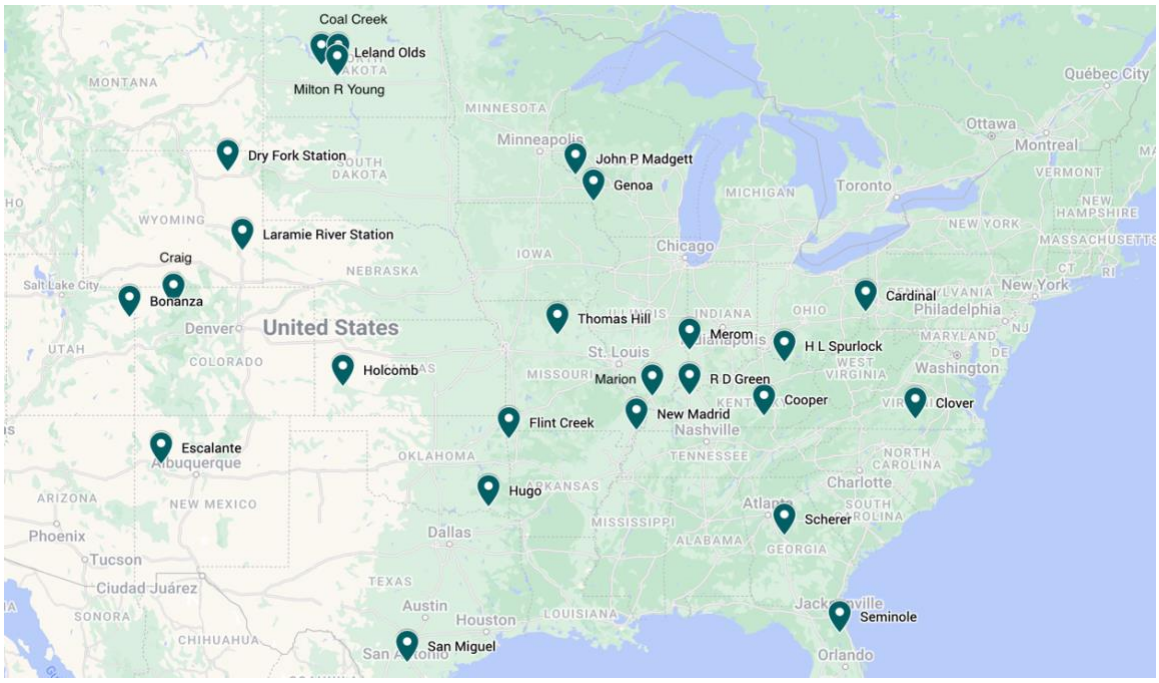
Figure 9. U.S. coal power plant capacity by state in 2022



State	Capacity (GW)
Texas	18.4
Indiana	13.6
West Virginia	13.0
Kentucky	11.2
Missouri	10.9
Pennsylvania	10.8
Ohio	10.6
Illinois	10.3
North Carolina	9.9

The IRA will change state and local economies by reducing energy costs, investing in infrastructure, creating jobs, raising labor standards, and funding a just transition. The opportunity for states is huge, but only if they leverage key provisions of this new legislation.

Figure 10. U.S. rural electric cooperative-owned coal plants that may retire with IRA funding



Not pictured: Healey Coal Plant in Alaska. Map generated with Google Maps, using Energy Innovation® analysis.

OPEN QUESTIONS

Comparing the models' predictions of the IRA's impact to the detailed bill provisions reveals that the greatest uncertainty is execution. The IRA's key provisions won't reduce emissions without some meeting of public finance with private investment.

It is clear wind, solar, and battery tax credits provide an unprecedented opportunity to reduce inflation while investing heavily in every U.S. state. But the U.S. electricity system is fragmented, heavily regulated, and dominated by yesterday's utility businesses models. Turning this investment potential into real infrastructure will require years of hard work updating now-stale technology assumptions, learning new ways of operating electricity systems, siting and permitting new infrastructure, and developing plans that result in a reliable electricity system for all. Utilities and regulatory staff will need more capacity to deal with this urgent but complex opportunity, but it is no sure thing they will dedicate (or receive) the resources to rise to the occasion.

