

# **Workforce development needs to support a successful implementation of IRA**

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## **ABSTRACT**

Aiming to catalyze investments in domestic manufacturing capacity, the Inflation Reduction Act (IRA) set the stage for U.S. manufacturers to create more well-paying jobs in the rising green industries (e.g., solar, electric vehicles, batteries, heat pumps) and in the transformation of more conventional industries (e.g., semiconductor, steel, concrete, chemicals). A recurring issue facing the industry is adequacy of the workforce to continue current operations or to expand production. To make the most of the unprecedented funding Congress has provided, we need to deploy programs that can create a workforce to maintain and grow U.S. manufacturing. To develop effective, targeted programs, we will need to first understand the gaps and the demand. For example, manufacturing facilities are eligible only for full IRA tax credits if they meet prevailing wage and apprenticeship requirements. Are the existing apprenticeship programs adequate to meet the needs of those manufacturers? What are the needed skillsets? The workforce landscape varies from state to state and from industry to industry. This paper provides a landscape analysis to answer these questions, focused on the current federal strategies to support workforce development, using case studies of how workforce needs for battery electric vehicles (BEV) manufacturing vary across multiple states. This paper closes by recommending strategies to enhance workforce education and training to broaden the pool of skilled workers.

## **Introduction**

The Inflation Reduction Act of 2022 (IRA) is the largest investment ever made by the federal government to decarbonize our economy and combat climate change. Its \$370 billion in appropriations over the next decade has the potential to scale up the green transition in all corners of the country. This effort is projected to decrease U.S. net greenhouse gas (GHG) emissions by 32-43% and generate an average of 912,000 jobs per year over the next decade (Pollin, Lala, and Chakraborty 2022). However, given the far-reaching effect this legislation will have on all aspects of our economy, not just manufacturing, it raises a question: Will there be enough workers to do the work? As new battery plants are constructed, who will operate those assembly lines? When the EV charging network is expanded, who will do the installation? The size and capabilities of our workforce may be the single biggest obstacle to achieving the full potential of this legislation (Colman 2023).

To that end, we need a comprehensive view of workforce development from both the supply side and the demand side. How do we grow the pool of workers with the technical skills required for these jobs—which can be a multi-year process—while also ensuring that we are anticipating the correct level of demand from the business community? One strategy that we explore is building flexible skills into the training that this new class of manufacturing workers will receive, so that workers can adapt to the needs of employers in a variety of positions. Industrial employers, labor, the communities that host these jobs, educators, regional development groups, and every level of government should be involved. This paper focuses on the role the federal government plays in supporting these manufacturing workforce stakeholders to ensure that as the IRA plans are implemented, job benefits are equitable and communities have the support they need to navigate this economy-wide transition.

## **What are our workforce needs?**

Over the next decade, manufacturers anticipate that they will need 4 million workers to fill newly created manufacturing jobs at all levels of the supply chain. However, at present, with manufacturing jobs openings already elevated (Figure 1), manufacturers expect to staff only 1.9 million of those openings (Manufacturing Institute 2022). If we can fill only half of our factory floors, what products are companies not able to produce? To meet the full workforce needs of the manufacturing sector—and maximize the promise of the IRA—stakeholders at all levels need to essentially double their training, recruiting, and onboarding pipelines.

Investments from the recent federal legislation are already ramping up across the country. In the eight months since the passage of the IRA and CHIPS Act, companies have committed more than \$200 billion to large-scale manufacturing projects. These investments represent a significant increase in the pace of capital improvement projections and are projected to create at least 82,000 jobs (Allen 2023). This trend is reflected across other sectors of the clean energy economy as well; in the months since the IRA passed, utility-scale clean energy investments have equaled more than all the investments from 2017 to 2021 combined (American Clean Power 2023). Data points like these show that the business community recognizes the opportunity in this first step—the new sustained demand for clean energy to support a decarbonizing economy. Now we have to sort out the second step of staffing new facilities and expanded production lines.

