

Unleashing America's Advanced Energy Future

Federal Resources for Lawmakers to Combat Inflation,
Create Jobs, and Achieve Energy Independence

Prepared by Advanced Energy United
November 2022



About Advanced Energy United

Advanced Energy United is a national association of businesses committed to making the energy we use secure, clean, and affordable. Advanced Energy United represents the full range of advanced energy and transportation technologies and services, both grid-scale and distributed. Advanced energy includes energy efficiency, demand response, energy storage, wind, solar, hydroelectric, nuclear, electric vehicles, chargers, software, and more. Today, our industry employs 3.2 million American workers. Our member companies provide all the products and services necessary to decarbonize our economy cost-effectively. They have a combined market capitalization of approximately \$3 trillion dollars.

Acknowledgements

The Inflation Reduction Act (IRA) and Infrastructure Investment and Jobs Act (IIJA) represent some of the most far reaching and complex energy policy passed by Congress. The work of unpacking and fully understanding the components and implications of this legislation has drawn upon the expertise of innumerable analysts, advocates, lawyers, and economists in the advanced energy industry and beyond.

This guide was developed with the knowledge and expertise of Advanced Energy United's Policy Team. It draws insights and inspiration from an array of organizations. Just as passing the IRA and IIJA was the work of many hands, so too is the review and implementation thereof. We would like to acknowledge, in particular, the analysis of the Blue Green Alliance, the Bipartisan Policy Center, Energy Innovation, the National Renewable Energy Laboratory, Resources for the Future, Rewiring America, RMI, the Solar Energy Industries Association, and the Urban Sustainability Directors Network for helping to inform this guide.

We likewise utilized and cross-reference the insights of a number of legal analyses to help ensure the accuracy of our work. Chief among the legal experts we called on was the team at **Wilson Sonsini Goodrich & Rosati**, which has been an invaluable resource throughout the process of review, analysis, and comment upon this important law.



Table of Contents

About Advanced Energy United	i
Acknowledgements	i
Introduction	iii
Versatile Support for State Advanced Energy and Transportation Actions	1
Prioritizing the U.S. Workforce and Domestic Content	4
Expanding Access to Advanced Energy and Transportation Tax Credits	7
Energy Efficiency and Building Electrification	10
Clean Electricity and Storage Incentives	22
Transmission and Grid Infrastructure	28
Supporting Communities	32
Advanced Energy Manufacturing Incentives	38
Transportation Electrification	46
Glossary	54



Introduction

American families and businesses are facing stiff headwinds. The energy we use to heat and cool our homes, fuel our cars, and power our economy is a big reason why. Driven in large part by rising natural gas prices, residential electricity prices are projected to be 16% higher in 2023 than they were in 2020, [according to the U.S. Energy Information Administration \(EIA\)](#). Families who warm their homes with heating oil or natural gas are likely to be particularly hard hit, with prices spiking 27–28% this winter when compared to last, [per the EIA](#). And prices at the gas pump aren't much better. Between January and November of 2022, gasoline prices are up almost 22%—and that's down from a high of nearly 50% in June!

These high and volatile prices are the result of a variety of causes, from geopolitical disruptions, such as the war in Ukraine and OPEC cutbacks, to the aftershocks of COVID-19 and attempts to revive the global economy. They are a significant factor in the high inflation that has undercut wages and economic growth and prompted the Federal Reserve to raise interest rates, only adding to economic headwinds. These interconnected economic crises demonstrate the need for a real American energy independence that shields families, businesses, and our economy from volatile energy prices while undercutting the influence of petro-dictators.

At the same time as Americans are battling inflation, communities across the country are still working to rebuild after COVID-19. For many, that downturn was just the latest in a series of economic blows. Industrial communities have seen decades of job loss and economic divestment as manufacturing and heavy industry have moved elsewhere. The economies of coal communities have been hollowed out as electric generation has shifted to cheaper and cleaner sources. Meanwhile, rural communities, tribal communities, and communities of color have found themselves shut out of American economic progress or, worse yet, forced to face the adverse impacts of that growth while reaping few of the rewards.

For many of these communities the transition to greater energy independence presents an opportunity. Zero-emission energy resources such as wind, solar, nuclear, geothermal, and storage will provide clean, affordable power to millions, while also reducing our reliance on price-volatile fuels. The process of building and operating these projects can bring billions in new investment and good paying jobs to rural communities where these facilities are often built.

Electrifying transportation—from passenger cars to school buses, delivery trucks, and municipal buses—will help reduce and stabilize transportation costs for households, school districts, businesses, and municipalities. The switch to electric vehicles (EVs) can also cut air pollution, particularly in disadvantaged communities located near ports, highways, and other transit hubs. Making millions of American homes and offices more energy efficient, electrifying them, and



expanding access to local solar and behind-the-meter storage will make these buildings more affordable and resilient. Ensuring these technologies are deployed in low-income communities will particularly help consumers for whom the price of power is an acute concern, while also creating well-paying, long-lasting local jobs. And manufacturing these technologies, and the infrastructure and supply chains that support them, in American factories will help revitalize domestic industry.

Lawmakers across the country are working hard to address the headwinds facing families and businesses—combating inflation, creating jobs, and building an American energy future that’s more affordable, reliable, clean, and independent. With deep roots in their states and communities, these leaders are working to make sure the benefits of this transition, from new jobs and economic investment to cleaner air and more affordable electricity, flow to those most in need. Federal resources and incentives in two recently passed pieces of legislation—the bipartisan Infrastructure Investment and Jobs Act (IIJA, also known as the Bipartisan Infrastructure Law) and the Inflation Reduction Act (IRA)—can help bolster these efforts.

This guide is designed to help Lawmakers better understand how the IRA and IIJA are likely to change energy generation, transportation, and the U.S. economy, and identify the programs and incentives they can utilize to achieve their goals—from reducing energy costs, creating jobs, and revitalizing industry to lifting up disadvantaged communities and cutting pollution.

At Advanced Energy United, we have spent a decade helping state policymakers and regulators navigate the transition to an advanced energy future, realizing the benefits—from good jobs and new industry to cleaner air—and addressing the obstacles. If left unaddressed, these obstacles are likely to be stumbling blocks in the path to an affordable, reliable, and clean energy future. Throughout the guide we spotlight these larger issues, from the need for more transmission for clean energy to better grid plans and processes to fully take advantage of distributed generation and EVs (to name just a few), to help policymakers tackle these issues proactively.

Based on our analysis, the resources and incentives provided by the IRA and IIJA give states an unprecedented opportunity to lower energy costs, revitalize manufacturing, electrify transportation, and make the shift to clean power. Given the complexity of these new laws, and the sheer volume of programs and policies, it can be difficult to know where these opportunities lie, or what to do first. To help Lawmakers identify these opportunities and take action, each section of this guide includes a set of “Takeaways” and recommendations, tailored to the powers of your office. Below are six high-level recommendations for Lawmakers drawn from these sections:

- ▲ The IRA and IIJA provide State Energy Offices and other arms of the state Executive Branch with significant and flexible financial resources to support advanced energy and transportation electrification as detailed in the **Versatile Support for State Advanced Energy and Transportation Actions** section (pages



1–3). Lawmakers should make sure their states have the staff, programs, and financial infrastructure—i.e., a “green bank”—to utilize these resources.

- △ As reviewed in the **Energy Efficiency and Building Electrification** section (pages 10-21), the IRA appropriates \$8.6 billion to State Energy Offices to administer two rebate programs (HOMES and HEEHRA) to help households, especially low- and middle-income households, purchase energy efficient appliances and go electric. We recommend that Lawmakers ensure their administrations are prepared to make swift and effective use of these resources to reduce residential energy bills
- △ In many parts of the country, clean energy is the most affordable form of electricity generation. The IRA and IIJA only serve to further improve those economics, as the section on **Clean Electricity and Storage Incentives** (pages 22-27) details. Lawmakers should consider establishing or accelerating goals to decarbonize their state electric grid to take advantage of these economic savings and should work to move the state government over to clean energy, taking advantage of direct pay, to save taxpayer dollars.
- △ The IRA and IIJA contain extensive programs and provisions targeted to support rural, low-income, and environmental justice communities, as well as those who’ve been impacted by the energy transition, as the **Supporting Communities** section (pages 32-37) explains. Lawmakers should understand these provisions, identify eligible communities in their state, and collaborate with them to ensure they take advantage of these opportunities, attracting advanced energy investment, jobs, and economic growth.
- △ America is on the cusp of a new era in domestic advanced energy manufacturing, catalyzed in part by tax incentives, programs, and policies in the IRA and IIJA, as the **Advanced Energy Manufacturing** section (pages 38-44) discusses. Lawmakers should work with their economic development authorities to ensure their states attract new plants to produce solar panels, wind turbines, critical minerals, EVs, and more, drafting off this federal support.
- △ The **Transportation Electrification** section (pages 46-53) lays out the significant incentives and resources in the IRA and IIJA that will make it even more affordable for families, businesses, and state governments to make the switch to EVs. Lawmakers should direct their administrations utilize the fleet electrification tax credit (45W) with direct pay, as well as other federal resources to speed the electrification of the state fleet and help local governments and school districts to do the same.



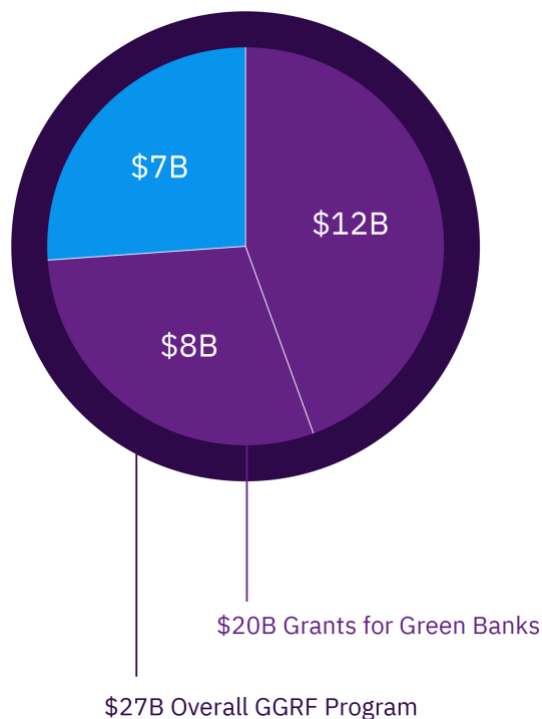
Versatile Support for State Advanced Energy and Transportation Actions

IRA and IIJA both include substantial programs that provide support for a wide range of state energy priorities via grant funding, allocated on both a competitive and formula basis. These resources can put state leaders in the driver’s seat, helping to accelerate the growth of advanced energy, electrified transportation, and healthy, efficient buildings—growth that will, in turn, attract investment and create jobs in-state. These programs offer significant flexibility for states to meet their unique needs but also require states to identify priority focus areas for the use of the funds and in some cases, to create new institutions that can leverage seed funding into a self-sustaining financing authority.

Greenhouse Gas Reduction Fund (GGRF)

Administrator: Environmental Protection Agency (EPA)

How It Works: The GGRF is a new \$27 billion program established by IRA. It is designed to (A) directly finance projects that deploy technology to reduce greenhouse gas (GHG) emissions and other air pollutants, particularly those projects that would not otherwise have access to private sector financing, and (B) provide funding for nonprofit financing institutions, often called “climate finance institutions” or “green banks”, to finance such projects and assist communities in air pollution reduction efforts. Funds in the program are broken out as follows:



\$20 Billion is reserved for **grants to green banks** to (A) directly finance eligible projects and/or (B) support or establish institutions that provide such financing.

40% (\$8 Billion) of the above is reserved for grants directed specifically to finance projects and **institutions serving low-income and disadvantaged communities.**

\$7 Billion is reserved for loans, grants, financial and technical assistance to **states, municipalities, tribal governments, and green banks to support low-income and disadvantaged communities** in the deployment of zero-emission technologies (e.g. rooftop solar) and other air pollution or GHG reduction projects.



Recipients: States, municipalities, and tribal governments are eligible to directly receive funds from the \$7 billion bucket. The \$20 billion bucket is reserved for green banks: nonprofit institutions that are capitalized with public funds, leverage both public and private resources to finance projects, and recycle earnings from their investments into future projects.

Expiration: The program is slated to open for applications in February 2023 and remain available until September 30, 2024.