Questions also remain about the reinvestment programs. Clearly, they can cut emissions by removing financial barriers to coal retirement and improving the economics of clean energy infrastructure. But the degree to which they will actually speed coal plant retirements is unclear.

The LPO will issue guidance on what will qualify in the coming months, clarifying the provisions' application and required level of emissions reductions.[38] The greatest uncertainty is utility willingness, and many utilities are already reticent to reduce emissions.[39] For these programs to work, utilities must devote significant new resources to developing transition plans and completing applications just to get through the door. In many cases this will require regulatory approval, representing a risk to utility managers that even their best plans to reduce costs and emissions will be rejected. Of course, regulators and other electricity stakeholders can encourage and support utilities applying for loan guarantees.

Government agencies face a massive implementation task. New departments must rise from nothing, and reams of employees must be hired to implement new programs that didn't exist to date. The LPO faces a tall task to attract applicants in a timely manner to fulfill its new mission. DOE finds itself able to finance new transmission lines but must fight against the slow pace of permitting and transmission development. State energy offices face staffing shortages while they apply for DOE grants and line up public-private partnerships to ensure new manufacturing facilities can be located in their communities. Meanwhile, utilities find themselves with limited downside to deviate from business-as-usual and propose new programs to their regulators.

Electricity infrastructure, particularly the backbone transmission system, also need an update not yet addressed by legislation. While the IIJA and IRA both provide new incentives for critical transmission lines, the U.S. transmission interconnection and planning processes need overhaul to rise to the challenge of rapid energy transition. FERC can address interconnection processes in its current proceeding[40] and help deal with clogged interconnection queues,[41] but the present mess could take years to untangle. Regional planning requirements are being updated, but the solutions contemplated by FERC's recent Notice of Proposed Rulemaking do not solve the fundamental market power and cost allocation problems that have prevented rational regional plans from being developed to date. And in the West and Southeast, such regional planning or cost sharing hardly exists. Whether the country can make difficult tradeoffs between state control and efficient infrastructure development significantly affects whether we can achieve a 70 to 80 percent clean electricity system at all, let alone by 2030.

RECOMMENDATIONS

Out of these many uncertainties, a theme emerges: The IRA's potential economic transformation will not happen without new state policy. This starts at PUCs, which will help orchestrate new renewable investment, infrastructure build-out, and plant retirements to serve the public interest. State legislators have a key role to play in setting the right policy objectives for state agencies and utility regulators, providing much-needed funding to agencies and regulators tasked with implementation, and guiding public resources towards promoting local economic development, especially in the communities that need it most. And state governors and agencies will set the

vision for the state, play a key coordinating role between the private and public sector, and apply for public funding in the IRA.

This section offers recommendations to help utility regulators, state legislators, and state energy officials reduce barriers to utility and private developer uptake of IRA funds. With the right suite of actions, states can attract the private investment needed to fast-track their clean energy transitions, bringing home lower electric bills, high-quality jobs, and cleaner air.

PUBLIC UTILITY COMMISSIONS

PUCs will be among the first to encounter the IRA's impact on renewable electricity. These commissions regulate their monopoly utilities by setting the rates they may charge customers, overseeing planning and investment, and soliciting public input. Through this, PUCs ensure rates remain "just and reasonable." Because the IRA dramatically reduces the cost of many clean energy technologies, just and reasonable rates will include more renewable resources, and presumably less fossil, than before the legislation passed. With new financing provisions and other federal programs to reduce the cost of clean energy investment, PUCs now have a stronger duty than ever to investigate and induce utilities to invest in clean energy on behalf of consumers. While the list of PUC actions is long, we suggest the following priorities to reduce costs and promote in-state clean energy investments:

Re-examine stale cost assumptions in planning and procurement

Any plan to invest in, or any market-based solicitation for renewable contracts completed prior to August 2022 is now out of date. Clean energy contracts will now be cheaper due to tax incentives and new tax treatment. Plans to defer coal retirements require updating to reflect the possibility that low-cost capital is now available from the LPO. Regulators can expect independent power producers to offer lower bids for just about any carbon-free clean energy technology. Under their authority to set just and reasonable rates, PUCs should insist that utilities redo integrated resource plans and resource solicitations, despite the procedural headache. For example, advocates have already submitted evidence that such reexaminations would be prudent for Duke Energy's Integrated Resource Plan and Carbon Plan in North Carolina.[42]

Enable competition to drive new investment and retirement

Even before the IRA, unsubsidized renewables were the cheapest new resource in most of the country. However, for regulators, discerning the true cost of clean energy and alternatives can be difficult—how to compare variable clean resources with dispatchable fossil that provide different services, for example. Such assessments generally depend on limited utility information as well. All-source procurement is a way around this—it is a well-established but underutilized process which asks the utility to provide assessments of resource need, then bid these services to the market.[43] For example, Xcel Energy Colorado achieved record-low wind, solar, and storage prices that shocked the electricity world with an all-source procurement in 2018 and helped avoid costly

investments in gas and accelerate coal retirement.[44] With the tax law changes in the IRA, utilities may be more successful at competing for these contracts, though safeguards against the exercise of market power are crucial.[45]

Take a proactive role in community transition

With the IRA's seismic investments in renewables and new financing options, coal plants will face increasing economic pressure to close before their extant retirement dates. Without a proactive approach, many coal-dependent communities could be devastated when cheaper clean technologies replace coal. The IRA's provisions to finance the reuse and reinvestment in infrastructure that reduces emissions, alongside big bonuses for clean energy projects and manufacturing facilities located in energy communities, mean cash is on the table to finance equitable development in coal communities, and reduce energy costs. A PUC's role will be to encourage utilities to proactively seek federal funds including loan guarantees to lessen the economic impact of coal replacement, gather stakeholder input on what location-specific procurement is possible and in line with community development goals, and consider putting temporary community transition funding into rates, as the Arizona Corporation Commission is currently considering.[46]

Streamline the clean energy interconnection process

PUCs can help accelerate the influx of cheap clean electricity by examining and streamlining the transmission interconnection processes by which a new power plant connects and begins providing power to the electricity system. Since the 2000s, interconnection wait times have doubled, and enough clean energy is now in interconnection queues nationwide to quadruple clean energy capacity. FERC is currently considering changes to interconnection policy, but state utilities can also help by examining the queue in their state and assessing whether proactive transmission build-out could help connect cost-effective clean energy. In states outside the regional transmission organization (RTO) it is clearly a state issue, where proactive transmission planning and process reform would reduce wait times and help hasten the pace of in-state clean energy investment.

Healthy skepticism on carbon capture

Due to known risks of the technology's performance, utilities should be wary of pursuing CCUS retrofits on coal-fired power plants, opting for proven renewable and energy storage alternatives wherever possible. Coal power provides some services the grid needs, such as dispatchable power, but it is not the only technology that can. CCUS projects that fail to perform as utilities promise could shackle ratepayers with high costs or threaten utilities' financial viability. If utilities need dispatchable clean power to meet state clean energy goals or federal power plant emissions standards, they should consider the suite of technologies including geothermal, nuclear, hydro power, hydrogen, and long-duration storage. Competitive procurement including a clear technology-neutral articulation of reliability needs is essential to avoiding the risks of over-investing in unproven technologies.

