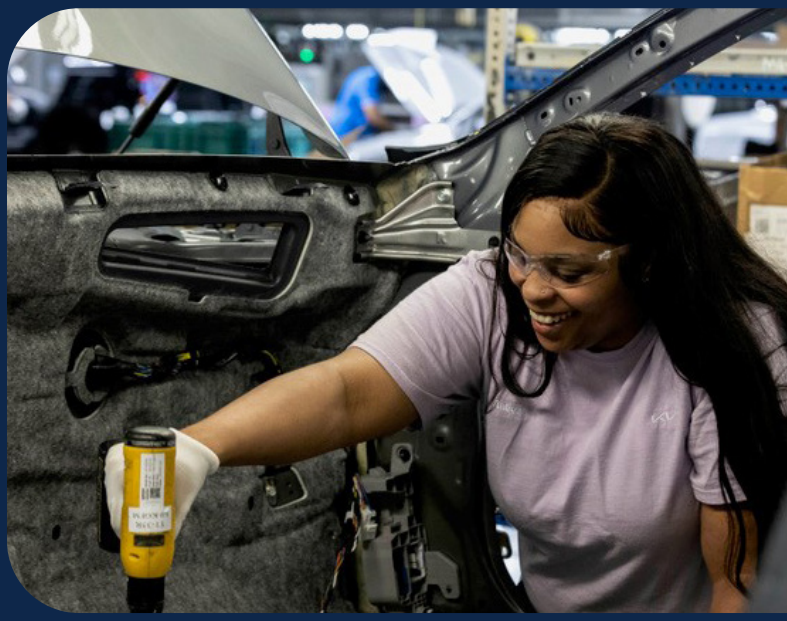
Benefits to Rural America from the Inflation Reduction Act: Driving Jobs, Investment, and Economic Resilience



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About E2

E2 (Environmental Entrepreneurs) is a national, nonpartisan group of business leaders, investors, and professionals from every sector of the economy who advocate for smart policies that are good for the economy and good for the environment. E2 members have founded or funded more than 2,500 companies, created more than 600,000 jobs, and manage more than $100 billion in venture and private equity capital.

E2 releases more than a dozen clean energy employment reports annually—including Clean Jobs America—with state-specific reports covering more than 20 states every year.

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INTRODUCTION

Tens of thousands of new jobs, billions in wages, cleaner and more affordable energy, and more resilient and profitable farms—these are just some of the ways America's rural communities are benefiting from the transition to a clean economy. This report takes a closer look at how clean economy incentives in the Inflation Reduction Act are driving those benefits in rural America. The report includes new data and on-the-ground perspectives across three areas of economic outcomes:

I. Section 1 presents new data from E2 and BW Research Partnership on how **the IRA clean energy tax incentives are driving a revitalization of rural manufacturing**. Findings include:

// One of every four large-scale clean energy projects announced in the first year of the IRA is located in demographically rural areas—more than 50 total projects in 21 states

// $20 billion in investments in rural areas

// More than 67,000 new jobs in rural counties—including more than 21,000 permanent jobs that will pay nearly $2 billion to workers each year

// Almost $5 billion in new tax revenues in the near term, with an additional $700 million in revenue every year of operation, that can help support schools, first responders, and other essential public services provided by federal, state, county, and local governments

// Nearly $3 billion to the nation's GDP in every year that the projects are operational

II. Section 2 shows that **$12 billion in clean energy loan and grant programs made possible by the IRA significantly accelerates access for rural Americans to the economic benefits of renewable energy**, and is an important step in ensuring that rural America is not left behind in the global transition to a clean energy economy. These IRA funds:

// Help the nation's more than 900 rural electricity co-ops supply cleaner, more efficient, and more affordable energy to their members

// Make clean energy and energy efficiency projects more accessible for local businesses, community organizations, farms, ranches, and municipal buildings and facilities that want them

III. Section 3 details the benefits of the IRA investment of **$20 billion over five years through the U.S. Department of Agriculture's popular and over-subscribed voluntary conservation programs for farmers and ranchers**. These IRA funds:

// Help farmers in their efforts to cut input costs, improve crop resilience and soil health, and boost their bottom lines

// Invest in programs and solutions that are overwhelmingly supported by Americans regardless of political affiliation

// Represent only a small part of the need to meet the demand for this support in rural America

SECTION ONE:
Benefits to Rural America of IRA-driven Private Sector Projects

A centerpiece of the IRA is a package of tax credits and other incentives for private sector investment in energy efficiency, renewable energy, and new or expanded battery and electric vehicle deployment and manufacturing plants throughout the U.S. This has resulted in historic levels of private sector investment in the clean energy sector and in reshoring America's manufacturing jobs.[1]

New data from E2 and BW shows what that means for rural America. Nearly 25% of the 210 large-scale clean energy projects announced in the first year that the IRA was signed into law are planned in rural areas.[2] [See Appendix I List of 52 Rural Clean Economy Projects Announced in First Year of IRA for a complete list of projects and more project details.] These projects are expected to bring an estimated $20 billion in investments to rural areas, creating more than 67,000 new jobs in rural counties. These include 21,000 permanent jobs that will pay nearly $2 billion to workers each year. In all, these projects will add nearly $3 billion to the nation's GDP every year they are operational, and add billions more to state, local, and federal tax rolls that can support critical public services and help to sustain rural communities.

Both the projects' near-term construction and longer-term operational phases bring direct and indirect jobs and community benefits to rural municipalities and counties.

Figure 1 // Combined Jobs, Wage, Tax, and GDP Impacts of Major Rural Clean Energy Projects Announced In First Year of the IRA

46,533 jobs each year for 5 years during construction phase
+21,382 *jobs* ***supported annually*** *during the operational life of projects*

$19.8 billion in initial total private capital investments
+$2.4 billion ***in ongoing annual investments*** *during the operational life of projects*

$24 billion added to U.S. GDP during construction phase
+$2.7 billion ***added to U.S. GDP annually*** *during the operational life of projects*

$16.8 billion in labor income during the construction phase
+$1.8 billion ***in labor income annually*** *during the operational life of projects*

$4.9 billion in tax revenue generated during the construction phase
+$712 million ***in tax revenue generated annually*** *during the operational life of projects*

*NOTE: The investments include projects publicly announced and estimated across the six clean energy sectors modeled: Solar, Wind, Electric Vehicles (EV), Electricity Transmission & Distribution (Electric T&D), Battery Storage, and Clean Fuels (including hydrogen and biofuels). See Appendix II Economic Impacts by Clean Economy Sector, for a more sector-specific breakdown of benefits. See Appendix III Modeling Methodology for more details on how these numbers were derived. See Appendix IV Glossary of Economic Impact Terms/Definitions for more information on terms used in the analysis.

