

GOOD JOBS AT ULTIUM CELLS IN WARREN, OHIO

A Case Study on the Nation's First Unionized EV Battery Cell
Manufacturing Plant

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Contents

Acknowledgments.....	3
Disclaimer and Copyright Notice	3
Executive Summary.....	4
Introduction	5
About the Facility and Community	7
Ensuring Good Jobs.....	10
Unionization Efforts	11
The Importance of Good, Local Jobs.....	12
Public Funding for the Facility	14
Federal Support for the Facility.....	14
State and Local Support for the Facility.....	15
Supply Chain Connections and Agreements	15
Community Impacts.....	18
Economic Impacts of Deindustrialization in the Mahoning Valley.....	18
Economic Benefits of the Ultium Facility.....	21
Training and Workforce Development	22
Conclusion.....	23
Appendix A : Methodology	24
References	25

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Executive Summary

This case study summarizes findings from an analysis conducted by Atlas Public Policy (Atlas) about the Ultium Cells (Ultium) facility in Warren, Ohio. This case study aims to understand the impact of the facility on workers, the community, and the electric vehicle (EV) supply chain in the United States. Atlas conducted research, toured the facility itself, and interviewed 11 employees in various roles and levels of seniority at the facility as well as government officials, a chamber of commerce representative, an academic, and a local United Auto Workers (UAW) President. Key findings from this case study include:

- **Inside the Ultium facility, it was clear that Ultium embodies modern manufacturing, marked by a clean and technologically advanced atmosphere that employees called “spaceship-like.”** As a visitor, there was a feeling of witnessing a highly advanced operation.
- **The workers, most of whom were operating computers rather than physically handling tools or materials, came across as focused experts.** Indeed, these workers spoke about how they had spent a considerable amount of time training to become experts in their roles.
- **Interviews with workers and the local UAW President provided insights into how the facility’s unionization in December of 2022 and full collective bargaining agreement in June 2024 were integral to creating good jobs at the facility.** The UAW contract establishes a 63 percent increase in the starting wage, ensures a 30 percent raise over three years, and provides good benefits as well as other key provisions to enhance workplace safety and quality of life.
- **The value of good jobs was particularly noteworthy in an area that has seen a sustained decline in manufacturing over the past few decades with limited other prospects for good jobs.** Workers emphasized that without the Ultium facility, they would have had to move away from their homes for even the chance at a similarly fulfilling, well-paying job with good benefits.

The Youngstown-Warren-Boardman Metropolitan Statistical Area (MSA), where the Ultium facility is located, has a long history in the automotive industry, including the closure of General Motors’ Lordstown facility in 2019. The closure resulted in the loss of 1,600 jobs on top of 2,750 jobs that had been lost in shift cuts since 2016. Everyone Atlas interviewed emphasized the significance of the revitalization the Ultium facility is bringing to the community.

Ultium Cells Ohio is a \$2.6 billion joint venture between General Motors (GM) and LG Energy Solution (LGES). The companies announced their plans for the facility in December 2019

and, as of June 2024, there are nearly 2,200 hourly and salaried workers on site, surpassing Ultium's employment expectations when they first announced the facility. Support from the federal government, including a \$2.5 billion loan from the Department of Energy's Loan Programs Office and tax credits from the Inflation Reduction Act, have been and will be essential to the construction and growth of Ultium Cells facilities in Ohio, Tennessee, and Michigan. Ultium has become part of a broader onshoring of the EV supply chain and has established domestic supply chain agreements for the sourcing of production materials and offloading of battery waste and scrap for recycling and reuse.

This case study provides further details on how the Ultium facility, with support from the federal government, is revitalizing a disinvested part of the country and helping to establish a domestic EV supply chain.

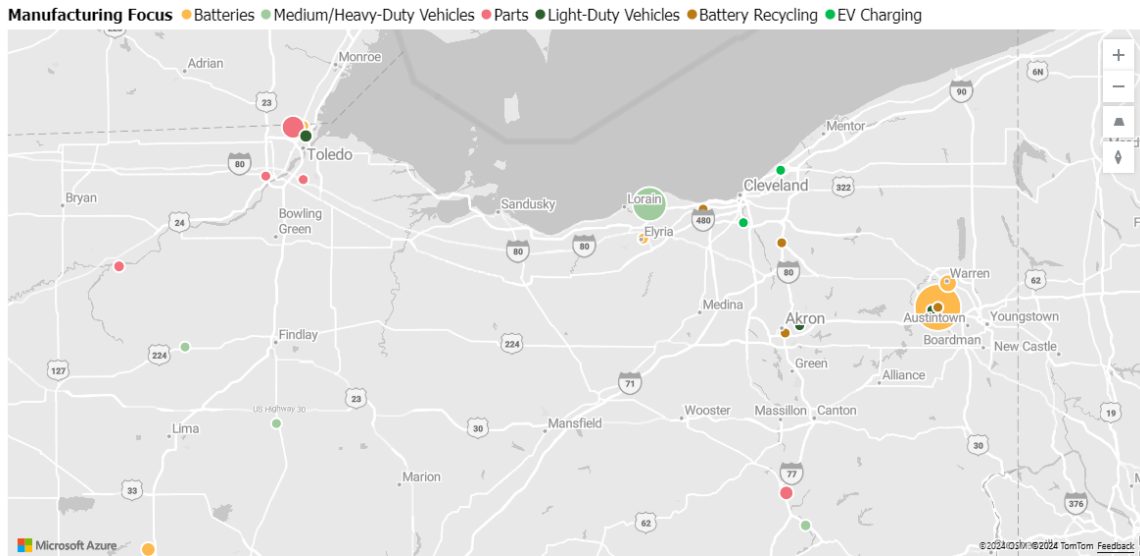
Introduction

In Q1 2024, nine percent of all new light-duty vehicle sales in the United States were electric, up from just three percent in Q1 2021 [1]. Facilities around the country are gearing up to supply this growing EV demand. Companies have announced \$205 billion in EV and EV supply chain manufacturing investments in the United States, three quarters of which have been announced since the passage of the Infrastructure Investment and Jobs Act (IIJA) in November 2021, per the EV Jobs Hub [2]. All-time investments are expected to deliver 238,000 manufacturing jobs across more than 490 facilities, as of the original announcement date.