Part of the challenge posed by our workforce gap is that the training and skills required within a decarbonized Industry 4.0 are different than the skillsets that have been required in the past. A McKinsey report shows that 23% of work hours will potentially be automated by 2030. Up to a third of the U.S. workforce may need to learn new skills or find work in new occupations (McKinsey Global Institute 2017). With the growing demand for digital skills, manufacturing jobs are overlapping with other industries like tech and creating competition for qualified

workers (Manufacturing Institute and EY 2022). Standing up new construction and manufacturing workflows also places a premium on adaptable workers who can identify efficiencies and problem solve on the shop floor. Sixty-five percent of manufacturers are finding that skills needed for changing job roles in their facilities are outpacing their current workforce (Manufacturing Institute and EY 2022).

Most clean energy technologies implemented in manufacturing, like industrial heat pumps, are customized to the specifications and layout of a factory. These aren't one-size-fits-all solutions, and workers need to be flexible and able to problem solve to ensure that the technology is working as it should. An improperly installed industrial heat pump could translate to tons of emissions and increased costs for the manufacturer. Our workforce solutions need to address both the quantity *and quality* of workers needed to fully deliver on the promise of the IRA.

Although manufacturing is currently experiencing workforce shortages, there are already many organizations, educational networks, and stakeholders committed to building a workforce to meet the needs of industry. Federal resources like the Workforce Innovation and Opportunity Act (WIOA) programs, Registered Apprenticeships Programs (RAPs), and more localized technical and development resources spread across stakeholders such as state agencies, community-based nonprofits, and organized labor present proven ways to address workforce shortages and training needs.

In many ways, the influx of federal funding for industry is an opportunity for experimentation and a reevaluation of the structure of the workforce development landscape. Most of the current workforce development resources lack an explicit decarbonization lens and may struggle to prepare workers for our rapidly evolving clean energy manufacturing landscape. To successfully kickstart the implementation of the IRA vision of a domestic clean energy economy, we will need to embed new operational paradigms in how we do our work. For example, classic energy efficiency strategies will need to be integrated into a broader carbon management framework; supply chains must be retooled to reduce the embodied carbon in manufactured goods and raw materials; and new technologies (e.g., industrial heat pumps) will have to be built, installed, and maintained by a trained workforce to replace legacy fossil fuel-fired industrial equipment. Splitting the responsibility for training tomorrow's industrial workforce across so many agencies and stakeholder groups risks diluting the core vision of a decarbonized economy and may miss opportunities to develop the flexible, forward-looking workforce of the future that we will need to sustain.



Figure 1. U.S. Manufacturing Job Openings. *Source:* Federal Reserve Economic Data (FRED).

## Federal Workforce Development Strategies

Despite the fact that workforce requirements undergird all the core IRA implementation strategies, the IRA lacks targeted funding specifically for addressing the rapidly growing and changing needs for workforce development. Workforce development in the legislation is limited to certain energy tax credits and roughly \$4.5 billion in programmatic funding that is eligible—but not specifically earmarked—for workforce development (Evans 2022). The limited funding for targeted workforce development in coordination with the IRA’s manufacturing investments puts pressure on our existing national workforce development resources to meet the moment, which is a tall order given the staffing shortages we are already facing. The Department of Energy (DOE) is responsible for implementing the bulk of the industrial manufacturing- and decarbonization-focused programs and funding distribution strategies through the IRA, with industrial decarbonization efforts split across at least 10 offices (Figure 2).

