

Center for Advanced
Automotive Technology

C • A • A • T

CAAT: Preparing Technicians for Careers in Advanced Mobility

CAAT Webinar

April 17, 2014



Presenters



Bob Feldmaier, Director of the CAAT at Macomb Community College



Sherri Doherty, Assistant Director-Communications for CAAT at Macomb Community College



Doug Fertuck, Assistant Director for Energy and Automotive Programs at Macomb Community College

Bill of Fare

- Who we are (Center For Advanced Automotive Technology)
- Smarter, Greener Cars
- Smarter Students:
 - Curriculum development and dissemination
 - Professional development
 - Technical and educational resources

About the Center for Advanced Automotive Technology (CAAT)









- Located at Macomb Community College South Campus
- Partnered with Wayne State University
- Became an Advanced Technological Education Center in 2010 funded by the National Science Foundation (\$2.8M Grant)
- Mission
 - Advance the preparation of skilled technicians for the automotive industry's more environmentally friendly and safer vehicles.
 - Be a regional resource for developing and disseminating advanced automotive technology education.



Map of National Science Foundation Advanced Technological Education (ATE) Centers



NSF ATE Centers

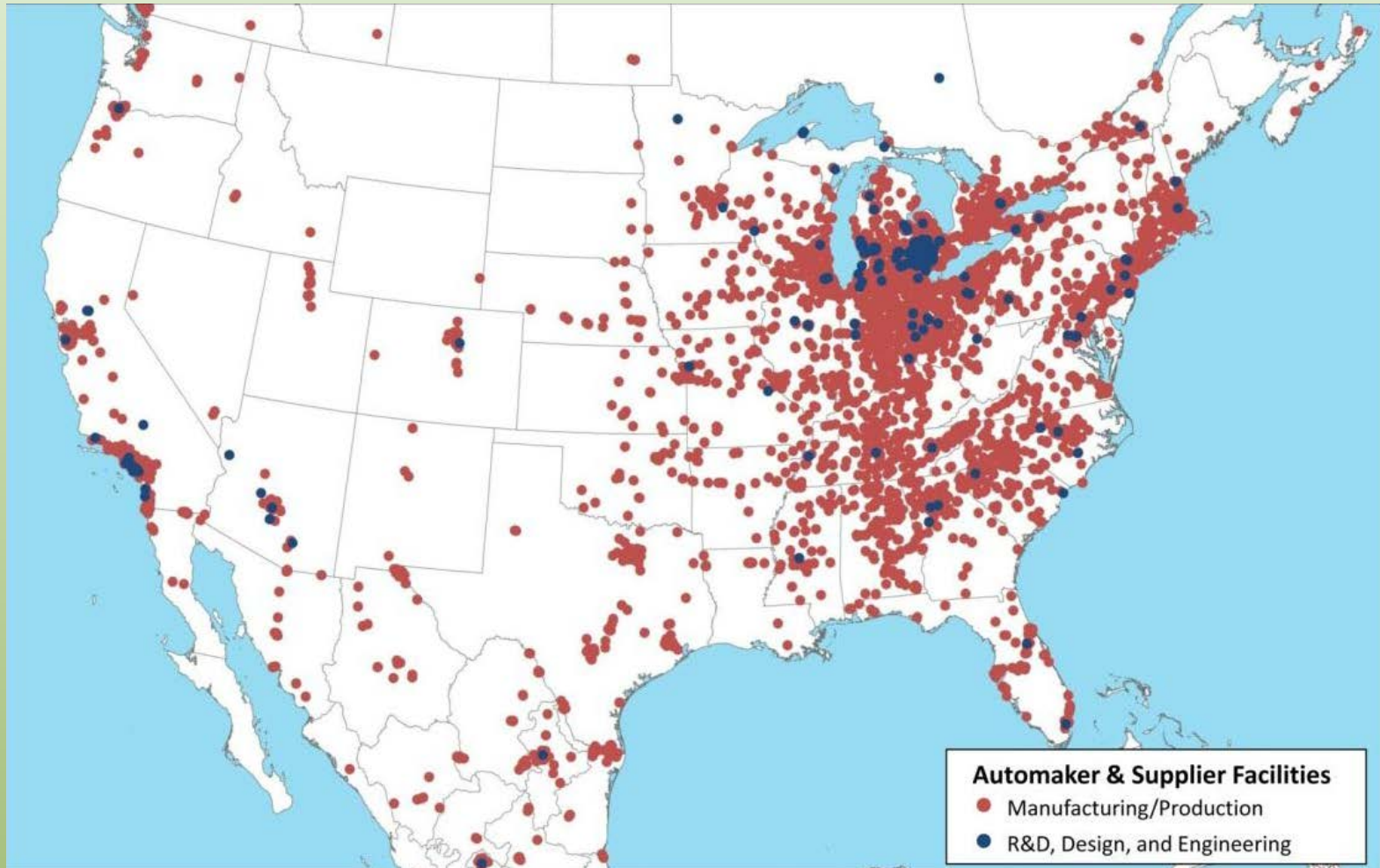
ADVANCED MANUFACTURING TECHNOLOGIES	INFORMATION TECHNOLOGIES
 <ul style="list-style-type: none">01 360° - Bemidji, MN02 AMTEC - Versailles, KY03 CA²VES - Clemson, SC04 CARCAM - Gadsden, AL05 FLATE - Tampa, FL06 RCNGM - Farmington, CT07 Weld-Ed - Elyria, OH	 <ul style="list-style-type: none">23 BATEC - Boston, MA24 CTC - Frisco, TX25 GeoTech - Louisville, KY26 MCIT - Omaha, NE27 MPICT - San Francisco, CA
AGRICULTURAL & BIO TECHNOLOGIES	LEARNING, EVALUATION & RESEARCH
 <ul style="list-style-type: none">08 Bio-Link - San Francisco, CA09 NBC2 - Blue Bell, PA10 VESTA - Springfield, MD	 <ul style="list-style-type: none">28 ATE Central - Madison, WI29 DeafTEC - Rochester, NY30 EvaluATE - Kalamazoo, MI31 SC ATE - Florence, SC
ENERGY & ENVIRONMENTAL TECHNOLOGIES	MICRO & NANO TECHNOLOGIES
 <ul style="list-style-type: none">11 ATEEC - Davenport, IA12 BEST - Oakland, CA13 CREATE - Santa Clarita, CA14 RCNET - Fort Pierce, FL	 <ul style="list-style-type: none">32 MATEC NetWorks - Phoenix, AZ33 NACK Network - University Park, PA34 Nano-Link - Rosemount, MN35 NEATEC - Troy, NY36 SCME - Albuquerque, NM37 SHINE - Seattle, WA
ENGINEERING TECHNOLOGIES	SECURITY TECHNOLOGIES
 <ul style="list-style-type: none">15 CAAT - Warren, MI16 LASER-TEC - Fort Pierce, FL17 MATE - Monterey, CA18 MatEdU - Lynnwood, WA19 OP-TEC - Waco, TX20 SCTE - Norco, CA21 SMART - Virginia Beach, VA22 SpaceTEC - Cape Canaveral, FL	 <ul style="list-style-type: none">38 ACE - Daytona Beach, FL39 CSEC - Tulsa, OK40 CSSIA - Palos Hills, IL41 CyberWatch - Largo, MD42 CWW - Bellingham, WA

Why CAAT at Macomb Community College?

