

# Michigan Investments in Batteries and Electric Vehicles

Presentation to The  
National Academies

July 27, 2010

# Strategy:

## Cluster Based Economic Development

- 2 year research program to identify industry diversification opportunities leveraging MI competitive advantages
- Worldwide best practice review in industry acceleration programs (Swedish Triple Helix, Cluster Approach)
- Implemented cluster teams to guide strategy
- Crafted key legislation providing targeted incentives to grow clusters

### Identified Target Industries:

Adv Energy  
Storage

Advanced  
Materials

Bioenergy

Solar  
Photovoltaic

Water  
Technology

Wind

# Strategy:

## Why Energy Storage in Michigan?

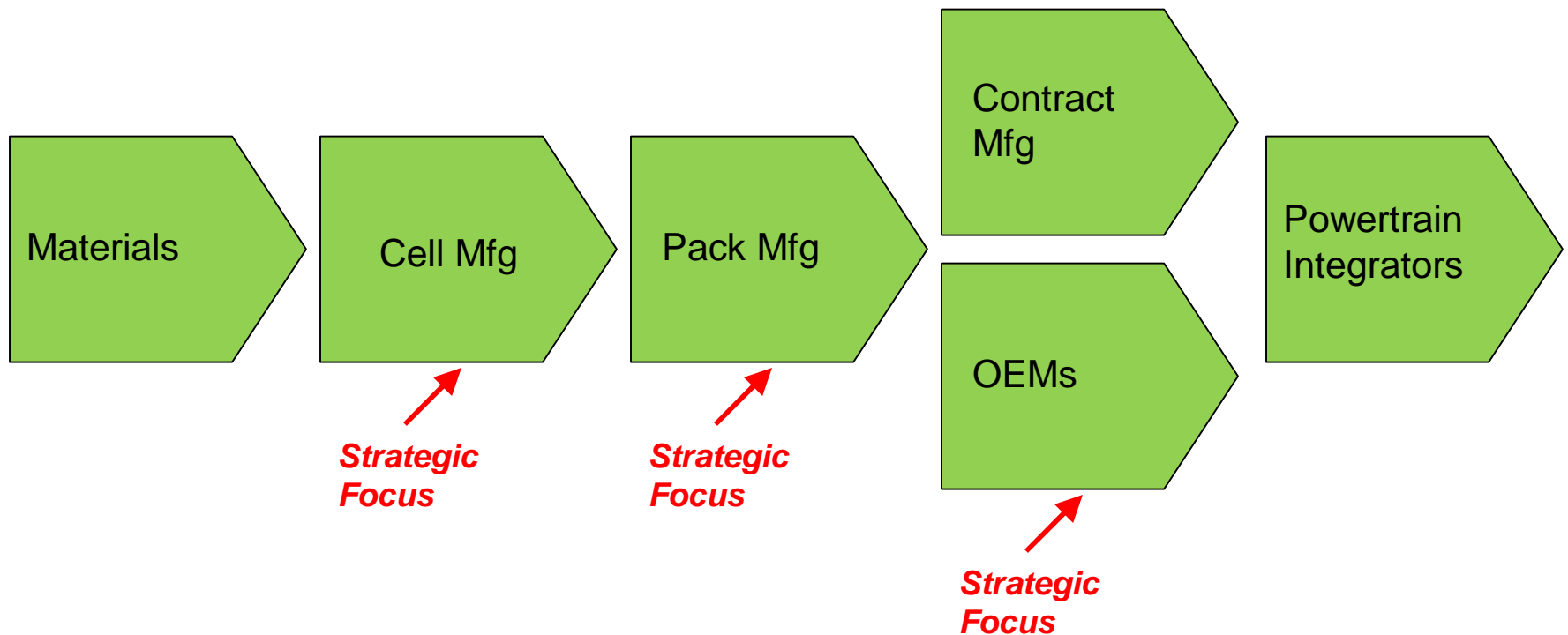
- Projected \$20 Billion marketplace in North America by 2020
- Diversification within auto industry sector – chance for domestic OEMs to lead
- Auto R&D in MI – this is the new ‘powertrain’
- Advanced manufacturing workforce
- Addressing energy security and a critical national need

