WIN WORKFORCE INTELLIGENCE NETWORK

NORTH AMERICAN INTERNATIONAL DETROIT AUTO SHOW

WELCOME

Jennifer Llewellyn, Oakland County Michigan Works!

WIN WORKFORCE INTELLIGENCE NETWORK

EV Jobs Academy

EV JOBS OVERVIEW

Michele Economou Ureste, Workforce Intelligence Network

SEMCA WIN WORKFORCE INTELLIGENCE NETWORK

EV Jobs Academy Flowchart
LEO-EVacademy@michigan.gov

revised 4.3.2023

State of Michigan Labor of Economic Opportunity (LEO) Workforce Development Agency (WDA)

Anne Pentiak, Talent Development Liaison
State of Michigan LEO
LEO-EVacademy@michigan.gov

Michigan Alliance for Greater Mobility Advancement (MAGMA) EV Jobs Academy Employer-Led Collaborative

MISSION:
To Provide Rapid Skill Growth in Emerging Technologies for Advanced Mobility and EV to Meet Industry Needs

ORIGINAL EQUIPMENT MANUFACTURERS:
- Ford Motor Company
- General Motors
- Nissan
- Stellantis
- Toyota

SUPPLIERS:
- BorgWarner
- GKN Automotive
- Robert Bosch
- Roush
- ZF TRW Automotive

INDUSTRY STAKEHOLDER PARTNERS:
- Economic Growth Institute – University of Michigan
- Macomb Community College
- Michigan Technological University
- SAE International
- State of Michigan
- Southeast Michigan Community Alliance - SEMCA
- University of Detroit Mercy
- Wayne State University

Full EV Jobs Collaborative Chair
Ann Thompson, Ford Motor Company
athom454@ford.com

EMPLOYER-LED COLLABORATIVES

SOUTHEAST MICHIGAN MOBILITY TALENT COLLABORATIVE

MISSION: To Align Educational Programs with Employer Occupational Skills Needs to Strengthen the Mobility Talent PipelineALENT

Led by the Detroit Chamber of Commerce (D3C3) & MICHauto

Christi Taylor, Detroit Chamber
ctaylor@detroitchamber.com

Trazell Primuse, MICH Auto
tprimuse@michauto.org

Drew Colman, MICHauto
dcoleman@michauto.org

SMART CITIES & COMMUNITIES FLEET COLLABORATIVE (SC2FC)

MISSION: To Prepare Local Communities for Opportunities in Electrifying Municipal Fleet & Required Charging Infrastructure

Led by the Southeast Michigan Council of Governments (SEMCOG) & State of Michigan

Beheshteh Makari, SEMCOG
makari@semcog.org

Noah Bussell, SEMCOG
Bussell@semcog.org

Naheed Huq, SEMCOG

DEFENSE & OUTDOOR RECREATION VEHICLES COLLABORATIVE

MISSION: To Develop & Scale EV Mobility Curriculum to Defense Sector & Outdoor Recreation Vehicles

Led by National Advanced Mobility Consortium (NAMC)

Jessica Sierakowski, National Advanced Mobility Consortium
jessicas@namconsortium.org

Lindsay Bayles, National Advanced Mobility Consortium
LindsayB@namconsortium.org

EV JOBS ACADEMY

EV JOBS ACADEMY EDUCATION & TRAINING TEAM

MISSION: To Scale Existing EV Mobility Curriculum through Statewide IHE's Accessible Through a Dedicated Online Platform

Led by Macomb Community College Center for Advanced Automotive Technology (CAAT) & Michigan Community College Association and Michigan AFL-CIO Workforce Development Institute (WDI)

Ben Cruz
cruzb800@macomb.edu

Amy Lee
alee@mcca.org

PROJECT TEAMS

RESEARCH PROJECT TEAM

MISSION: Identifies Labor Market & EV Mobility Data Intelligence to Support the EVJA Collaborative

Led by the Center for Automotive Research (CAR) Group & WIN Research

Bernard Swiecki, Center for Automotive Research
bswiecki@cargroup.org

Narges Lahiji, Center for Automotive Research
nlahiji@cargroup.org

OUTREACH & RECRUITMENT PROJECT TEAM

MISSION: Supports Job Seekers with EV Mobility Career Awareness & Employer Outreach

Led by Macomb/St. Clair Michigan Works! & Wayne County College Access Network (WCCAN)

Jamie Richardson, Wayne County College Access Network
deborah.taylor@semca.org

Justin Al-lgoe, Macomb/St Clair Michigan Works!
jal-igoe@macomb-stclairworks.org

WIN WORKFORCE INTELLIGENCE NETWORK

EV Jobs Academy

EV JOBS ACADEMY RESOLUTION

Jonathan Smith, Michigan LEO Senior Chief Deputy Director

Russell Kavalhuna, Henry Ford College President

Kojo Quartey, Monroe County Community College President

Beverly Walker-Griffea, Mott Community College President

Peter Provenzano, Oakland Community College Chancellor

Rose Bellanca, Washtenaw Community College President

State of Michigan LEO Senior Chief Deputy Director Jonathan Smith

WHEREAS, Since the launch of the EV Jobs Academy in January 2022, Michigan's powerful bipartisan economic development efforts stimulated over $16 billion in projects to secure 16,000 jobs in electric vehicles, batteries, semiconductors, and clean energy as representative of the following investments:

- In January 2022, General Motors announced a historic $7 billion conversion of the Orion Township assembly plant for full-size electric vehicle pickups and construction of Ultium's third U.S. battery cell plant in Lansing which is expected to create 4,000 and retain 1,000 jobs;
- In March 2022, LG Energy Solution announced a $1.7 billion expansion creating 1,200 jobs in Holland, manufacturing batteries;
- In June 2022, Ford Motor Company announced an investment of $2 billion, creating more than 3,200 jobs in plants across Michigan to support electric vehicle manufacturing growth and secure internal combustion engine portfolio in the state;
- In June 2022, Canadian electric vehicle charging network operator FLO announced an investment of $3 million for the company's first-ever U.S. manufacturing facility in Auburn Hills;
- In October 2022, Michigan-based Our Next Energy announced a $1.6 billion investment to establish its first cell and electric vehicle battery pack gigafactory in Van Buren Township which is expected to create an anticipated 2,112 jobs;
- In October 2022, Gotion announced a new $2.36 billion manufacturing facility in Big Rapids which is anticipated to create 2,350 new jobs;
- In January 2023, Ford announced a new $3.5 billion EV battery manufacturing facility in Marshall, Michigan which will create 2,500 middle-and high-wage jobs;

State of Michigan LEO Senior Chief Deputy Director Jonathan Smith

WHEREAS, Governor Gretchen Whitmer is committed to growing Michigan's economy and workforce as evidenced by:

- Creating the Office of Future Mobility and Electrification for the purpose of coordinating future investments across state government;
- Launching the EV Jobs Academy with a total of $12 million for the formation of an employer-led collaborative and training funds preparing Michigan's workforce for electric vehicle sector jobs;
- The establishment of the MI EV Scholars Program empowering Michigan's labor force for careers in the electric vehicle industry;
- Establishing Michigan Reconnect to offer Michiganders 25 years and older a tuition-free associate degree or skills certificate in high-demand careers which was recently expanded for Michiganders over 21 years of age through the newly passed bipartisan budget;
- Convening the Electric Vehicle and Mobility Talent Action Team, the first focused effort on talent in the electric vehicle and future mobility sectors;