One of the more than 490 facilities is Ultium Cells in Warren, Ohio. The facility is located about halfway between Cleveland and Pittsburgh, in North-East Ohio, see Figure 1. This region has a long history of auto manufacturing. GM made vehicles in the community from 1966 until 2019, when the company closed its Lordstown, Ohio facility as the Chevrolet Cruze went out of production [3]. This facility had manufactured more than two million Cruze vehicles since 2011 [3]. The closure resulted in 1,600 people losing their jobs at the facility. These workers were offered transfers to other GM facilities per the UAW-GM National Agreement, including facilities in state and out of state. GM relocated 1,300 hourly employees [4]. This was on top of shift cuts in 2016 and 2018 that impacted 1,250 and 1,500 employees respectively [5] [6].

Good Jobs at Ultium Cells in Warren, Ohio

Figure 1: Area Map of Northeast Ohio



The Ultium Cells facility (the largest yellow circle) is in the town of Lordstown, a ten-minute drive from the city of Warren, in Trumbull County, Ohio. The facility is approximately halfway between Cleveland, Ohio, and Pittsburgh, Pennsylvania.

Source: [2].

However just a few months later in December 2019, GM and LGES announced they would construct a facility on land adjacent to the former GM facility to produce EV battery cells [7]. This partnership would soon come under the banner of the new battery initiative, Ultium Cells [8]. Ultium was announced as an equally owned joint venture between GM and LGES, leveraging GM's manufacturing expertise and LGES's battery-cell technology [7]. This facility now employs nearly 2,200 hourly and salaried workers, more than what was operating in Lordstown when the facility closed. Ultium has announced \$2.6 billion in investment in the facility [9]. In 2023, the facility had the nation's second highest operational battery cell manufacturing capacity, after Panasonic in Nevada [10].

The facility is part of a broader investment agenda for GM and LGES. LGES' parent company, LG Corporation, has announced more investment in EV manufacturing facilities in the United States than any other parent company, per EV Jobs Hub [2]. Including the joint venture Ultium Cells facilities, LG Corporation has announced \$18.9 billion in the EV manufacturing supply chain, with operations across at least five states in the U.S. Meanwhile, GM is third for announced investment at \$17.9 billion.

The growth of the Ultium facility in Warren, Ohio provides an instructive case study on how battery manufacturing investments are impacting communities around the country, the role of organized labor in modern manufacturing, and the key enablers for onshoring a supply

chain. One critical enabler is federal support. Though this facility was originally announced before the passage of IJJA and the Inflation Reduction Act (IRA), Ultium Cells and its product benefit from the legislation through tax credits for production (45X), loans for facility construction, and downstream consumer tax credits for qualifying EV buyers. GM and LGES are expected to receive a \$35 tax credit per kWh for battery cells produced. Eligible EVs using the cells may receive a tax credit valued at up to \$7,500 for qualifying vehicle purchasers.

This case study will also illustrate some of the significant challenges in rebuilding a domestic supply chain with battery electric vehicle technologies. Challenges include financing the construction and operation of a large-scale battery plant and staffing and necessary training to set employees up for success. Importantly, this case study will demonstrate the reinforcing economic opportunities and benefits that good jobs in clean energy manufacturing can create for communities, businesses, and workers.

About the Facility and Community

The facility is located in the town of Lordstown, a ten-minute drive from the city of Warren, in Trumbull County, Ohio. Ultium Cells broke ground on the facility in May 2020 and was one of the top ten largest construction sites in the country with more than 2,000 union tradespeople employed during construction [11]. The 2.8 million-square-foot facility started producing cells in August 2022 (Figure 2).

Good Jobs at Ultium Cells in Warren, Ohio

Figure 2: The Exterior of the Ultium Cells Facility in Warren, Ohio



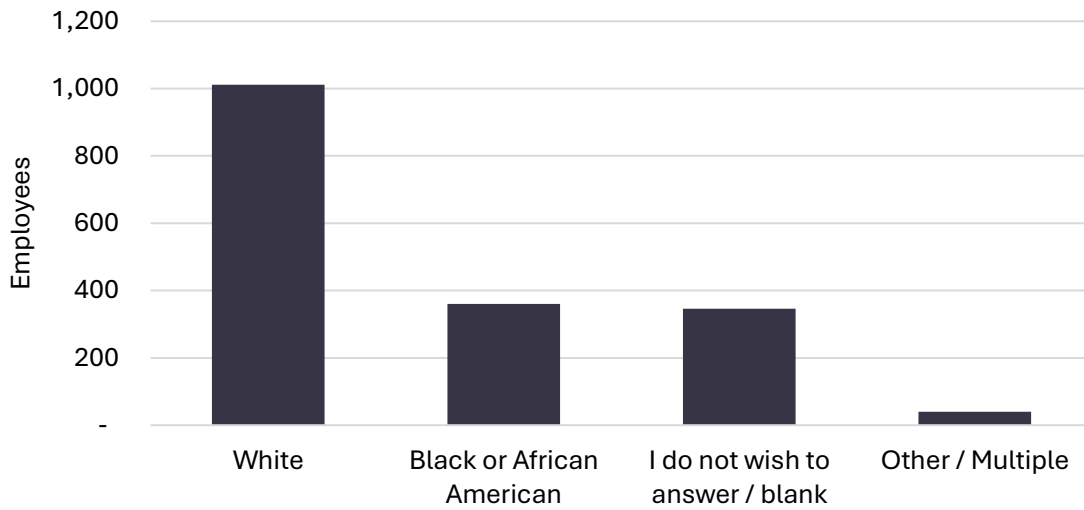
The Ultium Cells facility in Ohio as captured in August 2022. The facility began producing battery cells that same month.

Source: [12].

Ultium initially projected it would hire 1,100 people to work at the Warren facility; however, the facility exceeded expectations and currently has a plant workforce of 2,185 including 1,757 hourly employees and 428 salaried employees. According to data provided by Ultium, of the 1,757 hourly employees, 58 percent identify as White, 20 percent identify as Black, and 20 percent did not wish to answer, per Figure 3.¹ For the Youngstown-Warren-Boardman Metropolitan Statistical Area (MSA), 82 percent of the population were White, and 10 percent were Black or African American in 2022 [13]. According to data provided by Ultium, 100 percent of hourly workers are unionized. There are a further 428 salaried employees, of which 61 percent are White, 25 percent are Asian, and nine percent are Black.

¹ There was an 80 percent response rate for Ultium hourly employees.

Figure 3: Ultium Ohio Hourly Employee Racial Demographics



Data provided directly to Atlas Public Policy by Ultium Cells.