# Strategy:

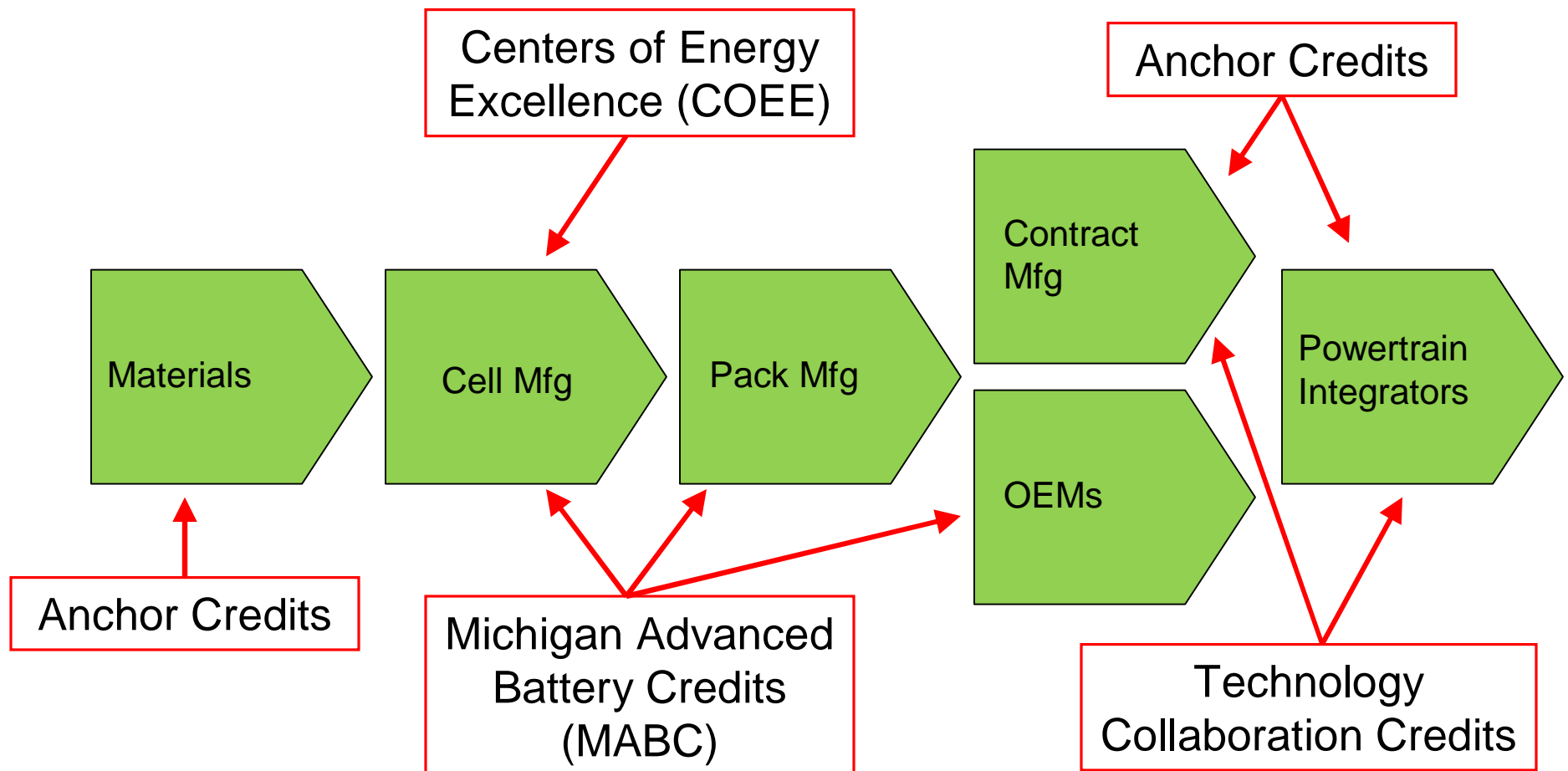
## How To Develop A New Industry

- Seed MI marketplace with key battery players— be first to market in North America
- Attract key anchor/magnet companies to spur value chain growth
- Design incentives the DOE would recognize as cost share in Federal funding opportunities
- ‘Dovetail’ IRC 30D credits to help vehicle OEMs compete
- Assist battery OEMs in industry diversification efforts

# Michigan Incentives: Attraction and Growth Strategy



# Michigan Incentives: Focus on the Value Chain



# Michigan Incentives:

## Centers of Energy Excellence

- Bold initiative to help develop, grow and sustain alternative energy clusters
- Goal of linking private sector with universities, national labs, and the state to **accelerate the commercialization** of innovative energy technologies
- **\$43 Million** awarded to Six Centers of Energy Excellence in 2008:



Advanced Batteries:  
**\$13 Million**

# Michigan Incentives:

## **\$1.02 Billion in Refundable Tax Credits**

<b>Michigan Advanced Battery Credits (MABC)</b>	
<b>Pack Manufacturing Credit</b> for manufacture of plug-in traction battery packs	<b>\$255 Million</b>
<b>Vehicle Engineering Credit</b> to support battery integration, prototyping, launch expenses	<b>\$135 Million</b>
<b>Advanced Battery Technologies Engineering Credit</b> to support engineering activities	<b>\$30 Million</b>
<b>Cell Manufacturing Credit</b> up to 50% capital investment for cell manufacturing facility	<b>\$600 Million</b>