Henry Ford College President Russell Kavalhuna

WHEREAS, In 2011, southeast Michigan community college presidents and Michigan Works! agencies established the SEMCA Workforce Intelligence Network (WIN). In 2022, the Michigan Department of Labor and Economic Opportunity's Office of Employment & Training (LEO-E&T) in partnership with the Michigan Economic Development Corporation (MEDC), awarded WIN $5 million to establish the EV Jobs Academy employer-led collaborative to identify and catalog the education and training needs and build a robust and highly-skilled workforce for the automotive, mobility and electrification industry throughout the State of Michigan on the same five-year timeline as the Infrastructure Investment and Jobs Act, Bipartisan Infrastructure Legislature; and

WHEREAS, The EV Jobs Academy is managed by LEO-E&T's Sector Strategies Team. Sector Strategies is a demand- driven model to address the needs of employers within an industry or a specific geographic region. This model supports industry, education, workforce development, economic development, and community organizations working together to develop employer-led collabor tives focused on building talent pipelines, addressing skill gaps, and creating career pathways for workers; and

Monroe County Community College President Dr. Kojo Quartey

THEREFORE, WIN community colleges support inter-educational collaboration to align, develop, or acquire curriculum with EV Jobs Academy employer-validated learning outcomes and in-demand credentials to ensure a robust and highly-skilled workforce for the automotive, mobility and electrification industry throughout the State of Michigan; and

THEREFORE, WIN community colleges lead the EV Jobs Academy Curriculum Recognition process and further, ensures that all EV Jobs Academy Recognized Curriculum and credentials have been informed and validated by EV Jobs Academy employers; and

Mott Community College President Dr. Beverly Walker-Griffea

THEREFORE, Michigan's community colleges commit to elevating employer confidence by ensuring consistent learning outcomes and assessment rigor of similar training and education programs; and,

THEREFORE, Michigan's community colleges lead the establishment of an educational repository of EV Jobs Academy Recognized Curriculum utilizing the Michigan Workforce Training and Education Collaborative (MW-TEC) to ensure widely available courses and programs validated by EV Jobs Academy employers. Further, WIN community colleges commit to course and program design, scheduling and delivery methods that address the need of employers, incumbent workers, working adults, and dual-enrolled high school students interested in career advancement or working in the automotive, mobility and electrification industry; and,

Oakland Community College Chancellor Peter Provenzano

THEREFORE, Michigan's community college faculty are devoted to researching and providing online, hybrid and simulated learning opportunities when the educational success of the learners is not at risk and online or simulated content exceeds the value of what could be taught in a traditional classroom or laboratory; and,

THEREFORE, Michigan's community colleges work collaboratively and strategically to locate learning laboratories, and acquire or develop curriculum to best serve employer, incumbent worker, and other learner needs in the most cost-effective and efficient manner by collaborating on potential funding opportunities for curriculum development or acquisition, laboratory equipment acquisition, and faculty development in the emerging technologies of the automotive, mobility and electrification industry; and,

Washtenaw Community College President Dr. Rose Bellanca

THEREFORE, On the 14th day of September, 2023 at the North American International Auto Show in Detroit, Michigan Henry Ford College President Russell Kavalhuna, Oakland Community College Chancellor Peter Provenzano, Monroe County Community College president Dr. Kojo Quartey, Mott Community College president Dr. Beverly Walker-Griffea, and Washtenaw Community College president Dr. Rose Bellanca who took part in reading this resolution, and together with, and on behalf of, the WIN Board of Directors and staff we proclaim that the WIN community colleges are leading the effort of advancing the EV Jobs Academy system of collaboration to sustain the curriculum development and training delivery for manufacturing and repairing electrified vehicles beyond the life of the EV Jobs Academy grant for the greater benefit of Michigan economic growth consistent with the talent pipeline development generated through the collective and strategic efforts of Michigan's community colleges.

WIN WORKFORCE INTELLIGENCE NETWORK

MAGMA
Michigan Alliance for Greater Mobility Advancement

MICHIGAN ALLIANCE FOR GREATER MOBILITY (MAGMA)

Kimberly Steinfeldt, GKN Automotive & MAGMA Co-chair

WIN WORKFORCE INTELLIGENCE NETWORK

EV Jobs Academy

ASSET MAPPING & RECOGNIZED CURRICULUM

Ben Cruz, Macomb Community College Center for Advanced Automotive Technology

Michigan Electric Vehicle Job Academy (EV Jobs Academy)

Collaboration between education providers and Industry is essential in meeting economic and educational goals of the State, especially with large scope initiatives such as the transformation from **ICE to EV!**

EV JOBS ACADEMY – Framing our Work

EV Jobs Academy Curriculum Recognition Process Sheet

Process to ensure that education/training curriculum is addressing employer needs for workforce preparation in EV technology.

1. Education/training providers submitted their curriculum to the EV Jobs Academy Curriculum Workgroup for review and recognition as meeting EV Jobs Academy.

2. The EV Jobs Academy Curriculum Workgroup aligned the curriculum against the occupations and competencies revealed through employer-validated surveys.

3. Curriculum identified by the Curriculum Workgroup as EV or mobility relevant was confirmed by members of the EV collaborative employer groups.

4. Upon employer confirmation, the Curriculum Workgroup will list the curriculum in the Directory of EV Jobs Academy Recognized Curriculum.

SEMCA WIN WORKFORCE INTELLIGENCE NETWORK

EV JOBS ACADEMY – Framing our Work

EV Jobs Academy Curriculum Recognition Process Sheet

5. Upon earning the EV Jobs Academy Recognition, the provider will ensure that the curriculum is listed MiTalent Connect and Credential Engine, as well as uploaded for scale on the M-WTEC Consortium Platform

6. Education/training providers MUST engage with MiWORKS agencies to ensure enrolled students in their EV Jobs Academy Recognized Curriculum are recorded in the OSMIS reporting system.

7. Education/training providers with Recognized Curriculum are required to remained engaged with the EV Job Academy Education Team and Curriculum Workgroup to retain their curriculum Recognized Status.

8. EV Jobs Academy Recognized Curriculum will be promoted across the state through various strategic activities and events.