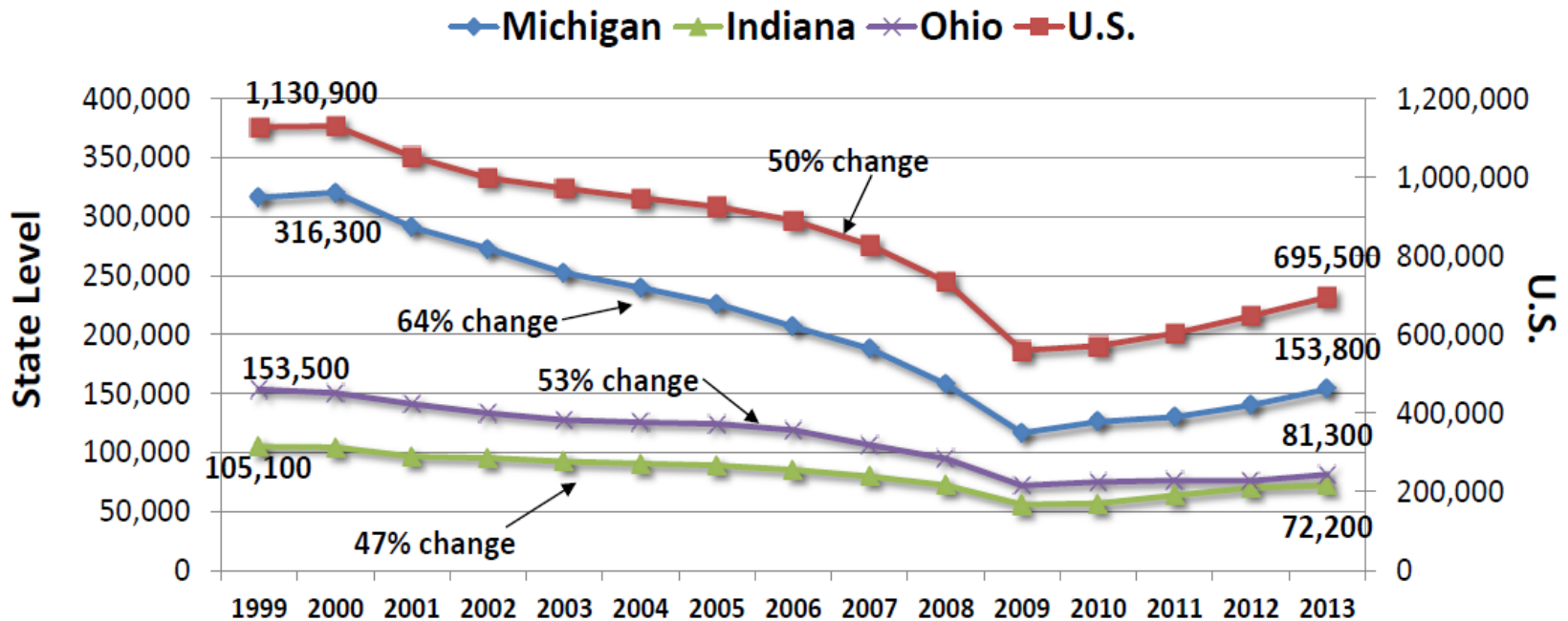
- Long history of preparing many students to work in the industry
- Leaders of advanced automotive curriculum development for technicians
- Located in the heart of the rejuvenated US auto industry
 - Over 215 Automotive R&D Companies in Michigan
 - Most (85%) are clustered in southeast Michigan
 - 60% of the top 150 automotive suppliers to North America are headquartered in Michigan
- Executing a number of related Energy and Automotive grants



Great Lakes Still Home to Much of the Auto Industry



Auto Industry Employment Remains Huge and is Now Growing



Source: U.S. Department of Labor Bureau of Labor Statistics

CAR
CENTER FOR AUTOMOTIVE RESEARCH

“Auto Jobs go High-Tech”

- Nearly half of Michigan’s auto jobs now outside of the factory; will soon be majority.
- “Detroit is still the intellectual capital of the auto industry.”
- Michigan ranks #1 in concentration of engineers (65,000).
- Number of technical jobs expected to grow as industry technology becomes even more advanced.
- Many foreign auto makers and suppliers have set up technical centers in Michigan (Toyota, Hyundai, Bosch, et al).

See *Detroit News*, January 26, 2014, citing multiple sources

CAAT's Strategic Priorities

- Preparing automotive technicians and designers in community colleges for advanced technology jobs
- Increasing the flow of students through the pipeline to jobs
- Collaborating and sharing across educational institutions
- Partnering with industry to understand their needs



Drivers of the Auto Industry Future

Source: Automotive Industry Office, Michigan Economic Development Corporation

Demographics & Vehicle Market

- *Rising urbanization*
- *Vehicle segment shifts*
- *Global platforms*



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Vehicle Design

- *Smaller*
- *Lightweight*
- *Connected*
- *Personalized*
- *Environmentally-friendly*



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- ❑ *Vehicle segment shifts*
- ❑ *Global platforms*



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- ❑ *Personalized*
- ❑ *Lightweight*
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- ❑ *Connected*



Connected & Automated Vehicles

- ❑ *Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) technologies*
- ❑ *Increasing levels of automation*
- ❑ *ITS integration with connected vehicles*



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Powertrain & Propulsion Technologies

- ❑ *Continuing drive for CO₂ reduction*
- ❑ *Harmonization of standards across global regions*

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Powertrain & Propulsion Technologies

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Material Technologies

- *Light weight*
- *Advanced mixed materials*
- *New forming technologies*
- *New joining technologies*

Drivers of the Auto Industry Future

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Material Technologies

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- ❑ *Advanced mixed materials*
- ❑ *New forming technologies*
- ❑ *New joining technologies*

Manufacturing and Supply Chain

- ❑ *Hyper-efficient*
- ❑ *Sustainable*
- ❑ *Modular manufacturing*
- ❑ *Logistics/supply chain management*

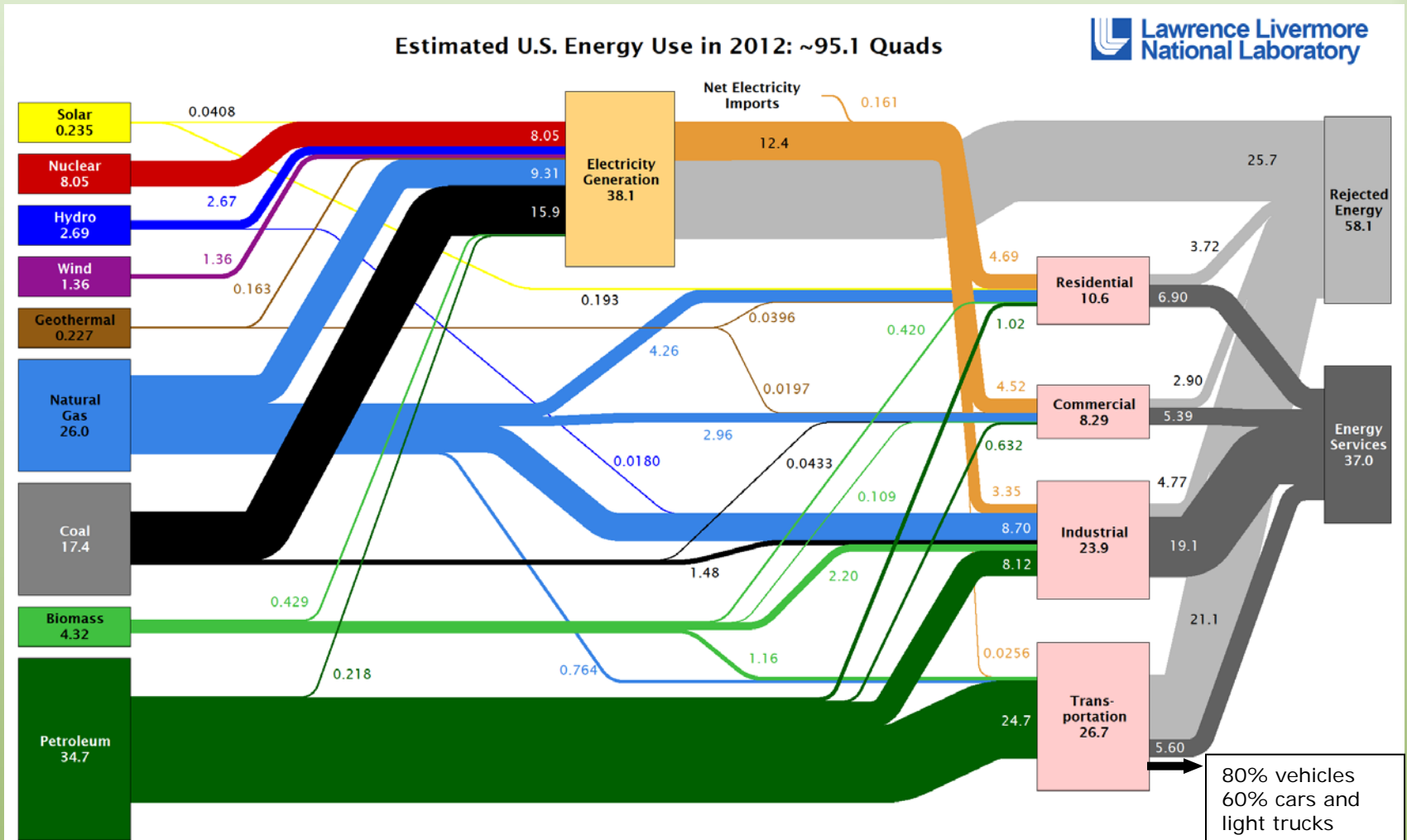
Drivers of the Auto Industry Future within CAAT's Scope