Climate Pollution Reduction Grants

Administrator: EPA

How It Works: The IRA provides \$5 billion for grants for projects that reduce GHG emissions in the states. This funding is broken into two categories:

- △ **\$4.75 Billion** is reserved for **competitive grants to eligible entities in the states**. Entities must submit applications detailing projected GHG reductions, including with respect to reductions specifically in low-income and disadvantaged communities.
- △ **\$250 Million** is reserved for EPA to provide a grant to **at least one GHG reduction project in each state**.

Eligible Recipients: States, tribes, air pollution control agencies, and municipalities.

Expiration: Competitive grants available through September 30, 2026

State Energy Program

Administrator: U.S. Department of Energy (DOE)

How It Works: IIJA provided \$500 million for the State Energy Program (SEP), which offers flexible support for state energy offices (SEOs) to advance state-led energy initiatives, enhance energy security, and maximize energy affordability. This funding is extremely flexible and offers significant discretion to Lawmakers and their energy advisors in the use of the funds, including hiring specialized staff and identifying key state energy priorities. In order to receive funding, states must submit an annual state energy conservation plan, which now includes transportation electrification and transmission and distribution planning as mandatory features. IIJA also requires states to submit annual state energy security plans starting in late 2022. Learn more [here](#).

Eligible Recipients: State and territorial energy offices, including the District of Columbia

Expiration: IIJA SEP funding will be distributed to states in accordance with the distribution formula in effect as of January 1, 2021 for fiscal years 2022 through 2026. This funding does not require a cost match. Additional funding will likely continue to be available through the annual Congressional appropriations process, which will require a 20% non-federal match.



Takeaways

Big Picture: Between the IRA and IIJA, states are poised to see a swift and significant infusion of resources to support programs and projects that help cut pollution, deploy zero-emission generation, cut energy waste, and electrify cars and buildings. State administrators, policymakers and regulators should be preparing now to effectively access and utilize these resources: developing the plans, growing the staff, and building the necessary institutional infrastructure.

Recommendations for Lawmakers:

- △ Enact legislation establishing a state “green bank” or similar financial institution, in order to access GGRF funds. Lawmakers can look to Nevada’s Clean Energy Fund, as well as similar financing bodies in Colorado, Michigan, and New York, to help design such an institution.
- △ Ensure that the SEO and other state institutions are properly staffed and resourced to manage the funds and programs catalyzed by the IRA and IIJA.



Prioritizing the U.S. Workforce and Domestic Content

The transition to advanced energy—building solar farms, wind turbines, EVs and energy storage facilities—represents an opportunity not only to cut pollution and improve public health, but also to rebuild the middle class and revitalize American industry. To ensure hard working Americans can take part in this transition, the IRA contains significant new provisions to around the payment of prevailing wages, the employment of apprentices in construction and maintenance, and the use of domestic content. Project developers and investors who meet these standards can claim progressively higher credit levels, reducing overall costs. As this section details, these policies apply to many of the incentives and resources provided by the IRA and IIJA.

Prevailing Wage

To realize the full value of many of the advanced energy tax credits, the IRA requires companies involved in the development and operation of advanced energy projects to meet prevailing wage standards. The precise value of meeting this standard varies from incentive to incentive and is detailed in our description of each. To meet these standards project developers must pay all employees, contractors, or subcontractors the local prevailing wage, which is defined as the average wage paid to workers in an occupation and located in the same locality. The prevailing wage is set by the U.S. Secretary of Labor, but states can assist projects with ensuring they are abiding by the labor standards.

Note that energy efficiency, grid infrastructure, and advanced energy manufacturing projects funded by IIJA are also subject to prevailing wage requirements in accordance with the Davis-Bacon Act.

Apprenticeships

To realize the full value of many of the advanced energy tax credits, the IRA also requires eligible companies to utilize apprentices in the construction and, in some cases, maintenance and operation, of projects and facilities. The precise value of meeting this standard varies from incentive to incentive and is detailed in our description of each. In order to comply with apprenticeship requirements these companies must ensure that, beginning in 2023, 10% of all hours involved in construction, alteration, or repair work (including those of contractors and subcontractors) are completed by individuals who are part of registered apprenticeship programs. This threshold rises to 15% of all hours after 2024. Apprenticeship programs would be validated by the Department of Labor. States can be helpful by working with industry through their labor departments to develop apprenticeship programs in advanced energy.



Domestic Content

To qualify for the 10% domestic content bonus a project must source 100% of any steel or iron used in the project (but not in components or subcomponents) and 40% of the adjusted percentage of its component parts from materials that are mined, produced, or manufactured in the U.S. The percentage phases up from 40% to 55% for projects that begin construction after 2026. Offshore wind projects start at 20% and phase up to 45% after 2026. States can assist projects by mapping out supply chains and setting up registries for producers who meet these requirements. Treasury guidance will be particularly important for understanding how these provisions will be enforced. It is anticipated that guidance will come in the first quarter of 2023.

Note: *Additional credit bonuses detailed in the “Supporting Communities” section of this guide.*

IIJA Flag: Infrastructure projects funded by IIJA are subject to “Build America, Buy America”, meaning they must use U.S. made iron, steel, manufactured products, and/or construction materials. “Infrastructure” includes transportation, water, utilities, broadband, transmission, and buildings.



Takeaways

Big Picture: The IRA makes the availability of a well-trained and organized energy workforce essential to project development. Advanced energy companies will go where they can easily meet prevailing wage and apprenticeship standards. Similarly, proximity to domestic content—solar panels, batteries, turbines, and more—will attract project developers looking to capture the domestic content bonus. While the details surrounding these credits have yet to be finalized by Treasury, decision makers should be moving promptly to ensure their states can take advantage of these new policies when rules and regulations are finalized in 2023.

Recommendations for Lawmakers:

- △ Require the state to conduct an energy workforce analysis and produce a report for additional state actions and funding need to address acute workforce needs.
- △ Establish and/or expand funding for energy workforce training, apprenticeship, and certification programs.
- △ Review and update economic development programs and relevant tax policies to ensure the state is well positioned to attract advanced energy manufacturing, the growth of which the IRA and IIJA are poised to spur.



Expanding Access to Advanced Energy and Transportation Tax Credits

Most federal incentives for advanced energy, from those for renewable energy projects and EVs to home energy efficiency retrofits, flow through the tax code. While they have been highly effective, they do face limitations. Until now, only companies, organizations, and individuals with tax liability could realize the value of such incentives. Some larger projects have found workarounds, but these require legal expertise and sophisticated business partnerships that come at a cost. Fortunately, the IRA incorporates two important provisions to address those hurdles: “direct pay” and transferability. These provisions expand access and help project developers, utilities, nonprofit organizations, and governments realize the full value of these incentives.

Direct Pay

The direct pay provision allows eligible entities to be treated as having made a payment of tax equal to the value of the credit they would otherwise be eligible to receive. In effect, this means that an eligible entity can receive a cash payment from Treasury equal to the tax credit amount, even if they don’t pay taxes or have limited tax liability. It allows entities without tax liability to nonetheless realize the value of the credit and thus reduce the cost of purchasing and deploying advanced energy technologies. The IRA establishes two types of direct pay:

- △ **Restricted:** Only tax-exempt entities may utilize direct pay under this standard. These include state, local, and municipal governments; rural coops and municipal utilities; nonprofit organizations; the Tennessee Valley Authority; Native American tribal governments; and Alaska Native Corporations. For the vast majority of advanced energy tax provisions, direct pay is restricted.
- △ **Unrestricted:** Any entity may utilize direct pay, regardless of their tax status or liability.

Transferability

Prior to the passage of the IRA, a developer without tax liability needed to enter tax equity markets and find a partner willing to purchase an equity stake in the project. The pool of partners with sufficient tax liability was limited, forcing credit holders to “sell” credits at a discount, and reducing their value. The establishment of transferability through the IRA now allows credit holders to trade tax credits for cash without requiring the purchaser to take an equity stake in the project or technology. This is intended to increase liquidity by expanding the market of entities who purchase tax credits.



Both direct pay and transferability apply to a broad swathe of the advanced energy and transportation tax incentives detailed in this guide, but they are not universally applicable. The chart below details which provisions apply to each credit.

Direct Pay and Transferability Chart			
Tax Credit	Direct Pay Restricted	Direct Pay Unrestricted	Transferable
Clean Electricity ITC (48)	x		x
Manufacturing ITC (48C)	x		x
Technology Neutral Clean Energy ITC (48E)	x		x
Clean Energy PTC (45)	x		x
New Residential EE Homes (45L)	None		
Carbon Capture and Sequestration (45Q)		x	x
Nuclear PTC (45U)	x		x
Hydrogen PTC (45V)		x	x
Commercial EV (45W)	x		
Manufacturing PTC (45X)		x	x
Technology Neutral PTC (45Y)	x		x
Clean Fuels (45Z)	x		x
Alternative Fuel Refueling Property Credit (30C)	x		x
Light-Duty EV Purchase (30D)			x
Used EV Purchase (25E)			x
Residential Energy Efficiency (25C)	None		
Residential Clean Energy (25D)	None		
Efficient Commercial Buildings Deduction (179D)	x		



Takeaways

Big Picture: Direct pay and transferability are game changers, allowing a host of market participants both to take advantage of these incentives and realize their full value. For tax-exempt entities—especially state governments, local authorities, and municipal utilities—direct pay represents an unprecedented opportunity, allowing them to realize the value of these incentives for the first time. Additionally, transferability significantly expands the pool of available tax liability that project developers and companies can tap into in order to monetize these credits.

Recommendations for Lawmakers:

- △ Establish or accelerate legislative requirements for the state government to transition to 100% zero-carbon electricity, utilizing direct pay to further reduce the cost of this transition.
- △ Require state procurement authorities utilize direct pay and transferability options whenever possible in the procurement of transportation and energy services for state operations.



Energy Efficiency and Building Electrification

With rising costs for electricity and heating oil, the need to cut energy waste and insulate American families and businesses from volatile prices has become even more urgent, particularly for low-income families and those on fixed incomes. As detailed below, several new and expanded programs for energy efficiency and electrification investments included in IRA and IIJA will support states as they attempt to meet decarbonization and efficiency goals, save consumers money, and electrify buildings. Direct consumer incentives, tax credits, and public investment all play a role. States will be responsible for both administering their own programs but also providing education to consumers about the incentives that will be available to them.

Home Owner Managing Energy Savings (HOMES) Rebate Program

Administrator: DOE

How It Works: IRA created the \$4.3 billion HOMES rebate program, which provides states with resources to provide rebates for whole-home energy retrofits to single family and multi-family dwellings that achieve modeled energy savings—in other words, they save as much or more energy as they planned to save based upon their retrofits. The size of the rebate varies based upon the dwelling, income of the residents, and projected energy savings, as detailed in the chart below:

	20–35% Energy Savings	35%+ Energy Savings
Single Family Home	Lesser of \$2000 or 50% project cost	Lesser of \$4000 or 50% project cost
Multi-Family Building	\$2000 per unit, building max \$200,000	\$4000 per unit, building max \$400,000
LMI Single Family Home	Lesser of \$4000 or 80% project cost	Lesser of \$8000 or 80% project cost
Multi-Family Building with 50% LMI	Lesser of \$4000 or 80% project cost	Lesser of \$8000 or 80% project cost

Note: These rebates cannot be combined with those from the HEEHRA program for the same upgrade.

Recipients: Owners of residential buildings via their SEOs. These offices must submit an application to receive funds. The allocation amount will be determined by the formula in effect for the SEP as of January 1, 2022.

Expiration: September 30, 2031



High-Efficiency Electric Home Rebate (HEEHRA) Program

Administrator: DOE

How It Works: Similar to the HOMES program described above, IRA created a new \$4.3 billion program, administered by SEOs, to provide rebates that reduce (or eliminate) the upfront cost to electrify low- and moderate-income households. The program is limited to income-eligible households that fall into one of two brackets:

- △ Households making less than 80% of Area Median Income (AMI): 100% of costs covered (to cap)
- △ Households making 80 to 150% of AMI: 50% of costs covered (to cap)
- △ The above standards also apply to multi-family dwellings where at least 50% of resident households fall within the bracket.

Rebates are applied to specific eligible technologies, with maximum cost caps specific to each, and a total installation cost cap of \$14,000.