I. Near-Term Construction Phase Rural Benefits

The near-term project construction phase includes the investments, job creation, and benefits that result from building new factories, expanding or retrofitting existing facilities, or constructing a clean energy generation project. That could include an EV battery plant like Honda and LG Energy's new $3.5 billion factory in Jeffersonville, Ohio[3] or Nissan's $250 million investment to boost EV component production at its drivetrain plant in Decherd, Tennessee.[4] It would also include the work to build out a renewable energy project like Entergy's 250-megawatt Driver Solar project near Osceola, Arkansas, which will be the largest solar farm in the state.[5]

Figure 2 // Construction Phase Annual Impacts by Impact Type, Rural, All Sectors

	Jobs	Value Added/GDP	Labor Income		Taxes
Direct	20,388	$1,614,390,333	$1,506,603,864	**Local**	$128,686,870
Indirect	9,869	$1,334,884,058	$807,526,295	**State**	$194,380,478
Induced	16,276	$1,858,827,777	$1,056,506,076	**Federal**	$670,903,962
Total	**46,533**	**$4,808,102,167**	**$3,370,636,235**	**Total**	**$993,971,310**

Of the **67,000 total jobs** created by these projects in rural areas, **46,500** are expected during the construction phase. Of those, **44% are direct jobs**—positions like carpenters and electricians, who are working directly on the projects—and **21% are indirect**, meaning jobs created in the supply chain to meet the demands of the project for inputs like lumber or steel. The remaining **35% are induced jobs**—positions supported by direct and indirect workers spending their wages in the local economy at restaurants, hotels, retailers, grocery stores, farmers' markets, movie theaters, and the like. These jobs will translate into some **$3.4 billion in total labor income annually** over the typical five-year construction phase for these types of projects.

Projects under construction will also **contribute $994 million in federal, state, and local taxes in rural communities every year.** For context, $994 million in taxes is more than the annual tax generated by the nation's forestry industry.[6] That nearly $1 billion can be spent to improve public services like buying firefighting equipment or building playgrounds. The construction of these projects will also add **$4.8 billion to the U.S. GDP**.

II. Longer-Term Operations Phase Rural Benefits

The longer-term operational phase begins once the construction phase is completed. This includes the investments, job creation, and other benefits generated every year for the entire operating life of the project. In this phase, the analysis shows **an additional $2.4 billion is likely to be invested annually in rural America.**

Figure 3 // Operations Phase Annual Impacts by Impact Type, Rural, All Sectors

	Jobs	Value Added	Labor Income		Taxes
Direct	5,383	634,063,693	673,885,965	**Local**	$137,160,425
Indirect	7,001	1,084,370,760	605,138,133	**State**	$167,441,659
Induced	8,997	1,030,330,044	585,320,278	**Federal**	$407,485,527
Total	**21,382**	**$2,748,764,497**	**$1,864,344,376**	**Total**	**$712,087,611**

This investment would support about **21,400 permanent jobs each year for the lifetime of the projects.** Of these 21,400 jobs, **5,400 (25%) are jobs working directly for the project** such as factory workers, maintenance and repair personnel, and marketing and sales representatives, and **7,000 jobs (33%) are indirect**, or supported throughout the supply chain, due to new demand that the project creates for things like component parts, raw materials, or office supplies. The remaining **9,000 jobs (42%) are induced**, or supported by direct and indirect workers spending their

wages in the local economy. As with the induced jobs in the construction phase, these include jobs generated in communities thanks to new workers' purchasing power. They could include more realtors selling homes or restaurants and other retailers hiring more staff to meet increased customer demand for everything from chicken dinners to clothing at their stores.

All of this job creation is expected to provide almost $**1.9 billion in income for workers and their families every year.**

These projects will also contribute to essential community services by **generating $712 million in annual federal, state, and local tax revenue for the lifetime of the projects**, which is about equivalent to the annual tax contributions of the U.S. mining machinery and equipment manufacturing industry.[7] These annual contributions mean stable new revenue sources that can help fund salaries for teachers, firefighters, police, and other ongoing essential community services.

The IRA in Action in Rural America: Revitalizing Manufacturing

Kia Georgia: West Point, Georgia

The town of West Point, Georgia straddles the Chattahoochee River along the Alabama border roughly halfway between Montgomery and Atlanta. The community exemplifies the economic transition in many areas of the American South from textile production to automobile and other manufacturing over the past two decades, after Korean automotive giant Kia chose West Point as the site of its first North American assembly plant in 2006.

Now West Point will be part of another major economic transition—moving the nation's vehicle power from gasoline to electric.

Kia Georgia's West Point plant.

Roughly a year after passage of the IRA, Kia Georgia announced a $217 million expansion of its West Point plant in July 2023, creating nearly 200 new jobs. It's the most significant expansion in the plant's history—designed to increase the capacity to build Kia's electric SUV, the EV9. Production is projected to begin in the second quarter of 2024.

When Kia began hiring for the plant's opening in 2009, the offshoring of textile production, combined with the economic crash of 2008, had pushed the local unemployment rate in Troup County to a staggering 13%. When Kia advertised its first 1,000 jobs, says Kia Georgia CEO Stuart Countess, it received more than 40,000 applications in 30 days. The plant currently employs about 3,200 team members, with another 11,000 working at companies that supply the plant with seats, autobody parts, and other components that go into automaking. Those **suppliers are now expanding too**. As one example, in November 2023, Hyundai Industrial, which supplies car seats, arm rests, and head rests to Kia and Hyundai, announced a new facility with 100 employees in Newnan, Georgia, about 45 miles up I-85 from the Kia plant.

"Our local supplier base has really grown," says Kia Georgia CEO Stuart Countess. "It takes a lot more people in the surrounding area to support our production." In Kia's 14 years in West Point, he notes, unemployment in the county has dropped to 3.4%.

"We know we have to build electric cars here in the U.S. to qualify for the IRA incentives," says Kia Georgia CEO Stuart Countess. "But this aligns with our future, which is focused on the mobility solutions of tomorrow."

These dramatic benefits reflect just the first year of projects advanced by the federal incentives in the IRA, incentives that are designed to last for 10 years and which are expected to continue to drive billions in investments to rural America. They also reflect just one of the three main ways the IRA is a win for rural communities.