Source: Automotive Industry Office, Michigan Economic Development Corporation



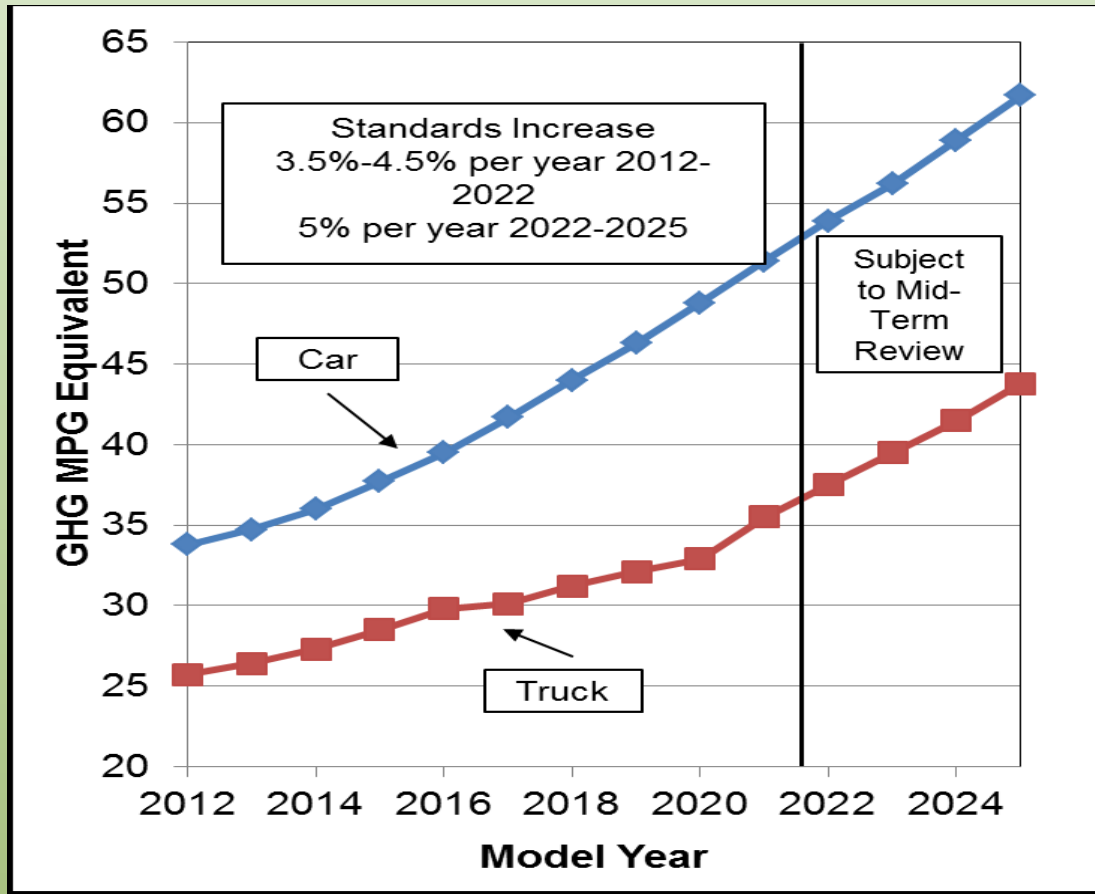
Questions?

Automobile Industry is Crucial to Energy Use in the US

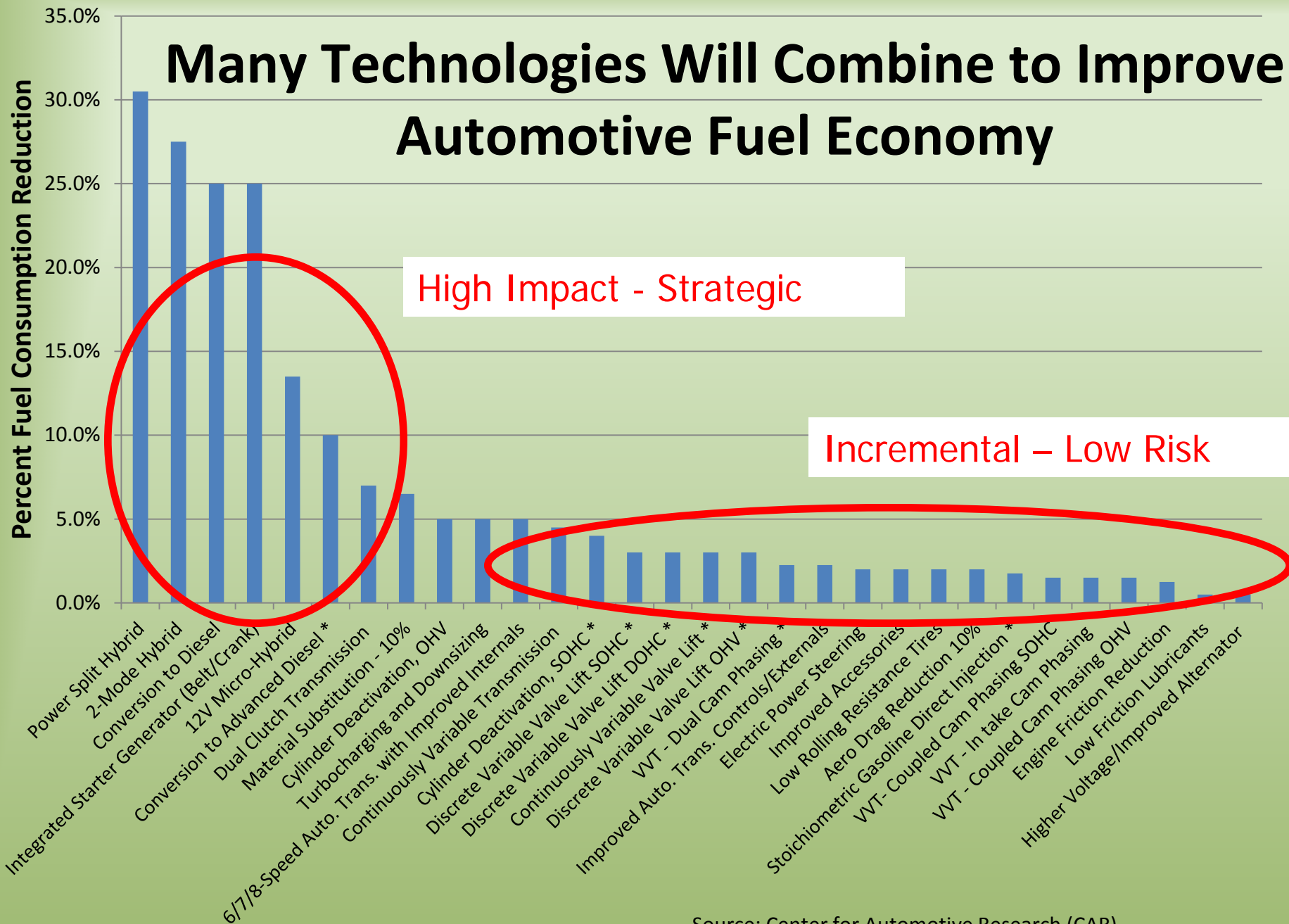


Source: LLNL 2013. Data is based on DOE/EIA-0035(2013-05), May, 2013. If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant "heat rate." The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential and commercial sectors 80% for the industrial sector, and 21% for the transportation sector. Totals may not equal sum of components due to independent rounding. LLNL-MI-410527

Fuel Economy Standards Getting Tough



Many Technologies Will Combine to Improve Automotive Fuel Economy



Source: Center for Automotive Research (CAR)

Forecasting How to Meet Fuel Economy Standards is Uncertain

- Technology advances
- Technology costs
- Trends in consumer demand and preferences
- Energy prices
- Emissions from electricity generation
- Infrastructure for alternate fuels and recharging

Do Hybrid and Electric Vehicles Make Sense?

Today

No

- Increase vehicle prices
- Internal combustion technologies becoming more energy efficient
- May be viewed as unsafe
- Recharging of BEVs takes too long
- Require expensive plug-in infrastructure to support charging

Yes

- Reduce greenhouse gases
- Offer major reductions in oil dependency
- Operate more efficiently and cost effectively
- Vehicles now in production perform well and reliably
- Reduce emissions at the tailpipe, important in large cities
- Government subsidies for consumers may offset initial cost penalties
- May be necessary to meet strict future fuel economy standards
- Battery costs likely to reduce 5-7% per year over next ten years
- Petroleum likely to become more expensive relative to electricity
- May be critical in race for global leadership in transportation technologies
- Residual value of Li-ion batteries may partially offset initial costs
- Technology can be applied to fuel cell vehicles

