

Advanced Electric Drive Vehicle Education Program

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Consortium

West Virginia University

May 15, 2012

Project ID #
ARRAVT031


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Overview

- Timeline
 - Start: December 18, 2009
 - End: December 17, 2012
 - 65% Complete
- Budget
 - Total Project Funding \$8,600,000
 - DOE Share-\$6,900,000
 - Contractor Share-\$1,700,000
- Barriers
 - Constant advances in technology
 - Working with strict academic calendars (i.e. secondary schools)
- Partners
 - Advanced Vehicle Research Center
 - AutoExposure
 - Eaton
 - ICS Learning Group
 - Motorweek
 - Perfect Sky, Inc
 - WV & SC Departments of Education



Relevance


- The National Alternative Fuels Training Consortium (NAFTC), together with its partners, will develop an *Advanced Electric Drive Vehicle Education Program* that will help **accelerate mass market introduction and penetration of advanced electric drive vehicles** to help reduce the country's dependence on foreign oil through:
 - Training and education activities
 - Outreach and awareness activities



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Relevance

- Project Effect on Work Force Development:
 - Over 20,000 Students will be trained in Advanced Electric Drive technical skills
 - Students become more employable and marketable over traditional graduates
 - Required critical skills on newly emerging technologies will be provided
- Project Impact
 - Curriculum and training developed under this project will continue to be offered throughout the country after project completion with the potential to reach tens of thousands individuals through training
 - Over 101 Million reached to date through training, outreach and education activities
 - Materials are being developed to allow for updates and additions for constant advances in technology
 - Providing academic institutions timely training for use within specific academic calendars
- Project Job Statistics PY2
 - 17.73 Retained Direct Full Time Employment (FTE) Jobs
 - 4 Created direct Full Time Employment (FTE) Jobs
 - 31.21 Induced job years created elsewhere in the economy as increases in income from the direct government spending*

*BASED ON: ESTIMATES OF JOB CREATION FROM THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009



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Relevance-Project Goals

- Goal 1: Create an **external advisory committee** to provide input on project-related activities
- Goal 2: Develop and provide **Career and Technical Education (CTE)** teaching materials to secondary schools about advanced electric drive vehicles (grades 7-12)
- Goal 3: Provide **training** to in-service and pre-service personnel, mechanics/automotive technicians, and first responders to work with advanced electric drive vehicles and their supporting infrastructure
- Goal 4: Design, develop, and disseminate marketing and outreach materials to provide **consumer education** on EVs, HEVs, PHEVs, and FCVs
- Goal 5: Expand **National AFV Day Odyssey**, a nationwide, biennial, outreach event to include educating a new generation of consumers at the secondary school level on the subject of advanced electric drive vehicles



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Approach-Milestones

- Milestone 1: Creation of Advisory Committee- STATUS COMPLETE ☑
- Milestone 2: Conduct of National AFV Day Odyssey 2010- STATUS COMPLETE ☑
- Milestone 3: Completion of MotorWeek television segment production- STATUS COMPLETE ☑
- Milestone 4: Completion of Advanced Electric Drive Vehicle Toolkit- STATUS COMPLETE ☑
- Milestone 5: Completion of First Responder Curriculum- STATUS COMPLETE ☑
- Milestone 6: Completion of CTE teaching materials for secondary schools- NEARLY COMPLETE
- Milestone 7: Completion of Automotive Technician Curriculum- STATUS: NEARLY COMPLETE
- Milestone 8: Completion of Electrical Vehicle Infrastructure Curriculum- STATUS UNDERWAY
- Milestone 9: Dissemination of NAFTC NTC Courses and Workshops (all)- STATUS UNDERWAY
- Milestone 10: Conduct of National AFV Day Odyssey 2012- STATUS UNDERWAY



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Approach-Curriculum Development

First Responder Safety Training

Develop curricula to train First Responders to safely respond to accidents involving AED vehicles

Four (4) First Responder Safety Training Train-the-Trainer workshops (EVs, HEV, PHEVs, and FCVs) for NTC instructors

Instructor Manual, Participant Workbooks, On-Line course, Quick Reference Guide (QRG), QRG Phone App, and Lab Sheets, as well as, supplementary instructors materials and presentations

First Responder Safety Training Video



Approach-Curriculum Development

Career and Technical Education (CTE) Training

Develop curricula for secondary school professionals to incorporate into existing high school automotive technology programs.

Instructor Manual, Lesson Plans, Student Manual, Practical Exercises, animations, training video, pre-and post-tests, as well as, supplementary instructors materials and presentations

Two focus groups, 2 professional development courses and 10 pilot classrooms for CTE instructors in SC and WV



Approach-Curriculum Development

Automotive Technician Training

Develop curriculum for pre- and in-service automotive technicians to diagnose, repair and maintain Advances Electric Drive vehicles

Instructor Manual, Participant Workbooks, and Supplementary Training Materials

Hybrid Training Engines

Hybrid Electric Vehicle Training Educator (HEVTE)

Train-the-Trainer Dissemination

Electric Drive Vehicle Technician Training Video



Approach-Curriculum Development

Electric Infrastructure Training

Develop a Curriculum for Electric Drive Vehicle Charging Stations and Equipment

Instructor Manual,
Participant Workbooks,
and Supplementary
Training Materials

Advanced Electric
Drive Vehicle
Infrastructure
Technician and
Service Personnel
Train-the-Trainer
Course