SECTION TWO:
Improving Access to Renewable Energy and Energy Efficiency in Rural America

The IRA authorizes more than $12 billion in grants and loans that can be stacked on top of tax incentives to expand clean energy installations and energy efficiency upgrades throughout rural America. This marks **the single largest investment in rural electrification since President Franklin Delano Roosevelt created the Rural Electrification Administration (REA) in 1936.** And, much as the REA and later rural broadband legislation were needed to ensure that rural communities were not left behind in major economic transitions, this IRA funding is a critical first step to ensuring that rural areas are not left behind in the new clean economy.

The investment includes three key programs:

I. The Rural Energy for America (REAP) Program

II. The Empowering Rural America Program (New ERA)

III. Powering Affordable Clean Energy (PACE)

I. The Rural Energy for America Program (REAP)

For farmers, ranchers, and rural small businesses, **the IRA includes $2 billion through 2031 for REAP grants and loans to install solar panels, wind turbines and other clean energy generators and make energy efficiency upgrades to rural buildings**. The IRA also raises caps on the size of clean energy and energy efficiency installations that are eligible for funds, so REAP grantees can build larger systems to save even more on their electric bills. The IRA raises the maximum size of each individual grant from $250,000 to $500,000 for energy efficiency projects and from $500,000 to $1 million for renewable energy systems, with grants covering up to 50% of a project's cost.[8]

As of November 2023, **USDA had awarded $411 million in REAP funds for renewable energy and energy efficiency projects in 47 states**. Examples include a one-megawatt (MW) solar array at Vail Rubber Works, a 95-year-old manufacturer in St. Joseph, Michigan, and a 854.1 kilowatt (kW) solar array for the family-owned rice milling operations of the Arkansas River Valley LP in Atkins, Arkansas.[9] On the energy efficiency front, a REAP grant will be used to convert

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an irrigation-pump motor from diesel to electric at Hardy Farms GP, a family-owned peanut farm in Hawkinsville, Georgia. The project will save the business an estimated $12,703 annually—65% of its current electricity costs.[10]

The new REAP investments in the IRA are also a boon for rural companies like Harvest Solar, which installs photovoltaic (PV) systems in communities in Michigan, Illinois, and other Midwestern states. "The new funding has turned a lot of the farms and businesses we've talked to in the past from tire-kickers into greenlighted projects," says Ken Zebarah, Harvest Solar's Director of Commercial Sales.

The REAP investments also benefit entities that serve the broader rural community. Another REAP grant will help the J.F. Hawkins Nursing Home in Newberry, South Carolina, replace its 40-year-old boiler and chiller system with a modern variable refrigerant flow (VRF) system, says Randy Lucas, a tax and energy consultant who advised on the project. The new system will save the center roughly $32,000 a year (36%) on its energy bills, improve air quality, and be more reliable in the sweltering Carolina summers—important improvements for the elderly residents that rely on the system. "It's really good to see this type of project get off the ground and come to fruition," says Lucas.

II. The Empowering Rural America Program (New ERA)

Beyond resources for individuals and rural businesses, the IRA includes **$9.7 billion for grants and loans in the New ERA program to help the country's more than 900 rural electric cooperatives** that provide power to 42 million people and more than 21.5 million businesses, schools, farms, and homes in 48 states.[11] Under the program, a grant can cover up to 25% of a project's cost. The program clearly fills a critical need; the U.S. Department of Agriculture (USDA) estimates that more than 150 proposals for grants and loans, from nearly every state and Puerto Rico, **sought $43.3 billion in requests, more than four times the available funding**, for 800 clean energy projects.[12] The highest demand came from co-ops in Kentucky ($4.2 billion),[13] North Dakota ($3.3 billion)[14] and Texas ($2.2 billion).[15]

Another high-impact part of the IRA for co-ops are the changes made to the "direct pay" option for clean energy tax credits. Before the IRA, nonprofits, including rural co-ops, could not access tax incentives directly if they wanted to build clean energy infrastructure. In order to benefit from federal clean energy tax credits (for solar, wind, and other renewable energy), rural co-ops had to pay part of the value of the tax incentive to partner with a private entity. Because rural co-ops are member-owned entities, any extra cost could be borne by rural ratepayers through rate hikes. That changed under the direct pay provision in the IRA—co-ops can now access the full value of the credit directly and rural ratepayers can benefit from greater savings as a result.

These programs are important tools for addressing inequities and reducing the burden of energy costs on rural families. Rural ratepayers pay an average of 4.4% of their household budget for energy expenses. That's 40% higher than the national average, according to the American Council for an Energy-Efficient Economy.[16] Clean energy is increasingly the lowest-cost generation source in many rural areas.[17] Federal investments in the rural transition to clean energy can mean real savings for ratepayers, as a result. For example, one co-op applicant said that if approved for New ERA funding, it expects its proposed clean energy investments to **save each household in its service area $700 per year**.[18]

The IRA rural energy funding supports co-ops in diversifying their energy mix to provide **more reliability** as they transition away from concentrated reliance on coal-fired generation, which constituted the largest share (32%) of their total energy mix in 2021,[19] considerably higher than the overall national share of 23% in the same year.[20]

III. Powering Affordable Clean Energy (PACE)

The IRA also appropriates $1 billion for the new Powering Affordable Clean Energy (PACE) program, a partially forgivable loan program for municipalities, nonprofits, Indian tribes, private investors, and other entities seeking to build clean energy and/or energy storage infrastructure in rural communities. At least 50% of the population served by a loan applicant's proposed renewable energy project must live in communities with populations of 20,000 or less.[21]

Under PACE, the USDA Rural Development's Rural Utilities Service will issue loans of up to $100 million for projects that use wind, solar, hydropower, geothermal, or biomass, and for renewable energy storage projects. Loans to "disadvantaged or distressed communities" and to "priority energy communities"—places that were dependent on extractive fossil fuel industries but have seen those industries pull out without leaving a lifeline for those who remain—qualify for up to 40% loan forgiveness, double the 20% rate for other applicants.[22]

As with the New ERA and REAP programs, PACE clearly fulfills a critical need in rural America, as the demand for PACE loans far outstrips the available funding. When the window closed for the $1 billion PACE program in September 2023, the agency had received **requests for more than $12 billion through 308 letters of interest**.[23]

The IRA in Action in Rural America: Driving Access to Clean Energy Savings

Tri-State Generation and Transmission: Westminster, Colorado

The IRA's New ERA and direct pay provisions are both welcome news to rural co-ops like wholesale power supplier Tri-State Generation and Transmission Association, whose members include 42 electric distribution co-ops and public power districts, providing electricity to more than a million people in Colorado, Nebraska, New Mexico and Wyoming. In 2020, Tri-State launched an aggressive Responsible Energy Plan,[24] which will result in 50% of the power its members use coming from clean energy sources in 2025 and 70% by 2030. Additionally, the plan would reduce carbon emissions associated with wholesale electricity sales in Colorado by 89% by 2030, relative to a 2005 baseline, if Tri-State obtains New ERA assistance.