Future

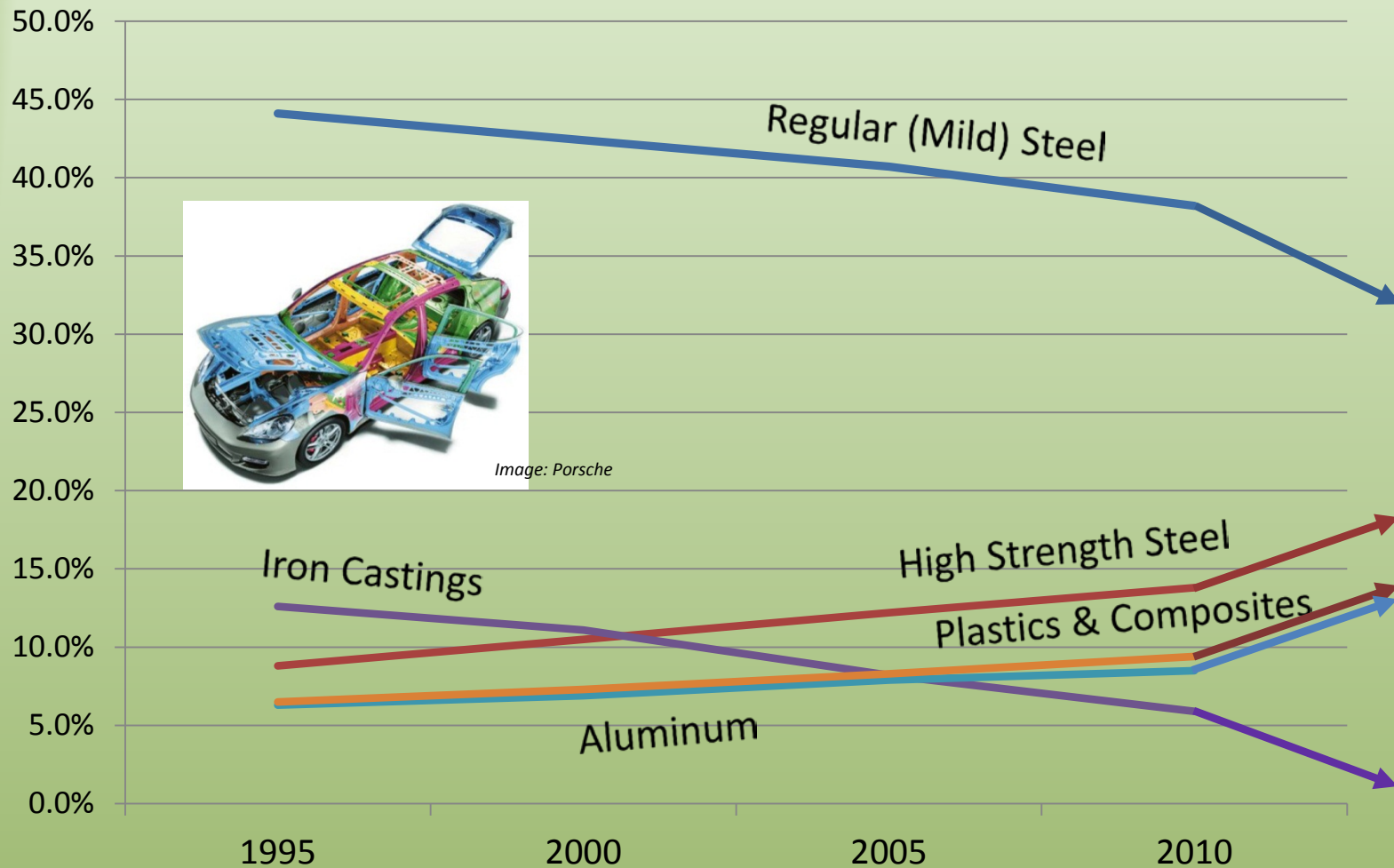
- Require increased R&D spending to realize performance potential
- Require increased investment in new technologies and workforce training
- May require increased generating capacity
- Increase dependency on risky rare earth metals

Drivers of the Auto Industry Future within CAAT's Scope

Source: Automotive Industry Office, Michigan Economic Development Corporation



Average Material Content of North American Light Vehicles



2014 Corvette Stingray: A Future Direction for Materials

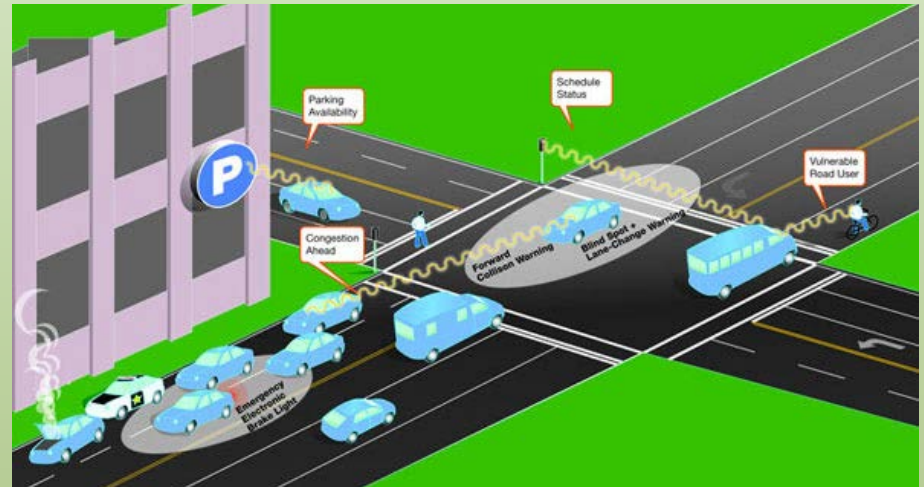
- New body shop for aluminum frame
- Carbon fiber hood and roof and interior
- Carbon-nano composite underbody panels
- Magnesium frame seat
- SMC fenders, doors and rear quarter panels & hatch
 - Extrusions, castings and sheet (castings 2mm – 11mm)
 - Hydro formed tubes
- Magnesium structural chassis components
- Joining: adhesive, laser welding, fasteners, spot welding



Connected & Automated Vehicles Defined

- Connected and automated vehicles use any of a number of different communication technologies to communicate with:

- The driver
- Each other
- Roadside infrastructure
- The “Cloud”



Benefits and Challenges of Connected & Automated Vehicles



Crash elimination



Improved energy efficiency



Reduced need for new infrastructure



Data challenges



Travel time dependability



New models for vehicle ownership



Productivity improvements



New business models and scenarios

What Can CAAT Do for You?

- Curriculum Development (seed funding)
- Curriculum Dissemination
- Professional Development
- Technical and Professional Resources



CAAT Seed Funding

- Funding available on a first come, first serve basis for educational institutions to develop or adapt materials:
 - From modules and artifacts to courses and complete curricula
 - Equipment not to exceed 20% of funding request
- CAAT and its partners will identify priority development needs

Focus of CAAT Curriculum Development and Dissemination

Automotive Systems and Subsystems	Pre-production Research⇒ <i>Design</i> ⇒ Development⇒Testing	Production Tooling⇒Manufacturing⇒ Assembly⇒Operations	Post-Production Service⇒Reuse⇒Recycle
HEV/EV Vehicle Systems	X		X
– Energy Storage	x	X	X
– Motors, Controls, and Components	x		x
Advanced Engine Systems	X	x	X
Alternate Fuel Propulsion Systems	X	x	X
<i>Light-weighting and materials</i>	X		X
<i>Connected & Automated Vehicles</i>	X	x	X

Note: *Italicized* areas are new

CAAT Seed Funding Process

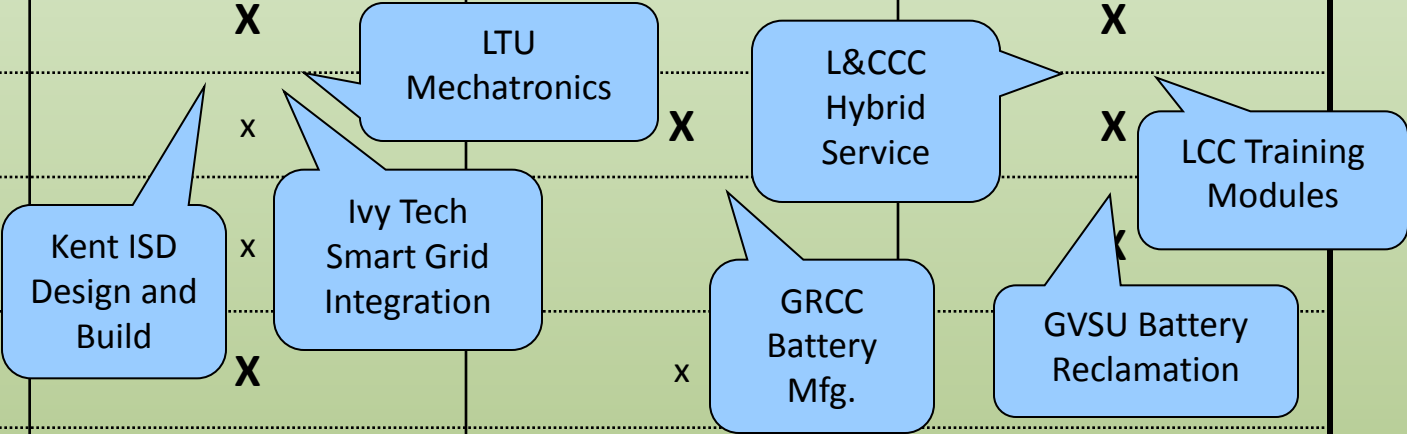
- Submit funding request using Proposal Template posted online
- Proposal reviewed and approved by CAAT
- Contract issued with key milestones for:
 - Deliverables
 - Payments
 - Reports