STATE LEGISLATORS

State legislators have plenary authority to regulate their state economies but generally do not engage in energy planning directly or make applications for federal funds. State legislators can ensure their constituents benefit from the IRA's provisions by ensuring their PUC and other agencies proactively plan for the coming energy transition and maximize the dollars coming into their state. We propose legislators prioritize the following for their states:

Increase clean electricity standard ambition

State legislators can increase or introduce clean electricity standards, which typically refers to a technology-neutral standard requiring utilities serve customers with a certain percentage of "clean" zero- or low-carbon resources, such as renewables, nuclear energy, coal, or natural gas fitted with carbon capture, and other technologies.[47] This well-established policy framework reduces pollution, promotes new investment, and generally insulates customers from volatile fossil fuel prices. To date, 16 states have legislation committing to 100 percent clean electricity sales by 2050 or sooner,[48] but the IRA provides an opportunity to accelerate these goals without increasing costs. States should pass clean electricity standards that balance affordability, feasibility, and investment opportunity, targeting 80 percent carbon-free electricity by 2030.

Require utilities to invest in electricity storage

State legislators should also consider passing utility storage mandates. Battery storage is quickly becoming a cost-effective way to integrate renewable electricity, but most utilities still have not made meaningful investments in the technology. States can look to California for an example here. The first legislative storage mandate, AB 2514, required the California Public Utilities Commission to create a procurement mandate for the investor-owned utilities in the state.[49] The mandate, approved in 2013, required utilities to procure 1.3 GW of energy storage by 2020. Controversial at the time, utilities quickly discovered that batteries were cheap and effective. As of June 2022, more than 3 GW of batteries were connected to California's grid, which have been a critical part of maintaining reliability.[50]

Create a transmission authority to enable cost-effective clean energy deployment

When budgeting, state legislators should consider funding a state transmission authority that leads state transmission planning and siting and represents the state at FERC. Such an authority should develop proactive intrastate transmission plans to access cost-effective clean energy resources, and coordinate with other states in the region on mutually beneficial interstate transmission projects. Texas' Competitive Renewable Energy Zones are an example of successful intrastate transmission planning resulting in gigawatt-scale cost-effective wind deployment,[51] and New Mexico's recent creation of a transmission authority can be an institutional model for other states.[52] With FERC's soon-to-be finalized new transmission rulemaking, this can also help states engage with emerging regional planning processes and ensure maximum benefits for residents.

Push for greater regional grid coordination

For states in the West and Southeast that are not a part of an RTO, legislators should require utilities to study, join, or form such a body. RTOs consolidate state transmission planning and operation with a regional entity, regulated by FERC. States operating in an RTO still maintain authority over their energy production and consumption through the PUC, but consumers see huge benefits from power plant competition, regional diversity, and improved reliability at lower cost. For example, greater regional coordination among Western states through the Energy Imbalance Market has saved consumers billions in electricity costs and helped to maximize wind and solar efficiency.[53] One independent analysis found the Southeast U.S. could save more than $17 billion annually and create 285,000 jobs by moving toward a single-region competitive market,[54] while another analysis found the West could save $2 billion annually and create 657,000 permanent, high-paying jobs by joining an RTO.[55]

Dedicate resources to community transition

As the transition to clean energy development accelerates, state legislators should also budget for community development plans in current fossil fuel dependent communities. Legislation should require the PUC and utilities to plan for community transition and assess the value of federal loan guarantees for community transition. While the IRA has several programs to emphasize reinvestment, energy communities cannot rely on clean energy alone to create enough new jobs and tax revenue for full replacement. Proactive diversification of local economies is one path for success. Legislators should also consider creating and budgeting for a just transition office to oversee and provide resources to coal communities to develop transition plans.[56]

Nucla's Just Transition

In 2019, the Colorado legislature passed a bill creating the first Office of Just Transition (OJT), and just in time. With six coal mines and seven coal-fired power plants still operating, small communities, particularly in Western Colorado, risked near-total economic collapse. Since the legislation passed, the OJT created a Just Transition Action Plan to support economic diversification and job retraining. The town of Nucla illustrates how this plan can work. When their coal plant shut down three years ahead of schedule, it was the largest employer. The plant also provided nearly half the tax revenue that supported the whole region—including the fire department and school district. Residents were rightfully concerned, but Nucla worked with OJT to transition their economy to focus on tourism and small businesses. Nucla shows how pre-emptive planning can help ease the sting of coal closures. Now, newly appropriated OJT funds will help Nucla continue to restructure while preparing other Colorado coal communities.

