



MICHIGAN
ECONOMIC
DEVELOPMENT
CORPORATION

Advanced Manufacturing Higher Education Strategic Investment Grant Initiative Webinar

April 12, 2024



Objectives for Discussion

- 1 Overview of MEDC Talent Solutions and Talent Action Team (TAT) model**
 - Goals, structure and employer partners
 - Priority roles and skills profiles
- 2 Grant Application Overview**
 - Overview of grant priorities
 - Guidance for successful submission
 - Application tasks and timeline

MEDC Talent Solutions

MEDC Talent Solutions

Offers a concierge service to provide key employers in Michigan a competitive advantage with ready-to-deploy talent sourcing & training solutions

1 Developing strategic labor and skill forecasts in partnership with companies

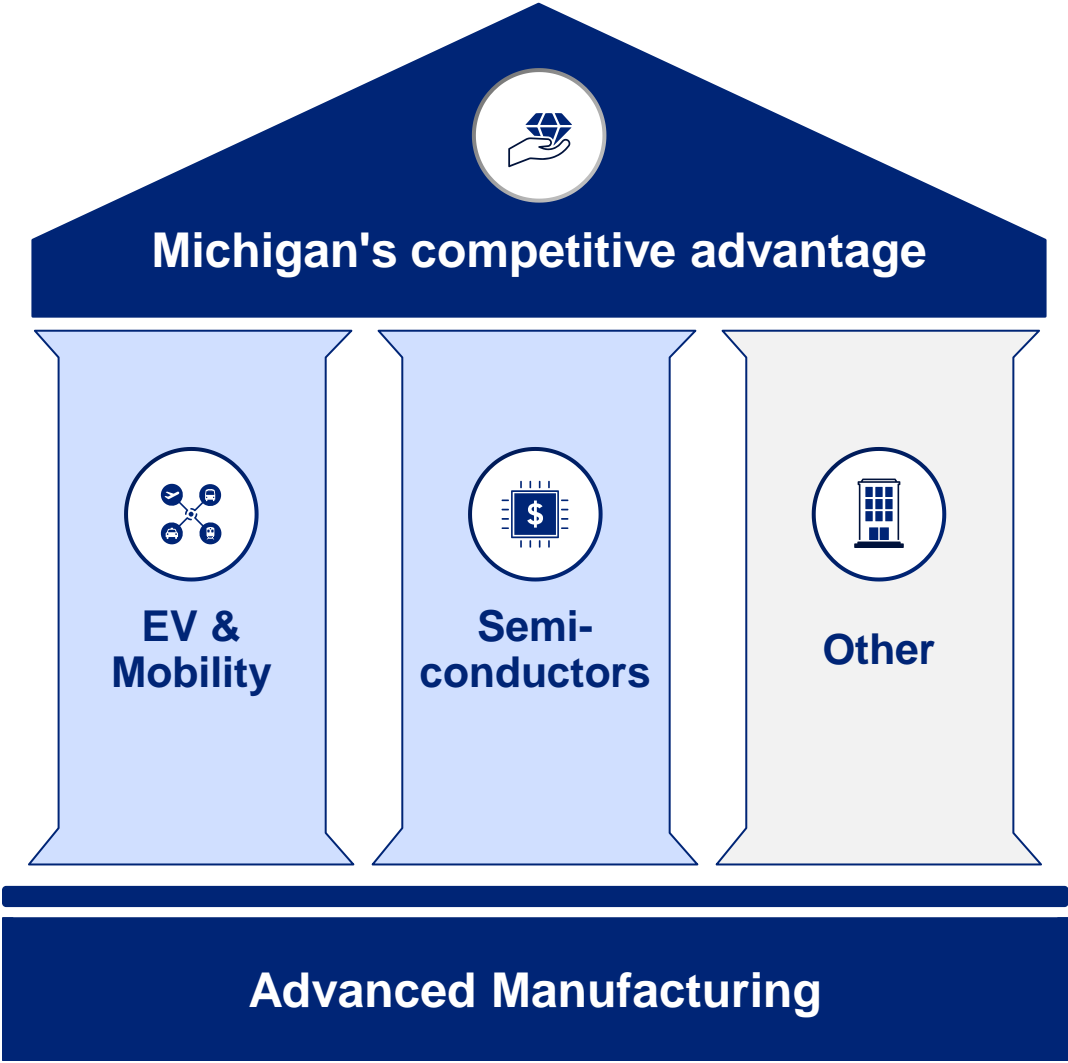
3 Deepening diverse talent pools by creating opportunities for Michiganders to join the growing advanced manufacturing sector

2 Promoting advanced manufacturing employers as great places to work, offering highly purposeful and rewarding career



4 Partnering with training providers to develop tailored, accelerated, flexible programs

TATs launched and plans to leverage its infrastructure to support companies in MI across other industry sectors



We launched **Talent Action Teams (TATs)** across the Advanced Manufacturing industry to deliver:

- ✓ **Employer-centric** training and marketing efforts to promote priority roles in industry
- ✓ **Training and recruitment** partners to expand key pipelines and support underrepresented job seekers
- ✓ Direct access to **top tech and engineering talent** to core employers.