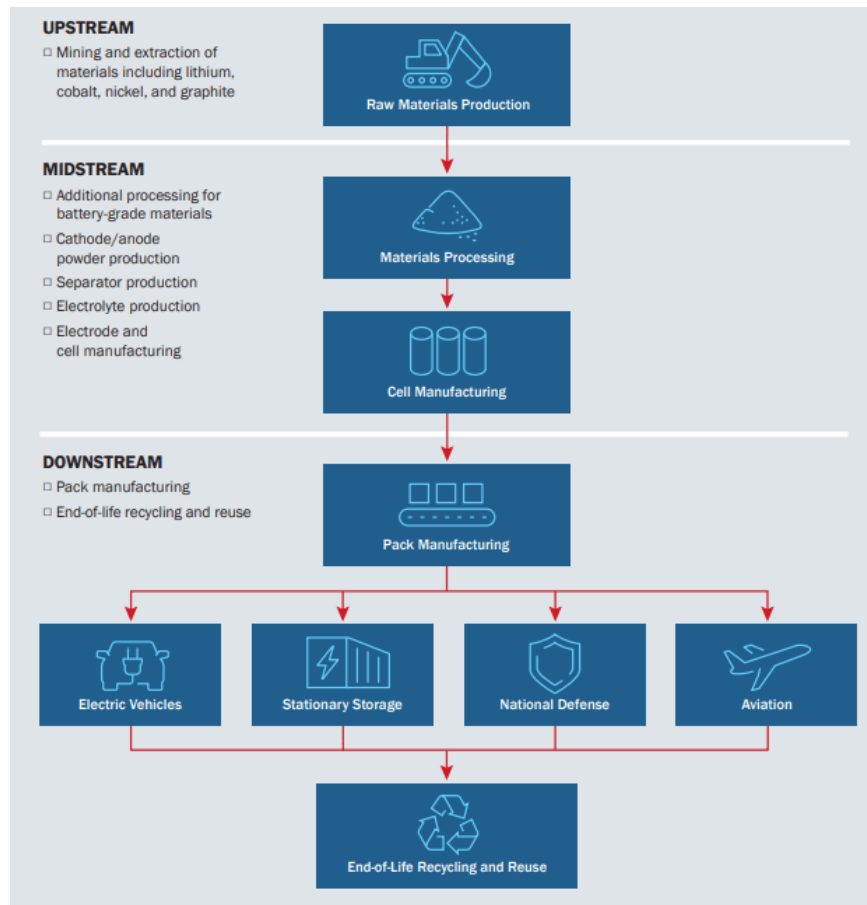
In addition to having more staff, the site has a greater production capacity than originally planned, 44 gigawatt-hours, up from the company’s original announcement of about 30 gigawatt-hours [14]. The facility produces 2,500 metric tons of cells per annum, more than double the output of the Spring Hill, Tennessee, Ultium facility.

The Ultium facility produces Nickel Cobalt Manganese Aluminum (NCMA) battery cells. These pouch-type cells can deliver a greater range at a lower cost. The cells produced at the facility in Warren are shipped to GM factories to be assembled into battery modules and battery packs, which are then used to power the vehicle (Figure 4). The Ultium platform will be used in Chevrolet, Cadillac, GMC, and Buick vehicles. Ultium batteries will also be used by GM partners, Honda, and Acura. Battery cells are shipped to various GM facilities including:

- Detroit-Hamtramck, Michigan
- Orion Township, Michigan
- Spring Hill, Tennessee
- Ramos, Mexico

Other than Warren, there are two Ultium plants—one operational in Tennessee and one under construction in Michigan [15].

Figure 4: Lithium-Based Battery Supply Chain Diagram



A lithium-based battery supply chain diagram. Ultium Cells focuses specifically on Cell Manufacturing.

Source: [16].

Ensuring Good Jobs

Stakeholders stressed the importance of not just creating jobs but creating good jobs at the facility. For many of the employees we spoke to, the labor agreement between the union and management was a key part of delivering good jobs. The U.S. Departments of Commerce and Labor defined eight principles that comprise a “good job”: recruitment and hiring practices, family-sustaining benefits, diversity, equity, inclusion and accessibility values, empowerment and representation opportunities, job security and working conditions, a meaningful organizational culture, stable and predictable pay, and opportunities for skills and career advancement [17]. Employees spoke to a number of these principles in our conversations, specifically, good pay, benefits, the importance of

reliable, local employment, and what that enabled, as well as a form of manufacturing that is clean and high-tech.

Unionization Efforts

Workers at Ultium voted to join the UAW in December 2022 and it is the first large-scale unionized battery cell manufacturing facility in the country [18]. One of the key players who helped achieve unionization was George Goranitis, the current United Auto Workers (UAW) Local 1112 President. Atlas spoke to Goranitis about his experience working at GM facilities and union organizing. Goranitis explained that, when GM closed its facility at Lordstown, employees were offered the chance to transfer to other facilities, which he did. Goranitis had worked at GM for 11 years and loved his job, so opted to transfer. After 18 months in Tennessee, Goranitis knew it was time to go home to Ohio and he left GM. After working in a number of jobs in the area, including as a correctional officer, Goranitis jumped at the chance to work at the Ultium Facility when it opened. He joined in March 2022. He had gained some knowledge about unions from witnessing union leaders at the GM facility in Ohio, and he brought that experience to the Ultium facility to help organize a successful union campaign. In December 2022, workers voted to join the UAW by an overwhelming margin, 710 to 16 [19]. The Ultium plant workers came under the GM-UAW agreement as part of the terms negotiated between the UAW and GM after a six-week strike against the Detroit Big Three automakers in 2023.² In June 2024, UAW members at the Ultium Warren facility voted to ratify a contract establishing wages, benefits, and work conditions, with a 98 percent approval [20].

The contract establishes a starting wage of \$26.91 an hour—a 63 percent increase from \$16.50 an hour— and includes terms for workers to get a 30 percent raise over three years [21]. While these wages are lower than wages at GM auto assembly plants, UAW President, Shawn Fain, described them as very positive for the EV battery industry, and the union expressed the intention to use the Ultium contract as a model for other EV battery plants [21].

Employees Atlas spoke with were clear about the importance of these increases. One employee had been working the night shift at Ultium as she continued her day job working at a fast-food chain. The increase in pay, as well as some promotions she received, allowed her to quit her fast-food job. She said that she was “blessed” with the job. In another interview, an employee used the same language, “[t]hat’s one thing we all say to each other. We’re very blessed to have this job.”

² The Detroit Big Three automakers include Ford, General Motors, and Stellantis.