# Michigan's Energy Storage Industry: Supply Chain Investments

## Cell Manufacturing

  
\$100 Million

  
\$100 Million

  
\$100 Million

  
\$100 Million

  
\$100 Million

  
\$100 Million

## Pack Manufacturing

  
\$115 Million

  
\$78 Million

  
\$20 Million

  
\$42 Million

## Battery & Vehicle Engineering

  
\$45 Million

  
\$75 Million

 **CHRYSLER**  
\$45 Million

# Michigan's Energy Storage Industry:

## \$1.3 Billion in Federal Grants to Michigan!

### Cells, Batteries, & Materials Manufacturing

   
\$299 Million

 **LG Chem** |  **cpi**  
compact power, inc.  
\$151 Million

  
\$249 Million

 **DOW**  **KOKAM**  
\$161 Million

  
\$106 Million

  
\$35 Million

### Electric Drive Component Manufacturing

  
\$105 Million

  
\$63 Million

  
\$40 Million

### Transportation Electrification

 **CHRYSLER**  
\$70 Million

  
\$30 Million

  
\$30 Million

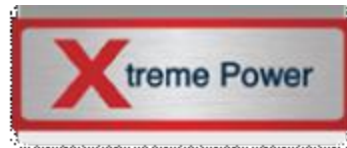
*Awards also to Eaton, University of Michigan, Michigan Tech, Wayne State University*

# Creating the Battery Capital of the World

## Vehicle Builds

### Cell Manufacturers

### Value Chain



Announced Investment Since 11/2008

**\$5.7B**

# MICHIGAN'S ADVANCED ENERGY STORAGE COMPANIES

## MICHIGAN BATTERY COMPANIES

- other
- cell manufacturer

Company	City	Focus
A&D Technology	Ann Arbor	Battery testing
AVL	Ann Arbor	Electric/hybrid drivetrain testing
Saktis	Ann Arbor	Cell and pack production
Chrysler LLC	Auburn Hills	Vehicle manufacturing
FEV	Auburn Hills	Electric/hybrid drivetrain testing
Toda America	Battle Creek	Cathode material production
Ford Motor Company	Dearborn	Vehicle manufacturing
Eaton	Galesburg	Electric/hybrid drivetrain testing
Magna Electronics	Grand Blanc	Electric motors/ components
Johnson Controls—Saft	Holland	Cell and pack production
LG Chem	Holland	Cell and pack production
Battery Solutions	Howell	Battery recycling
A123 Systems	Livonia	Cell and pack production
Dow Kokam	Midland	Cell and pack production
fortu PowerCell	North Muskegon	Cell and pack production
TSC Michigan	Northville Twp	Electrolyte production
Azure Dynamics	Oak Park	Electric/hybrid drivetrain integrator
Cobasys	Orion Twp	Battery and pack production
Compact Power	Troy	Battery pack production
Ricardo	Van Buren Twp	Battery testing
Detroit Testing Laboratory	Warren	Battery testing
General Motors	Warren	Vehicle manufacturing
Xtreme Power	Wixom	Grid storage solutions



# Michigan's Energy Storage Industry:

## Why This Is Important

- Establishes domestic manufacturing/availability of high-power, high-energy, large format cells
- Attracts new development and expansion opportunities for existing transportation-focused companies
- Creates the foundation for an electric vehicle “ecosystem” aimed at sustainability
- Provides opportunities for collaboration between private industry and academia
- Accelerates the growth of an industry identified as a critical national need



# Continuing Michigan's Strategy: **Now The Hard Work Begins**

- Investments/Actions to date are just the beginning
- Focus on dual use opportunities
- Focus on complementary industries to leverage new strengths/technologies
- Refine economic development toolkit to address future needs
- Policy development and advocacy to strengthen the industry

**Execution!**

**Execution!**

**Execution!**

## **Continuing Michigan's Strategy:** **The “Alliance” – An aggressive proactive technical collaboration**

- Aligning State initiatives with national priorities under the stewardship of the Federal Government's
  - Department of Energy / National Labs
  - Department of Defense / TARDEC
- A Michigan retention / attraction advantage

## Backing the ALLIANCE

- Common areas of research, interest and need for industry partners
- Working Agreements with MEDC:
  - DOE / OESA – Memorandum of Intent
  - ORNL – Memorandum of Understanding
  - ORNL – Work for Others Agreement – contract
  - TARDEC - Cooperative Research & Development Agreements
  - MEDC, DOE/ORNL & TARDEC – Letter of Agreement
- Pooled Resources \$27 M over three years



## Our Collective Charge

- Make relevant to our constituents the resources of DOE / Oak Ridge and the National Laboratory network
- Communicate, package and sell this unique Michigan / Federal collaborative
- Drive dual use solutions through commercialization of advanced technologies

# Continuing Michigan's Strategy:

## Strategy Recap and Future Work

- |             |   |    |   |
|-------------|---|----|---|
| Completed   | { | 1. | Identify Incumbent Strengths / Strategy Development   |
|             |   | 2. | Develop Unique Attraction Tools <ul style="list-style-type: none"><li>• <b>COEE - \$13 million</b></li><li>• <b>MABC - \$1.02 billion</b></li></ul> |
|             |   | 3. | Attraction of Strategic Supply Chain Companies  |
|             |   | 4. | Compete for Recovery Act Awards - <b>\$1.3 billion</b>  |
| In Progress | { | 5. | Continue 'Ecosystem' Development  |
|             |   | 6. | Assist Industry on Regulatory & Policy Issues   |
|             |   | 7. | Facilitate Industry/Government Collaboration  |
|             |   | 8. | Expose Companies to Opportunities in Complementary Markets and Through Alliance   |
|             |   | 9. | Identify and Compete for Additional Federal Funding Opportunities   |

# Thank You

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