SEMCA WIN WORKFORCE INTELLIGENCE NETWORK

EV JOBS ACADEMY – Framing our Work

On Demand Occupations

As a result of the feedback and discussion With Employer Partners

EV Jobs Academy Critical Occupations:

Top 4 occupations included:

- Mechanical engineers
- Electrical Engineers
- Software Developers
- Electrical/Electronic engineering technologists & technicians

Next 5 included:

- Automotive service Techs/Mechanics
- Computer occupations
- Industrial machinery mechanics
- Assemblers & Fabricators
- Maintenance/Repair

MEDC TAT Mobility Critical Occupations:

Top 4 occupations included:

- Electrical Engineers
- Software Developers
- Firstline Supervisors
- Production Workers

Next 4 included:

- Mechanical and other Engineers
- Production, Planning, and Clerks
- Engineering Technicians
- Engineering Support

SEMCA WIN WORKFORCE INTELLIGENCE NETWORK

EV JOBS ACADEMY – Framing our Work

	A	B	C	D	E	F	G	H
1	EV Jobs Academy	Henry Ford community College	Jackson community College	Lansing Community College	Macomb Community College	Monroe Community College	Mott Community College	Northwestern Michigan College
2	OCCUPATIONS	The curriculum recognized in this document have been formally reviewed and aligned with employer validated data and the Education & Training team curriculum work group. The EV Jobs Academy Project Manager, Education & Training team Lead or designee has the right to remove recognition by the EV Jobs Academy Education & Training teamwork group. To be recognized, curriculum must be submitted to the EV Jobs Academy Curriculum Workgroup, a sub-committee of the EV Jobs Academy Education & Training team using a standardized template.						
3	Engineering	Engineering	Engineering	Engineering	Engineering	Engineering	Engineering	Engineering
4	Pre-Engineering Mechanical AS	Pre-Eng. Mechanical/Industrial-AS						
5	Pre-Engineering Electrical AS	Pre-Eng. Electrical/computer-AS						
6	Pre-Engineering - AS	Pre-Eng'g Sci Transfer-AS			Pre-Eng'g Sci Transfer-AS/WSU			Pre-Engineering-AS
7	Software Developers	Software Developers	Software Developers	Software Developers	Software Developers	Software Developers	Software Developers	Software Developers
8	Information Technology programming	Computer Information Systems AAS; JAVA, C++, CompTIA A+, CompTIA Network+, C#, PHP, SQL		Computer Programmer Analyst AB and CC	Information Technology Programming-AAS & JAVA, C, C++, mobiles, skill certificates			
9	Computer Software Programming	Computer Science AS, Computer Software Applications CA			Computer Software Programming - AS degree			
10	Automotive Embedded systems programing	AUTO-237: Computerized Engine/Vehicle Network, Programming, and Security Systems			ITCS 1300 Embedded C for Automotive Systems, & AUTO 2600 - Automotive Cybersecurity			
11	Eng'g Technologists & Technicians	Eng'g Technologists & Technicians	Eng'g Technologists & Technicians	Eng'g Technologists & Technicians	Eng'g Technologists & Technicians	Eng'g Technologists & Technicians	Eng'g Technologists & Technicians	Eng'g Technologists & Technicians
12	Electrical Eng'g Technology	1. ELEC Eng'g Technology AS 2. ELEC Automation Controls CA		Electrical Tech AAS & Certificates	Electrical Eng'g Tech AAS			

SEMCA WIN WORKFORCE INTELLIGENCE NETWORK

EV JOBS ACADEMY – Framing our Work

Credit Based Programs - Macomb Community College Program and Occupations Data				
Credit Based Programs - Program Data and Occupations	Credit Hrs.	Degree Type	Occupation Category	Business function
Pre-Engineering, AS Program meets requisite requirements for transfer to a baccalaureate degree program in Engineering	62	Associate Degree	Engineering	Engineering
Programming, AAS	64	Associate Degree	Computer Programmers	Software Developers
Programming for Electronic Games, AAS	65	Associate Degree		
Website Programming, AAS	62	Associate Degree		
Data Analytics Certificate	22	Certificate		
Database Programming, Certificate	21	Certificate		
Information Technology - Website Programming, Certificate	47	Certificate		
Programming for Electronic Games, Certificate	50	Certificate		
Programming, Certificate Includes Java, Embedded C, C++, Apple ISO & Mobile development	36	Certificate		
ITCS 1300 - Embedded C Programming for Automotive Systems	4	Academic Credit		
Computer Science Transfer, AS Science Program	60	Associate Degree		
Information Technology, AAS	63	Associate Degree		

MiTalent Connect and Credential Engine

SEMCA WIN WORKFORCE INTELLIGENCE NETWORK

Macomb Community College

Education • Enrichment • Economic Development

Discover. Connect. *Advance.*℠

Contact Information
EV Jobs Academy Curriculum Work Group Lead

Ben Cruz
Macomb Community College
cruzb800@macomb.edu

WIN WORKFORCE INTELLIGENCE NETWORK

EV Jobs Academy

ONLINE LEARNING PLATFORM

Dennis Bona, Michigan Workforce Training and Education Collaborative

WIN WORKFORCE INTELLIGENCE NETWORK

EV Jobs Academy

EV JOBS ACADEMY KEY STAKEHOLDERS

Laurie Huber, Workforce Intelligence Network

WIN WORKFORCE INTELLIGENCE NETWORK

MICHIGAN DEPARTMENT OF LABOR & ECONOMIC OPPORTUNITY

MICHIGAN DEPARTMENT OF LABOR & ECONOMIC OPPORTUNITY (LEO)

Jonathan Smith, Senior Chief Deputy Director

WIN WORKFORCE INTELLIGENCE NETWORK

SEMCA MICHIGAN WORKS!

GLOBAL EPICENTER FOR MOBILITY (GEM)

J.V. de La Fuente, Director of Regional Initiatives and Grant Compliance

GLOBAL EPICENTER OF MOBILITY

REVOLUTIONIZING THE DETROIT REGION

PROGRAM OVERVIEW

Greg Pitoniak – CEO, SEMCA Michigan Works!

J.V. de la Fuente – Director, GEM Talent Transformation

WHAT IS AT STAKE

- The world is experiencing its most significant mobility revolution in the past century
- New technologies are disrupting the automotive industry while redefining what mobility is and how people and goods move
- As others have shared with you, the EV market and job potential is a huge opportunity for Michigan
- Amid this shift, no state has more to gain – or lose – than Michigan

WHAT IS GEM

- Opportunity: BBBRC advanced mobility grant from the U.S. Economic Development Administration (EDA).
- Led by the Detroit Regional Partnership, the GEM Coalition was selected out of 529 applicants to become one of 21 funded initiatives.
- The GEM Coalition is made up of five co-recipient organizations, managing six pillars, and overseeing dozens of projects.
- Awarded $52.2 million in 2022, the grant runs October 2022 – May 2027.
- GEM has an intentional focus on Historically Excluded Communities to ensure equal opportunities to fully participate in programs funded by the grant.

GEM PROJECT PARTNERS

SEMCA
Talent Transformation

PURPOSE
Assist companies in equitably meeting the region's advanced mobility talent needs, offset retirement and transition losses, and support career pathway advancement.

TECH TOWN
Mobility Acceleration & Innovation Network

PURPOSE
Accelerate the growth of mobility startups that drive innovation to fill gaps in the mobility value chain.

MEDC OFME
Proving & Testing

PURPOSE
Equitably increase the number of companies and small entrepreneurs and help them access the state's world-class testing and proving assets.

U of M EGI
Supply Chain Transformation Center

PURPOSE
Help existing small-to medium-size manufacturers and suppliers transition to the future of mobility, including electrification and autonomy, or pivoting to new industries.

DRP
VIP Site Readiness

PURPOSE
Verify and catalog development-ready sites to attract major mobility business investments across the Detroit Region.