"The IRA investments will help us maintain and even increase our pace of transition," says Evan Jurkovich, Tri-State's Senior Manager of Energy Policy and Federal Affairs, "and there's no question that it helps us maintain our affordability. We'll be able to do more with less, stretch our dollar further, and hopefully put us in a good position for years to come."

Newly available direct pay tax credit options specifically will help Tri-State finance and build its own clean energy generation projects and save rural ratepayers money in the process. "Co-ops have always been paying more for their renewable energy than IOUs because of the tax structure," says Jurkovich, referring to investor-owned utilities. "Because we didn't get the full value of the tax credit passed through to us, that meant our power purchase agreement pricing was higher. Now really for the first time, it becomes economical for co-ops to own these projects. That keeps the value of that asset on the books for Tri-State and thus our member-owners, and that value stays in the rural communities we serve."

Evan Jurkovich, Tri-State's Senior Manager, Energy Policy and Federal Affairs

The full $12 billion investment across REAP, New ERA, and PACE supports all rural energy users from small businesses to individual farmers to large co-ops—so that they too can benefit from the cost savings, energy diversification and wealth building that comes from access to and ownership of clean energy and energy efficiency projects.

SECTION THREE:
Boosting Economic Resilience in American Agriculture

The IRA provided almost **$20 billion to significantly boost funding for the USDA's core conservation programs**. These extremely popular, completely voluntary initiatives support conservation practices such as cover crops, low or no tillage, crop rotation, integration of livestock, riparian buffers, and many more.

As previously documented by E2,[25] and detailed in additional studies below, regenerative agriculture practices are improving soil health and productivity, making farms more resilient to increasingly common extreme weather events, and reducing the need for costly inputs like fertilizer, pesticides, and fuel. In short, they are saving money and saving farms—making them essential to the future success of the rural economy.

Open to all farmers regardless of what crops they raise—as well as to ranchers and foresters—these USDA Natural Resources Conservation Service (NRCS) programs have been underfunded and dramatically oversubscribed for many years. In 2022 alone, more than 73% of applicants were turned away from two of the top programs, the Conservation Stewardship Program (CSP) and the Environmental Quality Incentives Program (EQIP). This means that more than 110,000 farmers nationwide were excluded from participation.[26] That continued a long-term trend: between 2010 and 2020, less than one third (31%) of farmers who applied to EQIP and only 42% of applicants for CSP were awarded contracts.[27]

"These programs have not only been underfunded, they've been hard to access and difficult to fit on the farmers' planning timeframe," says Aaron Lehman, President of the Iowa Farmers Union. "This funding really is a game changer."

Corn and soybeans grow in alternate rows in a no-till field on a farm in Rosebud County, Montana.

Leading national farmers' organizations, such as the 200,000-member National Farmers Union (NFU) and the National Council of Farmer Cooperatives, agree. "The IRA is cause for optimism for farmers and ranchers across the country, with historic investments in voluntary, incentive-based conservation programs that are critically underfunded," NFU president Rob Larew said in a statement.[28]

In addition to the overwhelming demand from America's farmers and ranchers, the USDA conservation programs enjoy broad and bipartisan public support. In a spring 2023 nationwide poll by the Yale Program on Climate Communications on a dozen specific climate actions by the federal government, **funding to help farmers improve soil health and restoration to absorb more carbon received the highest support of any action—82%—including a sizeable majority (61%) of conservative Republicans. Also supporting this action were 95% of liberal Democrats, 90% of moderate/conservative Democrats, and 81% of liberal/moderate Republicans**.[29]

Farmers are interested in these programs because in addition to being good for conservation, these practices can be very beneficial to their bottom lines. Healthier soils reduce the need for increasingly costly fertilizer and other chemical inputs, retain more water in drought conditions, and cut down on erosion and runoff in heavy downpours and severe storms. In one notable study, Cargill partnered with the non-profit Soil Health Institute in early 2023 to interview 100 row crop farmers in nine of the top corn and soybean-producing states that have implemented soil health practices (such as no or low tillage and/or cover crops) for at least five years. The results were dramatic: 88% of soybean growers and 85% of corn farmers reported increased net income as a result of implementing these practices. Reduced spending on fertilizer, pesticides, and equipment-related expenses lowered the average production cost of corn by $24 per acre and of soybeans by $17 per acre. **Two-thirds (67%) of the farmers interviewed reported higher yields, and 97% reported greater crop resilience to extreme weather, particularly in recent years of drought**.[30]

The need to measure and verify soil health data has become increasingly essential. **The IRA authorized $300 million over eight years to support the USDA's measuring, monitoring, reporting, and verification (MMRV) activities**, a welcome infusion for farmers adopting practices that improve soil health and thereby store more carbon.

There is also strong industry recognition of the value of these conservation programs, and the IRA provisions that support them, from traditional agriculture companies. American iconic farm equipment manufacturer John Deere is one example. Deere has offered MMRV-related technologies such as GPS and data capture for precision ag since the early 2000s. "Precision control technology really enables sustainable ag practices—it enables documentation and control of where and how inputs are applied," says Derek Muller, John Deere's Electric Small Tractor Product Manager. The company is also harnessing the innovation opportunity stemming from the growing rural clean economy by developing a line of electric small tractors and alternative power equipment by 2026. "**To advance regenerative agriculture, Deere supports IRA incentives that encourage the use of more sustainable technologies**," says Muller.

In case studies published by the nonprofit American Farmland Trust between 2019 and 2022, 10 row crop farmers in Illinois, Ohio, Oklahoma, Pennsylvania, and New York found that **soil health practices improved their bottom line between $4 and $59 per acre per year, with return on investment ranging from 7% to 343%**.[31]

As with other rural IRA funding, the importance of these investments can be seen in farmers' demand for them. Even with IRA funding in Fiscal Year 2023, the four leading programs were oversubscribed as follows:[32]

- **EQIP** funded just 26% of the 8,791 applications it received—$475 million in applications for the $250 million available.
- **CSP** accepted 40% of its 3,871 applications received, also outpacing the $250 million available.
- The Agricultural Conservation Easement Program **(ACEP)** received 263 applications and selected just 77, or 29%. There were more than $180 million in requests for $100 million available.
- The Regional Conservation Partnership Program **(RCPP),** which supports climate-smart ag practices, came up even shorter—$2 billion in project proposals for the $250 million available.