One employee described crying when she received her first paycheck at the lower rate (\$16.50), wondering how she could survive on it. The increased pay and subsequent promotions were a huge relief for her and her family. Indeed, these higher wages compare favorably to local wages. At the Youngstown-Warren-Boardman MSA level in May 2023, the median hourly wage was \$18.91 and for production occupations (which encompasses manufacturing) the median hourly wage was \$20.32 [22]. One hourly employee described what this meant:

So, one thing I am grateful for is our pay went up, and thank God for that because there's a lot of people now that have their own apartments, that are buying their own houses... they bought their own cars. So, it's done a lot of great for a lot of good people in this building.

Other improvements in the agreement include time and a half pay after ten hours, paid relief time, which means employees will be paid from the time they clock in until the time they clock out, and full pay for bereavement and jury duty [23]. In addition, the contract specifies that four union health and safety representatives and a union industrial hygienist will all be at the plant full-time [20]. Regarding medical and health expenses, UAW members will receive a one-time \$500 lump sum payment to offset any out-of-pocket healthcare cost differentials between Ultium and GM coverage [23].

The contract also allows GM employees who lost their jobs when the Lordstown plant closed to apply for available positions at the Ultium facility in Warren, an option that could help reunite families [24]. GM employees who choose to transfer to the Ultium facility will keep their current master agreement wages, benefits, and seniority, and for those transferring from outside the region, GM will offer a relocation allowance. During Atlas's visit to the facility, some former UAW employees were training in the plant's virtual training center. The center is a room with large screens that teach employees how to operate different machines. In total Goranitis said 168 employees returned to the facility.

The Importance of Good, Local Jobs

The employees interviewed noted several key benefits of the job. Many described the work as clean and not physically exhausting, contrary to how they imagined a manufacturing job. One employee came from steel manufacturing and described the difference as “night and day”. He explained that the work does not tax him physically in the ways he was used to at the steel facility.

Another employee came to work at Ultium from the healthcare sector with no experience in manufacturing. She said she got burnout from working through the COVID-19 pandemic. She expected manufacturing to be physically demanding and dirty, but she explained that

Good Jobs at Ultium Cells in Warren, Ohio

the job is neither. When she started, she said she did not see herself in manufacturing but after working at Ultium now for two years, she sees her future in the sector. Similarly, one employee described the facility as “spaceship-like”, a sentiment that others agreed with.

A hiring manager for the plant explained that because the jobs at the facility are clean and not physically demanding, people with different physical abilities can work there. The median age of hourly employees is 42 and nearly 45 percent of employees are at least 45 years old. This is very close to the national proportion for manufacturing jobs (48 percent of employees are 45 years or older). Given the nature of modern manufacturing, there may be greater longevity for this workforce in the manufacturing sector [25].

There remain some concerns about safety. Goranitis, the UAW Local 1112 President, noted that employees still have questions about the safety of the mixing process, but they are now able to raise those questions through the union.

The employees Atlas spoke with were enthusiastic about their jobs. One employee interviewed explained that jobs at the Ultium facility are sought-after, noting anecdotal evidence that the parking lot was fuller since the contract was negotiated by UAW members. This employee said that this was in part due to the accountability that came through the union and in part because the pay was better, so missing a day of work was more consequential.³ When asked about what a good job meant to them, one man offered that it’s “when you wake up in the morning and you don’t mind coming in. A bad job is like, ‘I’ll do anything to not come in’”. One employee offered that because of the pay and because of what he perceived as the steadiness of a job related to GM, he felt like he had won the “job lottery”.

Several employees mentioned the importance of a large, local, respected employer. One man said that his former job in the food industry required significant amounts of travel and long hours. Now, with a much shorter commute, he can stop by his mother’s place after work every day and better care for his daughter who has a disability. Another employee spoke about working at a fast-food chain and long days on the road driving between stores. The job at Ultium allows her to spend more time with her family. Employees reiterated the benefits of good, local employment opportunities, whereby people no longer have to spend hours on the road. Using data supplied by the company, we found that the average (mean) distance between home and work for hourly employees is 14.5 miles, significantly shorter than the national average 21-mile commute for employees in the same pay bracket [26].⁴ Goranitis noted that local jobs are especially significant for those former GM employees,

³ Employees highlighted the accountability measures in Doc. 8 from the National Agreement, which put in place procedures and standards for attendance.

⁴ This does not include the 14 employees who live more than 100 miles away.

like him, who were forced to relocate to keep their GM employment, “[w]e recently have just had 168 Members come back that have been separated from their families for five years.”

The employees spoke also about how the facility could set a standard. One employee, who previously worked in food production, said that companies in this area take advantage of people. He explained that he has seen several “vulture corporations.” He explained, “[t]hese people come in with these big ideas... Well, what they do is they hire people and after about a year, it's gone, and everybody got their hopes up.” This employee said that people not only trust Ultium but also talk to their friends about their pay, which lifts the bar for other employers. He explained, “[p]eople talk, right? You talk to your friends and if they know you're getting this wage, then it just spreads.” In this way, he said, the Ultium facility set the standard for employers in the area. His hope was that there would be a ripple effect, whereby “this little chunk of Tod Avenue becomes something again.”

Public Funding for the Facility

The Ultium Cells facility has also been a recipient of various forms of public funding support. This includes both federal support from the Department of Energy’s Loan Programs Office (LPO) and tax credits from the IRA, as well as state and local subsidies. Given the scale and complexity of financing large EV and battery manufacturing facilities, federal support in particular is crucial to the broader onshoring of EV and battery manufacturing facilities.

Federal Support for the Facility

The Ohio facility will benefit from federal funding in multiple direct and indirect ways. Ultium was awarded a loan package from the LPO for \$2.5 billion [27]. This funding will be split across three locations – this location in Ohio, as well as Tennessee, and Michigan. The deal was closed in December 2022 [27]. Ultium noted that the loan will cover up to a third of the cost of the facility. The LPO has multiple portfolios. This loan funding comes from the Advanced Technology Vehicles Manufacturing (ATVM) Loan Program, authorized by the Energy Independence and Security Act of 2007. IIJA changed the loan authority to include medium and heavy-duty vehicles and other clean transportation technologies, while IRA increased the program’s size, including appropriating \$3 billion in credit subsidy to enable \$40 billion in loans [28]. IRA also removed the \$25 billion cap on ATVM loan authority. The Ultium loan was the first under the loan program for a battery cell manufacturing project [27]. Since the loan was awarded, the LPO has made a number of other significant loan announcements.