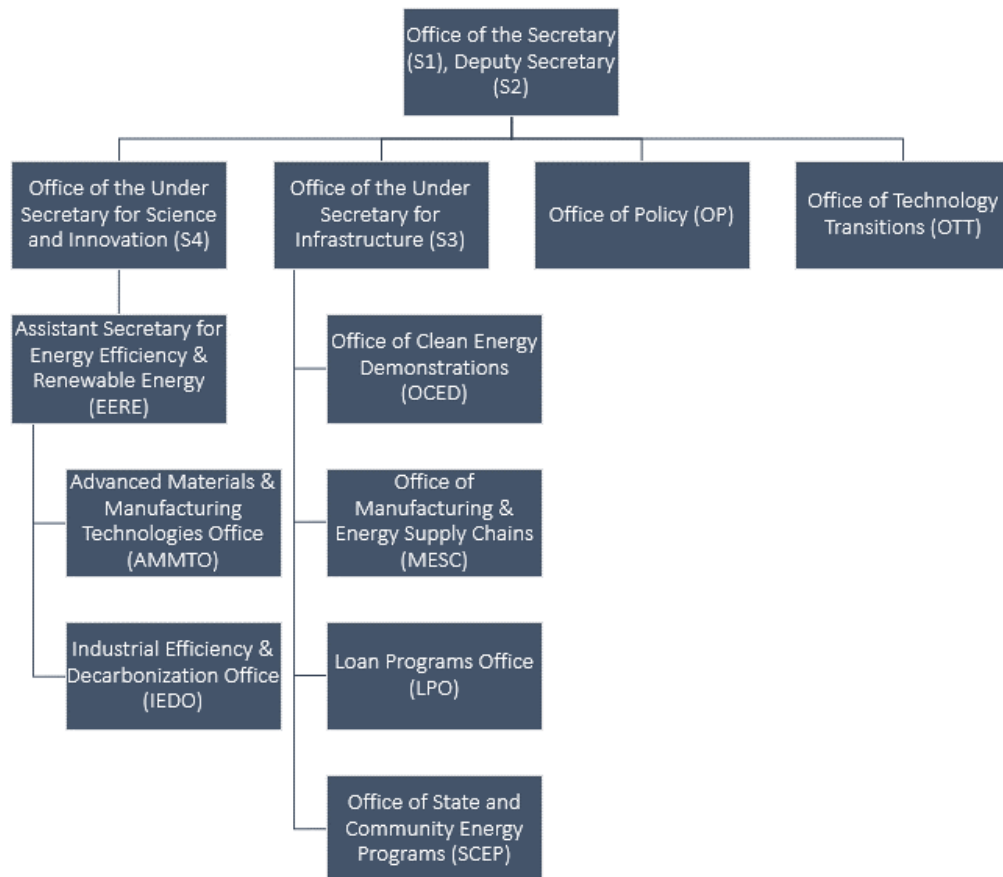


Figure 2. DOE office hierarchy, showing some of those engaged in manufacturing workforce development efforts. *Source:* DOE

These include offices within the new Energy Efficiency and Renewable Energy (EERE) division, as well as offices organized through the Office of Manufacturing Energy and Supply Chains (MESC). In addition, the cross-cutting Office of Policy (OP) and Office of Technology Transitions (OTT) play a vital role in coordinating actions relevant to all programs. The recent institutional reorganization of DOE, announced in early 2022, is meant to organize basic research and clean energy innovation apart from strategic deployment and commercialization efforts, while still supporting cross-office collaboration. New offices were also created to focus on core integrative issues, combining basic research and deployment for targeted areas.

However, no single office has been tasked with centrally organizing questions and needs around workforce development. Rather, budget allocations from FY23 and the agency's proposed

budget for FY24 split clean energy and industrial decarbonization workforce needs across a wide variety of offices within DOE (Table 1). These offices differ in their target stakeholders and workforce-related mandates; in general, the workforce-related goals and activities that DOE offices are currently mandated to take part in include developing workforce trainings, coordinating workforce efforts within and across federal agencies, and providing strategic workforce guidance and analysis to stakeholders both within and outside of federal government, as shown in Table 1. Workforce initiatives are not clearly defined for the Loan Programs Office (LPO), although loans could potentially support a range of workforce needs related to industrial manufacturing technologies. Within the Office of Clean Energy Demonstrations (OCED), workforce requirements and funding are included in funding opportunity announcements (FOA), which require applicants to develop comprehensive strategies around workforce development.