The IRA in Action in Rural America: Driving Economic Resilience

The Lehman Farm: Polk County, Iowa

Aaron Lehman's farm in central Iowa has been through dozens of transformations since his ancestors, Johannes and Catherina Lehmann and their family, came from Bern, Switzerland to settle on the New World land in 1869. The Lehman Farm is a microcosm of multi-generation family farms throughout Iowa and the nation which have moved away from crop diversity over the decades as the business of agriculture changed dramatically.

Now **Lehman, President of the Iowa Farmers Union, is an ardent advocate for the USDA conservation programs getting major new infusions from the IRA**, as documented in this report. These policies are among the tools Lehman sees to restoring the health of both Iowa's legendary rich soils and its once locally-focused farm economy—keeping the value of farmers' innovations and creativity in the communities where they live.

"Over the history of the farm, we raised pigs, chickens for eggs, cattle for dairy, and a variety of crops," Lehman says. At one point, his forebears claimed to have the highest producing herd of Brown Swiss dairy cattle in Iowa. But over the years that variety was lost.

Lehman has utilized USDA conservation programs EQIP and CSP to restore some of the diversity the farm lost over the decades, "We didn't want to be reliant on just corn and soybean prices," he says. These programs have helped support introducing new crop rotations like dry field peas, oats, and triticale (a hybrid of wheat and rye), as well as a range of cover crops. More broadly, Lehman has seen the positive impacts of these funds for farmers across Iowa on their capacity to experiment and innovate, to improve soil health and reduce reliance on inputs such as fertilizer, where supplies and prices are controlled by a small number of large producers.

In addition, Lehman points out that agricultural consolidation has resulted in a system where less than 15 cents of every food dollar spent in the U.S. actually comes back to the farmer. And in Iowa, home to the nation's second largest agriculture economy after California, less than 15% of the food consumed in the state actually comes from Iowa. "We need to find new ways to empower farmers that don't rely so much on that consolidated system," he says.

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Aaron Lehman on his Iowa family farm.

The federal IRA dollars are critical to keeping that going. "These investments are making a real difference—they trust farmers to be innovators in that system," says Lehman. "And the real concern I have is those who want to take away that investment, to instead invest it back into the commodity system where farmers have very little control. **When you invest in farmers to sell into their communities, those dollars stay local—they support local businesses, local schools, local churches—and our communities can thrive and grow**."

The roughly $20 billion in federal investments in the IRA for regenerative agriculture through conservation programs has helped to close the need gap for immensely popular but historically underfunded programs that are critical in helping farmers lower costs and make their farms more resilient and more profitable. The result is that more family farms stay in business, farm communities thrive, and America's food supply is more diversified and secure.

CONCLUSION:
Investing in The Clean Economy Means Investing in the Future of Rural America

The positive impacts of the IRA's historic investment in America's rural economic growth and resilience are transformative. In its first year, the IRA incentives have spurred 52 major rural manufacturing projects that are projected to create 67,000 rural jobs and nearly $2 billion in worker income, creating viable new career opportunities and revenues to sustain rural communities. In addition to spurring growth, these IRA funds are essential to ensuring that rural America has access to the benefits of the clean economy transition and that our farms and farming communities are more profitable and more resilient. Farmers and rural workers across multiple industries, as well as rural consumers, strongly favor these investments in clean energy, infrastructure, and agricultural resilience. **The federal clean economy investments in the IRA position rural communities as leaders in building a thriving 21st century American economy**.

APPENDIX I:
List of 52 Rural Clean Energy Projects Announced in First Year of IRA

Below is a list of the 52 major projects announced across rural America in the first year of the IRA—between August 2022 and August 2023. This list is based on public announcements as tracked by E2)

Sector	Developer Name	Type of Project	Total CAPEX	City	State
Wind	TPI Composites, Inc	Manufacturing	$199,875,005	Newton	IA
Wind	Siemens	Manufacturing	$199,875,005	Hutchinson	KS
Wind	Fincantieri Bay Shipbuilding	Manufacturing	$199,875,005	Sturgeon Bay	WI
Wind	Crowley Wind Services	Manufacturing	$199,875,005	Eureka	CA
Wind	Apex Clean Energy	Generation	$1,450,000,000	Nowata County	OK
Solar	SolRiver Captial	Generation	$3,925,286	Canyonville	OR
Solar	Hounen Solar	Manufacturing	$33,000,000	Orangeburg	SC
Solar	Vitro	Manufacturing	$93,600,000	Cochranton	PA
Solar	May Renewables LLC	Generation	$70,000,000	Cope	SC
Solar	Holcim US	Generation	$24,533,036	Alpena	MI
Solar	Entergy	Generation	$245,330,360	Osceola	AR
Solar	Ecoplexus	Generation	$89,000,000	Silverstreet	SC
Solar	Pine Gate Renewal	Generation	$115,000,000	Lucedale	MS
Solar	Bullrock Renewables	Generation	$3,238,361	Bristol	VT
EV	Gotion	Manufacturing	$2,360,000,000	Big Rapids	MI
EV	Canoo	Manufacturing	$706,507,719	Pryor	OK
EV	Magna	Manufacturing	$263,333,333	Lawrenceburg	TN
EV	Magna	Manufacturing	$263,333,333	Stanton	TN
EV	Magna	Manufacturing	$263,333,333	Stanton	TN
EV	Nissan	Manufacturing	$250,000,000	Decherd	TN
EV	Honda	Manufacturing	$233,333,333	Anna	OH
EV	Honda	Manufacturing	$233,333,333	East Liberty	OH
EV	Honda, LG Energy Solutions	Manufacturing	$3,500,000,000	Jeffersonville	OH
EV	Daejin Advanced Manufacturing USA Inc.	Manufacturing	$10,200,000	Cumberland City	TN
EV	Ecoplastics Corporation	Manufacturing	$205,000,000	Register	GA
EV	Hanon Systems	Manufacturing	$40,000,000	Statesboro	GA