Summary of CAAT Seed Funding Projects

Institution	Title	Contract Date	Completion date	Amount	Status	Contact
Lawrence Technological University	Hybrid-based modules for two mechatronics courses	5/12/2011	11/7/2011	\$22,278	Completed	Vladimir Vantsevich vantsevi@uab.edu
Lewis and Clark CC	Modified ASE certification courses to include hybrid/EV impacts	6/1/2011	11/7/2011	\$27,540	Completed	Christopher Reynolds cereynolds@lc.edu
Grand Rapids CC	Curriculum for battery manufacturing job training	6/1/2011	5/22/2012	\$8,403	Completed	Julie Parks jparks@grcc.edu
Lansing CC	Hybrid and EV overview modules for technician workforce and general public	2/8/2012	7/26/2012	\$13,180	Completed	Glenys Warner warnerg@lcc.edu
Grand Valley State University	Modules for Li-ion battery reclamation technology	5/8/2012	3/31/2013	\$25,000	Completed	Charlie Standridge standric@gvsu.edu
Ivy Tech CC	Course module on integrating EV charging stations to "Off Grid" energy center	5/14/2013	5/1/2014 (Targeted)	\$22,299	Progress report submitted 11/2013	Susan J Ely sely3@ivytech.edu
Kent Intermediate School District	Project-based module for HS based on design, build, test and competition of an EV	11/4/2013	7/31/2014 (Targeted)	\$16,000	1 st report and 2 nd payment due 4/30/2014	Angela Morris AngelaMorris@kentisd.org
Utica Community Schools	Middle school CTE bridge course based on design and build of an EV	3/10/2014	11/30/2014 (Targeted)	\$22,000	Project initiated	Shannon Williams shannon.williams@UticaK12.org
Wayne State University	Course module for technicians and engineers on the analysis and control of electric motors	2/13/2014	1/31/2015 (Targeted)	\$16,122	Project initiated	Wen Chen wchenc@wayne.edu
University of Alabama at Birmingham	Course for technicians and engineers in Energy Efficiency of HEVs and EVs, Labs	5/1/2014 (Estimated)	1/31/2015 (Estimated)	\$25,000 (Proposed)	Awaiting final proposal from UAB	Vladimir Vantsevich vantsevi@uab.edu

CAAT Seed Funding Projects for Curriculum Development

Automotive Systems and Subsystems	Pre-production Research⇒ <i>Design</i> ⇒ Development⇒Testing	Production Tooling⇒Manufacturing⇒ Assembly⇒Operations	Post-Production Service⇒Reuse⇒Recycle
HEV/EV Vehicle Systems	X		X
– Energy Storage	x	X	X
– Motors, Controls, and Components	x		x
Advanced Engine Systems	X	x	
Alternate Fuel Propulsion Systems	X	x	X
<i>Light-weighting and materials</i>	X		X
<i>Connected & Automated Vehicles</i>	X	x	X



Note: Italicized subjects are new as of 2014

Questions?

And Now...



Sherri Doherty, Assistant Director-Communications
for CAAT at Macomb Community College

CAAT Website - www.autocaat.org

Center for Advanced
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Home About CAAT Educators Industry Students Resources Resource Library Technologies Membership



News

Events

BMW Lifts i3 Electric Car Production to Meet Rising Demand

April 15, 2014

Bayerische Motoren Werke AG (BMW), the world's largest maker of luxury vehicles, has increased production of the i3 electric city car 43 percent

More >

The Saleen Tesla Model S Is Such A Crazy Idea It Just Might Work

April 14, 2014

Saleen over the weekend released the

2014 CAAT Conference (May 2, 2014)



This FREE conference will focus on the future of the automotive industry and may include an

CAAT Webinar



CAAT Webinar Preparing Technicians for Careers in Advanced Mobility April 17, 2014 at 1:00 PM

CAAT Website – About Us

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Educators

Industry

Students

Resources

Resource Library

Technologies

Membership

About CAAT

Why CAAT at Macomb
Community College?

What Does the CAAT Do?

Accomplishments

Partners

Oversight

Staff Biographies

CAAT Conference

CAAT Electric Vehicle Ride
and Drive

Photo Gallery

NVC Only Access

Home > About CAAT > What Does the CAAT Do?

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What Does the CAAT Do?

- Partners with industry, education, government, and professional organizations to support local economic development
- Identifies funding opportunities through these partnerships for curricula creation and adaptation across the advanced automotive technology spectrum
- Advances the preparation of students for careers in new and developing advanced automotive technologies through:
 - Establishment of seamless 2+2+2 educational pathways (high school to community college to university)
 - Integration of science, technology, engineering and mathematics (STEM) concepts into high school curricula
 - Faculty professional development
- Through this website, provide a forum for sharing:
 - Up-to-date educational resources for advanced automotive technology
 - Latest in green mobility technology and industry needs and news



How Can We Help You?

CAAT staff is available to help develop projects for seed funding, advise on proposals prior to submission and collaborate on new projects to meet industry technician needs and/or curriculum supporting advanced automotive technologies.

We also provide technical assistance for faculty professional development, establishing educational pathways, resources to assist with economic development and/or workforce development related to the auto industry.

Please contact us at: 586-445-7126 or e-mail at CAAT@macomb.edu

CAAT Website – Educators

Educators

Seed Funding



- ▶ Funded Programs
- ▶ Apply for Seed Funding

Professional Development

Educational Partners

Browse Resource Library

Home > Educators > Seed Funding > Apply for Seed Funding

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Apply for Seed Funding

The documents below describe the Seed Funding Program and include how to apply for seed funding:

- An overview of the Center for Advanced Automotive Technology (CAAT) and seed funding, [Click Here](#)
- The proposal template applicants complete and submit to the CAAT to request seed funding, [Click Here](#)
- Debarment and suspension form to be completed by seed funding recipients, [Click Here](#)
- Check list for assessing seed funding proposals, [Click Here](#)
- The process flow chart explaining the entire process beginning with applying for funding to receiving funding and submitting final products, [Click Here](#)
- For the funded project report template, [Click Here](#)
- Requirements for delivery of funded materials, [Click Here](#)
- Sample annual NSF survey to be completed by funding recipients, [Click Here](#)

If you have questions, please call the CAAT office at 586-445-7126 or by e-mail at CAAT@macomb.edu

CAAT Website – Industry

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Industry

Michigan Academy for Green
Mobility Alliance (MAGMA)

Home > Industry/Employers

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Industry/Employers

The CAAT works with automotive industry employers to advance the preparation of students for careers in advanced automotive technologies.

The CAAT, through Macomb Community College and Wayne State University, works very closely with automotive industry employers to respond to their immediate and future talent and educational needs. Macomb Community College and Wayne State University are active participants in the [Michigan Academy for Green Mobility Alliance \(MAGMA\)](#). Here are a few examples of how Macomb Community College and Wayne State University work with employers:

- Develop and/or deliver specialized curriculum, incumbent training, and/or worker preparation for new employees.
 - The new [Electric Vehicle Technology Certificate Programs](#) respond to the immediate and future vehicle electrification needs of the automotive industry.
- Fund development of specialized curriculum, incumbent, and/or new employee training by partnering with a local community college and/or university.
- Provide internship opportunities for students.
- Provide graduates from a variety of certificate and associate and bachelor degree programs (check out our [Career Pathways](#) page that summarizes these programs and pathways).

Contact the CAAT at CAAT@Macomb.edu with your questions or for assistance.

Other Resources:

- Search for [National Automotive Technician Education Foundation \(NATEF\)](#) accredited automotive programs around the country.
- Search at the [Driving Change: Greening the Automotive Workforce](#) website for green and/or growing occupations and related training programs in the states of Michigan, Indiana, and Ohio.

CAAT Website – Students

[Home](#) [About CAAT](#) [Educators](#) [Industry](#) **[Students](#)** [Resources](#) [Resource Library](#) [Technologies](#) [Membership](#)

Students

[Career Pathways](#)

[Electric Vehicle Technology Certificate Programs](#)

[Alternative Fuels and Hybrid Electric Vehicle Courses in Michigan](#)

[Student Activities](#)

[Home](#) > [Students](#) > [Electric Vehicle Technology Certificate Programs](#)

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Electric Vehicle Technology Certificate Programs

Currently, there are over 2.6 million hybrid and electric vehicles on the road in the United States. In 2013, manufacturers offered 49 hybrid electric vehicles, 3 plug-in hybrid electric vehicles, and 9 fully-electric vehicles. By 2020, the world-wide electric vehicle value chain will likely be greater than \$250 billion (Source: World Bank Study). Energy prices, environmental concerns and fuel economy targets are driving the demand for hybrid and electric vehicle technicians now and into the future.

Two Electric Vehicle Technology Certificate Programs, one in product development, and the other in service, prepare individuals, including unemployed and underemployed persons, with the fundamental skills and abilities for careers in these fields. These certificate programs are sequences of technical and professional courses that are industry focused and designed for workforce preparation. These courses may also apply toward other technical certificates and associate degree programs.



The MCC EV Cohort at the Volt assembly plant in Hamtramck, MI.

Electric Vehicle Technology Certificate Programs



CAAT Website – Resources

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Resources

This section of our site contains additional resources you may find useful such as our [Newsletter](#) and our upcoming [Webinars](#). Please note that when you follow the Newsletter link you will be redirected to an external site we use to manage our Newsletter. Here, you may download our archived newsletters or signup to receive new editions.



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Our library is set up to browse based on three criteria (engineering technology, education level, and audience). You can filter your results by clicking one of these fields. The number next to each field denotes the number of resources under this category. Types of resources under each category may include class activities, complete courses, curriculum, homework, labs, lesson plans, modules, presentations, studies, and reports. For a refined search of the library or the rest of the site, please use the [Search Resources](#) tab.