DRP
GEM Central

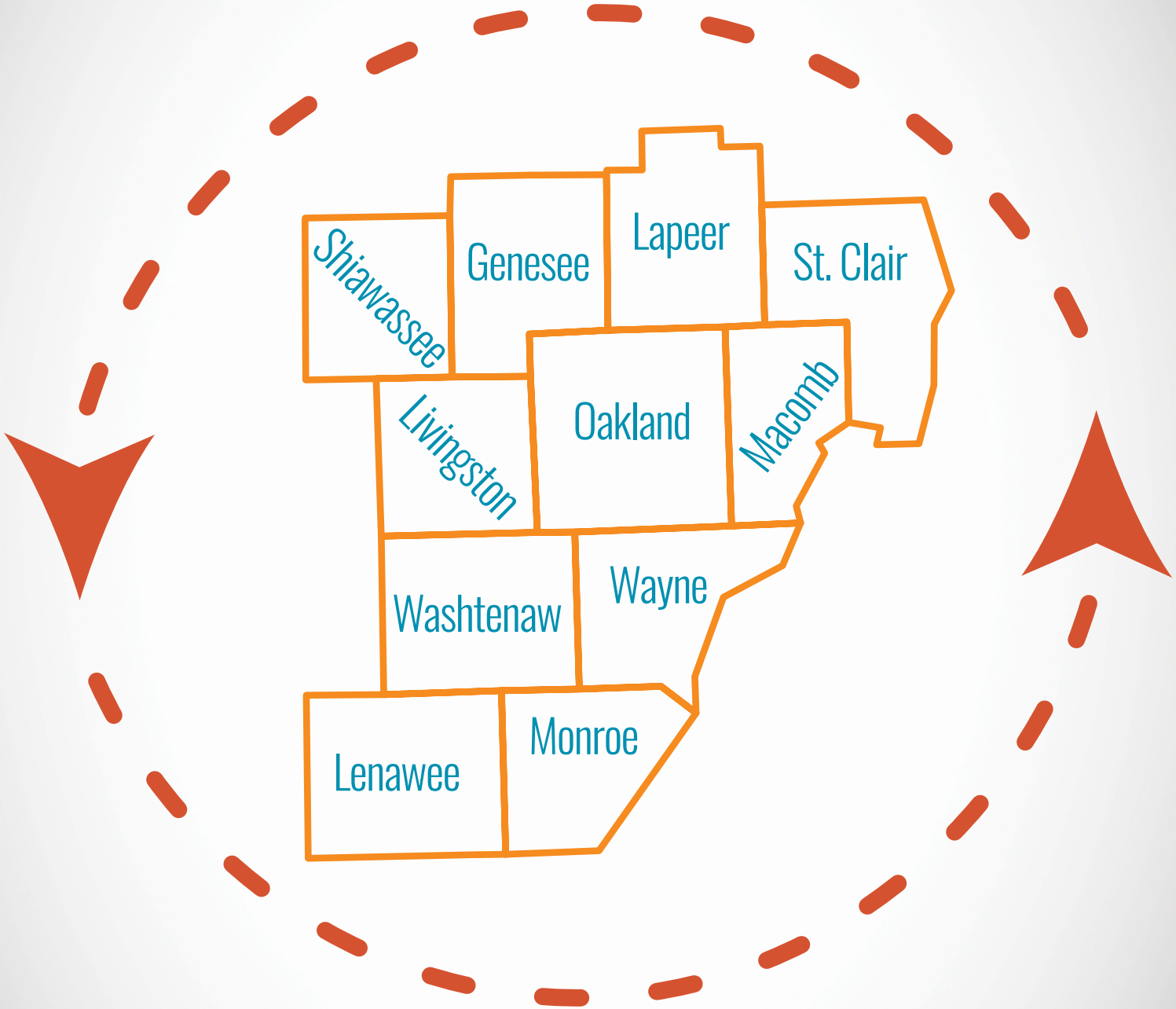
PURPOSE

- Main Convener of Stakeholders
- Pillar Project Management & Central Technical Services
- Tracking Aggregate Metrics
- Mobility research and data support
- DEI expertise supporting all component projects
- GEM Communications

$52.2 Million

BBBRC grant serves the 11-county region and is designed to accelerate economic growth by building on the region's mobility assets.

GEM will create a smart, secure, sustainable, and inclusive advanced mobility industry, starting with the transition to next-generation electric, autonomous, and fully connected vehicles.



TALENT TRANSFORMATION

PURPOSE

Assist companies in equitably meeting advanced mobility talent needs, offset retirement and transition losses, and support career pathway advancement and system coordination to support advanced mobility talent retention and development.

Project Support Organizations (subrecipients)

- Detroit Regional Chamber
- Detroit Future City
- Ann Arbor Spark
- MI Founders Fund
- Global Detroit
- GST Michigan Works!
- Michigan Works! Southeast
- Oakland County MI Works!
- Macomb/St. Clair MI Works!
- Detroit Employment Solutions Corp.
- SEMCA Michigan Works!

TALENT TRANSFORMATION

The Talent Transformation project is comprised of three pillars:

BUSINESS SERVICES

- Develop and operate a network of Business-facing advanced & customized talent consulting, assessment and referral services to help business **attract, retain, upskill and reskill teams.**

TALENT SERVICES

- Development and operation of Talent-facing network to **support talent at all levels** through the Michigan Works! Agencies.

NETWORK DEVELOPMENT AND ALIGNMENT

- **Creating alignment** with key talent stakeholders

HISTORICALLY EXCLUDED COMMUNITIES

- Certain communities have experiences that prevented them from fully participating in high-growth manufacturing, technology, or mobility jobs.
- GEM's HEC definition is inclusive and broad, but distinct to address issues specifically to each sector.

- MBEs /WBEs/VOB
- Disability and Neurodiverse
- LGBTQA+
- Distressed Rural
- Distressed Urban
- Justice 40: Communities of color and low-income communities with fewer government resources, community capacity, and political power
- Black/Indigenous/Hispanic/Latino/a/x
- Women
- Returning citizens
- Veterans
- Refugees and Immigrants
- Justice 40: Low-income and working-class households

FUNDING AVAILABLE FOR TRAINING IN MOBILITY SECTOR

- $2.25M in GEM training funding
  - $5,000 per job seeker/ALICE
  - $3,000 per incumbent worker
- $8.4M EVJA training funding available from the State of Michigan through the Michigan Works! Agencies
- $3.6M training funding in on-going EV Infrastructure Training Program
- $55M Going PRO Talent Fund available state-wide

EVJA AND GEM WORKING TOGETHER

- GEM and EVJA are working collaboratively
- Avoiding duplication
- Maximizing resources
- Many common partners - e.g., all Michigan Works! Agencies
- SEMCA Michigan Works! is the common administrator/coordinator for both initiatives

EV Jobs Academy

EDUCATION AND TRAINING PROVIDERS

COMMUNITY COLLEGES

10

- HENRY FORD
- MACOMB
- WASHTENAW
- SCHOOLCRAFT
- OAKLAND
- MACOMB
- LANSING
- MONROE
- MOTT
- NORTHWESTERN MICHIGAN

UNIVERSITIES

4

- WAYNE STATE UNIVERSITY
- UNIVERSITY OF DETROIT MERCY
- MICHIGAN TECH UNIVERSITY
- UNIVERSITY OF MICHIGAN

TRAINING PROVIDERS

6

- LHP ENGINEERING SOLUTIONS
- NEXT EDUCATION
- SAE
- SQUARE ONE
- AUTOMATION WORKZ
- DIVERSE NOTE

CONTACT INFORMATION

TALENT TRANSFORMATION

J.V. de la Fuente
Director - GEM Talent Transformation
jv.delafuente@semca.org

Jacklyn Salazar
Program Manager – Employer Services
jacklyn.salazar@semca.org

Dan Roeske
Program Manager – Talent & Sector Strategy
dan.roeske@semca.org

Andrea Broecker
Sr. Associate Manager – Communications
andrea.broecker@semca.org

GEM CENTRAL

Christine Roeder
Executive Vice President
christine.roeder@detroitregionalpartnership.com