Office	Ongoing manufacturing workforce development work	Workforce Focus			
		Training	Coordination	Analysis	Other
Assistant Secretary for Energy Efficiency & Renewable Energy (EERE)	<ul style="list-style-type: none"> <li>Crosscutting work to develop more robust and diverse workforce training opportunities throughout EERE programs to build a pipeline for permanent, good-paying jobs for the clean energy workforce.</li> </ul>	X			
Advanced Materials & Manufacturing Technologies Office (AMMTO)	<ul style="list-style-type: none"> <li>Works with S3 on RD&amp;D and workforce development efforts to maximize economy-wide decarbonization and energy efficiency and enable secure, sustainable, and resilient domestic supply chains.</li> <li>Trains the manufacturing workforce of the future through regional education initiatives, Manufacturing USA Institute education and workforce development programs, and the Lab Embedded Entrepreneurship Program (LEEP).</li> <li>Developing a manufacturing workforce development roadmap.</li> </ul>	X			
Industrial Efficiency & Decarbonization Office (IEDO)	<ul style="list-style-type: none"> <li>Includes manufacturing workforce opportunities for training, technical assistance, and development in programs (like Better Plants Challenge, Better Climate Challenge, and the Combined Heat and Power (CHP) Deployment Program). Within these programs, there is an emphasis on diversity and inclusion, and reskilling programs that will be specifically targeted toward underserved communities, energy communities, and tribal communities to aid in their transition to the clean energy economy.</li> <li>Coordinates on workforce development activities with Department of Labor (DOL) and Department of Commerce (DOC), including a strong collaboration with DOC's Manufacturing Extension Partnerships.</li> </ul>	X	X		
Office of the Under Secretary for Infrastructure (S3)	<ul style="list-style-type: none"> <li>Coordinates with AMMTO on RD&amp;D and workforce development efforts to maximize economy-wide decarbonization and energy efficiency and enable secure, sustainable, and resilient domestic supply chains.</li> </ul>		X	X	X
Office of Clean Energy Demonstrations (OCED)	<ul style="list-style-type: none"> <li>Requires comprehensive workforce development plans in all OCED's funding opportunities, including in IJA and IRA funding opportunities like the Industrial Demonstrations Program.</li> </ul>				X
Office of Manufacturing & Energy Supply Chains (MESOC)	<ul style="list-style-type: none"> <li>Oversees the Industrial Assessment Center (IAC) program, which trains the next generation energy workforce by providing on-site, practical experience applying engineering, environmental, and technological expertise to small and mid-sized domestic manufacturers. MESOC's diversity efforts target nontraditional engineering students for workforce training opportunities.</li> </ul>	X			
Loan Programs Office (LPO)	<ul style="list-style-type: none"> <li>LPO provides access to needed loans and loan guarantees to innovative and high-impact energy technologies when private lenders cannot or will not until a given technology has reached full market acceptance. Through this, LPO supports domestic manufacturing investments and their workforce.</li> </ul>				X
Office of State and Community Energy Programs (SCEP)	<ul style="list-style-type: none"> <li>State Energy Program (SEP) works with NREL to create state-by-state and U.S. territory forecasts for clean energy jobs. NREL is also developing a State Clean Energy Workforce Development Program Evaluation Framework that states will be able to use for their programs.</li> <li>Incorporates EJ and clean energy workforce development outcomes in local and state energy program planning.</li> </ul>			X	
Office of Policy (OP)	<ul style="list-style-type: none"> <li>The Office of Energy Jobs within OP leads efforts to align energy workforce development programs with job goals across DOE.</li> <li>Manages the 21st Century Energy Workforce Advisory Board, to provide recommendations on DOE's strategy in support of current and future energy sector workforce needs.</li> <li>Publishes the annual U.S. Energy and Employment Report.</li> </ul>		X	X	X
Office of Technology Transitions (OTT)	<ul style="list-style-type: none"> <li>Provides specialized tools, training, analysis, workforce development, and programs to improve the successful transition of technology from proof of concept to prototype to demonstration and, ultimately, market deployment.</li> </ul>	X		X	X

Table 1. DOE office ongoing and proposed manufacturing workforce development efforts. Source: DOE FY24 Budget Justification

Workforce training efforts are the most common funding allocation directive across DOE. These include well-established DOE-run programs for engaging with the industrial workforce, such as Better Plants and Better Climate (through IEDO). There are also investments in regional educational institutions, such as the network of Industrial Assessment Centers (IAC), through MESC, and trainings specifically focused on workforce needs related to commercialization and transition of technologies (OTT). IACs have in the past been able to help small and medium-sized industrial plants that lack dedicated energy managers find ways to save money by improving the plant's energy efficiency. At the same time, the program trains the next generation of energy engineers, preparing students for jobs as energy efficiency professionals and developing a pipeline for employers in the future (U.S. Climate Alliance and ACEEE 2022). The Infrastructure Investment and Jobs Act of 2021 (IIJA) included \$150 million to expand the IACs program to additional areas and create Regional Centers of Excellence within the existing IAC network to amplify the program's impact. As federal energy management goals expand to support not just energy efficiency but decarbonization, IACs have an opportunity to broaden their scope and train energy professionals to take a climate-focused approach to energy efficiency, working to reduce both overall energy usage and carbon emissions.