Engineering Technologies

[Advanced Combustion Engine Technology](#) (7)

[Alternative Fuels and Lubricants](#) (15)

[Autonomous, Automated, and Connected Vehicle Technology](#) (4)

[Energy Policy](#) (17)

[Energy Storage and Battery Technology](#) (25)

[Grid Interface \(Power and Communications\)](#) (7)

[Fuel Cells/Hydrogen](#) (14)

[HEV/EV System Technologies \(HEV, EV, and Plug-in HEV\)](#) (43)

[Integration, Networking, and Communications](#) (6)

[Materials Lightweighting](#) (24)

[Other](#) (21)

[Power Electronics \(Motors, Controls, Inverters, and Converters\)](#)

(21)

Education Level

CAAT Website - Technologies

Technologies

Advanced Engine Technologies

Alternative Fuels

Batteries

Fuel Cells

Hybrid and Battery Electric Vehicles

- ▶ HEV Types
- ▶ HEV Levels
- ▶ Simulations

Integration, Networking, and Communications

Materials Lightweighting

Power Electronics

Smart Grid

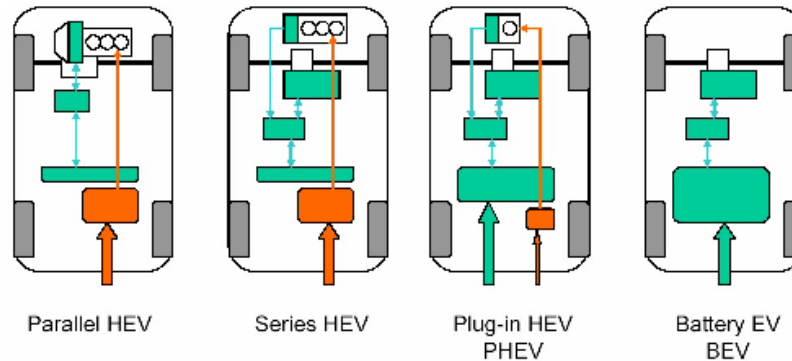
Home > Technologies > Hybrid and Battery Electric Vehicles

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Hybrid and Battery Electric Vehicles

Hybrid Electric Vehicles (HEVs)

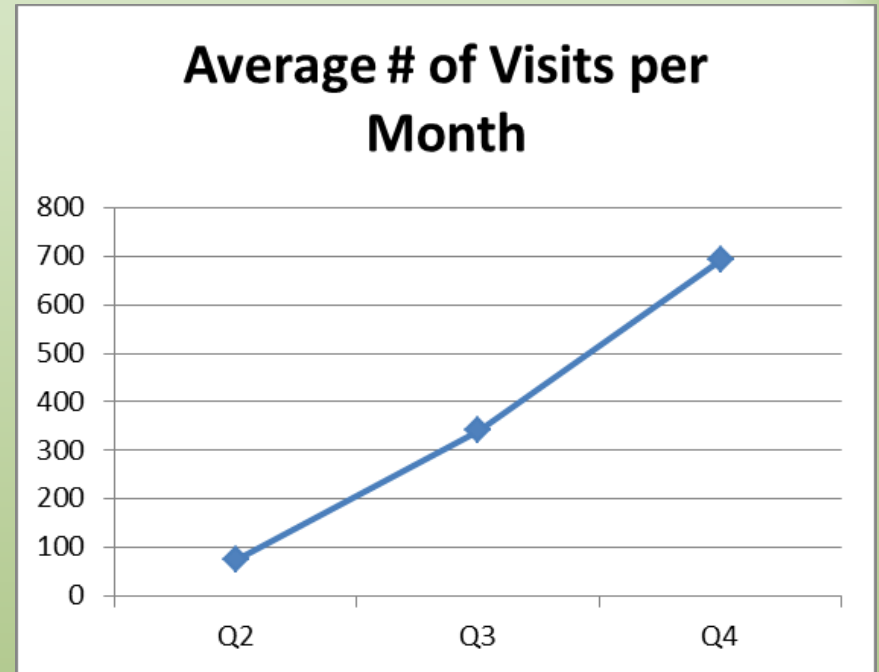
HEVs are vehicles propelled by more than one power source such as an engine and electric motor. They are classified by **type** and **level**. Advantages of HEVs are improved fuel economy, efficiency, and reduced emissions. The disadvantage of HEVs is cost. The cost aspect may be offset in years to come due to higher gas prices and improved HEV technologies. For more information on types and levels of HEVs, visit their respective pages in the menu on the left.



CNET On Cars - Car Tech 101, Hybrid systems exp...

CAAT Website

- Website traffic in 2013
 - More than 3,300 total visits
 - More than 2,200 unique visitors
 - More than 13,300 total page views
 - Visitors from 85 countries
- Average number of visits per month in 2013
 - Q2 = 75
 - Q3 = 341
 - Q4 = 692



CAAT Resource Library

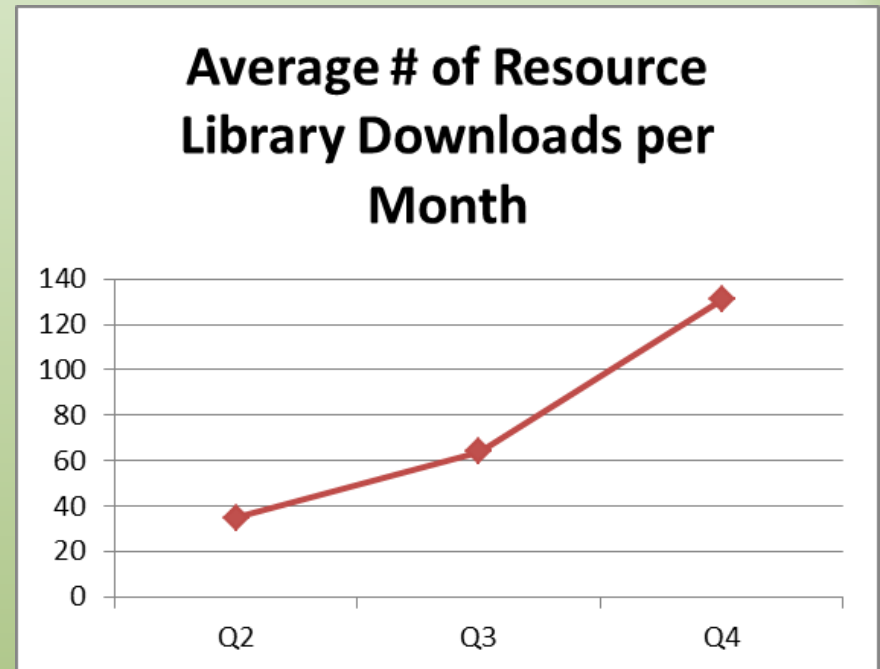
- FREE educational Resource Library
 - Contains more than 80 classroom ready educational resources:
 - Classroom activities, curriculum, homework, labs, lesson plans, presentations, reports, complete modules, courses, industry reports and more
 - Conference resources page
 - Content obtained from:
 - Seed funding projects (17)
 - Macomb Community College & Wayne State University (13)
 - Other sources (54)

All CAAT Resource Library content is approved by and available through:



CAAT Resource Library Downloads

- Resource library usage shows steady growth
 - Average number of resource library downloads per month in 2013
 - Q2 = 35
 - Q3 = 64
 - Q4 = 131



CAAT Resource Library Downloads

- 694 Resource downloads in 2013
 - Resources were downloaded by:
 - Students (256)
 - Educators (201)
 - Other / General Public (90)
 - Industry / Employee Representative (69)
 - Job Seeker (40)
 - Professional or Non-Profit Organization (37)
 - Government Organizations (1)
 - Resources are being used:
 - As resource materials (421)
 - To teach students (221)
 - To teach industry professionals (34)
 - To develop other educational resources (18)



CAAT Monthly Newsletter

Sign up today!

- Visit www.autocaat.org
- Click on Resources
- Click on Newsletter

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Center for Advanced
Automotive Technology

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CAAT Newsletter

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Would you like to stay up to date with the CAAT and the latest in advanced automotive technologies? Don't miss a thing by signing up for the CAAT monthly newsletter! We hope you will enjoy this opportunity to stay connected with us and appreciate our efforts to advance the preparation of students for technician careers in new and developing advanced automotive technologies. Our newsletter features the newest additions to the CAAT website, recent CAAT outreach efforts, upcoming events, articles, and a "Did You Know?" section where you can learn interesting facts about the CAAT, technologies, and more. Receiving our newsletter is also the best way to stay updated on our FREE [Resource Library](#) since it features a section dedicated to new library resources.

By signing up for our newsletter your email address will not be shared with anyone and will be used solely for the purpose of CAAT communications. You may view our collection of past newsletters below. To sign up for our monthly newsletter, click the sign up link below. After subscribing you will have the option to unsubscribe to our newsletter at any time.

CAAT e-Blast | January 2014

Center for Advanced
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Stay Connected



Join Our Mailing List

Did You Know?