Provide funding for PUCs and state energy offices to maximize IRA funds

In general, public utilities and state energy offices will need significant resources to be able to engage in federal processes and implement the programs created by the IRA. State legislators should increase PUC and state energy office budgets in line with the potential for state entities to apply for and utilize IRA funding.

GOVERNORS AND STATE ENERGY OFFICES

Governors and state energy offices play a primary role organizing state and local governmental resources and initiating public-private partnerships that leverage federal funds most effectively. They can also work with other states on regional efforts. We recommend the following priorities for state agencies and governors:

Assess clean energy resource and market potential

State energy offices should assess and develop new wind and solar energy areas in their state, which will make up the bulk of the next decade's clean electricity build-out. By proactively identifying sites, states can prioritize transmission and grid upgrades needed and attract development. Such identification also requires engaging local stakeholders, including Native American Tribes and energy communities most affected by the transition. Because clean energy incentives exist alongside tax credits for clean energy manufacturing and mining development, state energy agencies can develop comprehensive resource plans that include new opportunities to manufacture, construct, and produce clean energy.

Support a clean energy workforce

To help leverage IRA's incentives for clean energy manufacturing and deployment, state energy offices should analyze current workforce capabilities and create economic and workforce development plans that foster local wind, solar, and other clean energy jobs. The IRA creates new opportunities for apprenticeship and prevailing wage throughout the energy sector.[57] An excellent example is the New York State Energy Research and Development Authority's recent report on the workforce gaps in the offshore wind sector[58]—by assessing current workforce needs and capacity, this study will help New York meet its offshore wind goals while creating high-road jobs. States should perform similar workforce analyses as they develop new economic and workforce development plans for clean energy deployment and manufacturing as a whole, with a focus on specific industries that are a priority for the state.

Connect state agencies and utilities driving clean energy deployment

Governors and state energy agencies have the ability to coordinate decarbonization efforts in the transportation, buildings, industrial, and agricultural sectors with electricity sector decarbonization efforts. While electric utilities have huge new opportunities to invest in low-cost clean energy resources, they lack jurisdiction to affect or even understand how other sectors are changing with IRA incentives that reduce the cost of, for example, green hydrogen, electric vehicles, building electrification, and CCS. These developments not only benefit consumers, they also magnify the role that cheap wind, solar, batteries, and other clean electricity technologies have in developing the economy as a whole and reducing pollution. State energy offices can bring together agencies managing transportation, public health, building codes, and industrial development to inform electric utility planning, and vice versa.

CONCLUSION

The IRA is a promising but incomplete piece of climate legislation. No matter what happens from here, the legislation will transform the electricity system—how quickly and ubiquitously depends in large part on subsequent state action.

Energy Innovation® modeling finds the IRA can cut U.S. electricity sector emissions 72 to 86 percent relative to 2005. In reality, the IRA's emission reduction range is likely more uncertain. The legislation provides huge incentives to reduce electricity sector emissions, but successful implementation requires rapid deployment of infrastructure—something the U.S. has struggled with in recent history. It opens the door to rapid, affordable decarbonization, but utilities and states have to work quickly to realize these immense benefits.

The IRA's tax credits cement the cost advantages of wind, solar, and storage over fossil fuels for decades to come. States and utilities, with assists from federal agencies, just have to seize the new economic reality for their residents. Healthier, safer communities with high-quality jobs are now within reach—and states hold the key to realizing this opportunity.

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