TAT has developed skills profiles for the EV and semiconductor priority roles. Some examples below:

Roles requiring a 4-year degree

Industrial / process engineer | Skills profile and learning modules

Industrial / process engineer

Foundational Skills
Standard Knowledge
Process Engineer Foundations (STEM (intermediate))
• Algebra, Calculus, Analytic Geometry & Trigonometry
• Calculus-Based & Electromagnetic Physics
Chemical Engineering (Basic)
• Safe chemical handling
• Organic chemistry
• Thermodynamics
• Transport processes
• Chemical kinetics

Core Competencies
Semiconductor-Focused Knowledge
Business Processes
• Manufacturing Processes (e.g. lean/agile)
• Six Sigma, Red X Principles, Value stream analysis
Soft Skills
• Communication Skills
• Teamwork / Collaboration
• Problem Solving
• Self-Motivation

Chemical Engineering
• Vacuum operation
• Chemistry of coating reactions
• Surface chemistry
• Process modeling
• ALD/CVD process chemistry

Material Science
• Electron microscopy
• Thin film characterization and deposition

Use Cases
Illustrative Use Cases that will ensure manufacturability and yield through data analysis and variability reduction projects
• Maintain tool history and update operating procedures
• Perform failure analysis

Electrical Engineer | Skills profile and learning modules

Electrical Engineer

Foundational Skills
Standard Knowledge
Electrical Engineer Foundations (Intermediate understanding)
• Electrical Circuits
• Electromagnetics
• Analog & Digital Comm. Systems
• Automatic Control Systems
• Schematic Diagrams
• Root Cause Analysis
• Signal and Power Integrity
• Electro-optics
STEM (Intermediate)
• Algebra, Calculus, Analytic Geometry & Trigonometry
• Calculus-Based & Electromagnetic Physics
Computer Science (Intermediate)
• Object-Oriented Programming Languages (e.g., C and C++)
• Processing Models
• Stacks and Stacks Applications
• Computer Networks
• Software Design and Implementation

Core Competencies
Semiconductor-Focused Knowledge
Business Processes
• Manufacturing Processes (e.g. lean/agile)
• Six Sigma, Red X Principles
Soft Skills
• Communication Skills
• Teamwork / Collaboration
• Problem Solving
• Self-Motivation

Specializations* (Choose One)
Devices & Manufacturing
• Microelectronics Fabrication & Manufacturing
• Nanoscale Transistors
• Device Simulation
• RF Design, Passive & Active

Circuits
• Power Electronics in Power Systems (e.g., analysis, design, simulation, & modeling)
• RF System Design

Use Cases
Illustrative Use Cases
• Support design of electronic systems (e.g. schematic capture, simulation, layout review)
• Conduct debugging, updates, and develop diagnostics for equipment and applications (e.g. printed circuit boards, power electronics)
• Maintain electrical data

Computer Engineer | Skills profile and learning modules

Computer Engineer

Foundational Skills
Standard Knowledge
Computer Engineer Foundations (Intermediate understanding)
• Data Structures
• Computer Systems
• Random Signal Theory
• CRUI/GPUGPA Memory Controllers
• Digital System Design
• Server Architecture (e.g., processor, memory interfaces)
STEM Skills (Intermediate)
• Algebra, Calculus, Analytic Geometry & Trigonometry
• Calculus-Based & Electromagnetic Physics
Computer Science (Intermediate)
• Object-Oriented Programming Languages (e.g., C and C++)
• Processing Models
• Stacks and Stacks Applications
• Computer Networks
• Software Design and Implementation

Core Competencies
Semiconductor-Focused Knowledge
Business Processes
• Manufacturing Processes (e.g. lean/agile)
• Six Sigma, Red X Principles
Soft Skills
• Communication Skills
• Teamwork / Collaboration
• Problem Solving
• Self-Motivation

Software and Programming
• Oracle (Agle, X86)
• C++
• Python
• AutoCAD (2D, 3D)
• Solids
• Tensorflow
• Spark/Hadoop
• Solidworks
• Cadence/Allegro
• Linux
• Bash