On tax credits, Ultium confirmed that it receives the Section 45X Advanced Manufacturing Production Credit for the battery cell outputs of the facility. This tax credit will be shared evenly between GM and LGES. The facility will also indirectly benefit from consumer-facing tax credits as the battery cells produced at the facility will go into several GM models, helping ensure they are eligible for the clean vehicle tax credit (30D). Along with other requirements, eligible 30D vehicles must meet a certain level of domestic manufacturing and final assembly rules to qualify [29]. Currently, a variety of vehicles that use the Ultium batteries are eligible for the tax credit, meaning buyers can access up to \$7,500 at the purchase of a vehicle [29]. As of June 2024, GM models including the Chevrolet Blazer EV, Chevrolet Equinox EV, and Cadillac LYRIQ were all eligible for the credit, for customers that meet eligibility requirements such as income requirements.

State and Local Support for the Facility

In addition to federal support from loans and tax credits, the Ultium Cells facility is supported by state and local subsidies for job creation and community investment. The Ohio Department of Development awarded Ultium Cells a \$13.8 million tax credit at a 1.95 percent payroll rate over a period of 15 years in 2020 for committing to creating 1,000 new jobs at the facility [30]. The agreement requires the company to maintain operations in Warren for at least 18 years and generate \$45 million in new payroll [31]. According to JobsOhio, the entity provided \$50 million in assistance for Ultium to commit to 1,000 jobs and invest \$1.5 billion, which the company over-performed.⁵ Ultium is also a recipient of an Ohio Department of Development Community Reinvestment Areas subsidy at an undisclosed amount [32]. These agreements between Ultium and the State of Ohio ensure that both parties benefit from the investment in Lordstown.

Supply Chain Connections and Agreements

This Ultium facility is part of a broader onshoring of the EV supply chain. Through this facility and supply chain agreements with partners in the United States, Ultium is supporting a whole network of suppliers in a growing EV supply chain that will contribute to building out a robust domestic EV production ecosystem. The buildout of additional facilities in the supply chain will have positive impacts on local communities across the country. LGES and GM have established multiple domestic supply chain agreements to source materials for production and offload battery waste and scrap for recycling and reuse, see Figure 5. Many

⁵ JobsOhio provided this information via an email to Atlas Public Policy in support of this research.

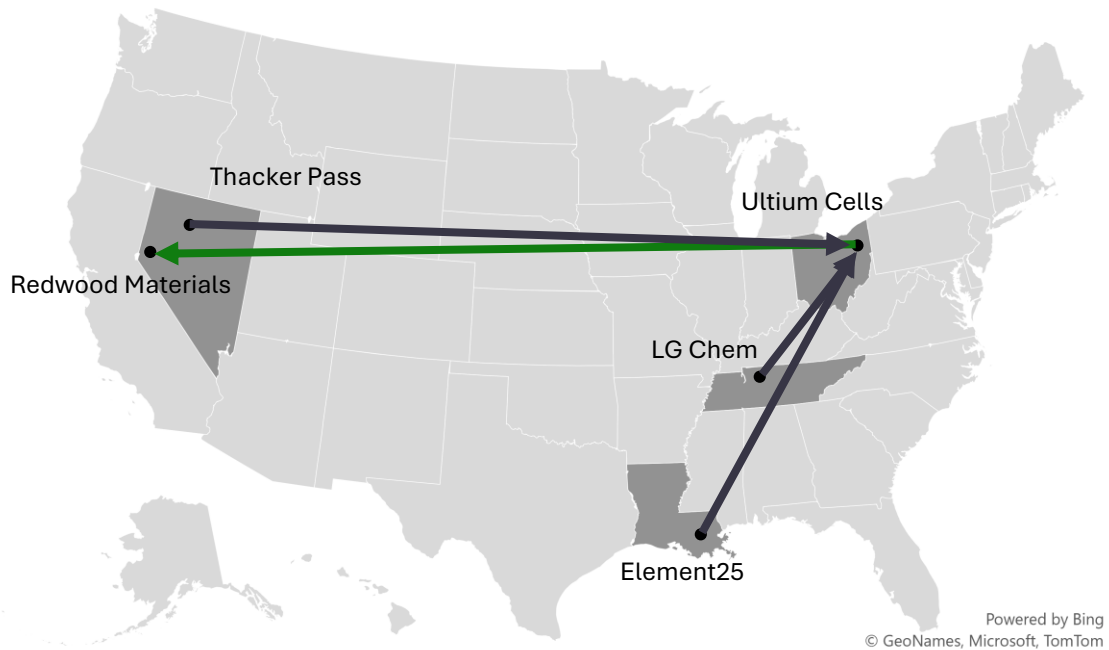
Good Jobs at Ultium Cells in Warren, Ohio

of these supply chain facilities are based in the United States, reflecting the impact of domestic manufacturing incentives and ensuring eligibility for the consumer-facing, \$7,500 Clean Vehicle Tax Credit (30D).

GM is actively building out supply chains for key minerals for Ultium batteries including lithium, nickel, cobalt, manganese, and aluminum. GM is helping establish a domestic lithium supply as an investor and consumer of Lithium Americas' Thacker Pass mine in Nevada [33]. Thacker Pass is currently the largest known source of lithium in the United States. The project will be developed in two phases over the estimated 40 years of the mine's life [34]. It is expected that the lithium extracted and processed from the mine will be able to support the production of up to 40,000 metric tons of lithium carbonate equivalent a year in the first phase of the project (Phase 1) [34]. Since commencing construction in March 2023, Lithium Americas has created 1,800 construction jobs and the company expects to employ up to 500 permanent employees over the life of the mine [35]. Under the agreement with Lithium Americas, GM has committed to investing \$650 million in the project and will have exclusive access to Phase 1 production. Thacker Pass is currently projected to begin in 2026 [36]. Phase 2, estimated to begin five years after Phase 1, will see a doubling of the mine's capacity [35]. The Thacker Pass project also received a \$2.26 billion conditional commitment for a loan from the DOE's LPO [37].

To supply manganese for the batteries, GM and Australian mining company, Element 25, announced an agreement in June 2023 for Element 25 to supply up to 32,500 metric tons of manganese sulfate, a precursor for battery cathode active material [38]. In exchange, GM will provide Element 25 with an \$85 million loan to help fund the construction of a facility in Louisiana. Element 25 will begin producing manganese sulfate at the Louisiana facility in 2026. The manganese ore will be sourced from mining operations in Australia. When fully operational, the facility is expected to create over 200 permanent jobs.