Sector	Developer Name	Type of Project	Total CAPEX	City	State
EV	Woory Industrial Co	Manufacturing	$18,000,000	Dublin	GA
EV	Enchem America Inc	Manufacturing	$152,500,000	Brownsville	TN
EV	Kia	Manufacturing	$200,000,000	West Point	GA
EV	Kontrolmatik Technologies	Manufacturing	$279,000,000	Walterboro	SC
EV	Joon Georgia, Inc	Manufacturing	$317,000,000	Statesboro	GA
EV	Liochem	Manufacturing	$104,000,000	Franklin	KY
EV	Cabot Corporation	Manufacturing	$75,000,000	Pampa	TX
EV	General Motors	Manufacturing	$491,000,000	Marion	IN
EV	General Motors	Manufacturing	$45,000,000	Bedford	IN
EV	Lear Corp	Manufacturing	$37,500,000	Traverse City	MI
EV	Autokinition	Manufacturing	$15,000,000	Bellevue	OH
EV	GM	Manufacturing	$8,000,000	Defiance	OH
EV	Hitachi Astemo Americas	Manufacturing	$153,000,000	Berea	KY
EV	Manner Polymers	Manufacturing	$54,000,000	Mt. Vernon	IL
Elec T&D	Chevron	Generation	$146,400,000	Weepah Hills	NV
Elec T&D	Hitachi	Manufacturing	$37,000,000	South Boston	VA
Elec T&D	Berkshire Hathaway Energy	Manufacturing	$500,000,000	Ravenswood	WV
Elec T&D	Nucor	Manufacturing	$115,000,000	Crawfordsville	IN
Clean Fuels	Steel Dynamics	Generation	$274,495,913	Columbus	MS
Clean Fuels	Plug Power	Manufacturing	$387,000,000	Alabama	NY
Clean Fuels	Syntex Industries	Generation	$250,000,000	Clarksville	AR
Clean Fuels	Air Products & AES	Generation	$4,000,000,000	Wilbarger County	TX
Battery Storage	Electrovaya	Manufacturing	$75,000,000	Ellicott	NY
Battery Storage	Anovion Technologies	Manufacturing	$800,000,000	Bainbridge	GA
Battery Storage	BorgWarner	Manufacturing	$42,000,000	Seneca	SC

APPENDIX II:
Economic Impacts by Clean Economy Sector

The 52 clean energy projects announced in rural America in the first year since the passage of the IRA total $19.8 billion in capital investments and another $2.4 billion in operational investments (publicly announced and estimated) across the six sectors modeled: Solar, Wind, Electric Vehicles (EV), Electricity Transmission & Distribution (Electric T&D), Battery Storage, and Clean Fuels (including hydrogen and biofuels). (Figure 1).

For more information on this modeling effort please refer to Appendix I: Modeling Methodology

Figure A1 // Total Investment by Sector, Rural

Sector	Total Capital Investment ($billions)	Annual Operational Investment ($billions)
Solar	$0.68	$0.13
Wind	$2.25	$0.59
EV	$10.28	$1.03
Electric T&D	$0.80	$0.12
Battery Storage	$0.92	$0.09
Clean Fuels	$4.91	$0.41
Total Investment	**$19.83**	**$2.36**

Figure A2 // Total Capital Investment by Sector

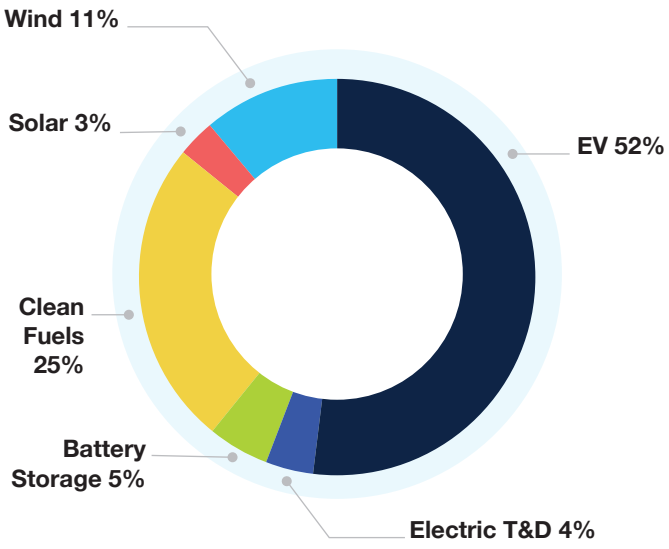
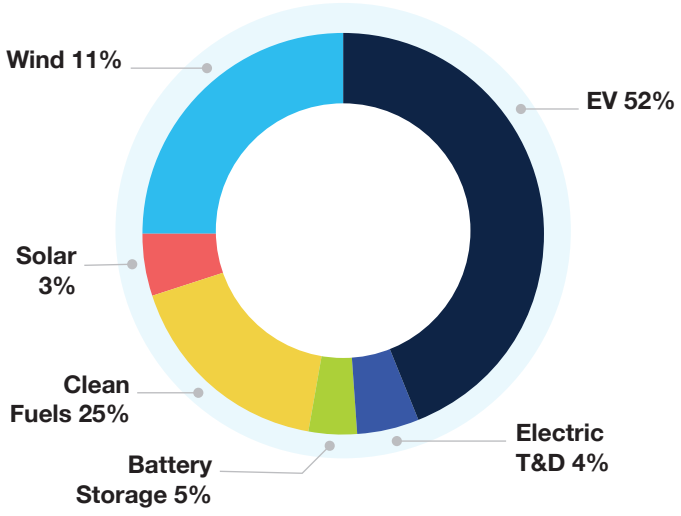


Figure A3 // Annual Operational Investment by Sector



Sector Breakdown—Construction Phase

In the first year of project announcements electric vehicle (EV) manufacturing led the sectors in rural benefits. In the construction phase, the EV sector is responsible for supporting two-thirds (31,000 jobs) of the annual five-year construction phase impacts. The EV sector captures more than half of total capital investment in rural areas, while clean fuels account for one quarter. During this phase, the EV sector also contributes the most to rural GDP, with nearly $3.1 billion in annual value added. The wind sector follows, contributing 5,600 jobs annually for five years during construction phase (Figure 2).

Figure 4 // Construction Phase Annual Impacts per Sector, Rural

Sector	Jobs	Value Added	Labor Income	Taxes
Solar	1,405	$177,338,438	$106,233,447	$32,556,080
Wind	5,622	$575,185,124	$375,417,034	$107,888,861
EV	30,990	$3,084,738,047	$2,233,595,441	$653,204,853
Electric T&D	2,321	$236,703,893	$167,428,523	$49,509,496
Battery Storage	2,765	$275,236,134	$199,292,829	$58,282,284
Clean Fuels	3,430	$458,900,532	$288,668,962	$92,529,737
Total	**46,533**	**$4,808,102,167**	**$3,370,636,235**	**$993,971,310**

Operations Phase By Sector

In the operations phase, EVs also lead the way. The EV sector is responsible for supporting 43% (9,100 jobs) of the annual jobs in the operations phase. The EV sector also contributes the most to rural GDP during the operations phase, with nearly $1.2 billion in annual value added. The clean fuels and wind sectors follow, contributing 4,900 and 4,500 annual jobs, and $602 million and $591 million in value added to the GDP respectively (Figure 3).