Bernard Swiecki
Vice President, Mobility & Research
bernard.swiecki@detroitregionalpartnership.com

Monique Sesi
Chief of Staff
monique.sesi@detroitregionalpartnership.com

Rebecca White
Director, Communications
rebecca.white@detroitregionalpartnership.com

GLOBAL EPICENTER OF MOBILITY

REVOLUTIONIZING THE DETROIT REGION

WIN WORKFORCE INTELLIGENCE NETWORK

W.E. UPJOHN INSTITUTE FOR EMPLOYMENT RESEARCH

DATA PROJECTIONS & GROWTH

Michael Horrigan, W.E. Upjohn Institute

Occupational Projections for Lithium-Ion Battery Production in Michigan

Presentation to the Michigan Auto Show
September 14, 2023

Michael Horrigan, Dakota McCracken, and Erik Vasilauskas

W.E. UPJOHN INSTITUTE
FOR EMPLOYMENT RESEARCH

Overview

- Supply chain concept for lithium-ion battery production
- Database of Companies in the lithium-ion battery supply chain
- Validation of data and imputation
- Establishing the relationship between supply chain employment and productive capacity
- Projecting occupational employment for lithium-ion battery production

In the ***National Blueprint for Lithium Batteries 2021-2030***, the Federal Consortium for Advanced Batteries differentiates the segments of the supply chain

- **Upstream**: raw materials production
- **Midstream**: materials processing and cell manufacturing
- **Downstream**: pack manufacturing and end-of-life recycling and reuse

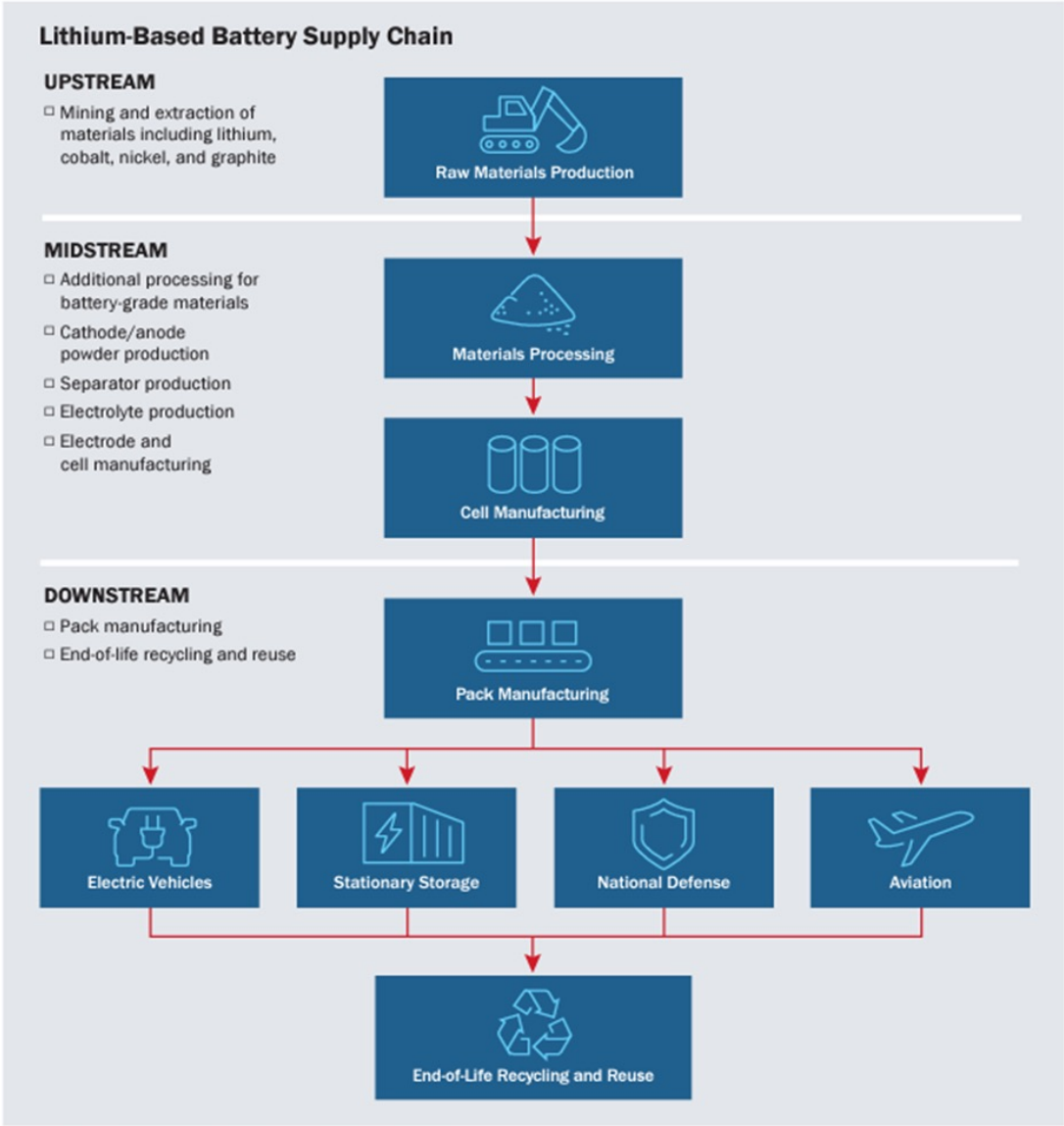


FIGURE 5. Steps in the lithium-battery material supply chain.

Source: National Blueprint for Lithium Batteries 2021-2030

National Alliance for Advanced Transportation Batteries

- R&D consortium of companies working to promote the manufacturing of lithium-ion and other advanced batteries
  - Incorporated as a Section 501(c)(6) trade association in 2009
  - 220+ corporate members in the energy storage industry

Source: NAATBatt International

North American Lithium-Ion Battery Supply Chain Database

In response to the national blueprint, **NAATBatt International** and the **National Renewable Energy Laboratory (NREL)** created a publicly available directory of North American companies in the lithium-ion supply chain.