Figure 5: Ultium Cells Facility Material Inputs and Outputs in the United States



This map includes facilities that are not yet open and refers only to materials but does not include the end customers of the battery cells. Green refers to the recyclable material outputs from the facility and black refers to the material inputs at the facility.

Cathode materials are another input for the facility, and core component of a battery cell. These materials will be supplied by LG Chem’s production plant in Tennessee (also owned by LG Corporation) under a long-term supply contract with GM [39]. This supply contract is expected to be used primarily for Ultium Cells production. From 2026 through 2035, LG Chem will supply GM with more than 500,000 tons of cathode material. The project will create 860 jobs, with 300 positions offering salaries over \$100,000.

Supporting circularity in manufacturing, Ultium has an agreement with Redwood Materials to recycle end-of-life batteries and production scrap. Redwood is already operating a recycling facility in Nevada that is expected to employ up to 1,600 permanent employees [40]. Redwood recycles, refines, and remanufactures feedstocks from both the Warren, Ohio, and Spring Hill, Tennessee, facilities into new cathode and anode battery materials [41]. Ultium has already started shipping scrap cells, cell material, coated material, and slurry waste from these factories to Redwood. Ultium provided information on quantities of materials shipped to Redwood to date including:

- Aluminum Pouch: 1,316 metric tons (MT)
- Anode Foil: 1,498 MT

Good Jobs at Ultium Cells in Warren, Ohio

- Cathode Foil: 1,283 MT
- Cells: 1,060 MT
- Electrode Stack: 1,115 MT

An Ultium source reported that there is a 96 percent yield rate for materials – that is, 96 percent of input materials are used in battery cells and only four percent becomes waste material for recycling. Previously Ultium had a contract with Li-Cycle, another battery recycler; however, that agreement was mutually dissolved as Li-Cycle works through financial challenges [42] [43].

Community Impacts

As a result of deindustrialization, the Youngstown-Warren-Boardman MSA region has incurred significant social and economic costs. The loss of a core part of its economy resulted in lower household incomes, increased poverty rates, and a shrinking tax base. In other instances of deindustrialization, communities also suffered less tangible impacts including decreases in mental and physical well-being, as well as a loss of a sense of identity [44].

Investment in communities and support for workers to transition into new industries, like EV and battery production, provides a pathway to reindustrialization to reverse the impacts of deindustrialization. Facilities, like Ultium, can deliver benefits such as good-paying and secure jobs for residents, increased revenue for the local government and businesses, and social and educational opportunities that improve the quality of life for members of the Lordstown community.

Economic Impacts of Deindustrialization in the Mahoning Valley

When GM opened the Lordstown plant in the 1960s, half of the U.S. population lived within 600 miles of the region, known as the Mahoning Valley, making Lordstown a strategic, centralized location for the facility [3]. The region was formally a steel stalwart, with the city of Youngstown ranking as the second largest steelmaker in the country after Pittsburgh [3]. For decades, the GM facility was foundational to the regional economy, supporting up to 15,000 workers in the 1970s, according to the local union [45]. Since 1966, the plant produced more than 16 million vehicles in more than a dozen different Chevrolet models, including the Impala, Cavalier, and Cruze [3]. The Cruze became one of the company's most

Good Jobs at Ultium Cells in Warren, Ohio

popular models and is credited with aiding the company's recovery from near bankruptcy. In 2019, when the plant closed, around 1,600 workers lost their jobs [46]. Along with additional employees from other shuttered GM plants, some of the workers accepted GM's offer to transfer to alternative GM plants around the country, while others remained in the Mahoning Valley area where they were offered buyouts [4].

The closure of the GM facility, coupled with the ongoing economic struggle from the loss of highly-paid steel jobs since the 1980s, was devastating to the region [3]. Youngstown State University Professor AJ Sumell added that "it was demoralizing, but we're used to being demoralized" in the wake of continuous factory closings in the area. The GM plant closure meant Lordstown lost a third of its revenue due to the loss of \$3 million in income taxes [47]. Analysis from the Center for Economic Development at Cleveland State University released in 2019 showed the extent of the job losses from the plant closure [48]. They estimated that the elimination of all three shifts at the plant would cause the loss of nearly 8,000 jobs (including direct, indirect, and induced jobs) and more than \$8 billion in economic activity in the regional economy. Specifically, the analysis found that a multiplier effect existed whereby, for every four jobs lost at a facility, a further two were lost in the supply chain and one more was lost in the consumer services sector. The authors of the study estimated that the closure led to a gross regional product loss of 9.4 percent.

Electric truck start-up Lordstown Motors purchased the old Lordstown Assembly facility in 2019, promising more than 400 jobs building EVs [49]. Lordstown Motors announced they would begin production of the Endurance pickup truck starting late 2020. To help with financing operations and aid the facility in starting production after delays occurred, Foxconn acquired the Lordstown Motors assembly plant for \$230 million in 2021 [50]. However, in 2023 Lordstown Motors filed for bankruptcy. Rebranded as Nu Ride Inc., the company now seems to be making a small number of tractors onsite [51].

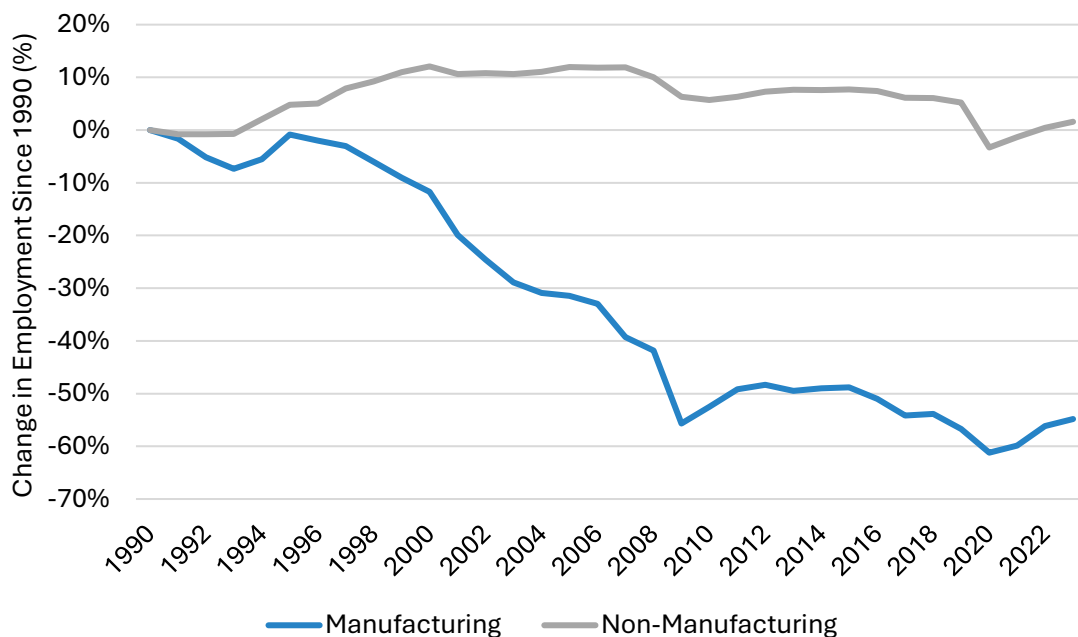
There are a number of indicators that tell the story of economic decline in the Mahoning Valley region over the past several decades including population decline, elevated poverty levels, declining manufacturing jobs, and unemployment rates. Since 2000, the Youngstown-Warren-Boardman MSA population has dropped by 12 percent [52]. This is amid a period of state and national population growth. The national population grew by 18.8 percent, and the population of Ohio grew nearly four percent, emphasizing the concentrated distress in the Mahoning Valley [53]. The population loss in the Youngstown-Warren-Boardman MSA continued a longer-term population decline in the area. Trumbull County, where the Ultium Cells Warren facility is located, saw its population fall from a high of 247,000 in 1972 to 200,000 in 2023, a drop of 23 percent [54].