Eligible Technologies	Coverage Cap
Heat Pump HVAC	\$8000
Heat Pump Water Heater	\$1750
Heat Pump Clothes Dryer	\$840
Main Electric Panel Upgrade	\$4000
Electric Wiring	\$2500
Insulation, Air Sealing, Weatherization	\$1600
Electric Stoves, Cooktops, Ranges	\$840

Note: These rebates cannot be combined with those from the HOMES program for the same upgrade.

Recipients: Owners of residential buildings via their SEOs. These offices must submit an application to receive funds. The allocation amount will be determined by the formula in effect for the SEP as of January 1, 2022. \$225 million of the total is reserved for tribal governments.

Expiration: September 30, 2031



LMI Energy Efficiency Made Easy: The Gray Household

The Gray family resides in Dallas, TX. They are a four-person household with an annual income of \$80,000. The Gray family owns a single family home and wants to save money by making their home and appliances more energy efficient. Because their income falls below 80% of the area median income, they are eligible for the High-Efficiency Electric Home Rebate (HEEHRA) Program established via the IRA and administered by the state of Texas. There are also several new features of the tax code the Grays plan to utilize. The IRA ended the lifetime cap on the energy efficient home improvement tax credit, which previously limited the amount of tax credits a family could ultimately claim, and replaced it with an annual cap of \$1,200 (or up to \$2,000 for certain upgrades). The Grays are now able to space out their purchases over several years to meet their specific needs.

In year one, the Grays decide that the most impactful renovations they can make are weatherizing their home and upgrading their electric panels to enable them to further electrify their home. They spend \$2,500 making several weatherization improvements including installing insulation, air sealing, buying new windows and doors, and conducting an energy audit. The improvements are estimated to [save them \\$283 annually](#). Through usage of HEEHRA, they can take \$1,600 off the upfront cost. They are also eligible to claim an additional \$270 on their taxes through the energy efficient home improvement tax credit, enabling them to ultimately make the upgrades (after filing their taxes) for \$630. The Grays also installed a new smart electric panel that costs \$2,200, but through HEEHRA they save \$2,000, making the final purchase price \$200.

In **year two**, the Grays opt to purchase an air-source heat pump because of how much more efficient it is than their current heating and cooling system. The heat pump costs \$10,000, including installation, which is an eligible expense for the purposes of the tax credit. The Grays are eligible to receive an \$8,000 rebate through HEEHRA to reduce the total price to \$2,000. They then are eligible to take 30% off of the remaining \$2,000 on their taxes to reach a final price of \$1,400. On average, their heat pump is projected to [save them \\$460 a year](#) on energy costs.

In **year three**, the Grays opt to purchase an induction stove and install all new electric wiring. The induction stove's listed price is \$1,500 but through HEEHRA the Grays can take \$840 upfront off the listed price, resulting in a final price of \$660. [Induction stoves offer several benefits](#), including being safer and more efficient than traditional gas stoves and producing no indoor air pollution. The Grays also purchase all new electric wiring to better support their recent induction stove and heat pump upgrades. It costs them \$2,600 but through HEEHRA they receive \$2,500 off the upfront costs, resulting in a final cost of \$100.

Finally, in **year four**, the Gray family purchases a heat pump water heater. It costs them \$3,500 to buy and install the water heater, but they are eligible through HEEHRA for a \$1,750 rebate, bringing the purchase price to \$1,750. They then can claim an additional 30% credit on their taxes for a final cost of \$1,225. Energy Star estimates that for a family of four the lifetime savings of a heat pump water heater can be [as much as \\$4,500](#).



<p>Weatherization Improvements</p> <p>Cost: \$2,500 -\$283 annual savings -\$1,600 HEEHRA Savings -\$270 Tax Credit</p> <p>Purchase Price: \$630</p>	<p>Smart Electric Panel</p> <p>Cost: \$2,200</p> <p>- \$2,000 HEEHRA Savings</p> <p>Purchase Price: \$200</p>	<p>Air Source Heat Pump</p> <p>Cost: \$10,000 - \$8,000 HEEHRA Rebate - 30% Tax Credit</p> <p>Purchase Price: \$1,400</p>	<p>Induction Stove</p> <p>Cost: \$1,500 - \$840 HEEHRA Rebate</p> <p>Purchase Price: \$660</p>	<p>Water Heater</p> <p>Cost: \$3,500 - \$1,750 HEEHRA Rebate - 30% Tax Credit</p> <p>Purchase Price: \$1,225 Lifetime Efficiency Savings: \$4,500</p>
<p>Cumulative Savings After Four Years: \$16,085</p>		<p>Overall, the Gray family saves \$16,085 over four years through HEEHRA and the energy efficient home improvement tax credit, and their purchases are also projected to save them hundreds annually on their utility bills.</p>		

Issue Spotlight: The Future of Gas Infrastructure

The way we heat our homes and businesses is changing. State and local decarbonization policies, increasing and volatile gas prices, and desirable new electric home appliances like air and ground source heat pumps, heat pump water heaters, and induction cooktops are pulling consumers away from the use of natural gas in our buildings. Now, with an influx of new funding available from IRA, consumers have even more incentive and resources to make the switch to efficient, zero-emission building technologies. This new demand, as well as domestic manufacturing incentives in the IRA, will encourage private industry to scale its manufacturing efforts and grow the energy efficiency and electrification workforce with qualified technicians who can install, maintain, and service these products. At the same time, gas utilities continue to hook up new customers, grow their gas distribution networks, and spend billions of dollars per year to replace pipelines. These two trendlines are at odds. As people electrify their homes, reducing or ending their gas consumption, fewer customers will remain on the hook for growing system costs. This will cause bills to increase as gas utilities increase rates to compensate, which will make the economics of electrification even more cost-effective. To protect their residents, ratepayers, and constituents from this death spiral—especially those who are least able to transition away from gas (e.g. renters and low- and fixed-income households)—state policymakers can and should take preventive measures to manage the transition to clean buildings in an orderly and cost-effective way. We have included a list of potential steps policymakers should consider to tackle this challenge in the “Takeaways” section below.



Energy Efficient Home Improvement Tax Credit (25C)

Administrator: U.S. Department of the Treasury (Treasury)

How It Works: The Energy Efficient Home Improvement Tax Credit allows homeowners to receive a credit against their tax bill that is equal to a portion of the cost of energy efficiency home improvements and/or installation of high-efficiency appliances. The IRA extended this provision, which had lapsed in 2022, through the early 2030s and raised the efficiency standards such improvements and appliances must meet to be eligible.

Eligible Technologies: Upgrades to increase the energy efficiency of windows and doors, heat pumps, heat pump water heaters, biomass stoves, hot water boilers, central air conditioning, electric panel upgrades, and home energy audits.

Base Credit	Lesser of 30% or price cap as noted below
Prevailing Wage + Apprenticeship	N/A
Bonus Credits	Taxpayers may deduct up to \$2000 for expenditures on heat pumps, water heaters, and certain stoves, exceeding \$1200 annual limit
Limitations	<p>Annual Limit: \$1200 (w/ exceptions noted above)</p> <p>Price Cap:</p> <ul style="list-style-type: none"> △ \$150 – Home energy audits △ \$500 – Exterior doors △ \$600 – Exterior windows, air conditioning, panel upgrades, other water heaters and boilers △ \$2000 – Heat pumps, heat-pump water heaters, biomass stoves and boilers
Direct Pay	No
Transferable	No
Expiration	December 31, 2032



Efficiency and Electrification Made Easy: The Greene Household

The Greene family resides in St. Paul, Minnesota. They are a three-person household with an annual income of \$250,000. The Greens own a single family home and want to make it more energy efficient to deal with the cold Minnesota winters. Because of their income, they are not eligible for the HOMES rebate program established through the IRA. However, there are several new features of the tax code the Greens plan to utilize. The IRA ended the lifetime cap on the energy efficient home improvement tax credit, which previously limited the amount of tax credits a family could ultimately claim, and replaced it with an annual cap of \$1,200 (or up to \$2,000 for certain upgrades). The Greens are now able to space out their purchases over several years to meet their specific needs.

<p>In year one, the Greens decide that the most impactful renovation they can make is weatherizing their home. They spend \$2,500 dollars making several improvements including installing insulation, air sealing, getting new windows and doors, and conducting an energy audit. The improvements are estimated to save them \$283 annually. By using the energy efficient home improvement tax credit, they save \$750 on the renovations.</p>	<p>In year two, the Greens opt to purchase an air-source heat pump because of how much more efficient it is than their current heating and cooling system. The heat pump costs \$10,000, including installation, which is an eligible expense for the purposes of the tax credit. The Greens are eligible to receive a \$2,000 credit to reduce the total price to \$8,000. On average, their heat pump is projected to save them \$460 a year on energy costs.</p>	<p>In year three, the Greens install a new rooftop solar system and upgrade their electric panel in conjunction. Installing their 5 MW solar system costs them \$15,000, but through the extended residential clean energy tax credit they save 30% on the total cost enabling them to pay \$10,500. Even in cold Minnesota, solar is an excellent way to save on energy costs, resulting in average savings of \$2,200 per year on electricity costs.</p>	<p>Finally, in year four the Greens purchase a heat pump water heater and a new smart electric panel. It costs them \$3,500 to purchase and install the water heater and \$2,200 for the panel, but they are eligible to claim a \$1,650 credit, bringing the final price to \$4,050 and allowing them to take further steps to electrify their home in the future. Energy Star estimates that for a family of three the lifetime savings of a heat pump water heater can be as much as \$3,050.</p>
<p>Weatherization Improvements</p> <p>Cost: \$2,500 - \$750 Tax Credit Purchase Price: \$1750 Annual Savings: \$283</p>	<p>Air Source Heat Pump</p> <p>Cost: \$10,000 - \$2,000 Credit Purchase Price: \$8,000</p>	<p>Rooftop Solar System</p> <p>Cost: \$15,000 - 30% Tax Credit Purchase Price: \$10,500 Annual Savings: \$2,200</p>	<p>Heat Pump Water Heater</p> <p>Cost: \$5,700 - \$1,650 Tax Credit Purchase Price: \$4,050 Lifetime Efficiency Savings: \$3,050</p>
<p>Cumulative Savings After Four Years: \$8,900</p>	<p>Overall, the Greene family saves \$8,900 over four years because of the changes IRA made to the tax code and their purchases are projected to save them thousands annually on electricity costs.</p>		



Weatherization Assistance Program

Administrator: DOE

How It Works: IIJA provided \$3.5 billion for the Weatherization Assistance Program, which helps to reduce energy costs for low-income households by funding upgrades that increase the energy efficiency of their homes. Funding from the program can also be used for electrification. Learn more about the program [here](#) and read IIJA guidance [here](#).

Recipients: Low-income homeowners via a network of local weatherization providers. These providers receive funding from their state weatherization offices (usually the SEO, state housing agency, or state community services agency).

Expiration: The full formula funding allocation will be distributed to states upon receipt of state five-year plans. It is recommended that the funding be spent within the five-year timeframe. This funding does not require a cost match. Additional funding for the program will likely continue to be available through the annual Congressional appropriations process.

Residential Clean Energy Tax Credit (25D)

Administrator: Treasury

How It Works: The Residential Clean Energy Tax Credit allows homeowners to receive a credit against their tax bill that is equal to a portion of the cost of installing an eligible clean energy generation or storage system. The IRA restored this credit to its full level, extended it through 2034 (with a phase down beginning in 2032), and added battery storage to the list of eligible technologies.

Eligible Technologies: Solar electric, solar water heating, biomass, geothermal heat pumps, residential wind, fuel cells using renewable fuels, and stand-alone energy storage systems.

Base Credit	30% until Dec. 31, 2032 26% in 2033 22% in 2034
Prevailing Wage + Apprenticeship	N/A
Bonus Credits	None
Limitations	Systems must be at least 3 kWh to qualify
Direct Pay	No
Transferable	No
Expiration	December 31, 2034



Issue Spotlight: Connecting Distributed Energy Resources To the Electric Grid

Even before passage of the IRA, markets for distributed energy resources (DERs, including small-scale electricity generation such as rooftop solar, energy efficiency, demand response, batteries, and electric vehicles (EVs)) was growing rapidly. U.S. residential and commercial building solar deployment exceeded 5,600 MW in 2021, a five-fold increase since 2011, representing a market value of about \$15 billion. Meanwhile the community solar segment, which barely existed ten years ago, added nearly 1,200 MW of new capacity in 2021. The U.S. market for light-duty EVs more than doubled from 2020 to 2021, to more than 650,000 units, and is up a remarkable 40-fold since 2011. Yet this is still less than 5% of new vehicle sales.