It will be important to coordinate training program efforts across offices; for example, IEDO implements workforce training and development and coordinates across federal agencies to better leverage federal resources in support of building a diverse and well-prepared workforce. Cross-cutting offices such as OP, OTT, and the Office of the Under Secretary for Infrastructure (S3) also are mandated to provide strategic analysis and guidance around workforce development strategies. A challenge going forward will be to ensure that DOE-funded training programs are aligned with future-looking best practices. This may be especially challenging across regionally dispersed training centers, such as the IACs, where local stakeholder needs co-shape programming. Only one workforce-focused office (SCEP) is explicitly tasked with coordinating strategic workforce plans state by state; however, SCEP's workforce efforts have largely focused on buildings because of the IRA workforce provisions dedicated to the building sector. Given the diversity of industrial sector needs, as well as the highly variable state and local governmental strategies and priorities, explicit incorporation of a more regionalized planning approach to workforce development may be necessary across all DOE offices. It will be an ongoing challenge for DOE to be flexible in its implementation of workforce programming while also providing clear guidance and goal setting. The development of a manufacturing workforce development roadmap, a stated goal of AMMTO, may be one vital step towards achieving this.

There are several other federal workforce programs, outside of DOE, that may be able to provide essential platforms for delivering the needed federal support for building a clean energy manufacturing workforce. They include programs like WIOA, Registered Apprenticeship Programs (RAP), and the Good Jobs Challenge. Located in the Department of Labor, WIOA is



the primary federal workforce development program; it coordinates workforce training through a network of approximately 3,000 One-Stop centers. These centers are overseen by a local Workforce Development Board that develops curriculum and programming to provide training and employment opportunities responsive to the region's business needs. For instance, in Ohio, WIOA's One-Stop centers are helping to prepare the region to meet the demand of Intel's new semiconductor fabrication plant (Muro, Brachman, and You 2023). To ensure that every factory and region in the country can develop the needed workforce support resources, however, it may not be enough to simply disperse funds to local centers and allow each local workforce strategy to develop through local partners. Federal support may be needed to play a greater role in coordinating efforts across government entities and ensuring that lessons learned from other sites are applied where they are most needed.

In addition to WIOA, the Department of Labor's (DOL) RAPs train workers with a combination of paid on-the-job training and classroom instruction. These are developed with industrial partners and registered through either the DOL or a State Apprenticeship Agency (SAA). The IRA elevates the role for RAPs by requiring a certain number of qualifying apprentices on job sites and imposing certain prevailing wage requirements to unlock the full amount of a funding applicant's eligible tax credit. The benefits to workers enrolled as apprentices are paid work experience, a portable, nationally recognized credential, and progressive wage increases. For those who complete the program, 93% are employed upon completion and earn an average starting wage of \$77,000 annually (White House 2022). For employers, RAPs create a pipeline of qualified candidates with skills tailored to the specific manufacturing work they're doing, saving time and money down the line. Studies have shown that employers receive \$1.47 in benefits for every dollar spent on RAPs through higher revenue, increased productivity, and worker retention (White House 2022).

Because these programs are industry led, expansion under the IRA presents an opportunity to prioritize in workforce training skills that are lacking in the current workforce. RAPs could expand to support increased need for machinists, tool and die makers, industrial engineering, mechatronics—even software developers (Farrell and Lawhorn 2022). RAPs have been most widely adopted by the construction trades, but there are numerous active and growing apprenticeship programs that can be used as models geared to the needs of modern manufacturing.

The Department of Commerce's Economic Development Administration's (EDA) Good Jobs Challenge provides another template for a regionally integrated training program that can bolster our clean energy workforce. Created by the American Rescue Plan Act of 2021, the Good Jobs Challenge is a \$500M investment in sectoral partnerships between industries and workforce training programs across the country. These partnerships place participants on a training track with companies committed to providing good-quality jobs, wraparound support services, and developing in-demand skills. The strength of the Good Jobs Challenge's program design is the

requirement for a backbone organization that can coordinate regional stakeholders like business chambers, organized labor, community-based organizations, community colleges, and technical schools. These backbone organizations help ensure that training programs meet the needs of the local business community and that participants have the support they need to complete the program.