In the county, 16.4 percent of the population lived below the poverty line, slightly higher than the state average of 13.4 percent in 2022 [55]. Manufacturing jobs dropped

Good Jobs at Ultium Cells in Warren, Ohio

precipitously in the Youngstown-Warren-Boardman MSA for decades. While most industries have grown in the MSA, manufacturing jobs have halved over this period, see Figure 6. This is part of a broader trend, whereby manufacturing jobs have been automated and offshored over the past few decades [56]. As a community with elevated unemployment levels, as well as a history of jobs in the fossil fuel industry, the community in which the facility is located is classified as an energy community by the U.S. Department of Energy (DOE) [57].

Figure 6: Employment Change Relative to 1990 Baseline in Youngstown-Warren-Boardman MSA

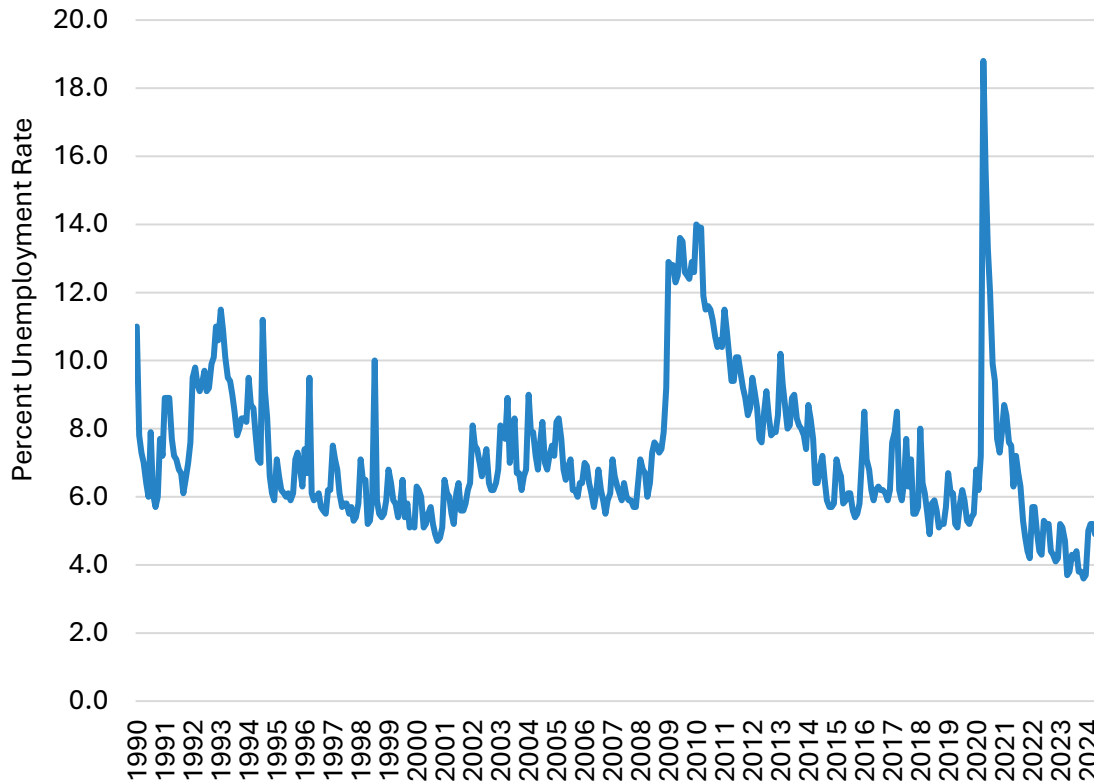


Change compared with 1990 baseline on annual averages since 1990 through 2023. The non-farm labor force is dominated by trade, transportation, and utilities, then government, closely followed by manufacturing which makes up 13 percent of the non-farm employed labor force.

Source: [58]

In the Youngstown-Warren-Boardman MSA, the unemployment rate was 4.9 percent as of April 2024, Figure 7. This is near historic lows for the MSA and is well down from April 2020, during the pandemic, when it was 18.8 percent or 14 percent in January 2010 in the wake of the Great Recession. In Trumbull County, the unemployment rate was 5.4 percent in April 2024, also down from previous years, though higher than the state of Ohio at four percent [59] [60].

Figure 7: Unemployment Rate Declines in the Youngstown-Warren-Boardman MSA



The unemployment rate over time since 1990 has seen many fluctuations, but recent data shows the rate reaching the lowest level in three decades. The spike in 2020 is attributed to the COVID-19 pandemic. Data through May 2024.

Source: [61]

Economic Benefits of the Ultium Facility

The Ultium facility provides an important boost in a region that has seen an ongoing economic and demographic decline. The facility has provided hope, not just for employees, but for the community. Professor Sumell said that there is more optimism in the town than he has encountered in the last 20 years. Indeed, there is reason to believe that there is potential economic opportunity as other facilities locate nearby to supply Ultium. In March 2024, anode materials producer Graphite One announced it would invest \$435 million and is expected to employ more than 160 residents at a facility in Niles, Ohio, a 15-minute drive from the Ultium facility [62]. While Ultium stated they do not have a commercial relationship with Graphite One, the lure of Ultium is well-documented. In a 2022 report produced by Benchmark Minerals, Natural Resources Defense Council (NRDC), and Jobs

Ohio, the facility was listed as the first in a list of advantages the state has to attract more EV manufacturing investment [63]. The authors recommended that the state try to attract cathode active materials producers. While Graphite One is an anode active material producer, it still broadly aligns with the recommendation and helps catalyze the region as a growing “cluster”, as described by Guy Coviello, president and CEO of the Youngstown/Warren Regional Chamber [64].