Figure 5 // Operations Phase Annual Impacts per Sector, Rural

Sector	Jobs	Value Added	Labor Income	Taxes
Solar	1,373	$162,811,832	$103,653,172	$30,903,498
Wind	4,445	$591,489,573	$352,478,817	$198,731,879
EV	9,096	$1,171,617,730	$711,647,419	$242,415,140
Electric T&D	929	$132,573,496	$75,989,024	$27,605,210
Battery Storage	663	$87,698,444	$56,563,233	$18,953,233
Clean Fuels	4,875	$602,573,422	$564,012,711	$193,478,652
Total	**21,382**	**$2,748,764,497**	**$1,864,344,376**	**$712,087,611**

APPENDIX III:
Modeling Methodology

The following applies to Section 1 of the report and APPENDIX IV: Details by Clean Energy Sector.

In November 2023, E2 and BW Research Partnership produced an analysis of the economic benefits of 210 major clean energy projects announced in the first year of the IRA.

This report includes a more detailed analysis of the 52 announced in rural counties as defined by the USDA.

As with the national analysis, this rural analysis required filling in the gaps of publicly announced information. Modeled impacts differ from initial estimates offered by companies announcing new projects tracked by E2. Some of the announcements provided no capital investment estimate and others provided no job creation estimate. Additionally, those estimates were inconsistently defined, lacking clarity on whether they are direct jobs only or direct, indirect, and induced jobs, and if they were for construction or permanent positions.

This section details the extrapolation methods used in the investment processing, and the economic modeling assumptions for each sector.

Investment Extrapolation Methods

For project announcements that did not provide capital investment amounts, the research team extrapolated such data using a stepwise approach depending on other available data, detailed below. Projects were first sorted by the six sectors, then further by project type: manufacturing or electric/fuel generation

1. For projects with estimated generation/production data in announcement, BW used average cost per production unit from similar projects to extrapolate capital investment.
2. For projects with anticipated jobs in announcement, BW used average cost per job from similar projects to extrapolate capital investment.
3. For projects without any data in announcement, BW used average cost of all similar projects to extrapolate capital investment.

Operations phase investment extrapolations relied on secondary data by sector to create OPEX to CAPEX investment ratios that were applied to each sector's capital investments. The OPEX to CAPEX investment ratios are detailed in the table below, along with the source for the assumptions.

Sector	Project Type	OPEX to CAPEX Ratio	Source
Solar	Generation	20%	COMED – E3 Solar cost data[a]
Solar	Manufacturing	10%	NREL solar cost benchmarking[b]
Wind	Generation	36%	Internal review of wind manufacturing operating costs
Wind	Manufacturing	21%	NREL JEDI land-based wind model
EV	Installation	N/A	N/A – no projects in this model

a https://www.ethree.com/wp-content/uploads/2022/12/E3-Commonwealth-Edison-Decarbonization-Report.-December-2022.pdf
b https://www.nrel.gov/docs/fy19osti/72134.pdf

Sector	Project Type	OPEX to CAPEX Ratio	Source
EV	Manufacturing	10%	UC Davis – Cost Structure of an ICEV and a BEV[c]
Electric T&D	Generation	9%	COMED – E3 Charging infrastructure cost data[d]
Electric T&D	Manufacturing	16%	Internal review of EV charger manufacturing operating costs
Battery Storage	Generation	14%	COMED – E3 Battery Storage cost data[e]
Battery Storage	Manufacturing	10%	Large-scale battery cell manufacturing operational costs[f]
Clean Fuels	Generation	8%	NYSERDA JTWG Jobs Study – E3 Hydrogen cost data[g]
Clean Fuels	Manufacturing	8%	NYSERDA JTWG Jobs Study – E3 Hydrogen cost data[h]

Economic Impact Modeling Assumptions

The research team used IMPLAN and NREL's JEDI modeling software to estimate the economic impacts reported in this analysis. To do so, the research team developed economic impact models specific to each sector, project type, and investment phase; the details of which can be found in the tables below.

Sector	Project Type	Phase	Modeling Assumptions
Solar	Manufacturing	CAPEX	IMPLAN 51 – Construction of new manufacturing structures
Solar	Manufacturing	OPEX	IMPLAN 307 – Semiconductor and related device manufacturing
Solar	Generation	CAPEX	IMPLAN 52 – Construction of new power and communication structures – Adjusted spending patterns for Solar
Solar	Generation	OPEX	IMPLAN 60 – Maintenance and repair construction of nonresidential structures – Adjusted spending patterns for Solar
Wind	Manufacturing	CAPEX	80% in IMPLAN 51 – Construction of new manufacturing structures, 20% in IMPLAN 395 – Wholesale – Machinery, equipment, and supplies
Wind	Manufacturing	OPEX	IMPLAN 281 – Turbine and turbine generator set units manufacturing
Wind	Generation	CAPEX	NREL's JEDI land-based wind model
Wind	Generation	OPEX	NREL's JEDI land-based wind model
EV	Manufacturing	CAPEX	IMPLAN 51 – Construction of new manufacturing structures
EV	Manufacturing	OPEX	Industry input based on employment in relevant industries – see table below
EV	Installation	CAPEX	N/A – no projects in this model
EV	Installation	OPEX	N/A – no projects in this model

c https://steps.ucdavis.edu/wp-content/uploads/2018/02/FRIES-MICHAEL-An-Overview-of-Costs-for-Vehicle-Components-Fuels-Greenhouse-Gas-Emissions-and-Total-Cost-of-Ownership-Update-2017-.pdf

d https://www.ethree.com/wp-content/uploads/2022/12/E3-Commonwealth-Edison-Decarbonization-Report.-December-2022.pdf