These markets are growing because of falling costs, but also because DERs empower customers to take control over their energy use and costs and can help cut emissions. In an era of rising prices, especially for electricity, and growing awareness of the need to cut emissions, these are particularly appealing attributes. Simply put, more and more customers, whether residential, commercial, industrial or public sector, want to install DERs for a variety of reasons. The incentives in the IRA will only accelerate this deployment.

Despite this bright future, longstanding barriers exist that are slowing DER deployment and limiting customers' ability maximize the benefits they can provide. DERs face challenges simply interconnecting¹ to the grid and doing so in a timely and cost-effective manner. Once interconnected, it is often not possible to realize all the benefits from DERs, especially benefits that accrue to all electricity customers, such as deferred or avoided investments in generation, transmission and distribution infrastructure, and improved grid reliability and resilience. Addressing barriers to interconnection is therefore a first step towards realizing the full potential of DERs and getting the most out of the IRA.

Barriers to DER interconnection are well known. These include: timeliness of processing interconnection applications by utilities, a lack of standardization regarding interconnection application processes and technical requirements, poor access to electricity system data and customer data, high interconnection fees and system upgrades costs, and outdated utility planning processes that do not adequately consider DERs. Underlying all of this is that utilities generally lack the financial incentive to implement efficient interconnection processes and to then work towards getting the most value out of DERs that are ultimately connected to their systems. Local issues, such as outdated building codes, can also present considerable barriers. The "Takeaways" section below provides suggestions for how policymakers can address these issues.

¹ Interconnection refers to the process of safely connecting DERs to the grid, whether on the customer side or utility side of a customer's electric meter. Interconnection allows the DER to operate in parallel ("synchronized") to the grid, and for behind-the-meter systems, to export electricity onto the grid when the output of the DER exceeds the customer's load. This would apply to electric vehicles with "vehicle-to-grid" capability.



New Energy Efficient Homes Credit (45L)

Administrator: Treasury

How It Works: This per-dwelling credit, first established in 2006, incentivizes residential homebuilders and developers of multi-family properties to reduce energy consumption by building new residences to meet the latest energy efficiency and/or zero-energy standards in their construction. Note: This credit can be combined with the Section 179 Energy Efficient Commercial Building tax deduction for qualifying residential rental developments.

Base Credit	<p>Single Family Home:</p> <ul style="list-style-type: none"> △ \$2500 – Meets latest Energy Star Requirements △ \$5000 – Certified DOE Zero Energy Ready <p>Multi-Family Building:</p> <ul style="list-style-type: none"> △ \$500/unit – Meets latest Energy Star Requirements △ \$1000/unit – Certified DOE Zero Energy Ready
Prevailing Wage + Apprenticeship	(See Below)
Bonus Credits	<p>Multi-family projects that meet prevailing wage standards:</p> <ul style="list-style-type: none"> △ \$2500/unit – Meets latest Energy Star Requirements △ \$5000/unit – Certified DOE Zero Energy Ready
Limitations	None (IRA removed prior height limit on multi-family buildings)
Direct Pay	No
Transferable	No
Expiration	December 31, 2032



Efficient Commercial Buildings Deduction (179D)

Administrator: Treasury

How It Works: This credit, which was also first established in 2006, incentivizes commercial building owners to conserve energy by allowing them to immediately deduct the installation costs of energy-efficient systems (e.g. lighting, HVAC, building controls). The IRA increased the maximum deduction amount and expanded the scope of eligible participants to include state, tribal, and local governments and tax-exempt entities through the application of direct pay.

Base Credit	25% energy savings = \$0.50 deduction/sq. ft. + \$0.02 for each 1% increase in energy savings
Prevailing Wage + Apprenticeship (PWA)	25% energy savings = \$2.50 deduction/sq. ft. + \$0.10 for each 1% increase in energy savings
Bonus Credits	N/A
Limitations	Max increase in energy savings: 50% (total) △ Max w/o PWA: \$1.00/sq. ft. △ Max w/ PWA: \$5.00/sq. ft.
Direct Pay	Yes (restricted to tax-exempt entities)
Transferable	No
Expiration	December 31, 2032

Energy Improvements at Public Schools

Administrator: DOE

How It Works: IIJA provided DOE with \$500 million for energy efficiency, renewable energy, and clean transportation improvements in public schools. Funding for school facilities from the American Rescue Plan was also made available by the Department of Education to state and local educational agencies in 2021 and may still be available in some states. [Learn more here](#) and [here](#).

Recipients: Local educational agencies in partnership with individual schools or organizations that can assist with energy improvements.

Expiration: \$100 million from the IIJA funding is available each year from 2022 to 2026. DOE intends to issue a funding opportunity announcement for first round of funding in late 2022.



Additional Support for State-Led Energy Efficiency

Both IRA and IIJA also contain substantial additional resources for states to indirectly bolster energy efficiency in their borders:

- △ **Assistance for Building Code Updates:** IRA provides DOE with \$1 billion for grants to state and local governments in order to assist them in adopting the latest energy efficiency and zero energy building codes. This program expires after September 30, 2029. IIJA also provides \$225 million to DOE to make grants to states and tribal governments for building code adoption, with \$45 million available each year from 2022 to 2026.
- △ **Energy Efficiency Workforce Training:** IRA provides DOE with \$200 million in new funds to help SEOs train contractors involved in home energy efficiency and electrification work. These funds can be utilized to lower the cost of training, provide testing and certification, and partner with nonprofit organizations that provide such training. The program expires after September 30, 2031. IIJA also provides \$40 million under the SEP for states to train energy auditors, available each year through 2026, and \$10 million for energy efficiency career skills training, available until expended.
- △ **Energy Efficiency Revolving Loan Capitalization Grants:** IIJA established a \$250 million program at DOE to provide capitalization grants to states for commercial and residential energy audits. 40% of the funding will be distributed to all states, and 60% is prioritized for the 15 states with the highest per capita energy consumption.
- △ **Energy Efficiency and Conservation Block Grant Program:** IIJA provides \$550 million via DOE for states, tribes, and local governments to develop, promote, implement, and manage energy efficiency, renewable energy, and zero-emission transportation projects. Learn more about the program [here](#).
- △ **Energy Efficient Nonprofits:** IIJA provides \$50 million to DOE to grant to nonprofit organizations for energy efficiency improvements.



Takeaways

Big Picture: The funding in IIJA and especially the IRA has the potential to significantly increase investment in electrification and energy efficiency, unlocking healthier homes and more affordable energy bills for households at all income levels, as well as making businesses, schools, and other public buildings more energy efficient (which can help save taxpayer dollars). Because many of these incentives are available for individual homeowners and building owners, states should conduct robust communications efforts ensure that their citizens are aware of the programs available to them. The HOMES and HEEHRA programs in particular, if implemented well, represent a significant opportunity to grow the market for low- and middle-income energy efficiency and electrification upgrades. States should also proactively plan for both increased electricity and reduced gas needs, address DER interconnection challenges, and invest in their contracting workforce.

Recommendations for Lawmakers:

- △ Make their constituents aware of the tax credits and rebates available for residential and commercial clean building projects.
- △ Establish a “resilient schools” program that can help public schools in the state take advantage of IRA, IIJA, and ARP funding for school facilities.
- △ Authorize new electrification and DER programs targeted at communities with the fewest resources for such investments, in particular disadvantaged communities that have often borne the burden of energy infrastructure.
- △ Direct Utility Commissions to create transparent long-term gas planning processes to review gas investments in light of new market trends and added customer risks.
- △ Consider establishing or accelerating energy efficiency resource standards to ensure utilities are helping cost-effectively consumers reduce energy waste
- △ Consider statutory modifications to evolve gas-only utilities into source-neutral heat or energy utilities, and/or authorize programs that allow gas utilities to pilot networked geothermal energy systems.
- △ Prioritize DER interconnection and integration via legislative action, including requiring the development of standard interconnection requirements, processes, and fees, and equitable cost allocation methodologies for grid upgrade costs.
- △ Update statutes governing the utility business model and planning processes so that utility financial incentives and core activities are better aligned with DER markets and customer preferences. Empowering the commission to make regulatory changes will accelerate DER deployment, reduce costs, and define clear and essential roles for the utility that supports these markets.



Clean Electricity and Storage Incentives

The price of clean energy and energy storage continue to fall across the U.S. In many places, resources like wind and solar are now the most affordable sources of electricity. As Americans continue to face rising and volatile prices, stable, affordable, and cost-effective advanced energy resources can help address this problem and rein in inflation. As detailed below, the IRA extends and augments many tax policies and programs that help further reduce clean energy and storage costs. The legislation also introduces new adders, which help further lower costs, and provisions that allow companies and utilities to realize the full value of these incentives—savings that can be passed back to families and businesses.

Investment Tax Credit (48)

How It Works: The ITC is a long-standing incentive that helps lower the cost of advanced energy technologies by reducing a share of the upfront project costs. The IRA revised, extended, expanded—in technological scope—and restored to full value the ITC. Under the IRA, project developers must now meet prevailing wage and apprenticeship requirements to receive the full credit, as detailed in the chart below, but can stack percentage adders on top of that to further increase its value. The credit applies only to newly developed projects. New credit monetization features—ITC credits may now be transferred and are eligible for direct pay for tax-exempt entities—should make it easier to realize the full value of the credit and expand access to a wider range of consumers.

Eligible Technologies:

- △ **Already Eligible:** Solar, wind (onshore and offshore), geothermal systems, microturbines, combined heat and power, and waste energy recovery were already eligible for the ITC and remain as such.
- △ **Newly Eligible:** Stand-alone energy storage systems (those paired with renewables were already eligible), linear generators, qualified biogas property, microgrid controllers, dynamic glass, and interconnection property (if the maximum output is less than 5MW-AC).
- △ The IRA establishes a technology-neutral ITC (48E) beginning in 2025 (see below).



Base Credit	6%
Prevailing Wage + Apprenticeship	30%
Bonus Credits	<ul style="list-style-type: none"> △ Uses domestic content: 10% △ Sited in energy community: 10% △ Sited in low-income community or on Indian land: 10%** △ Low-income building project or low-income “economic benefit” project: 20%**
Limitations	<p>** Only wind and solar projects with a nameplate capacity greater than 5 MW are eligible for these bonuses</p> <p>** Aggregate cap of 1.8 GW/year</p>
Direct Pay	Yes (restricted to tax-exempt entities)
Transferable	Yes
Expiration	December 31, 2032

ITC Made Easy: Geothermal Generation

Alpha Advanced Energy Co. is looking to develop a geothermal energy project in the United States. The 20 MW project is estimated to cost \$50 million before tax incentives. Alpha Advanced Energy Co. is looking to take advantage of the ITC to reduce project costs. First, the company plans to pay workers who will be constructing the project the prevailing wage of the community where it will be located, which is determined by the Secretary of Labor. Secondly, the company partners would work with relevant organizations in the community to ensure that 15% of labor hours performed on the project will be provided by a qualified apprentice. As a result, the company is now eligible for a 30% tax credit. However, Alpha also signs an agreement with domestic suppliers to source project parts from manufacturers based in the United States and is now eligible for an additional 10% credit. Finally, the company finalizes the project location in the vicinity of a of a recently closed coal mine, enabling them to claim an additional 10% under the “energy community” bonus. In total, Alpha Advanced Energy Co. is eligible for a 50% ITC and the final project now costs \$25 million.



Production Tax Credit (45)

How it Works: Similar to the ITC, the PTC is a long-standing tax incentive for clean generation. It functions by providing a tax credit for each kilowatt hour (kWh) of electricity generated by eligible technologies. Unlike the ITC, its goal is to lower the cost of kilowatts produced, rather than the cost of project development. The IRA revised, extended and expanded—in technological scope—the PTC. To receive the full value of the PTC, project developers must now meet prevailing wage and apprenticeship standards, as noted in the chart below. In most cases they can further increase that value with stackable bonus credits. The passage of IRA also made the PTC transferable and eligible for direct pay (for certain entities), which make it easier to realize the full financial benefit.