Additional Computer Engineering
• Computer Networks
• Microprocessors
• Microprogramming
• Computer Architecture
• System-on-Chip Embedded Systems
• Sequential Logic Design
• Software Design and Implementation
• Data Science and Information Processing

Use Cases
Illustrative Use Cases
• Build, test and modify prototypes and derivative platforms
• Test parts and troubleshoot and support and part of system failures
• Support research and development to apply machine learning into data analysis and parts
• Work with computer experts to handle parts failures and coordinate replacements

Source: Burning Glass, company job postings, 4-year degree course materials, BCG analysis

Roles requiring a certificate or 2-year degree

Semiconductor technician | Skills profile and learning modules

Semiconductor Processing Technician

Foundational Skills
Standard Knowledge
Semiconductor Processing Technician Foundations (Intermediate understanding)
• Digital Electronics
• Electromechanical Devices and Systems
• Electrical distribution systems (AC, DC, RF)
• Series and Parallel Circuits
• Schematic Diagrams
STEM Basics (Basic)
• Physics
• Chemistry
• Mathematics
• English
• Communication
• Professional Writing
• Technical and Professional Writing
• Business and manufacturing processes (e.g., agile/lean)

Core Competencies
Semiconductor-Focused Knowledge
Manufacturing Knowledge
• Shop floor control systems
• Lean manufacturing, 5S and Six Sigma Processes
• Shutdown planning
• Quality Assurance & Control
• Machine Maintenance Strategy
• Root Cause Analysis
• Statistical Process Control (SPC)
• Hand and Power Tools

Software
• Microsoft Systems (e.g. Excel)
• Computer Aided Drafting
• Query Management Apps

Workplace Knowledge
• Production Safety (e.g. PPE, industrial ergonomics)
• Dexterity with Tools
• Cleanroom Standards

Use Cases
Illustrative Use Cases
• Perform assembly of parts in a safe manner, including of sub-assemblies and electro-mechanical parts
• Ensure quality parts are assembled by conducting inspection and following quality assurance standards
• Conduct troubleshooting

Maintenance & Repair | Skills profile and learning modules

Maintenance & Repair

Foundational Skills
Standard Knowledge
Maintenance & Repair Foundations (Intermediate understanding)
• Knowledge of instrumentation
• Control systems
• Electrical distribution systems (AC, DC, RF)
• Digital electronics
• Schematic Diagrams
STEM Basics (Basic)
• Precalculus
• General Physics
• General Chemistry
• Statistics
Professional Skills (Basic)
• Microsoft Systems (e.g., Office, PowerPoint)
• Technical and Professional Writing
• Professional Communication
• Business and manufacturing processes (e.g., agile/lean)

Core Competencies
Semiconductor-Focused Knowledge
Manufacturing Knowledge
• Manufacturing processes and logistics
• Shop floor control systems
• Lean manufacturing and 5S organizational practice
• Shutdown planning
• Quality Assurance & Control
• Machine Maintenance Strategy

Repair Processes
• Root Cause Analysis
• Query Management Applications
• Statistical Process Control
• Hand and Power Tools

Software
• PERL, Scripting Language
• UNIX
• Programming and Logic skills (e.g., C/C++)

Physical Skills
• Production Safety (e.g., PPE, industrial ergonomics)

Semiconductor Knowledge
• Micro and Nano Processing
• Semiconductor Processing
• PC Hardware
• Electromechanical Devices and Systems
• Assembly of Mechanical Systems
• Sensors, Power Amps and Motors
• Vacuum Technology

Use Cases
Illustrative Use Cases
• Maintain fabrication mechanical system and conduct trouble shooting
• Verify effectiveness of preventative maintenance and adjust long-term planning
• Develop production report of online machine status and issue to shift manager, lead, or engineer
• Provide clear status reporting to facilitate next steps in repair and recovery

Soft Skills
• Teamwork
• Critical thinking
• Oral & Written Communication

Source: Burning Glass, company job postings, two-year college course materials, BCG analysis

Skills profiles will be used for:

- Assessment of existing curriculum
- Initial development of new curriculum
- Identifying job types for recruitment efforts

Application Overview

Key Initiatives

Programmatic solutions to goals aligned with industry:

- Build a more **diverse pipeline** by raising awareness of the advanced manufacturing industry at a young age and increasing access to existing or future relevant education programs
- Develop **training** programs that meet MI industry need now, but that can be quickly scaled to future years if business attraction and expansion opportunities occur
- Connect more of Michigan's top engineering talent with **opportunities in Advanced Manufacturing (e.g. EV, mobility, semiconductor)**



Focus on 3 areas or initiatives:



PK-12 Engagement: Promoting engineering / career readiness and advanced manufacturing industry awareness among PK-12 students.