## **Electric Vehicle Manufacturing Case Studies**

The transition to battery electric vehicle (BEV) from internal combustion engine (ICE) manufacturing is an opportunity for federal policy makers to identify and address workforce challenges and solutions necessary to support a growing new industrial manufacturing sector, and strategically coordinate efforts across a variety of stakeholder groups. To drive consumer demand for BEVs and help meet GHG reduction goals, Congress included funding to build out the national BEV charging grid in the IIJA and in the IRA extended a tax credit of \$7,500 for the purchase of new BEVs. This has spurred considerable investment in new BEV and battery manufacturing facilities and the conversion and retooling of existing auto manufacturing plants to support the BEV supply chain (Alliance for Automotive Innovation 2023a). Since 2015, a total of \$120 billion has been invested in BEV manufacturing in the United States, but \$50.8 billion of that total has come in the six months since the IRA was passed. Just as capital investments have ramped up rapidly, associated new job creation has also accelerated; a total 143,000 new jobs are associated with BEV investments, with 46,400 (32%) coming in the first six months post-IRA passage (Environmental Defense Fund and WSP 2023).

Workforce limitations may, however, slow the expansion of BEV manufacturing. We must pay attention to supporting an equitable transition for workers in communities shifting from ICE to BEV manufacturing. BEV powertrains are mechanically much simpler than those of ICE vehicles; the lack of a transmission, exhaust systems, and gasoline fuel management systems means fewer moving parts. A factory producing a BEV requires approximately half the workers as those needed to assemble a traditional ICE vehicle (UAW 2020). Developing equitable plans for displaced workers is critical; while BEV assembly plants may need fewer workers, the regional demand for manufacturing essential supporting supply chain products like semiconductors, batteries, and steel will only increase, possibly allowing displaced autoworkers to transition to jobs that support BEV supply chains, with the right support (Li-Bridge 2023). If the manufacturing industry wants to address its workforce shortage issues, focusing on these transitioning workers is a good place to start. This requires extensive regional coordination, which is a role that the federal government may be able to fill.

Another challenge in the transition from BEV to ICE manufacturing is the rapid growth of BEV in U.S. regions where vehicle manufacturing does not have as long a history. While some automakers are investing in building new production lines and expanding BEV manufacturing facilities in the same location as pre-existing ICE manufacturing, others are

building new BEV facilities in greenfield locations outside the regions where the bulk of ICE vehicle investments occur. As case studies, we show how two states, Ohio and South Carolina, are working to support the automobile industry’s workforce needs as it transitions from ICE to BEV production lines. We selected these states to showcase the range of effective strategies across areas of the country and how workforce approaches will differ based on the characteristics of regional stakeholders. Many other states, including Michigan and Indiana in the Midwest and Alabama and Georgia in the Southeast, are also making substantial investments in their workforce programs. As BEV manufacturing investments continue, tracking the successes and lessons learned from each of these states will be essential.