Impact of the IRA: Passage of the Inflation Reduction Act (IRA) reversed the scale down schedule and extended the credit ten years through 2032, providing investors with long-term certainty for the first time. The IRA altered how the credits are administered, applying a base credit rate of 0.3 cents/kWh, multiplied by an inflation adjustment factor, but also created new “adder” credits that increase it to 1.5 cents/kWh (plus inflation adjustment) for meeting certain labor standards and then provides additional 10% adders for meeting domestic content provisions and locating projects in “energy communities”.

Eligible Technologies:

- △ **Already Eligible:** Onshore wind, biomass, geothermal, landfill gas, municipal solid waste, qualified hydropower, marine, hydrokinetic, and carbon capture and sequestration (CCS) facilities.
- △ **Newly Eligible:** Solar, offshore wind, nuclear, and hydrogen* production.
- △ Note: The details of the Hydrogen production credit are detailed in the Advanced Energy Manufacturing section of this guide.
- △ The IRA establishes a technology-neutral PTC (45Y) beginning in 2025 (see below).



Base Credit	0.5 cents/kWh (adjusted for inflation using 2022 adjustment factor)
Prevailing Wage + Apprenticeship	2.6 cents/kWh
Bonus Credits	<ul style="list-style-type: none"> △ Uses domestic content: 10% △ Sited in energy community: 10%
Limitations	PTCs for CCS (45Q), nuclear (45U), and hydrogen (45V) are not eligible for bonus credits
Direct Pay	Yes—restricted to tax-exempt entities except for the CCS (45Q), hydrogen (45V), and manufacturing (45X) PTCs
Transferable	Yes
Expiration	December 31, 2032

Nuclear Production Tax Credit: The IRA creates a new PTC for zero-emission nuclear power produced and sold by qualifying facilities. Only existing nuclear facilities are eligible. The credit is worth \$0.03/kWh (\$3/MWh), adjusted for inflation. Facilities that meet prevailing wage and apprenticeship requirements, should see that increase to \$0.15/kWh (\$15/MWh). The end result of this new credit should be to lower the cost of zero-emission nuclear generation, improving the economics of existing plants and allowing them to stay online longer. This new credit is complemented by the IIJA Civil Nuclear Credit Program, which provided DOE with \$6 billion to provide financial support to existing nuclear reactors that are at risk of closing and being replaced by higher-emitting power resources.

Technology Neutral Credits: Beginning in 2025 the tax code for clean electricity projects will be modified to support a technology neutral framework. Projects will have the option to claim either the 48E (ITC) or 45Y (PTC) if their greenhouse gas emissions rate is not more than zero. The bonus credit structure and amounts currently set in the IRA will all remain the same. Treasury will need to establish clear guidelines and it will be important for states to monitor this transition. Effectively this will expand the pool of technologies—particularly those still in early-stage development—able to access these credits without additional federal legislation. For established technologies, such as solar and wind, the economic benefit of these provisions should remain largely unchanged.



Low Emission Electricity Outreach Program

Administrator: EPA

How It Works: The IRA provides \$68 million for the EPA to support partnerships and technical assistance, as well as general outreach and education, with respect to GHG emissions reductions connected to the generation and use of electricity. The funds are broken into four groups, two of which are available for states and targeted communities:

- △ **\$17 million** for technical assistance and partnerships connected to state, local, and tribal governments
- △ **\$17 million** for technical assistance and partnerships for low-income and disadvantaged communities

By Q1 of 2023, the EPA should provide more detail regarding the specific utilization of these funds.

Expiration: September 30, 2031

Clean Energy Demonstrations

As mentioned above in the Advanced Energy Manufacturing Incentives section, IIJA provided \$21.5 billion to establish a new Office of Clean Energy Demonstrations (OCED) and fund large-scale demonstration projects of energy technologies such as clean hydrogen, energy storage, advanced nuclear reactors, and technologies to reduce industrial emissions. Learn more about OCED [here](#).



Takeaways

Big Picture: IIJA and, particularly, the IRA, provide significant and durable support for the development of clean electric generation and energy storage. Historically, the tax credits and programs that have spurred on clean energy development in the U.S. have operated on a “start-stop” basis, requiring reauthorization every few years. This has slowed and depressed the pace of deployment. These new policies, particularly when combined with additional incentives, which only further reduce already low costs, will dramatically accelerate deployment while continuing to lower costs. In a moment of rising and volatile energy prices, this is an opportunity few can afford to miss. States should be working quickly to facilitate deployment and attract the jobs and investment that come along with that.

Recommendations for Lawmakers:

- △ Establish or accelerate a goal for 100% decarbonization of the state’s electricity sector.
- △ Establish or accelerate goals for the state government to transition to 100% clean energy, using direct pay to further reduce the cost of this transition.
- △ Establish an energy storage deployment target and provide state incentives that complement the newly established ITC for standalone storage in IRA.



Transmission and Grid Infrastructure

Between the IRA and IIJA, there are a variety of funding sources to support a reliable, resilient, affordable, and clean electric grid. Chief among these are the programs that support the grid itself—funding for new and upgraded transmission lines, for upgrades that will help keep the lights on in the face of natural disasters, and for grid technologies that are flexible and responsive to the needs of a 21st century energy system. Given the variety of entities with a stake in how the grid is maintained and operated, such as utilities, independent developers, and regional transmission organizations (RTOs), it will be important for state policymakers to ensure that there is a clear plan in their states for the grid of the future and to coordinate both federal and non-federal funding to achieve that vision.

Transmission Facility Financing

Administrator: DOE

How It Works: The IRA allocates \$2 billion to cover the costs of direct loans to non-federal borrowers that support the construction or modification of transmission lines that have been designated as being in the national interest. Loans can cover up to 80% of project costs.

Expiration: September 30, 2030

Transmission Planning and Siting

Administrator: DOE

How It Works: The IRA provides \$760 million to facilitate planning and siting of interstate transmission lines. Eligible uses of these funds include studying the impacts of transmission projects, examining alternate siting corridors, participating in regulatory proceedings, and, for approved projects, economic development activities for affected communities. Grants awarded under this program require a 50% non-federal match and funds are contingent upon timely decision-making by the siting authority.

Recipients: Relevant siting authorities, including state, tribal, and local governments

Expiration: September 30, 2029

Interregional and Offshore Wind Transmission

The IRA provides DOE with \$100 million to convene stakeholders and conduct planning, modeling, and analysis related to interregional transmission and transmission of offshore wind-generated electricity, which is available through September 30, 2031.



Transmission Facilitation Program

Administrator: DOE

How It Works: IIJA created a \$2.5 billion revolving loan fund at DOE for new electric power transmission lines. Funding can be used to provide loans or capacity contracts or to enter into public-private partnerships. [Learn more here.](#)

Expiration: Funding is available until expended

Issue Spotlight: Building 21st Century Transmission Infrastructure

Transmission infrastructure—the long-distance high-voltage lines that deliver electricity in bulk from generation resources to local distribution networks—is the backbone of our country’s power system, ensuring Americans across the country have continuous access to affordable, reliable electricity to power their homes, businesses, and neighborhoods. Building out transmission is essential to ensuring we can access the benefits of new clean energy and storage resources. According to the Energy Systems Integration Group, between 2001 and 2019, the country’s share of clean electricity increased from 28% to 38%, with the addition of approximately 200 GW of wind and solar to the U.S. power grid. Recently enacted federal incentives in the IRA will only accelerate this deployment. The IRA has the potential to reduce emissions from the power sector by approximately 40% by 2030. Achieving that reduction potential, however, is only possible if we invest in transmission infrastructure across the country.

However, a large amount of potential clean power capacity is struggling with the wait times and costs of connecting to the transmission grid, and the construction of new high-voltage transmission lines has declined over the last decade. To alleviate the growing gridlock, transmission planning and interconnection processes need reform. Independent estimates indicate that to meet our growing clean electricity demands, we’ll need to expand transmission systems by 60% by 2030.

A [recent study](#) conducted by the REPEAT Project estimated that the current pace of transmission expansion is approximately 1% per year. In order to unlock the emission reduction opportunities in the IRA, we must double the rate of transmission expansion by approximately 2.3% per year. Over 80% of the potential emissions reductions delivered by IRA in 2030 are lost if transmission expansion is constrained to 1% per year, and roughly 25% are lost if growth is limited to 1.5% per year.

In order to maximize the potential of the IRA and build a reliable, affordable and clean grid, we need to address the obstacles that prevent us from building transmission infrastructure in a smart, cost-effective way. A variety of challenges stand in the way of transmission expansion, ranging from weak planning processes, to fights over who will pay the cost of new lines, to local permitting and siting issues. These barriers exist at every level of government, from towns and counties to states and federal authorities. Addressing them will require the engagement of policymakers across the country. Under “Takeaways” at the bottom of this section, we outline a set of high-level recommendations to address these issues.



Grid Resilience Formula Grants (40101d)

Administrator: DOE

How It Works: IIJA provides \$2.5 billion in formula funding to states and tribes to modernize and improve the resilience of their electric grids. These governments may, in turn, allocate these funds to eligible entities, which include electric grid operators, electricity generators, transmission owners or operators, and distribution providers.

Recipients: States and tribal governments

Expiration: Funding is allocated annually and is available for five years, through 2026. States and tribes must submit an application by March 31, 2023 to receive the first year's allocation.

Grid Resilience and Innovation Partnerships Program

Administrator: DOE

How It Works: IIJA provided \$2.5 billion in competitive funding to reduce the likelihood of events disruptive to the grid, \$3 billion for the Smart Grid Investment Matching Grant Program, and \$5 billion to demonstrate innovative approaches to transmission, storage, and distribution infrastructure that enhance resilience, or new approaches to regional grid resilience. DOE has combined these three programs into the Grid Resilience and Innovation Partnerships (GRIP) Program.

Recipients: Depends on the subprogram, but eligible recipients include states, tribal governments, local governments, public utility commissions, electric grid operators, electricity generators, electricity storage operators, transmission owners or operators, distribution providers, fuel suppliers, and technology vendors.

Expiration: DOE will release annual funding opportunity announcements for five years, through 2026. The first funding opportunity, expected late 2022, will cover both 2022 and 2023.



Takeaways

Big Picture: For the U.S. to achieve the clean, reliable, and resilient grid of the future, there must be a meaningful expansion of electric transmission infrastructure to connect clean energy resources with energy demand. The challenges to seeing this infrastructure built are many: a need for state and federal policy improvements, enhanced coalition engagement in the siting process at the local and state level and crafting smart policies that recognize the full value of clean energy technologies. The IRA and IIJA make significant funding available to states to both plan for and start to execute on the electric grid of the future. To maximize the impact of this funding, states should establish transmission and grid resiliency planning processes, work with neighboring states on regional transmission development, address siting and permitting barriers, and ensure that they are engaging with host communities.

Recommendations for Lawmakers:

- △ Address siting barriers by legislating processes to identify corridors where transmission could be optimally located to minimize adverse impacts to communities and resources and mechanisms to ensure that the economic opportunities afforded by transmission are shared by host communities. In some cases, this can be achieved by establishing a state transmission authority.
- △ Consider whether your state's transmission policies are focused on identifying the most cost-effective and beneficial transmission projects that can be built out. Transmission investments should consider future renewable energy development required to meet federal and state policies as well as consumer demand for clean energy.
- △ Engage with local communities, who are the hosts of transmission infrastructure. Meeting their needs and reducing impacts on them, particularly historically disadvantaged communities that often unfairly bear the burden of energy infrastructure, is vital to achieving the needed national transmission buildout.
- △ Establish a grid resiliency planning process that outlines the steps the state should take to strengthen its electric grid and make it more reliable, which can focus the use of funds from the 40101d grid resilience program and the GRIP program.