- First released September 2021, with continued updates planned through 2025
- Recent release (June 2023) documents 791 firms engaged in the North American supply-chain for lithium-ion batteries

Source: NAATBatt International

North American Lithium-Ion Battery Supply Chain Database

For each facility, the database provides:

- Company name
- Website URL
- Facility in North America for the segment identified
- Facility address
- Products or services offered at the facility
- Approximate size of the company's overall workforce in North America, when available
- Headquarter company, location, and website
- Installed battery manufacturing capacity (in gigawatt-hours) and material production capability (in tons per year), plans for future capacity, types of chemistries and processes, and expansion plans by sector (e.g., transportation, stationary), when available

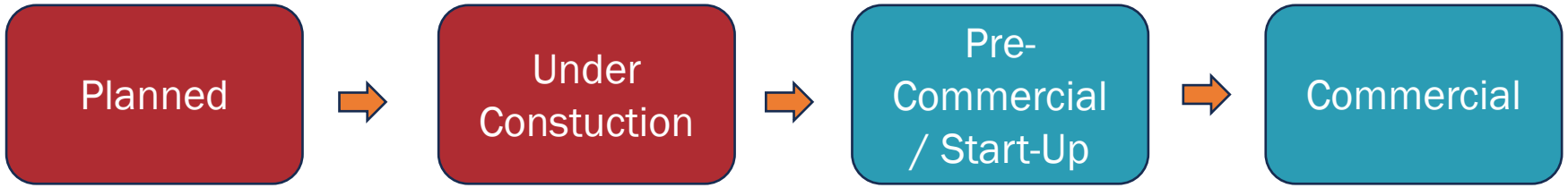
Source: NAATBatt International

NaatBatt and NREL Database

Data Validation

Methodology: Identification of Active Firms

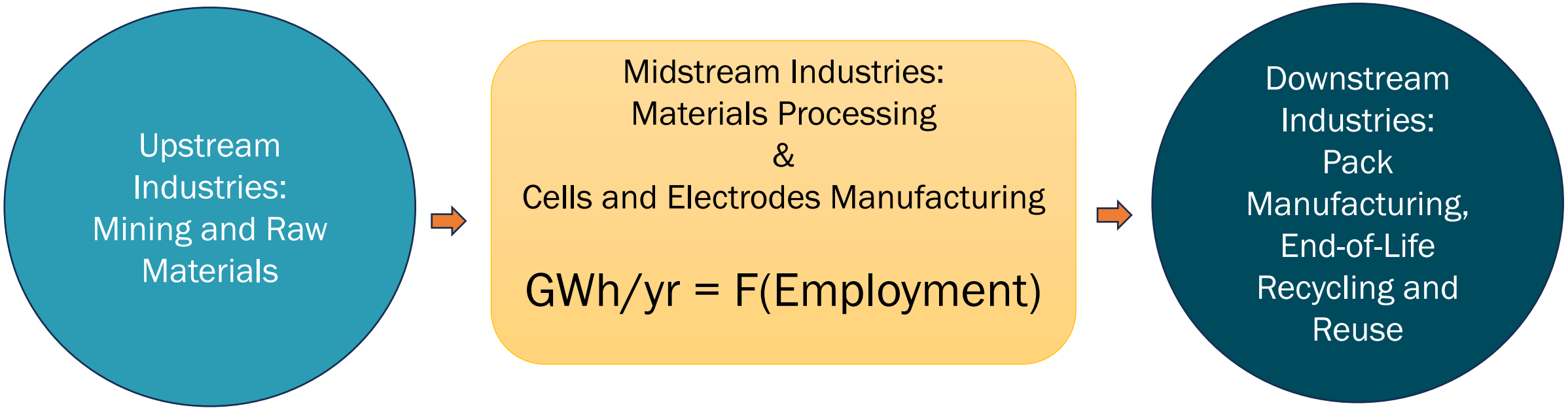
- The NaatBatt Database collects information on facilities in various stages of development. Facilities are placed into one of the following four stages:



- Our analysis is based on the 63 "Commercial" and "Pre-Commercial facilities" active in Michigan in year 2023

- Workforce estimates at facilities "Planned" and "Under Construction" are excluded from calculations of employment in the base period

Methodology: Establishing the relationship between supply chain employment and productive capacity



Employment forecasting assumes a stable relationship between supply chain employment and productive capacity in cells and electrodes manufacturing

Methodology: Imputation of Missing Values

- NaatBatt documents facility workforce and production capacity (where applicable) for firms in its database, but the data base does have some missing information:
  - In Michigan, 22 of 63 active firms contained missing information in one or both fields

- Imputation procedure for missing employment size:
  1. Direct outreach to establishment
  2. Web research
  3. Use of establishment databases (National Establishment Time Series, Claritas, Gale Business Insights)

Methodology: Imputation of Missing Values

- One firm in supply chain segment four, “Cells and Electrodes” was missing a value for productive capacity. We used a linear regression to model the relationship between workforce and productive capacity for the rest of the firms, using that to impute the missing observation.

- In cases where a single workforce size is available for a firm with establishments in multiple supply-chain segments, we used national estimates of the proportions of workers in each supply chain segment

Establishing the relationship between supply-chain employment and productive capacity

Measuring the Output of Lithium-Ion Battery Manufacturers

- A Gigawatt-hour (GWh) is a unit of measurement for electric energy
  - Annualized as GWh/year

1 GWh/yr = 1,000 MWh/yr = 1 million kWh/yr

- Automakers quote a vehicle's battery capacity in terms of kilowatt-hours
  - Battery sizes range widely from 20 – 200 kWh
  - Trending larger with consumer demand for increased vehicle range

32.2 GWh/yr → Approximates the supply of 470,000 electric vehicle-grade batteries, where 68.4 kWh is regarded as an EV-average

Michigan Cells & Electrodes manufacturers total productive capacity in 2023 (NaatBatt)

Source: US Energy Information Administration, Electric Vehicle Database

Michigan Employment Across the Supply Chain

The following levels of employment in eleven supply chain segments are associated with 32.2 GWh/yr annual production capacity in the year 2023:

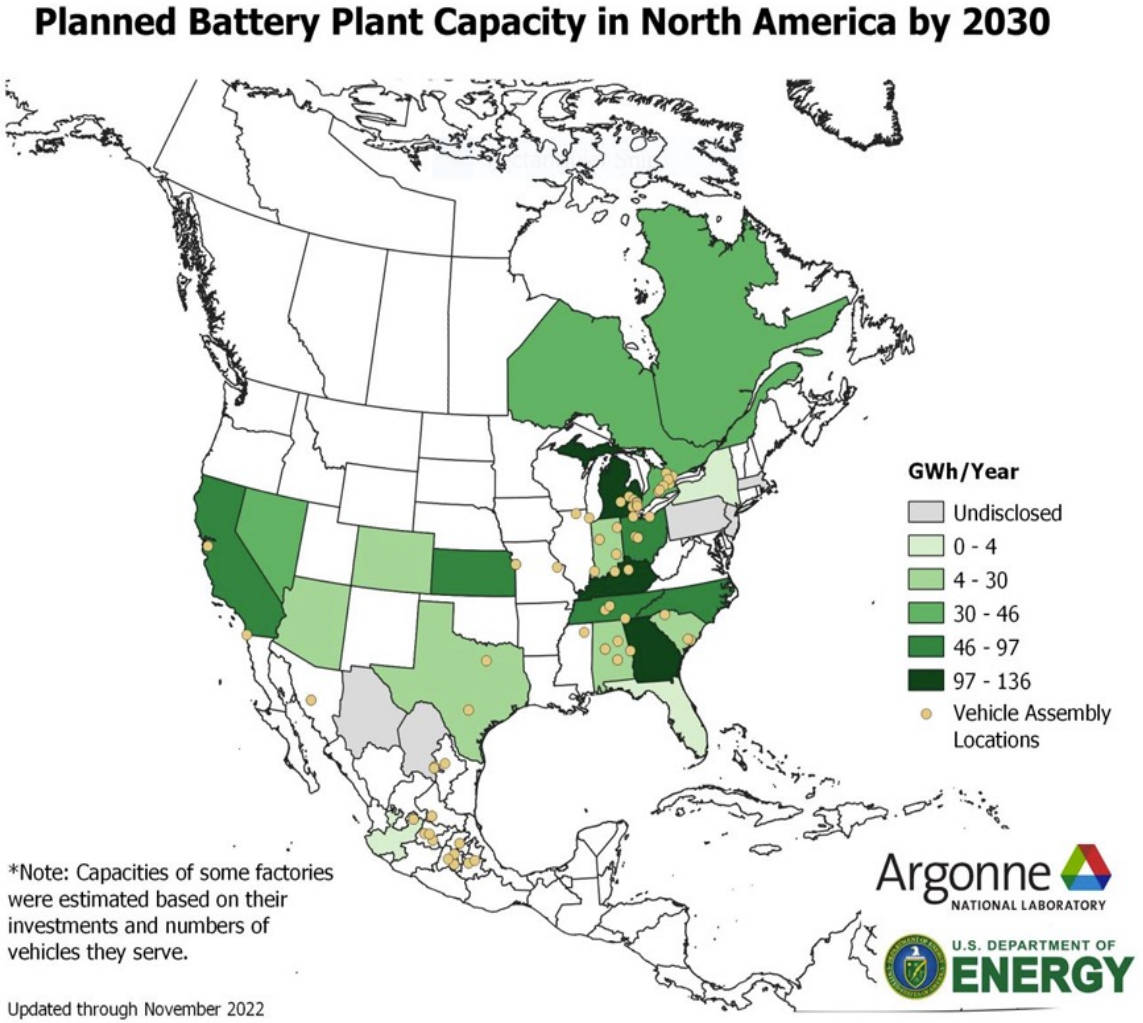
Supply Chain Segment	NAATBatt Employment In Michigan	Relative Share of Total Employment
1-Raw Materials	400	5.3%
2-Battery Grade Materials	54	0.7%
3-Other Battery Components Materials	63	0.8%
4-Electrodes and Cells	1,406	18.7%
5-Modpacks	3,534	46.9%
6-End of Life (EOL)	114	1.5%
7-Equipment	41	0.5%
8-Service and Repair	446	5.9%
9-Research and Development	1,315	17.5%
10-Modeling	160	2.1%
11-Distributors	0	0.0%
Total	**7,533**	**100%**

Michigan Employment by Industry NAICS (2023, 32.2 GWh/yr)

NAICS 3-Digit	Description	NAATBatt Employment in Michigan	Relative Share of Total Employment
212	Mining (except Oil and Gas)	400	5.3%
325	Chemical Manufacturing	107	1.4%
326	Plastics and Rubber Products Manufacturing	995	13.2%
333	Machinery Manufacturing	10	0.1%
334	Computer and Electronic Product Manufacturing	318	4.2%
335	Electrical Equipment, Appliance, and Component Manufacturing	3,344	44.4%
336	Transportation Equipment Manufacturing	795	10.6%
423	Merchant Wholesalers, Durable Goods	77	1.0%
441	Motor Vehicle and Parts Dealers	125	1.7%
541	Professional, Scientific, and Technical Services	1,191	15.8%
561	Administrative and Support Services	105	1.4%
562	Waste Management and Remediation Services	40	0.5%
811	Repair and Maintenance	26	0.3%
	Total	**7,533**	**100%**

Battery Production Capacity for Michigan

- NAATBatt/ NREL data currently active:
  32 GWh/yr
- Argonne National Labatory projection:
  97-136 GWh/yr
- NAATBatt/ NREL data current & planned:
  157 GWh/yr



Source: NAATBatt Data and Upjohn Calculations, Argonne National Laboratory

NAICS 3-Digit	Description	NAATBatt Employment in Michigan in 2023 associated with 32.2 Gigawatt hours of battery production	NAATBatt Employment in Michigan in 2030 associated with 136 Gigawatt hours of battery production
212	Mining (except Oil and Gas)	400	400*
325	Chemical Manufacturing	107	452
326	Plastics and Rubber Products Manufacturing	995	4,202
333	Machinery Manufacturing	10	42
334	Computer and Electronic Product Manufacturing	318	1,343
335	Electrical Equipment, Appliance, and Component Manufacturing	3,344	14,124
336	Transportation Equipment Manufacturing	795	3,358
423	Merchant Wholesalers, Durable Goods	77	325
441	Motor Vehicle and Parts Dealers	125	528
541	Professional, Scientific, and Technical Services	1,191	5,030
561	Administrative and Support Services	105	443
562	Waste Management and Remediation Services	40	169
811	Repair and Maintenance	26	110
	Total	**7,533**	**30,127**

***Employment in Raw Materials held constant over the projection period.We exclude Mining from our projections based on uncertainty over the supply of, permitting for, and the development of economically viable sites for extraction of critical mining inputs**

Projecting Occupational Employment for Lithium-Ion Battery Production

Projecting Occupational Employment for Lithium-ion Battery Production

- For each 3-digit NAICS industry involved in lithium-ion battery production, identify its occupational staffing pattern in Michigan in 2022 using the Occupational Employment and Wage Survey Data (latest data available)

- Use Michigan projections data on occupational shares by 3-digit NAICS industry in 2030 for each occupation in that industry

- Apply these projected occupation/industry shares to the projected 3-digit NAICS employment associated with the 136 GWh production capability to generate projected occupational employment in 2030 by these NAICS industries
  - Exclude NAICS 212 – Mining, where growth in employment is conditioned upon the supply of, permitting for, and the development of economically viable sites for extraction of critical mining inputs

Projecting Occupational Employment for Lithium-ion Battery Production

- For each occupation, add up the projected occupational needs across all the relevant NAICS codes to generate an estimate of overall occupational requirements

- In addition, separate estimates of annual job openings are developed based on the assumption that the existing relationship between annual job openings and base year employment for the full occupation will approximate the same relationship for EV related occupational employment

Occupation Code	Occupational title	EV related occupational employment		Employment change 2023-2030	Annual job openings for EV related occupational employment
		2023	2030		
51-2000	Assemblers and Fabricators	1,431	5,851	4,420	5,762
17-2000	Engineers	654	2,903	2,248	1,674
51-4000	Metal Workers and Plastic Workers	582	2,397	1,815	1,843
13-1000	Business Operations Specialists	424	1,806	1,383	1,673
53-7000	Material Moving Workers	324	1,366	1,042	1,885
51-9000	Other Production Occupations	414	1,707	1,293	1,524

Occupation Code	Occupational title	EV related occupational employment		Employment change 2023-2030	Annual job openings for EV related occupational employment
		2023	2030		
11-3000	Operations Specialties Managers	256	1,122	866	820
51-1000	Supervision of Production Workers	194	838	644	941
15-1200	Computer Occupations	294	1,337	1,043	765
49-9000	Other Installation, Maintenance, and Repair Occupations	158	739	581	767
43-4000	Information and Record Clerks	145	565	421	774
11-1000	Top Executives	134	573	438	601