Curriculum Development & Incumbent Training: Developing curriculum and flexible training models that meets current industry demands (e.g., technicians) and develop the infrastructure to quickly scale if, and when, new needs arise.



The Michigander Scholars: Connecting tech and engineering students at your institution with internship and full-time hire opportunities, as well as mentorship and networking, with participating core employers.

Priority Roles for strengthening Michigan's competitive advantage



Engineers

- Bachelors in computer, electrical, industrial, process, **maritime**, **materials**, **nuclear**



Software Developers

- Bachelors in computer science *or*
- Associate or certificate in software



Production Workers

- HS diploma *or* GED



Maintenance & Repair

- Associate *or*
- HS diploma / GED *and* certificate / apprenticeship



First-Line Supervisors

- Production experience
- Associate, HS diploma, or GED



Processing Technicians

- Associate *or*
- HS diploma / GED *and* certificate / apprenticeship

Grant Funding Categories

PK-12 Engagement

Funds to **host and visit PK-12 students showcasing advanced manufacturing** career paths to grow the industry's long-term talent pipeline.

Curriculum Development & Incumbent Training

Funds to **develop new curriculum and update existing programs** to produce graduates more closely aligned to employer skill needs.

And to **develop custom trainings to meet TAT employer upskilling / reskilling needs.**

The Michigander Scholars

Funds to **organize and participate in student / employer activities** to retain Michigan's highly skilled young people.

Strategic investments will support pipeline building in Advanced Manufacturing



Recruitment

- **Marketing campaigns** related to specific programs that serve TAT priority roles
- **HS outreach** focused on enrolling HS'ers in relevant programs
- **K-12 outreach** focused on industry awareness (e.g., plant tours)



Faculty & Staff

- **Industry training** or experiences for faculty (e.g., plant tours, faculty externships)
- **Attracting faculty or career advisors** with industry experience (e.g., signing bonuses, first year salary)
- **Indirect cost maximum 10%** of total funding request



Program Costs

- **Curriculum design** to create new programs aligned with employers' needs (e.g., dedicate faculty time)
- Purchase of **technology** (e.g., software licenses)
- Modifying coursework for virtual delivery where appropriate to **reach nontraditional students**



Student Support

- Experiences and resources that increase visibility into **EV, mobility, and semi career paths**
- Stipends to support additional costs like **childcare or transportation** in identified industry programs / events

Investments In Scope

Investments Out of Scope

- **Costly marketing efforts** (e.g. print materials) with low ROI or broad application
- **K-12 outreach** with broad STEM applications

- **Faculty or advisor salaries** in perpetuity

- **Program development** not tied to serving the priority roles
- **Capital equipment or space** with broad applications

What a good proposal includes

- ❑ Defined timeline of program deliverables that fit within the eligible funding period (Jan 1, 2025 – June 30, 2026).
- ❑ Ability to scale / plans for future implementation of program beyond grant cycle.
- ❑ Illustration of how proposal will meet priority roles.
- ❑ Adaptability to accommodate / modify based upon the feedback from the audience or TAT employer partner(s).
- ❑ Explanation of how completion of program will benefit TAT employer(s), community, industries, etc.
- ❑ Each proposal must demonstrate eligibility for ARPA FRF funding.
- ❑ ***PROPOSALS MUST BE SUBMITTED BY 11:59 PM EST ON MAY 31, 2024, DEADLINE.***

Application Tasks



Create Account

- Eligibility Requirements:
 - Community college
 - 4-year college / university
 - Private training provider
 - Workforce training entity



Create Profile

- Key Contact
 - Subject to background check process prior to disbursement
- Organizational Questions
 - Current connections to advanced manufacturing industry