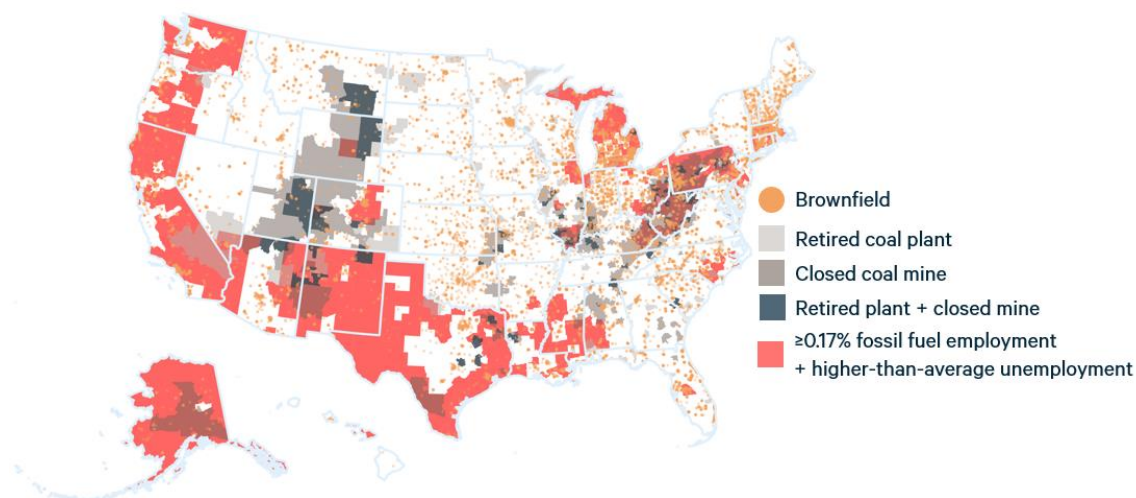
Supporting Communities

While curbing inflation, revitalizing manufacturing, and decarbonizing the grid are national priorities, some communities have borne the brunt of our industrial downturn, the impacts of fossil fuel production, and the disruption of our energy transition. Provisions in the IRA and IJIA are designed specifically to support these communities, channeling projects, investment, and jobs into them.

Energy Communities

To encourage the development of projects and facilities in communities impacted by our transition away from fossil fuels and recent economic downturns the IRA establishes a “Energy Communities” bonus for a variety of the tax credits and financial programs in the Act (as detailed throughout this guide). For tax provisions, this bonus is 10% on top of the existing percentage or credit amount. To qualify for this incentive, a project or facility must meet one of three criteria:

- △ **Brownfield:** The project/facility is on a brownfield, as defined by the U.S. EPA.
- △ **Coal Community:** The project/facility is within a census tract where a coal fired power plant has closed since 2010, or where a coal mine has closed since 2000.
- △ **Transition Community:** The project/facility is in a statistical area where fossil fuel-related industries, which can include “extracting, processing, transport, or storage of coal, oil, or natural gas”, directly employ at least 0.17% or produce more than 25% of local tax revenues, and in the previous year the community had an unemployment rate above the national average.



Map of Potential Energy Communities from Resources for the Future



These complex, overlapping, and (in certain cases) variable criteria create a complex patchwork of energy communities across the country. That said, [recent analysis](#), as illustrated above, indicates that, at present, roughly 50% of U.S. land area could fall under this definition of an “energy community.”

Low-Income Community Bonus

Administrator: Treasury

How It Works: This stackable bonus, which can add 10–20% to the clean electric generation investment tax credit (48 and 48E) for qualifying wind and solar projects, is designed to encourage project development in low-income communities and on Indian land. Those communities are defined as follows:

- △ **Low-Income:** A census tract with a poverty rate of at least 20%, as well as census tracts where the median family income (MFI) is 80% or less that of the statewide MFI. In metropolitan census tracts the MFI cannot exceed the greater of either the statewide MFI OR metro area MFI.
- △ **Indian Land:** Any land located within the boundaries of an Indian reservation, pueblo, or rancheria. Also included are lands held by an individual Indian, tribe, dependent Indian community, or in trust by the U.S. for the benefit of a tribe or Indian, or census tracts wherein the majority of residents are Alaskan Natives or members of a federally recognized tribe.

Base Adder:	10% for projects in low-income communities or on Indian land
Bonus Adder:	20% for projects that are (A) part of a low-income residential building project or (B) qualified as low-income economic benefit projects**
Eligible Projects:	Wind and solar facilities with nameplate capacity greater than 5 MW
Limitations:	<ul style="list-style-type: none"> △ Annual capacity limit: 1.8 GW/year (with rollover if not filled) △ Projects must be placed into service within 4 years

**Economic benefit projects must provide 50% of the financial benefits of electricity production to families with an income of less than 200% of the federal poverty line or less than 80% of the area median income. A community solar project targeted at LMI consumers, for example, would be likely to meet this standard.



Income Bonus Made Easy: Community Solar

A city in Illinois wants to establish a 5 MW community solar project to benefit low-income members of their community. The project is estimated to cost \$5 million. They hired Beta Community Solar to develop the project. Illinois, through their Future Energy Jobs Act (FEJA), actively promotes the establishment of community solar projects. The city also intends to take advantage of the IRA to save money on final project costs. Because of IRA, the city is eligible for “direct pay” of tax credits, allowing them to receive a payment from the Treasury Department for the total amount of the tax credit. Beta Community Solar will pay the workers who will be constructing the project the prevailing wage of the city. The company also partners with the city to ensure that 15% of the labor hours performed on the project will be provided by a qualified apprentice. As a result, the project is now eligible for a 30% tax credit. However, Beta also signs an agreement with domestic suppliers to source project parts from manufacturers based in the United States and the project is now eligible for an additional 10% credit. The city also has a large share of its current workforce in the fossil fuel industry, making the project eligible for an additional 10% under the “energy community” bonus. Finally, 50% of the financial benefits of the electricity produced by the project will go to families with an income of less than 200% of the poverty line, allowing the project to claim an additional 20% credit as a recognized “economic benefit” project. There is a limit to the amount of economic benefit projects that can receive this bonus every year, so the city will have to wait for Treasury to review their application. If the application is successful, the community solar project is eligible to receive a 70% tax credit, which will be paid directly to the city through the Treasury Department. This will reduce the final project cost to \$1.5 million.

Environmental and Climate Justice Block Grants

Administrator: EPA

How They Work: The IRA provides \$3 billion for competitive grants tailored to help low-income, disadvantaged, and environmental justice communities combat air pollution (including GHGs), address the impacts of and increase resilience to climate change, and otherwise increase community engagement around these issues. This fund is broken into two categories:

- △ **\$2.8 billion** is for grants to eligible partnerships
- △ **\$200 million** is for financing to provide technical assistance

Eligible Recipients: Community-based non-profit organizations, alone or in partnership with Indian tribes, local governments, or institutions of higher education.

Expiration: September 30, 2026



Justice 40

The Justice 40 initiative is an executive order signed by President Biden that makes it a goal for 40% of federal investments to be directed towards disadvantaged communities that are marginalized, underserved, or overburdened by pollution. The IRA invests billions of dollars into these communities through several grant programs that will be administered by EPA and DOE. The Biden White House has also stated they intend to direct other funding through the EPA to Justice 40 communities. States should be aware which communities qualify according to the White House criteria, so they are best able to help them with project planning, the application process, and implementation.

Tribal Energy Loan Guarantee Program

Administrator: DOE

How It Works: IRA provides \$75 million for the Tribal Energy Loan Guarantee Program, which supports tribal investment in energy-related projects, and increases the loan guarantee cap to \$20 billion. This program provides grants, direct loans, loan guarantees, and technical assistance.

Eligible Recipients: Tribes and tribal energy development organizations

Expiration: September 30, 2028

Energy Infrastructure Reinvestment Financing

Administrator: DOE

How It Works: The IRA provides \$5 billion for projects that reduce emissions from energy infrastructure, defined as facilities and equipment used for electricity generation or fossil fuel or petrochemical processing, or projects that repurpose or replace energy infrastructure no longer in use.

Eligible Recipients: Owners and/or operators of energy infrastructure

Expiration: September 30, 2026

Rural Communities

The IRA and IIJA both provide funding to support the deployment of advanced energy in rural communities. The IRA also includes a new program for rural cooperatives to purchase and develop clean electricity projects, pursue energy efficiency programs, and other advanced energy activities, which combined with new access to clean electricity tax credits will significantly decrease the costs of developing new advanced energy resources in rural areas.



Rural Energy for America Program (REAP)

Administrator: USDA

How It Works: The IRA provides \$2 billion to REAP over ten years, to be allocated to eligible recipients in the form of competitive grants. These funds can be used by agricultural producers and rural small businesses to install renewable energy systems and make energy efficient improvements to their properties through loan guarantees. The IRA also increases the eligible federal share to 50% of project costs, up from 25% previously.

Eligible Recipients: State, local, and tribal governments, land-grant colleges and universities and other institutions of higher education, rural electric cooperatives, and other similar entities as determined by the Secretary.

Expiration: September 30, 2031

Financial Assistance for Rural Cooperatives

Administrator: USDA

How It Works: The IRA provides \$9.7 billion for rural electric cooperatives to transition to advanced energy. The funding, which can be in the form of grants or loans, can be used for the purchase of clean electricity from other sources, development of new clean generation systems including carbon capture and energy storage, or energy efficiency improvements to generation and transmission systems. This funding is important for rural cooperatives as they currently supply two-thirds of their energy through fossil fuels.

Eligible Recipients: Rural electric cooperatives (no recipient may receive more than 10% of the total fund)

Expiration: September 30, 2031

Rural Renewable Electricity Loans

Administrator: USDA

How It Works: The IRA provides \$1 billion for loans and loan forgiveness for renewable electricity generation and storage projects. Unlike the program for rural cooperatives above, this program can be used by any utility that serves a rural area.

Eligible Recipients: Electric utilities that serve customers in rural areas, including tribal utilities, public power utilities, cooperatives, and for-profit utilities

Expiration: September 30, 2031

Rural Energy Infrastructure

Administrator: DOE

How It Works: IIJA provides \$1 billion to improve the cost-effectiveness of energy systems, site or upgrade transmission and distribution lines, reduce emissions from energy generation, develop microgrids, and increase energy efficiency in rural areas.

Eligible Recipients: Cities, towns, or unincorporated areas with fewer than 10,000 people

Expiration: \$200 million is available each year between 2022 and 2026.



Takeaways

Big Picture: The significant and overlapping programs and incentives detailed in this section should help to share the economic gains from America’s transition to advanced energy and electrified transportation with a range of communities that in the past have—intentionally and unintentionally—been excluded. Moreover, they should help communities that have been impacted by America’s transition away from fossil fuels effectively pivot and retool for an advanced energy future. Because many of these communities have been overlooked, or lack the capital, infrastructure, and technical expertise to help attract these projects and industries, it is important that state policymakers proactively identify and engage these communities, building capacity, attracting outside investment, and creating new jobs.

Recommendations for Lawmakers:

- △ Consider legislation that would allow communities (particularly “energy communities”) to designate themselves as advanced energy development zones, streamlining permitting and/or providing additional incentives for project development.
- △ Ensure state agencies and departments have the necessary resources to identify and engage with communities eligible for these bonus incentives.



Advanced Energy Manufacturing Incentives

The IRA, in conjunction with IIJA and the CHIPS and Science Act—both of which were passed with broad bipartisan support—is designed to help revitalize American manufacturing and reduce our reliance on China, Russia, and other foreign adversaries. It does that, in part, by ramping up U.S. demand for advanced energy and transportation technologies, which should shrink our exposure to foreign fossil fuels, and encouraging the use of American-made content. At the same time, the IRA also provides supply-side support, through a set of smart incentives, loans and grants, as this section details.

Manufacturing Production Credit (45X)

Administrator: Treasury

How It Works: This new tax credit, commonly referred to as the “manufacturing PTC”, is designed to bolster the domestic production of a set of advanced energy technologies (wind, solar, battery storage) as well as numerous critical minerals. The credits are applied to each unit—be that a solar cell, wind turbine, battery pack, or kilogram of aluminum—produced by a U.S. factory. As the case study below illustrates, by reducing the cost of each component, this credit creates an additive effect, lowering the overall cost of a final product comprised of U.S.-made components. Moreover, direct pay is available to ALL eligible manufacturers, regardless of their tax status, for the first five years of the credit. As such, 45X serves as a valuable incentive to build full, U.S.-based vertical supply chains—from raw materials to finished products—for a set of advanced energy technologies.