There is potential for the facility to grow other jobs. Analysis by Oxford Economics released in 2023 looked at the multiplier effect for auto manufacturing [65]. The center found that GM had a national job multiplier effect of 7.3. In Ohio, for each GM job created in Ohio, there are 10.3 additional jobs created in the state’s workforce. At the time of the study, GM’s facilities in Ohio directly employed over 4,500 people. Oxford estimates the economic activity spurred by these jobs results in 51,760 additional jobs. GM spent more than \$4.6 billion through Ohio-based suppliers for its facilities. The U.S. GM supply chain also has a strong multiplier effect, which Oxford estimates at around \$44.1 billion beyond the automotive industry. Nationally, the study also found that GM directly created over \$39.2 billion worth of U.S. GDP in 2022, and one quarter of the GDP generated by all U.S. auto manufacturers.

Locally, there are complementary benefits to having an employed, well-paid workforce. Goranitis pointed out the flow on effects from higher wages, “[m]embers now are able to go out and are able to spend the money at local businesses... So that they're spreading the wealth around here as well, with the wages that they're making not only that now we have traffic that coming into town for Ultium, and they're stopping at the local gas stations here in Lordstown, they're stopping at the local restaurants here in Lordstown.”

Training and Workforce Development

Ultium staff and Coviello noted that attracting a strong workforce is a challenge for several reasons. A leader in recruitment for the Ultium facility noted that Ultium struggled with brand recognition for a time. However, the company has seen a large uptick in interest in the jobs available at the facility. The recruitment employee, who speaks with potential applicants, explained that she also consistently encounters misconceptions about manufacturing jobs. She noted that they spend a significant amount of time helping people understand that they can apply for this job without any specific training and that they consistently message the value of common skills such as computer and video game skills. Coviello echoed the need for different skills for a new kind of manufacturing that is more high-tech and where workers spend more time problem-solving than performing rote tasks. None of the employees had previous work experience in EVs, but all saw their future working in EV manufacturing.

Good Jobs at Ultium Cells in Warren, Ohio

Once hired, manufacturing employees go through a training program that lasts between seven and 19 weeks depending on their role. Ultium noted that the training program includes the following stages:

1. On-boarding (one week)
2. Safety Training (one to four weeks based upon job function)
3. Simulator Training (two weeks)
4. On-Job-Training (three to twelve weeks based upon process area assignment)

Several employees we spoke with also traveled to other facilities, including internationally, for training. Employees noted that work at the facility is technical and requires considerable on-the-job training, meaning that they take longer to reach a productivity level comparable to existing manufacturing facilities. One employee who works in mixing said that “to fully know your job... takes about two years.” This means that it is harder for employees to move around to different work areas in the facility as is common in other auto manufacturing as there is more expertise required in each of the positions. However, the employees we spoke with mentioned a culture of promotion and were optimistic about the potential for upward mobility. Indeed, unionized facilities in general have lower turnover, per analysis [66].

There are also broader challenges for the workforce, including affordable housing in the area. One problem is that a significant amount of housing was demolished in the area as the population dropped in recent years. Professor Sumell noted that the region made “great progress in terms of demolition and housing abandonment, but since then, there has been a fairly significant increase in terms of housing prices and some concern of the opposite [housing shortage], which a lot of growing cities have faced.” This presents a challenge for the area to ensure that the workforce can find affordable, local housing and creates a need to build more housing for a growing workforce.

Conclusion

Workers we spoke with describe themselves as “blessed” to have jobs at Ultium in Warren, Ohio. Given the region’s struggles with the closure of the Lordstown facility and the decline of the steel industry, workers understood what it meant to have good-paying, local jobs with good benefits. The facility also represents a significant milestone in the evolution of EV manufacturing and the broader reshoring of critical supply chains in the United States. This growing supply chain has been bolstered by federal support. The facility's successful unionization, coupled with advancements in manufacturing, underscores a path forward for a modern battery manufacturing industry with good-paying jobs. As EV demand continues to rise, the Ultium Cells facility offers an example of how targeted public investments in EV manufacturing can create good jobs, onshore supply chains, and strengthen communities.

Appendix A: Methodology

Atlas Public Policy (Atlas) selected the Ultium facility for a case study based on three key criteria:

1. The facility represents significant investment in the EV supply chain. This includes all announcements that are over \$100 million or in the top 10 percent of largest investments in a given segment of the supply chain. Segments of the manufacturing supply chain include batteries, light-duty vehicle assembly, medium and heavy-duty vehicle assembly, mineral processing and separation, EV chargers, EV parts, and battery recycling.
2. The companies operating the facility have received or will receive support from IIJA and/or IRA or another federal program to help finance the construction or operations start-up at a facility. This includes at least one of the following programs (this is not an exhaustive list but provides examples of possible federal support) accessed by the facility and/or its suppliers or customers:
 - a. Advanced Technology Vehicles Manufacturing (ATVM) Loan Program
 - b. Advanced Energy Manufacturing and Recycling Program
 - c. Battery Materials Processing and Battery Manufacturing Recycling Grants Program
 - d. Electric Drive Vehicle Battery Recycling and Second Life Applications Grant Program
 - e. Qualifying Advanced Energy Project Credit (48C)
 - f. Advanced Manufacturing Production Credit (45X)
 - g. Domestic Manufacturing Conversion Grants Program
 - h. New Clean Vehicle Credit (30D) (i.e., facilities that produce vehicles eligible for the credit)
3. The facility is either under construction or operational.

For this case study, Atlas spoke with 11 Ultium Warren employees, including four hourly staff and five salaried staff working in office roles. These employees were all selected by company management. Atlas also spoke with two Ultium management employees. To respect employees' confidentiality, their names have been removed. Atlas also spoke with a number of stakeholders involved in the facility in different capacities, who are all mentioned by name and position.

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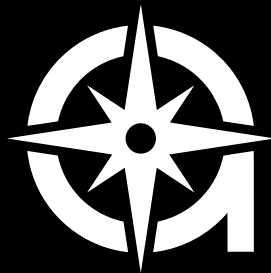
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