**Automotive Company Plant Locations & Jobs Profile**

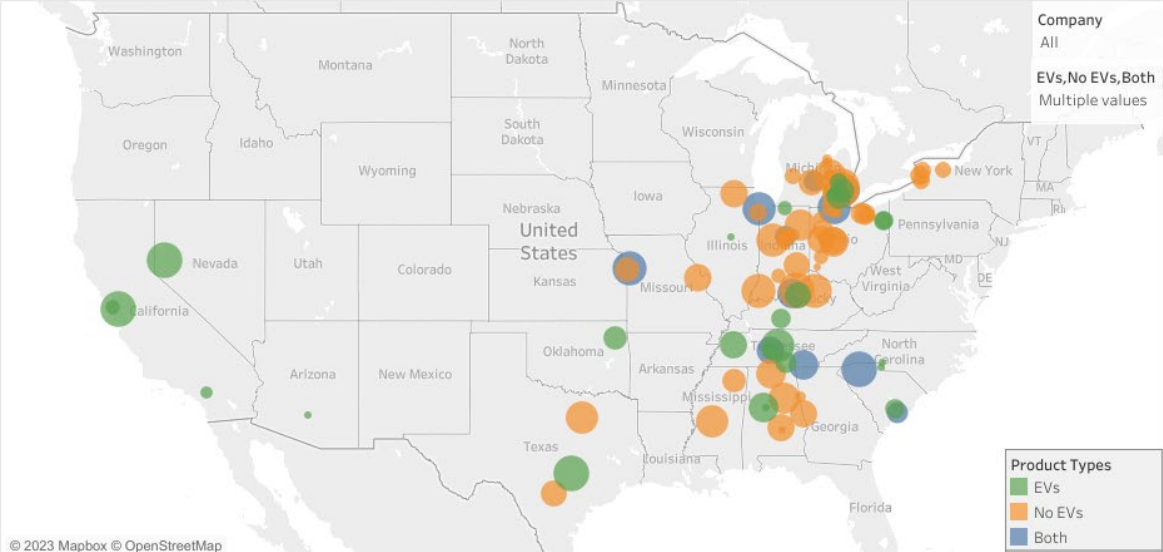


Figure 4. U.S. distribution of ICE and BEV auto manufacturing plants, highlighting the shift in BEV (here, marked EV) investments into the South and Southeast. *Source:* Third Way, April 2021.

**Ohio**

Ohio has a long history as a center of the auto industry in the United States. The state is the largest producer of ICEs and, with almost 200,000 jobs in the auto industry, has the nation’s second largest workforce in motor vehicle manufacturing (OEM assembly) and the second largest workforce in motor vehicle parts manufacturing (auto parts suppliers) (Alliance for Automotive Innovation 2023b). Challenges in Ohio are likely to center on helping to transition autoworkers into new jobs in the changing auto manufacturing ecosystem.

Communities across Ohio have decades of hard-earned experience navigating technology changes in the industry, plant closures, and the particular challenges of reskilling a manufacturing workforce. In 2019, General Motors closed its Lordstown assembly plant, which cost 1,500 people their jobs. For the Mahoning Valley's workforce in northeast Ohio, which includes Lordstown, Warren, and Youngstown, this closure was just the latest in a 40-year history of layoffs that began with regional steel mills shuttering (The Roosevelt Project 2022). These economic disruptions, which have been devastating for communities in the region, galvanized local action and led to the creation of a robust network of local and regional economic development groups and incubators focused on bringing new industry to the Mahoning Valley.

For displaced workers, imagine how different the experience of receiving training from a local development group versus a larger outside organization could be. Elevating local leadership during the IRA's implementation is a key part of ensuring that the energy transition is equitable and just. In many cases, to find these local leaders you don't need to look further than unions like the United Auto Workers (UAW), which are already heavily invested in Ohio's auto industry. Unions recognize the realities of the BEV transition and are developing solutions to preserve good jobs in communities that depend on ICE manufacturing (UAW 2020). In Ohio, allowing strong labor voices to continue to lead the transition from ICE to BEV manufacturing creates an opportunity to leverage additional funding through DOE, particularly in underserved and disadvantaged communities (MESC 2023).

Ohio can also serve as an example of leveraging local incubator groups like BRITE Energy Innovation or Youngstown Business Incubator (YBI) that are focused on creating an entrepreneurial business environment to attract companies of the future. The regional talent and expertise grew over decades in the automobile and steel industries. Since its inception, BRITE has assisted more than 600 startups in the region, creating more than 1,600 local jobs and generating more than \$230 million in investments (BRITE 2022). Tailored, local approaches like these can be successful because they leverage legacy infrastructure assets and tap into an entrepreneurial spirit that can have ripple effects in the community.

To connect local initiatives to a statewide network, community colleges across Ohio are developing curricula for these new jobs and advertising to interested workers in all parts of the state. This strategy includes a combination of short credential training programs to allow current workers to increase or refocus their skills (e.g., by gaining digital literacy certificates) and to a more comprehensive approach that aligns employer needs for new skills with training offered in existing engineering degree and certificate programs to build the workforce pipeline for future job needs in Ohio (Muro, Brachman, and You 2023).

Through Ohio's past economic transitions, it's clear that the state could invest more in proactive planning to help workers who lose their jobs because of a market change. Imagine if

provisions were in place for communities like those in Mahoning Valley during the steel plant and auto assembly closures to help them navigate their job loss and reskilling. Now, in these first months of IRA investment announcements, it's worth developing equity-based plans that elevate the voices of local stakeholders and hold both government and industry accountable to support communities through ongoing industry transitions. These plans could pull together organized labor, underserved and disadvantaged community groups, local governments, and workforce organizations to develop strategies to best take advantage of the IRA's investments, not just in the short term but for the long haul (The Roosevelt Project 2022). Ohio's use of trusted local economic development groups is building agility into the workforce development system. Identification of these successful practices and continued support from state and federal agencies to coordinate across stakeholder groups can ensure that workforce development needs will continue to be met in the state.