Eligible Technologies:

- △ **Solar:** Cells, wafers, modules, polymeric backsheets, inverters, solar grade polysilicon, and structural components (e.g. torque tubes and structural fasteners)
- △ **Wind:** Blades, nacelles, towers, vessels for the construction of offshore wind facilities, and both fixed and floating offshore wind foundations
- △ **Batteries:** Cells, modules, and electrode active materials
- △ **Critical Minerals:** Approximately 50 different critical minerals, including aluminum, cobalt, graphite, lithium, magnesium, nickel, tin, and tungsten (see 26 U.S.C. § 45X for full list)



Base Credit	Credits operate on a mass, watt-capacity, production cost or sales price basis, specific to the product or material. Consult code for details.
Prevailing Wage + Apprenticeship	N/A
Bonus Credits	None
Limitations	Credit begins 25% step down in 2030: ▲ 75% value in 2030 ▲ 50% value in 2031 ▲ 25% value in 2032
Direct Pay	Yes (unrestricted for first five years)
Transferable	Yes
Expiration	December 31, 2032

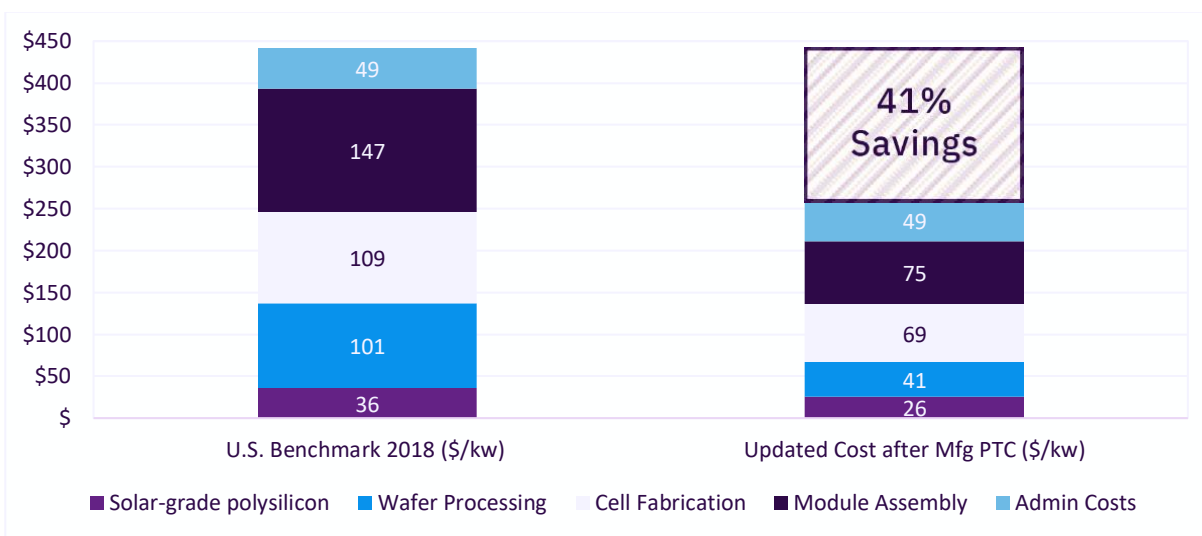
Component	U.S. Benchmark 2018 (\$/kw)	Mfg PTC Incentive (\$/kw)	Updated Cost (\$/kw)
Solar-grade polysilicon	\$36	\$10	\$26
Wafer Processing	\$101	\$60	\$41
Cell Fabrication	\$109	\$40	\$69
Module Assembly	\$147	\$72	\$75
Admin Costs	\$49	(unchanged)	\$49
Final Cost	\$442	(unchanged)	\$260



The Manufacturing PTC Made Easy: Solar Manufacturing

According to manufacturing statistics made available by the U.S. National Renewable Energy Laboratory, in 2018 it cost approximately \$440 per kilowatt to produce a solar panel in the U.S., not including sales margin and installation costs. The manufacturing PTC included in IRA helps reduce this cost at each step along the supply chain, as this case study illustrates. For this case, we'll consider four U.S.-based companies in the solar supply chain—Acme, Bravo, Capitol and Delta. Let's start with Acme Polysilicon, which produces solar-grade polysilicon. The IRA reduces the cost of that polysilicon by \$3 per kilogram, or about \$10 per kilowatt when accounting for waste in the production process. That polysilicon is processed into wafers by Bravo Wafer Company. The manufacturing PTC provides \$12 per square meter, or approximately \$60 per kilowatt assuming each square meter of panel produces about 200 watts, in incentives for domestic wafer production, which Bravo can pass along in lower product costs.

For the next step, the wafers produced by Bravo are then used by Capitol Solar to fabricate solar cells. Thanks to the tax credit for cell fabrication, Capitol can cut \$40 per kilowatt from the cost of its' solar cells. Capitol sells those cells to Delta Manufacturing, which then produces the finished solar modules (i.e. the solar panels) that go into a solar array. The IRA provides a \$70 per kilowatt incentive for module assembly, as well as a \$2 per kilowatt for polymeric backsheets (the material that goes on the back of the panel), allowing Delta to further reduce the cost of their finished product by \$72. As a result, thanks to the additive nature of the manufacturing PTC for solar, a 1 kilowatt panel that would have cost \$442 now costs \$260, a 41% cost reduction. Notably, this analysis doesn't include the incentives for the structural components of a solar array, such as tubes and fasteners, nor inverters. Including those manufacturing PTC incentives serves to further lower the final cost of a solar project.



Hydrogen Production Tax Credit (45V)

In a similar vein, the IRA creates a new PTC for clean hydrogen, defined as hydrogen produced with a lifecycle greenhouse gas emissions rate of less than 4 kg of CO₂ per kg of hydrogen. The base credit rate is 60 cents/kg of clean hydrogen produced, adjusted for inflation, and that amount increases to \$3/kg (plus inflation adjustment) if certain labor standards are met. For hydrogen produced using a process that emits between 0.45 kg and 4 kg of CO₂ per kg of hydrogen, the credit rate is reduced.

Base Credit	\$1.05/kg (adjusted for inflation using 2022 adjustment factor)
Prevailing Wage + Apprenticeship	\$5.28/kg
Limitations	<p>Credits are adjusted based on lifecycle GHG emissions per kg of hydrogen:</p> <ul style="list-style-type: none"> △ Less than 0.45 kg CO₂ = 100% of credit △ 0.45–1.5 kg CO₂ = 33.4% of credit △ 1.5–2.5 kg CO₂ = 25% of credit △ 2.5–4 kg CO₂ = 20% of credit △ Greater than 4 kg CO₂ = no credit
Direct Pay	Yes, unrestricted
Transferable	Yes
Expiration	none

Manufacturing Investment Tax Credit (48C)

Administrator: Treasury

How It Works: The manufacturing investment tax credit (ITC) provides a tax credit for investments to build or expand factories that produce a range of advanced energy and transportation technologies and alternative fuels in the U.S. The law also allows retrofits of industrial facilities that reduce emissions to qualify. Generally speaking, this incentive is designed to help catalyze the growth of U.S. advanced energy manufacturing. Unlike the manufacturing PTC (45X) discussed above, the manufacturing ITC applies to the investment in the manufacturing facility, not to the individual components that facility produces.



Eligible Projects:

- △ **Advanced Energy Technology Manufacturing:** Solar, wind, geothermal, and hydroelectric generation, energy conservation, storage, grid modernization, or carbon capture and sequestration technology
- △ **Advanced Energy Technology Recycling**
- △ **Transportation Electrification Technology Manufacturing:** EVs and associated charging technology
- △ **Alternative Fuel Technology Production Facilities:** Electrolyzers, fuel cells, and equipment for producing or refueling clean vehicles
- △ **Industrial Decarbonization Investments**

Base Credit	6%
Prevailing Wage + Apprenticeship	30%
Bonus Credits	None
Limitations	<ul style="list-style-type: none"> △ Total cap: \$10 billion △ 40% (\$4 billion) reserved for investments in energy communities △ Treasury determines awardees △ Recipients cannot also utilize 45X
Direct Pay	Yes (restricted to tax-exempt entities)
Transferable	Yes
Expiration	December 31, 2032 (or when program hits cap)



Support for Automotive Manufacturing

The IRA includes approximately \$5 billion specifically tailored to support the growth of electric and fuel cell vehicle manufacturing in the U.S. through two programs:

- △ **Advanced Technology Vehicles Manufacturing Program (ATVM):** The IRA includes \$3 billion in new funds for ATVM, an established program at DOE, which makes loans to U.S. facilities that manufacture clean vehicles, including medium- and heavy-duty trucks, zero-emission trains, maritime vessels, and aircraft. The IRA also removes the cap on the amount of a direct loan that the Secretary may issue. IIJA made medium- and heavy-duty EVs eligible under the program.
- △ **Domestic Manufacturing Conversion Grants:** The IRA includes \$2 billion in funding for grants to retool or retrofit recently closed and at-risk automotive manufacturing facilities in the U.S. to produce electric, hybrid, and fuel-cell vehicles.

IIJA also made domestic production of critical minerals eligible under the DOE Loan Program.

Advanced Industrial Facilities Deployment Program

The IRA provides \$5.8 billion for a new program, housed within the DOE's Office of Clean Energy Demonstration, to support projects that reduce emissions from energy intensive industries. The program provides grants, loans, and other financial supports for U.S. projects that reduce emissions from energy-intensive manufacturing processes such as steel, iron, glass, concrete, chemical, and paper production. Projects with the greatest potential GHG emissions reductions are prioritized and 50% of project financing must come from non-federal sources.

Additional Support for Manufacturing

Several IIJA programs also provide support for advanced energy manufacturing:

- △ **Battery Manufacturing and Recycling:** \$3 billion for battery material processing grants, \$3 billion for battery manufacturing and recycling grants, and \$50 million for state and local battery collection, recycling, and reprocessing programs. [Learn more here.](#)
- △ **Manufacturing in Coal Communities:** \$750 million to support advanced energy manufacturing facilities or reduce emissions at manufacturing facilities, provided the facility receiving support is located in or adjacent to a census tract with a recent coal mine or coal plant closure.



- △ **Industrial Energy Savings:** \$150 million for Industrial Research and Assessment Centers and \$10 million for Building, Training, and Assessment Centers. These centers, located at institutions of higher education, provide assessments of small- and medium-sized manufacturing plant sites and of buildings to identify opportunities for energy savings, including in partnership with energy service providers.
- △ **Clean Energy Demonstrations:** \$21.5 billion to establish a new Office of Clean Energy Demonstrations (OCED) and fund large-scale demonstration projects of energy technologies such as clean hydrogen, energy storage, advanced nuclear reactors, and technologies to reduce industrial emissions. Learn more about OCED [here](#).



Takeaways

Big Picture: The tax incentives, grants, and loans for advanced energy and transportation manufacturing represent a domestic industrial policy unheralded since the end of the Cold War. In the months since the IRA's passage, dozens of companies have announced plans to expand domestic production of EVs, batteries, solar panels, and critical minerals. That is just the beginning. States, particularly those that have been hard hit by the decline of U.S. manufacturing, offshoring, and the transition away from fossil fuels, should move quickly to try to attract this fast-growing industry—in particular since many of the supply-side incentives are currently slated to phase out by the end of the decade.

Recommendations for Lawmakers:

- △ Enact legislation that facilitates site development and supports industry growth in-state. To provide the state a competitive advantage, lawmakers should consider tailoring such incentives to specific segments of the advanced energy industry that best comport with existing state resources, industries, and capabilities.
- △ Increase funding for institutions of higher education, trade schools, and other workforce training and certification programs tailored to the needs of the advanced energy industry.
- △ Consider measures to reduce regulatory barriers to the responsible production and recycling of critical minerals for advanced energy manufacturing.



Transportation Electrification

With U.S. consumers, businesses, and state governments paying higher prices at the pump—prices that contribute to painful inflation and erode earnings—the need to electrify transportation has become particularly acute. By switching from oil, the price of which is often affected by foreign adversaries and global events, to home-made electricity, the U.S. can also strengthen its energy independence. As this section details, the IRA and IIJA contain substantial incentives and resources to help states, business, and families “go electric”. Federal policymakers have likewise redesigned some existing policies to grow the domestic supply chain for EVs, expand access for low- and moderate-income consumers, and encourage the development of EV infrastructure in often overlooked communities.

Commercial Clean Vehicle Tax Credit (45W)

Administrator: Treasury

How It Works: This new credit established under the IRA allows businesses and tax-exempt entities, including state and local governments, to reduce the cost of purchasing an EV, or other eligible alternative fuel vehicle. The amount of the incentive is a percentage of either the cost of the vehicle or the differential between the cost of the EV and a comparable vehicle—i.e. an electric school bus versus a diesel school bus—whichever is lesser.