Focus on Technology



Did you know the new 2015 Ford F-150 is losing weight and getting better miles per gallon thanks to the use of lightweight aluminum? It was revealed at the North

[Welcome to the First Edition of the Center for Advanced Automotive Technology \(CAAT\) Monthly e-Newsletter](#)

Due to your prior interaction with the CAAT, you have been included on our initial distribution list for this publication. We hope you will enjoy this opportunity to stay connected with us and appreciate our efforts to advance the preparation of students for technician careers in new and developing advanced automotive technologies. However, if you are not interested in receiving this monthly publication, simply scroll all the way to the bottom and click on the SafeUnsubscribe link to be removed from this mailing list.

Featured Articles

2014 CAAT Conference

Looking at the Future Through the Rearview Mirror

Save the date to attend this informative and FREE event that will be held on **Friday, May 2, 2014** at the Macomb Community College in Warren, MI.

The conference is co-sponsored by our friends at the Center for Automotive Research, SAE International, and the Design and Manufacturing Alliance.



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News **Events**

The Saloon Tesla Model S is Such A Crazy Idea It Just Might Work

April 14, 2014

Saloon over the weekend released the first renderings of their take on the Model S

More

Vive la Volture Electrique! Normandy Spurs Electric Car Revolution With Massive Discounts

April 14, 2014

The coastal region of northern France is

2014 CAAT Conference (May 2, 2014)



This FREE conference will focus on the future of the automotive industry and may include an

CAAT Webinar



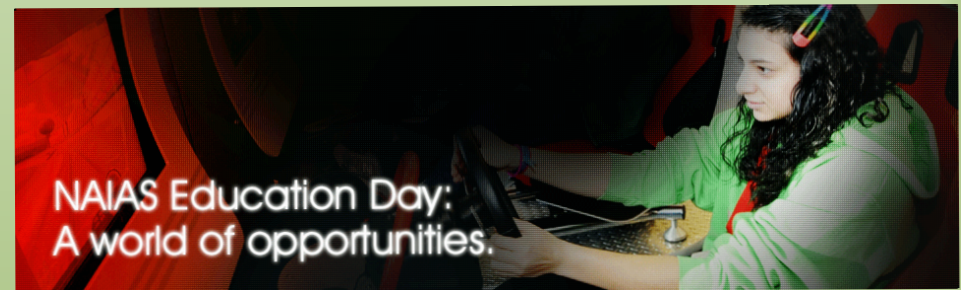
CAAT Webinar Preparing Technicians for Careers in Advanced Mobility. April 17, 2014 at 1:00 PM

CAAT Student Activities

University Bound



North American International Auto Show



Hybrid Electric Vehicle (HEV) Summer Academy



RET Days



CAAT Professional Development

- Wayne State University Electric Drive Vehicle Technology Short Course
 - Upcoming dates/locations TBD
- Southeastern Michigan Automotive Teachers Association (SEMATA) training sessions
 - Hosted by Macomb Community College in late fall
- CAAT Conference



2014 CAAT Conference

- FREE
- Friday, May 2, 2014
- MCC South Campus, in Warren, MI
- Theme: You Can't See the Future in the Rearview Mirror
- Co-sponsored by :
 - Center for Automotive Research (CAR)
 - SAE International
 - Design and Manufacturing Alliance (DMA)
- Hot breakfast & lunch included
- Register NOW (seating is limited) at www.autocaat.org

Center for Advanced
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Friday, May 2, 2014
Macomb Community College
South Campus, Warren, MI

2014 CAAT Conference

You Can't See the Future in the Rearview Mirror

A conference for automotive industry workforce development representatives as well as secondary and postsecondary automotive educators, counselors and school administrators.



Learn More

 #CAAT2014

2014 CAAT Conference

Keynote speakers on the future of the automotive industry:



- **Nigel Francis:** Senior Automotive Advisor to the State of Michigan & Senior Vice President, Automotive Industry Office, Michigan Economic Development Council (MEDC)



- **Kristen Dziczek:** Director, Labor & Industry Group and Assistant Research Director, Center for Automotive Research (CAR)



- **John McElroy:** Automotive analyst and host of "Autoline Daily," and the television program "Autoline This Week," broadcaster of five radio segments daily on WWJ Newsradio 950, and writer of a weekly blog for Autoblog.com and a monthly op-ed article for Ward's Auto World

2014 CAAT Conference

- Technical sessions
 - **Electric Vehicle Taxonomy**, presented by Macomb Community College
 - **Lightweighting, the New Chevrolet Corvette**, presented by General Motors
 - **Ann Arbor Connected Vehicle Project**, presented by the University of Michigan Transportation Research Institute (UMTRI)
- For more information
 - Visit the CAAT website
 - Sign up for the CAAT newsletter
 - Register NOW (seating is limited) at www.autocaat.org



2014 CAAT Electric Vehicle Ride & Drive

- Friday, May 2, 2014
 - 3:00 to 8:00 PM
 - MCC South Campus, Warren, MI
 - Open to the Public
- Register Now
at www.autocaat.org/drive
(Space is limited)

Join us for

THE ELECTRIFYING RIDE AND DRIVE

at Macomb Community College
Friday, May 2 • 3-8pm

Featured Electric Vehicles include:

- Chevrolet Volt
- Nissan Leaf
- Ford Focus EV
- Ford Fusion Hybrid
- Ford C-Max Plug-In Hybrid
- Chevrolet Spark EV
- Toyota Prius
- Toyota Highlander Hybrid
- Tesla Model S

- See what EVs are all about—
from BEHIND THE WHEEL!
- Compare existing makes and models!

Reserve your seat today!
www.autocaat.org/drive
Registration required—limited to 250 attendees

Enter the South Campus parking area
12 Mile and Hayes in Warren

FREE!
PUBLIC INVITED

Tour the Michigan Tech Mobile Lab,
with fun hands-on activities and more!

Brought to you by:

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Macomb
Community College
Education • Enrichment • Economic Development
Discover. Connect. Advance.

Vehicles subject to change. Drivers must be at least 18, provide valid driver's license, and sign liability waiver.

Questions?

To Wrap Up...



Bob Feldmaier, Director of the CAAT at Macomb
Community College

Macomb CC Automotive Programs

- Automotive Technology Program
 - NATEF Certified Automotive Training
 - Manufacturer Programs
 - GM ASEP
 - Chrysler CAP
 - Hybrid Electric Vehicle / Alternative Fuel Courses
- Certificate Options
 - Certificate in Automotive Technology
 - ***Electric Vehicle Development Technology Certificate***



MCC Automotive Programs (Cont'd)

- Degree Options
 - Associate of Applied Science in Automotive Technology
 - Associate of Applied Science in Manufacturing Technology
- 2+2 Career Pathways
 - WSU Bachelor of Science in Electric Transportation Technology



CAAT Affiliations

INDUSTRY

- A123 Systems
- Chrysler
- Continental Automotive Corporation
- Denso
- Ford Motor Company
- General Motors
- Johnson Controls SAFT
- Kelly Services
- LG Chem
- Magna E Car
- Nissan
- Toxco

GOVERNMENT AGENCIES

- Michigan Economic Development Corporation
- Michigan Works!



PROFESSIONAL ORGANIZATIONS

- Center for Automotive Research
- Design and Manufacturing Alliance
- National Alternative Fuel Training Consortium
- NextEnergy
- SAE International
- Workforce Intelligence Network

ACADEMIC

- Grand Rapids Community College
- Grand Valley State University
- Ivy Tech
- Lansing Community College
- Lawrence Technological University
- Lewis and Clark community College
- Michigan Technological University
- Muskegon Community College
- Oakland Community College
- Wayne State University

Michigan Academy for Green Mobility Alliance (MAGMA) – Critical CAAT Partner

- Michigan's first Skills Alliance focused on green technologies
- Voice of industry to the education community:
 - Industry led alliance
 - Provides industry awarded credentials
 - Promotes cross institution partnering
 - Primary input and feedback source for curriculum development
- EV Development Technician Certificate developed by MCC
 - Source of material for national STEM certificate



MAGMA Members

A&D Technology
A123 Systems
American Axle
ASI Systems
Behr
Bluwav Systems
Center for Professional Studies
Chrysler
Compact Power, Inc. / LG Chem Power
Continental Automotive Systems - CAS Division
Delphi
DENSO
Detroit Diesel
DELEG / BWT
Eaton Corporation
EcoMotors International, Inc.
ESD - Engineering Society of Detroit
ETAS (Engineering Tools and Systems)
FEV, Inc.
Ford Motor Company
General Motors
Global Technology Associates (GTA)

*Grand Valley State University
Henry Ford Community College
Hybrid Electric Vehicle Technology Center
Kettering University
Lawrence Technological University
Lear Corporation
Macomb Community College
Magna Powertrain
Michigan Economic Development Corporation
Michigan State University
Michigan Technological University
M-TEC at Henry Ford Community College
Nissan Technical Center North America
Ricardo, Inc.
SAE International
Schoolcraft College
Southeast Michigan Community Alliance
Toyota
University of Detroit Mercy
University of Michigan - Ann Arbor
University of Michigan - Dearborn
Wayne State University
Western Michigan University*