Program Proposals

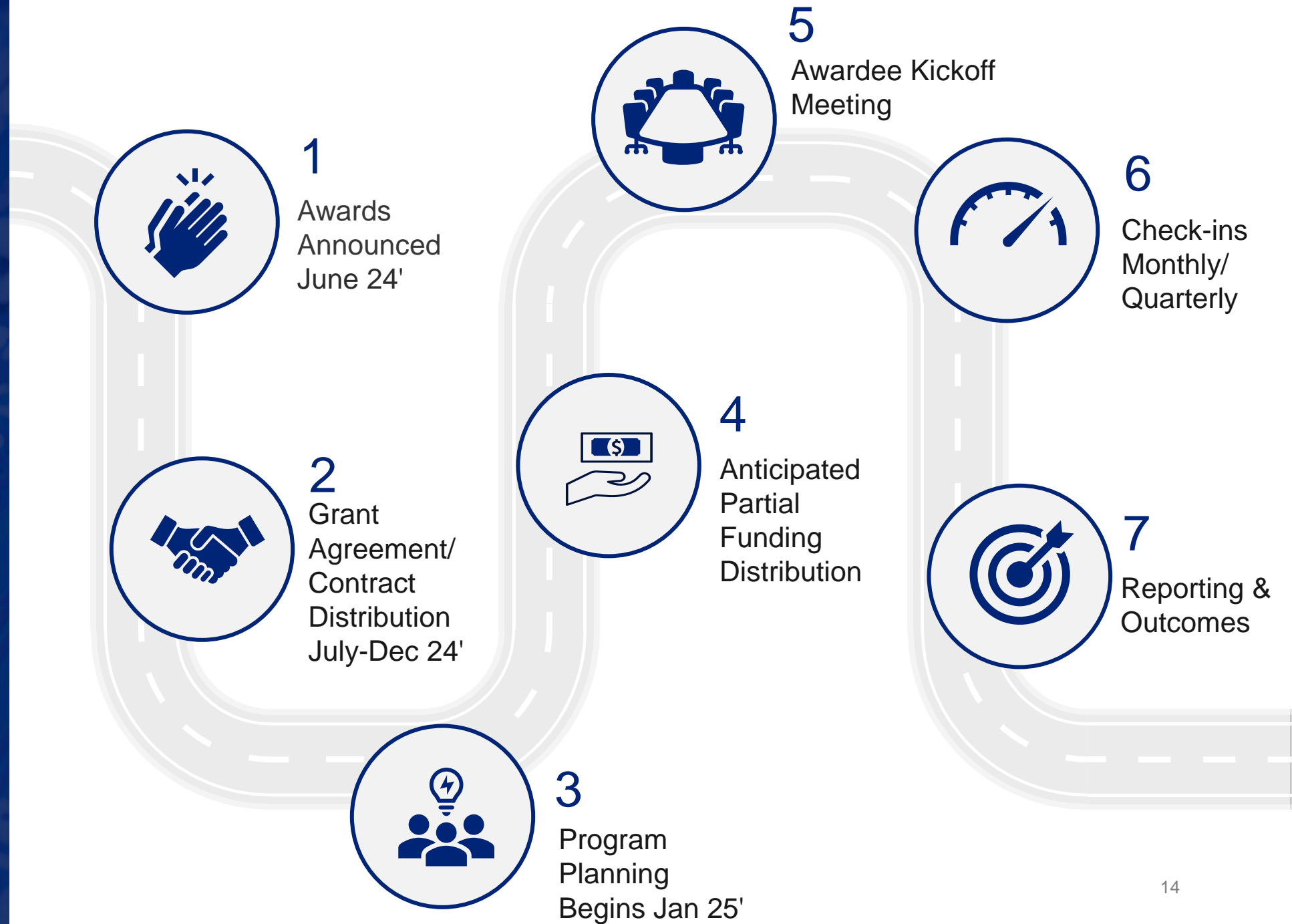
- Individual Submission per Proposed Program
 - Category
 - Description & scope of reach
 - Cost breakdown
 - Matching funds
- Submission Limits



Deadlines

- Tentative portal date launch of **April 29th.**
- All proposed program submissions due by **May 31, 2024**
- Announcement **June 2024**

Timeline: Post Application





**MICHIGAN
ECONOMIC
DEVELOPMENT
CORPORATION**



Crystal Ackerman

Talent Solutions Specialist
**Michigan Economic
Development Corporation**
ackermanc1@michigan.org

Chelsey Averill

Talent Solutions Specialist
**Michigan Economic
Development Corporation**
averillc@michigan.org

Joe Kaczmarek

Talent Solutions Specialist
**Michigan Economic
Development Corporation**
kaczmarekj@michigan.org

Ava Attari

Director, Higher Education Partnerships
Michigan Economic Development Corporation
attaria1@michigan.org

Christopher Rishko

Director, Talent Solutions
Michigan Economic Development Corporation
rishkoc@michigan.org



MICHIGAN ECONOMIC
DEVELOPMENT CORPORATION

THANK YOU



Appendix

Current TAT Employer Partners

Aisin
BorgWarner
Bosch
Denso
Ford
General Motors
LG Energy Solution
Magna
Mahle
Mobis
Nissan
Our Next Energy
Shape Corp.
Subaru
Toyota
Ultium
ZF

Calumet Electronics
Hemlock Semiconductor
KLA
SK Siltron CSS