Occupation Code	Occupational title	EV related occupational employment		Employment change 2023-2030	Annual job openings for EV related occupational employment
		2023	2030		
43-5000	Dispatching, and Distributing Workers	144	599	455	590
41-4000	Sales Representatives, Wholesale and Manufacturing	129	547	418	619
17-3000	Drafters, Engineering Technicians, and Mapping Technicians	150	625	475	407
43-9000	Other Office and Administrative Support Workers	134	529	394	693
47-2000	Construction Trade Workers	123	517	394	478
13-2000	Financial Specialists	123	516	392	497

Occupation Code	Occupational title	EV related occupational employment		Employment change 2023-2030	Annual job openings for EV related occupational employment
		2023	2030		
11-9000	Other Management Occupations	115	493	377	320
43-3000	Financial Clerks	83	324	241	378
11-2000	Advertising and Promotion Managers	75	318	243	317
41-2000	Retail Sales Workers	46	195	149	152
43-1000	Supervisors of Office and Adminstrative Support Workers	41	161	121	189
43-6000	Secretaries and Administrative Assistants	52	188	136	170

Occupation Code	Occupational title	EV related occupational employment		Employment change 2023-2030	Annual job openings for EV related occupational employment
		2023	2030		
49-3000	Vehicle and Mobile Equipment Mechanics, Installers, and Repairers	53	228	175	114
53-3000	Motor Vehicle Operators	35	148	113	140
23-1000	Lawyers, Judges, and Related Workers	44	188	144	51
37-2000	Building Cleaning and Pest Control Workers	26	111	85	155
41-3000	Sales Representatives, Services	31	131	100	104
49-1000	Supervisors of Installation, Maintenance, and Repair Workers	23	99	75	110

Detailed Occupations

51-2000	Assemblers and Fabricators
51-2021	Coil Winders, Tapers, and Finishers
51-2022	Electrical and Electronic Equipment Assemblers
51-2023	Electromechanical Equipment Assemblers
51-2031	Engine and Other Machine Assemblers
51-2041	Structural Metal Fabricators and Fitters
51-2051	Fiberglass Laminators and Fabricators
51-2092	Team Assemblers
51-2099	Assemblers and Fabricators, All Other

Detailed Occupations

17-2000	Engineers
17-2041	Chemical Engineers
17-2051	Civil Engineers
17-2061	Computer Hardware Engineers
17-2071	Electrical Engineers
17-2072	Electronics Engineers, Except Computer
17-2081	Environmental Engineers
17-2111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors
17-2112	Industrial Engineers
17-2131	Materials Engineers
17-2141	Mechanical Engineers
17-2151	Mining and Geological Engineers, Including Mining Safety Engineers
17-2199	Engineers, All Other

Areas to Research

- Assignment of NAICS codes
- Output / employment relationship
- Gigawatt projections
- Occupations most relevant
- Productivity impacts on occupational shares
- Expand framework to the entire U.S.

Average monthly changes in employment will slow down significantly over the next ten years

Year	BLS Projections US Employment	Average monthly employment change
2012	145,356,000	
2022	164,482,600	159,388
2032	169,148,100	38,879

Year	Michigan Projections	Average monthly employment change
2010	4,084,320	
2018	4,678,014	6,184.31
2020	4,279,580	
2030	4,654,510	3,124.42

Sources: BLS Occupational Projections and Michigan Labor Market Information

Sources

Sources

National Blueprint for Lithium Batteries 2021-2030. Federal Consortium for Advanced Batteries. June 2021.

NAATBatt Lithium-Ion Battery Supply Chain Database. NAATBatt. Last updated June 2023.

Assessment of Light-Duty Plug-in Electric Vehicles in the United States, 2010 – 2021. David Gohlke, Yan Zhou, Xinyi Wu, and Calista Courtney. Energy Systems and Infrastructure Analysis Division, Argonne National Laboratory. November 2022

Occupational Employment and Wage Survey, Bureau of Labor Statistics, May 2021, Michigan

Occupational Employment Projections by Industry, Michigan, 2020-2030, Department of Technology, Management, and Budget, Michigan Department of Labor and Economic Opportunity.

The National Renewable Energy Laboratory (NREL) is operated for the U.S. Department of Energy (DOE) by Alliance for Sustainable Energy, LLC ("Alliance"). NAATBatt International (NAATBatt) is the trade association for the advanced battery industry in North America.

Access to or use of any data or software made available on this server ("Data") shall impose the following obligations on the user, and use of the Data constitutes user's agreement to these terms. The user is granted the right, without any fee or cost, to use or copy the Data, provided that this entire notice appears in all copies of the Data. Further, the user agrees to credit DOE/NREL/ALLIANCE/NAATBatt in any publication that results from the use of the Data. The names DOE/NREL/ALLIANCE/NAATBatt, however, may not be used in any advertising or publicity to endorse or promote any products or commercial entities unless specific written permission is obtained from DOE/NREL/ ALLIANCE/NAATBatt. The user also understands that DOE/NREL/ALLIANCE/NAATBatt are not obligated to provide the user with any support, consulting, training or assistance of any kind with regard to the use of the Data or to provide the user with any updates, revisions or new versions thereof. DOE, NREL,ALLIANCE, and NAATBatt do not guarantee or endorse any results generated by use of the Data, and user is entirely responsible for the results and any reliance on the results or the Data in general.

USER AGREES TO INDEMNIFY DOE/NREL/ALLIANCE/NAATBATT AND THEIR RESPECTIVE SUBSIDIARIES, AFFILIATES, OFFICERS, AGENTS, AND EMPLOYEES AGAINST ANY CLAIM OR DEMAND, INCLUDING REASONABLE ATTORNEYS' FEES, RELATED TO USER'S USE OF THE DATA. THE DATA ARE PROVIDED BY DOE/NREL/ALLIANCE/NAATBATT "AS IS," AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. DOE/NREL/ALLIANCE/NAATBATTASSUME NO LEGAL LIABILITY OR RESPONSIBILITY FOR THE ACCURACY, COMPLETENESS, OR USEFULNESS OF THE DATA, OR REPRESENT THAT ITS USE WOULD NOT INFRINGE PRIVATELY OWNED RIGHTS. IN NO EVENT SHALL DOE/NREL/ALLIANCE/NAATBATT BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO CLAIMS ASSOCIATED WITH THE LOSS OF DATA OR PROFITS, THAT MAY RESULT FROM AN ACTION IN CONTRACT, NEGLIGENCE OR OTHER TORTIOUS CLAIM THAT ARISES OUT OF OR IN CONNECTION WITH THE ACCESS, USE OR PERFORMANCE OF THE DATA.

"Authors: Vicky Putsche, Erik Witter, Shriram Santhanagopalan, Maggie Mann, Ahmad A. Pesaran
National Renewable Energy Laboratory
Version 4 June 30, 2023
NAATBatt International funded this project under two Technical Services Agreements (TSA-21-17854 and TSA-21-21593) with NREL"

WIN WORKFORCE INTELLIGENCE NETWORK

ATS LAB Midwest

SPONSORSHIP REMARKS & NETWORKING

Kent Powell, Amatrol Vice President of Global Sales

WIN WORKFORCE INTELLIGENCE NETWORK

QUESTIONS?
& THANK YOU!

WEBSITES

WINintelligence.org
Miapprenticeship.org
Miautomobility.org

EMAIL

info@winintelligence.org