Skills Electrified Vehicle Technicians Need

- Overviews of Hybrid Electric Vehicles (HEV), Plug-in Hybrid Electric Vehicles (PHEV), and Battery Electric Vehicles (BEV) systems
- Safety Working With High Voltage Systems
- High Voltage Battery Systems
- HEV, PHEV, BEV Battery Controls
- Software For HEV, PHEV, BEV, Control Systems
- AC/DC Converters
- Vehicle Charging Interface/Infrastructure
- Regenerative Braking
- Power Electronic Circuitry for Electric Drive Systems
- Motor Control Electronic Hardware
- Thermal Systems Management and Control
- Systems and Integration
- High Voltage Electric Distribution Systems

Electric Vehicle Development Technology Certificate

- 1-year program, 28-credit hours
- Program initially linked to DOL grant for displaced workers
- First cohort started January 2013
 - 19 students started
 - 12 students completed
- Cohort 2 Status
 - 55 applied
 - 34 passed screening
 - 25 students started August 2013
 - 22 students still in program
 - Will be seeking internships/placements in May 2014



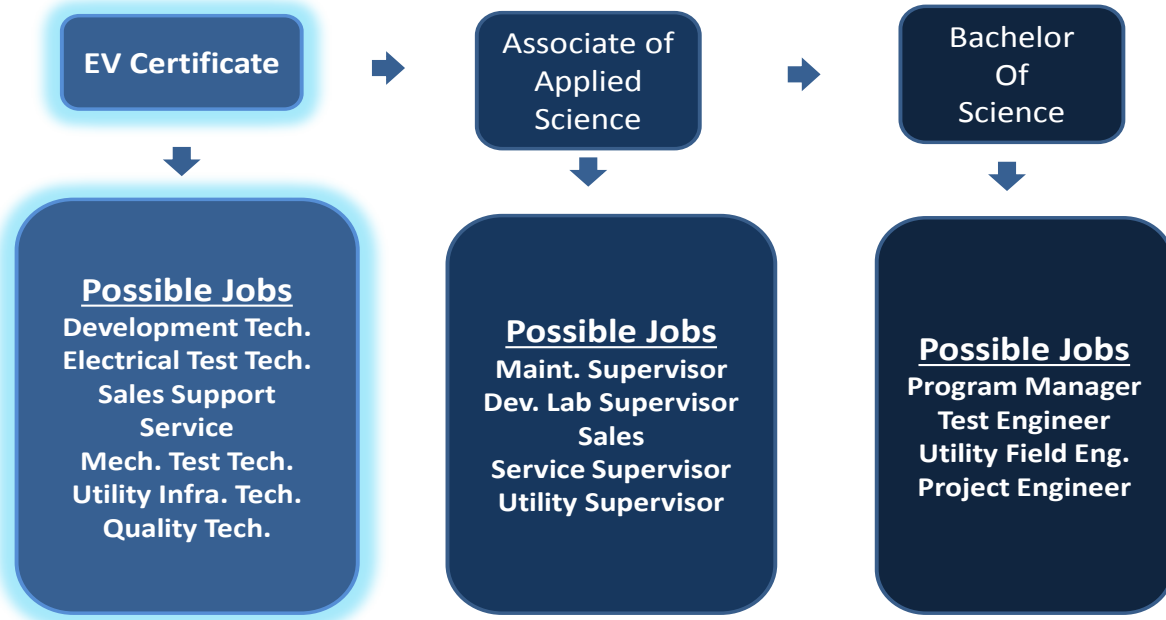
EV Development Technology Certificate

Course #	Class	Credit Hours
AUTO 1000	Automotive Systems	3
TMTH 1150	RCL Analysis	4
ELEC 1161	Electronic Technology I	3
ELEC 1171	Electronic Technology II	3
AUTO 2920	Introduction to EV Propulsion Systems	3
ELEC 2913	Motors & Controls for EV's & Industrial Applications	3
ELEC 2915	Advanced Energy Storage	3
ELEC 2914	EV Data Acquisition, Sensors and Control Systems	3
	Elective	3
TOTAL		28

EV Technician Certificate Articulation and Associated Career Paths

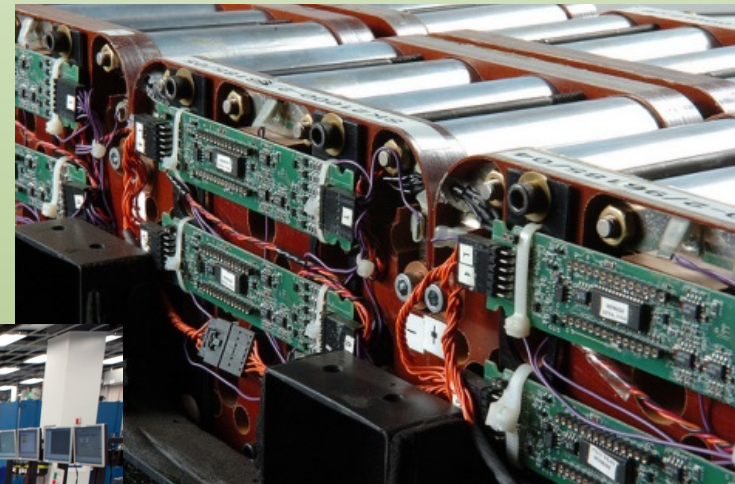
MACOMB COMMUNITY COLLEGE & WAYNE STATE UNIVERSITY

CAREER PATHWAYS



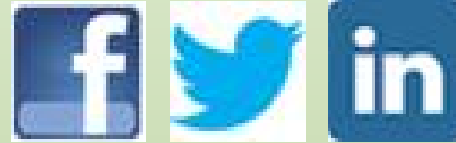
Examples of EV Certificate Disciplines

- Development, Design, Testing and Operations for:
 - Vehicle systems
 - Battery Cell / Battery Pack
 - High Voltage Systems (safety)
 - Electric Motors
 - Power Electronics
 - AC-DC Conversion
 - Controls and Calibration



Stay Connected with the CAAT

- Visit our website at www.autocaat.org
- Follow us on social media
- Sign up for our monthly newsletter
- Register for one of our webinars
- Attend the 2014 CAAT Conference and Ride & Drive



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The conference is targeted towards automotive industry workforce development representatives as well as secondary and postsecondary automotive educators, counselors and school administrators.



[Learn More](#)

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What's on Our Path to the Future?

- Developing stronger industry relationships
- Gathering curriculum for dissemination
- Increasing collaboration with other schools
- Maximizing impact of website
- Generating new seed funding projects
- Increasing the number of impacted students through the pipeline



Thank You!

Questions?

Backups

Future Automotive Technologies Drive a Need for New Skills

Future Automotive Technologies Drive a Need for New Talent

Common Talent Needs for All Technology Areas Below

- **Computer software engineers, applications and systems software**
- **Systems engineering/integration**
- **Electrical engineers and technicians**
- **Chemical engineers and technicians**
- **Electronics engineers and technicians (except computer)**
- Industrial engineers
- Quality engineers
- All skilled trades
- Commercial and Industrial designers
- Database administrators and analysts
- **Project and program managers**

Connected & Automated	Powertrain & Propulsion	Advanced Materials/Lightweighting	Manufacturing, Supply Chain & Logistics
<ul style="list-style-type: none"> • Electrical and electronics drafters • Electromechanical technicians • Engineering technicians, except drafters, all other • Electrical and electronics installers and repairers, motor vehicles • Network and computer systems administrators • Network systems and data communications analysts 	<ul style="list-style-type: none"> • Computer hardware engineers • Electrical and electronic engineering technicians • Mechanical engineers • Electromechanical equipment assemblers 	<ul style="list-style-type: none"> • Materials scientists • Environmental engineers • Simulation/modeling • Computer-controlled machine tool operators, metal and plastic • Extruding and drawing/forging/rolling/cutting/punching/press machine setters, operators and tenders, metal and plastic • Machinists • Welders, cutters, solderers and braziers and machine setters, operators and tenders 	<ul style="list-style-type: none"> • Mechatronic, Robotics and Automation Engineers and Technicians • Network and computer systems administrators • Network systems and data communications analysts • Supply chain analysts • Purchasing agents • Logistics managers

Sources: 1) MEDC, 2) Center for Automotive Research

Michigan occupation shortages in **bold**¹; under-produced occupations in **red**²

Cars Will Be Smarter in Many Ways

Applications									
Type of communication		Navigation	Safety	Infotainment	Office & Business	Mobility chain	Payment	Comfort	Maintenance & Service
1 Car-to-user 		✓	✓	✓	✓	✓		✓	
2 Car-to-OEM 		✓	✓				✓	✓	✓
3 Car-to-system 		✓	✓	✓	✓		✓	✓	✓
4 Car-to-3rd party 		✓	✓	✓	✓	✓			✓

SOURCE: McKinsey & Company

CAAT Webinars

- Preparing Technicians for Careers in Advanced Mobility
 - April 17, 2014 @ 1:00 PM EST
 - Learn how the Center for Advanced Automotive Technology (CAAT), a National Science Foundation (NSF) Advanced Technological Education (ATE) Center, provides curricula in advanced automotive engineering technology for middle-skill technicians by:
 - working closely with industry to identify future education and training requirements;
 - funding projects to develop new curricula demanded by industry;
 - housing and disseminating the latest curricula to schools. Additional details will be provided as they become available.