Base Credit	30% for EVs/15% for other eligible alternative fuel vehicles
Prevailing Wage + Apprenticeship	N/A
Bonus Credits	None
Limitations	<ul style="list-style-type: none"> △ Max. credit for class 1-3 vehicles: \$7,500 △ Max. credit for class 4+ vehicles: \$40,000
Direct Pay	Yes (restricted to tax-exempt entities)
Transferable	No
Expiration	December 31, 2032



Clean Heavy-Duty Vehicles

Administrator: EPA

How It Works: IRA provides \$1 billion in grants to cover the incremental costs for replacing class 6 and 7 zero-emission vehicles, including school and transit buses, trash collection vehicles, and medium-duty trucks. These funds can also be used for charging infrastructure, associated technological investments, and workforce training. \$400 million of this fund is set aside for projects in Clean Air Act non-attainment areas.

Recipients: States, tribes, local governments, nonprofit school transportation associations, or contractors who can provide or help finance vehicles and/or associated equipment for an eligible recipient.

Expiration: September 30, 2031

Electric Transit Buses

Administrator: Department of Transportation

How It Works: IIJA provided nearly \$2 billion for Bus and Bus Facilities Competitive Grants and \$5.5 billion for the Low or No Emission (Low-No) Program and specified that entities receiving funding for projects related to zero-emission vehicles must submit a zero-emission fleet transition plan. [Learn more here.](#)

Recipients: States, tribal governments, local governments, transit agencies

Expiration: Approximately 20% of the funding for each program is available each year from 2022 to 2026. The first round of funding was awarded in August 2022.

Electric School Buses

Administrator: EPA

How It Works: IIJA established a \$5 billion grant and rebate program for the replacement of existing school buses with clean and zero-emission buses, with 50% of the funds reserved for zero-emission buses and 50% for clean and zero-emission buses. [Learn more here.](#)

Recipients: States, tribal governments, local governments, nonprofit school transportation associations, or eligible contractors.

Expiration: \$1 billion in funding is available each year from 2022 to 2026. The first round of funding was awarded in October 2022.



Energy Improvements at Public Schools

Administrator: DOE

How It Works: IIJA provided DOE with \$500 million for energy efficiency, renewable energy, and clean transportation improvements in public schools. Funding for school facilities from the American Rescue Plan was also made available by the Department of Education to state and local educational agencies in 2021 and may still be available in some states. [Learn more here](#) and [here](#).

Recipients: Local educational agencies in partnership with individual schools or organizations that can assist with energy improvements.

Expiration: \$100 million from the IIJA funding is available each year from 2022 to 2026. DOE intends to issue a funding opportunity announcement for first round of funding in late 2022.

Used EV Tax Credit (25E)

Administrator: Treasury

How It Works: Similar to the new EV tax credit, this incentive, which is entirely new under the IRA, reduces the cost of purchasing a used EV for personal use. Buyers, whose eligibility is limited by income, can receive up to \$4,000 off the price provided the vehicle is class one, two, or three (i.e. cars and small trucks) and falls under sales price limitations.

Base Credit	Lesser of 30% of sales price or \$4000
Prevailing Wage + Apprenticeship	N/A
Bonus Credits	None
Limitations	<ul style="list-style-type: none">△ Only class 1, 2, or 3 vehicles eligible△ Sales price: \$25,000 max△ Buyer income limits: \$150,000 joint, \$75,000 single
Direct Pay	No
Transferable	Yes (starting in 2024)
Expiration	December 31, 2032



New EV Tax Credit (30D)

Administrator: Treasury

How It Works: The IRA also revised the federal tax credit for the purchase of a new EV for personal use. Buyers, whose eligibility is limited by income, can receive up to \$7,500 for a new EV, provided that vehicle meets domestic content standards, does not exceed certain MSRP limitations, is class one, two, or three (i.e. cars and small trucks), and final assembly occurred in North America. IRA removed the per manufacturer limit on the number of vehicles to which the credit can be applied, so manufacturers who had reached the old cap are once again eligible.

Base Credit	\$3750 (critical mineral req) + \$3750 (battery content req) = \$7500 max
Prevailing Wage + Apprenticeship	N/A
Bonus Credits	None
Limitations	<ul style="list-style-type: none"> △ Final assembly in North America △ % of critical minerals in battery sourced from U.S. or country under free trade agreement, or recycled in North America: ramp from 40% in 2023 to 80% in 2027 and later △ % of battery components manufactured or assembled in North America: ramp from 50% in 2023 to 100% in 2029 and later △ No critical minerals (by 2025) or battery components (by 2024) from China, Iran, or North Korea △ MSRP limits: \$55,000 (cars), \$80,000 (SUVs, vans, pickups) △ Buyer income limits: \$300,000 joint, \$150,000 single
Direct Pay	No
Transferable	Yes
Expiration	December 31, 2032



Issue Spotlight: The Challenges and Opportunities of Electrifying Transportation

The North American automotive industry is in the midst of a rapid evolution, transforming the fundamental products and business model of a [\\$700 billion industry](#) at a pace unprecedented since its creation. Automakers [plan to invest](#) \$1.2 trillion on this electrification transition through 2030. This is geographically diversifying the supply chain as automakers open new vehicle and battery assembly plants, suppliers source new raw materials, and the workforce adds new skill positions like software engineers and electricians.

EVs represent a vast technological and environmental improvement over combustion engine vehicles, but our infrastructure and transportation systems must evolve to accommodate these upgrades. Recently enacted consumer and commercial EV credits in the IRA combined with new federal EV charging programs in IIJA represent an acceleration of these trends and make it more urgent for states to create a regulatory framework that takes full advantage of transportation electrification for the benefit of the grid and society at large.

Estimates suggest electrifying the transportation system should increase overall electricity use by around 20-25%. However, with proper management peak load may only result in a small percentage increase, even at full EV adoption. Turnover of the nation's vehicle fleet takes decades and thus this increase will not happen overnight. It is entirely within the capability of utilities and regulators to meet this new demand, but they must do so in a manner that avoids unnecessary generation, transmission, and distribution costs.

Research shows that currently roughly 80% of light-duty EV charging happens at home. While that percentage will undoubtedly shrink as EV adoption expands to those without access to dedicated residential charging, the distribution system needs to adapt to the reality that for many the gas station refill now happens overnight in the garage. Vehicle-grid integration (VGI) programs and technologies that encourage and enable connected vehicles to respond to real-time grid conditions and even send electricity back to the grid if needed are essential to this future scenario.

The IRA also represents a major opportunity for businesses with vehicle fleets. The new commercial clean vehicle credit combined with a reformed EV charging credit greatly reduces the upfront capital expenditure. In fact, for many commercial applications such as cargo and step-in vans, box trucks and pickup trucks, electric drivetrains result in [positive net present value](#). The business case has never been clearer, and new work vehicle models are expanding. These fleets often have predictable routes and load patterns, making them great candidates for policies that encourage charging at times that are most beneficial to the grid.

States without an EV regulatory framework risk failing to capitalize on these energy system upgrades and economic benefits. As EV market penetration builds over the next decade, proactive state policymaking becomes increasingly important to grow EV access and improve grid resilience. The "Takeaways" section below provides suggestions for how policymakers can address these issues.



EV Charging Tax Credit (30C)

Administrator: Treasury

How It Works: Formally titled the Alternative Fuel Refueling Property Credit, this incentive reduces the cost of installing an EV charger, or other eligible refueling property, by providing a tax credit for a percentage of the project’s cost.

Base Credit	6%
Prevailing Wage + Apprenticeship	△ 30% (installations <\$100,000) △ 20% (installations >\$100,000)
Bonus Credits	None
Limitations	Only installations in low-income communities and non-urban census tracts are eligible under IRA
Direct Pay	Yes (restricted to tax-exempt entities)
Transferable	Yes
Expiration	Dec. 31, 2032

EV Charging Infrastructure

IIJA also included several programs that can be used to support EV charging.

- △ **NEVI:** Established a \$5 billion grant program, the National Electric Vehicle Infrastructure Formula Program, that provides funding to states for deploying EV charging infrastructure. [Learn more here.](#)
- △ **Community Charging:** \$2.5 billion for installation of “alternative fueling” infrastructure, including EV charging infrastructure, along interstate highways and public roads and in other publicly accessible locations.
- △ **Carbon Reduction Program:** Created a new program as part of the state apportionment from the Highway Trust Fund. The funding can be used for projects that will reduce transportation emissions, including installation of EV charging infrastructure.
- △ **Surface Transportation Block Grant Program:** IIJA allows for funding from this program to be used for installation of EV charging infrastructure and vehicle-to-grid infrastructure.



Emissions Reduction Programs

The IRA contains funding for additional EPA programs to reduce emissions from transportation.

- △ **Pollution Reduction at Ports:** \$3 billion in grants to finance the purchase of zero-emission equipment (e.g. drayage vehicles), as well as necessary planning and permitting, at port facilities around the country. These grants are open to states, municipalities, and tribal communities, along with private port operators partnered with eligible governments and tax-exempt entities. \$750 million of this fund is set aside for projects at ports in non-attainment areas. This program expires September 30, 2027.
- △ **Diesel Emissions Reduction:** \$60 million for grants, rebates, and loans to identify and reduce diesel emissions at goods movement facilities in low-income and disadvantaged communities, including by electrifying vehicles servicing said facilities. Funds are available for states, tribes, local governments, regional air quality authorities, port authorities, relevant nonprofit organizations, and private owners of diesel vehicles or vehicle fleets operating pursuant to a state or local government contract.
- △ **Mobile Source Standards:** \$5 million in grants for states to adopt and implement greenhouse gas and zero-emission vehicle standards for mobile sources (i.e. cars and trucks).

Except where noted, these programs are scheduled to run until September 30, 2031 or when funds are exhausted.



Takeaways

Big Picture: Transportation electrification presents a significant opportunity for the state to cut costs and a leading source of air pollution, while also helping to revitalize an iconic American industry: automotive manufacturing. The process of electrifying transportation, however, comes with a set of challenges. The incentives in IIJA and especially the IRA are likely to accelerate electrification in this decade. Now is the time for policymakers to move proactively so they can fully realize the opportunities this innovation creates while avoiding issues around infrastructure, interconnection, and increased electric load. In many cases, the IRA and IIJA also provide resources to help in this proactive regulatory and policy work, though states should also consider marrying these federal incentives with state-level support and innovative business models where upfront costs pose a particular challenge.

Recommendations for Lawmakers:

- △ Require state vehicle procurement, including transit agencies, to be fully electric, or include total cost of ownership formulas to ensure EVs are purchased when they are most cost-beneficial to taxpayers, and utilize relevant incentives and direct pay to lower upfront costs.
- △ Consider legislation to streamline permitting and energization processes for EV chargers to guarantee that public dollars are turning into operational charging sites quickly.
- △ Create and/or expand funding for offices providing technical assistance for local governments, school districts, and small businesses to access programs established to expanded by the IRA and IIJA.
- △ Pass legislation to require utilities to proactively plan for the EV transition, and fund utility make-ready programs to accommodate necessary grid improvements.
- △ Pass legislation that accelerates electrification of the state's school bus fleets by providing state incentives that complement the federal resources available.



Glossary

- △ **AMI** – Area Median Income
- △ **ARP** – American Rescue Plan
- △ **CCS** – Carbon Capture and Sequestration
- △ **DER** – Distributed Energy Resource (includes distributed generation, energy efficiency, demand response, behind-the-meter storage, and electric vehicles)
- △ **DOE** – U.S. Department of Energy
- △ **EPA** – U.S. Environmental Protection Agency
- △ **EV** – Electric Vehicle
- △ **GGRF** – Greenhouse Gas Reduction Fund
- △ **GHG** – Greenhouse Gas
- △ **GW** – Gigawatt (1,000 megawatts)
- △ **HEEHRA** – High-Efficiency Electric Home Rebate Act
- △ **HOMES** – Home Owners Managing Energy Savings Rebate Program
- △ **IIJA** – Infrastructure Investment and Jobs Act (aka the “Bipartisan Infrastructure Law”)
- △ **IRA** – Inflation Reduction Act
- △ **ITC** – Investment Tax Credit
- △ **KW** – Kilowatt (1,000 watts)
- △ **MSRP** – Median Retail Sales Price
- △ **MW** – Megawatt (1,000 kilowatts)
- △ **MFI** – Median Family Income
- △ **NEVI** – National Electric Vehicle Infrastructure Formula Program
- △ **PTC** – Production Tax Credit
- △ **SEO** – State Energy Office
- △ **SEP** – State Energy Plan
- △ **USDA** – U.S. Department of Agriculture
- △ **WAP** – Weatherization Assistance Program