## **South Carolina**

Over the past several decades, South Carolina's auto manufacturing industry has grown to more than 500 companies, 72,000 autoworkers, and \$27 billion annually in economic impacts for the state (SC Commerce 2023). As the BEV manufacturing market expands, along with supporting industries like lithium batteries, leaders at the state level in South Carolina are now focused on how they can best capture these new investments. One strategy the state's decisionmakers are pursuing is to consolidate and coordinate economic and workforce development resources across state agencies to support this growing new industry.

To that effect, in 2022, Governor McMaster passed an executive order to create a SC EV Economic Development Initiative, which sets up interagency working groups to develop a comprehensive statewide plan to deploy BEV-related resources and address anticipated workforce issues. Steps this working group has taken include creating a supply-gap analysis of the BEV workforce in consultation with the business community, industry stakeholders, educators, and other state agencies (SC Executive Order No. 2022-31).

To reduce siloing of workforce resources between agencies, the state legislature is considering the Statewide Education and Workforce Development Act, which would create a new Office of Statewide Workforce Development in the state's Department of Employment and Workforce. The bill would also require annual reports linking the number of job openings with the number of qualified workers. The legislation passed the SC House with bipartisan support and is now in the SC Senate. With the implementation of the IRA, in addition to the IJJA, American Rescue Plan, CHIPS Act, and other large federal investments in just the past three years, allocating funding from these new programs efficiently is critical.

One stakeholder group that has been under-represented in South Carolina's workforce ecosystem is organized labor. The lack of a strong organized labor presence and lower wages in

South Carolina have been cited as reasons for moving some manufacturing plants out of the more heavily unionized Midwest (Resneck 2022). However, organized labor is a key partner for many federal industrial funding opportunities. Community benefits plans (CBP) are required for federal support for industrial technology and clean energy investments, including commitments around investing in workforce development and engaging with communities and labor.

A cornerstone of South Carolina's workforce strategy is a network of regional workforce advisors that work at the local level to bridge gaps between those who educate students and those in the business community who rely on a talented labor pool. With a streamlined funding mechanism for businesses, these regional workforce advisors can more easily stand up support programs and provide realistic timelines on workforce development to interested companies. It also comes back to training our workforce to be flexible—if state agencies aren't responsive to the new skills needed by companies, training curricula will be dated, less effective, and likely to lead to poorer outcomes for companies and their workers. South Carolina has been able to adapt its state workforce support programs to meet the changing needs of the auto industry by enacting strategic and centralized initiatives, coordinated by state agencies.

## **Conclusion**

The labor shortages we are facing today are both a challenge and an opportunity. If our nation continues to invest in manufacturing infrastructure without a corresponding focus on workers, we are not going to achieve our goals. Workforce development must be a pillar of our national strategy; it's imperative for the successful implementation of the IRA and for achieving the necessary national transformation to a clean energy economy.

While reliance on different workforce development strategies across different industrial sectors and in different regions of the country will be necessary, the federal government must still provide clear organizing principles and goals to ensure rapid, successful implementation of industrial manufacturing solutions. While many of the core workforce implementation programs are run through the DOL, an agency built to center workforce concerns, these programs may lack the explicit industrial decarbonization perspective provided by DOE. However, DOE workforce initiatives are split across many offices and to date lack a clear roadmap that integrates efforts. The workforce-related successes in Ohio and South Carolina are in large part the result of concerted efforts to coordinate workforce activities across multiple stakeholders. Rather than investing additional resources in training materials, DOE may need to focus on centralizing and streamlining federal workforce funding streams to encourage interaction between complementary programs and strategies.

Our country is in the first year of implementing the IRA. Looking toward the future, we should revisit workforce development programs and the agencies that run them to look for

efficiency opportunities and improvements, as well as strong examples of successful workforce ecosystems that have developed in specific manufacturing sectors and regions of the country. If we grow complacent with workforce programs that worked in year one of the IRA, they will not be responsive to workforce needs five years from now.

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