e Ibid

f https://www.sciencedirect.com/science/article/pii/S0925527320303315

g https://www.bwresearch.com/docs/BWR_NY-JTWG-JobsStudy2021.pdf

h Ibid

Sector	Project Type	Phase	Modeling Assumptions
Electric T&D	Manufacturing	CAPEX	IMPLAN 51 – Construction of new manufacturing structures
Electric T&D	Manufacturing	OPEX	50% in IMPLAN 283 – Mechanical power transmission equipment manufacturing, 50% in IMPLAN 336 – Other communication and energy wire manufacturing
Electric T&D	Generation	CAPEX	IMPLAN 52 – Construction of new power and communication structures
Electric T&D	Generation	OPEX	IMPLAN 47 – Electric power transmission and distribution
Battery Storage	Manufacturing	CAPEX	IMPLAN 51 – Construction of new manufacturing structures
Battery Storage	Manufacturing	OPEX	IMPLAN 333 – Storage battery manufacturing
Battery Storage	Generation	CAPEX	IMPLAN 52 – Construction of new power and communication structures – Adjusted spending patterns for Battery Storage
Battery Storage	Generation	OPEX	IMPLAN 60 – Maintenance and repair construction of nonresidential structures – Adjusted spending patterns for Battery Storage
Clean Fuels	Manufacturing	CAPEX	IMPLAN 51 – Construction of new manufacturing structures
Clean Fuels	Manufacturing	OPEX	See table below
Clean Fuels	Generation	CAPEX	See table below
Clean Fuels	Generation	OPEX	IMPLAN 46 - Electric power generation - All other

Share of Total EV Manufacturing Capital Investment	IMPLAN Industry Code
5%	194 – Tire manufacturing
24%	340 – Automobile manufacturing
4%	342 – Heavy duty truck manufacturing
5%	343 – Motor vehicle body manufacturing
6%	347 – Motor vehicle gasoline engine and engine parts manufacturing
6%	348 – Motor vehicle electrical and electronic equipment manufacturing
5%	353 – Motor vehicle steering, suspension component (except spring), and brake systems manufacturing

Share of Total EV Manufacturing Capital Investment	IMPLAN Industry Code
8%	349 – Motor vehicle transmission and power train parts manufacturing
7%	350 – Motor vehicle seating and interior trim manufacturing
8%	351 – Motor vehicle metal stamping
15%	352 – Other motor vehicle parts manufacturing
3%	339 – All other miscellaneous electrical equipment and component manufacturing
4%	330 – Motor and generator manufacturing

Share of Clean Fuels Investments	IMPLAN Industry Code
58%	307 – Semiconductor and related device manufacturing
14%	236 – Fabricated structural metal manufacturing
17%	336 – Other communication and energy wire manufacturing
11%	52 – Construction of new power and communication structures

APPENDIX IV:
Glossary of Economic Impact Terms/Definitions

Employment and economic impacts for both construction and operational phases of a project are divided into direct, indirect, and induced effects across the local economy. This section provides an overview of the types of economic impacts discussed in the findings.

- **Direct effects** show the change in the economy associated with the initial job creation and initial economic activity. For the purposes of this research, direct jobs range from construction workers involved in building and improving the manufacturing facility to production, sales and administrative employees in the operations and management phase.
- **Indirect effects** include all the backward linkages or the supply chain responses resulting from the initial direct economic activity. An example, an indirect job added to the local economy would be a new worker at a lumber mill hired to handle the increased demand for construction lumber that results from the initial investment.
- **Induced effects** refer to the effects of increased household spending and are the result of direct and indirect workers spending their wages within the local economy. An example of an induced job would be a local restaurant hiring more staff because construction workers during the construction phase and factory workers during the operations phase have new disposable income and eat at this local restaurant.

Other terms used are:

Capital Investments	Initial short-term investments made by announced projects to begin the project process. This includes the purchase of necessary manufacturing and electric generation, transmission, distribution, and storage equipment, and the construction and retrofitting of facilities.
Operational Expenditures	Annual investments made by announced projects to support the manufacture of products, and operations and maintenance of electric generation, transmission, distribution, and storage systems for the lifetime of the projects. This takes the form of worker wages, intermediate goods of production, and other supply chain purchases.
Labor Income	The total payroll cost paid to employees (wages, salaries, benefits, payroll taxes) and payments received by self-employed individuals.
GDP/Value Added	Gross output less intermediate inputs. This is equivalent to Gross Domestic Product (GDP) for national outputs and Gross State Product (GSP) for state-level outputs. This is the net economic activity generated by the construction or operations of developments, less the cost of input materials to avoid double-counting economic activity.

Endnotes

1 https://e2.org/reports/clean-economy-works-economic-impact-report-2023/

2 Using the 2013 USDA Rural-Urban Continuum Codes, a rural county is defined as scoring a 4 or above. https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/

3 https://www.dispatch.com/story/business/automotive/2023/02/28/ev-battery-plant-in-fayette-county-to-employ-2200-workers/69933524007/

4 https://www.electrive.com/2023/01/24/nissan-invests-in-e-mobility-production-in-the-usa/

5 https://www.entergynewsroom.com/news/entergy-arkansas-announces-250-mw-solar-facility-near-osceola/

6 Estimate made using the IMPLAN contribution analysis event, the Forestry, forest products, and timber tract production industry (IMPLAN Code 15) generates $822 million in tax revenue annually.

7 Estimate made using the IMPLAN contribution analysis event, the Mining machinery and equipment manufacturing industry (IMPLAN Code 263) generates $710 million in tax revenue annually.

8 https://www.eesi.org/articles/view/usda-investments-in-clean-energy-for-rural-businesses

9 https://www.rd.usda.gov/media/file/download/usda-rd-reap-chart-11-01-2023.pdf

10 Ibid.

11 https://www.electric.coop/electric-cooperative-fact-sheet

12 See summary note under USDA Rural Development for New Era on all USDA state fact sheets, e.g. https://www.nrcs.usda.gov/sites/default/files/2023-11/ira-climate-alabama.pdf

13 https://www.nrcs.usda.gov/sites/default/files/2023-11/ira-climate-kentucky.pdf (as of 12/11/23)

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18 https://www.usda.gov/media/press-releases/2023/09/27/usda-sees-record-demand-advance-clean-energy-rural-america-through#:~:text=More%20than%2050%25%20of%20letters%20of%20interest%20submitted%20indicate%20they%20will%20serve%20distressed%2C%20disadvantaged%2C%20energy%20or%20Tribal%20communities.%20If%20selected%20for%20funding%2C%20one%20applicant%20said%20it%20expects%20its%20proposed%20clean%20energy%20investments%20to%20save%20each%20household%20in%20its%20service%20area%20%24700%20per%20year.

19 https://www.electric.coop/electric-cooperative-fact-sheet

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