Electric Vehicle
Infrastructure
Training Video



Approach

- Curriculum development process
 - Needs identification
 - Consortium Members' recommendations
 - Information/insight gained from industry connections/exposure
 - Carefully and diligently develop materials with SME involvement
 - Alpha review – internally and externally
 - Beta test conducted
- Blended/Hybrid Learning Environment
 - Mixing of different learning environments, giving students a more challenging and interesting learning experience, giving the instructor flexibility on presentation and incorporation of materials.
 - Traditional Classroom
 - Hands-on activities and Case Studies
 - Learning Management System (LMS) and Online Courses
 - Webinars and Chat rooms and Forums
- 98 Training Courses
 - Two (2) CTE Train-the-Trainer courses
 - Ten (10) CTE pilot courses in WV and SC
 - Four (4) First Responder Safety Training Train-the-trainer courses (16 have been completed to date)
 - Two (2) Automotive Technician Train-the-Trainer courses
 - Eighty (80) end user courses for First Responder and Automotive Technician



Approach

- Education and Outreach
 - National AFV Day Odyssey
 - Marketing Program
 - Website
 - Media Relations
 - Social Media
- Conference and workshops
 - Presentations, displays and attendance
- Over 206 million will be reached through media coverage, outreach activities and trainings conducted



Approach-Outreach and Education

National AFV Day Odyssey - A nationwide, biennial outreach event to include educating a new generation of consumers at the secondary school level on the subject of advanced electric drive vehicles

National AFV Day Odyssey 2012 Goals

- 150 Sites
 - 100 Traditional Sites
 - 50 High School Sites
- More than 250,000 direct attendees
- Goal to reach more than 100 million through media exposure



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Technical Accomplishments & Progress

Previous Work completed

Project Year 1

Milestone 1: Creation of Advisory Committee-
STATUS COMPLETE

Milestone 2: Conduct of National AFV Day Odyssey 2010-
STATUS COMPLETE

Milestone 3: Completion of MotorWeek television segment-
STATUS COMPLETE

Milestone 5: Completion of First Responder Curriculum-
STATUS COMPLETE



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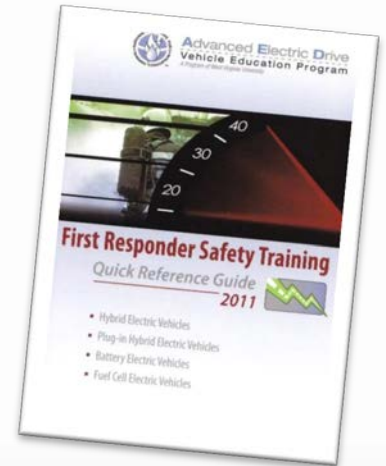
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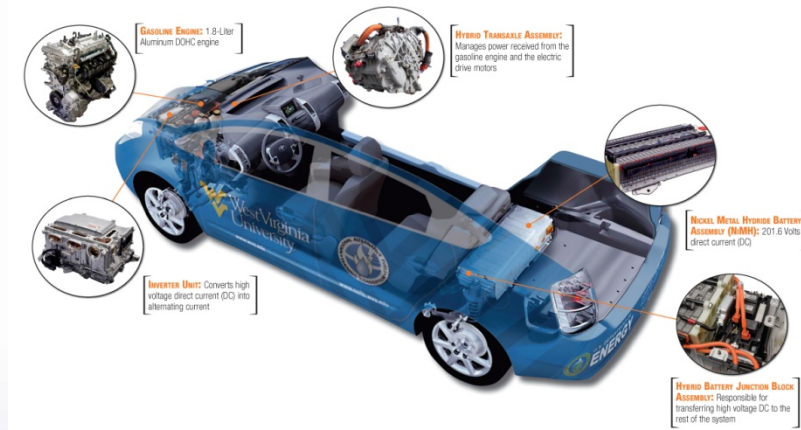
Technical Accomplishments & Progress

- Milestone 4: Completion of Advanced Electric Drive Vehicle Toolkit-
STATUS: COMPLETE ✓
- Milestone 5: Completion of First Responder Curriculum-
STATUS COMPLETE ✓-Items over and beyond requirements:
 - Quick Reference Guide
 - Development of Learning Management System (LMS) complete
 - Development of on-line training course underway
 - iPhone app completed and released (over 2,500 download at time of presentation development)
 - Android phone app under development
- Milestone 6: Completion of CTE teaching materials for secondary schools-
STATUS: UNDERWAY
 - Contractor in place and development underway
 - WV Board of Education and CTE Instructors Focus Group
 - SC Board of Education and CTE Instructors Focus Group



Technical Accomplishments & Progress

- Milestone 7: Completion of automotive technician curriculum-
STATUS: UNDERWAY
 - Development underway
 - Acquisition of Chevrolet Volt Training vehicle
 - Development of Hybrid Electric Vehicle Training Educator (HEVTY)
 - Acquisition of Hybrid Engine Trainers
- Milestone 8: Completion of electrical vehicle infrastructure curriculum and training-
STATUS: UNDERWAY
 - Curriculum development underway
 - Video development underway



Technical Accomplishments & Progress

- Milestone 9: Dissemination of NAFTC NTC Courses and Workshops- STATUS: UNDERWAY
 - First Responder Train-the-Trainer dissemination complete (and over target number)
 - First Responder end-user course dissemination underway
- Milestone 10: Conduct of National AFV Day Odyssey 2012-STATUS: UNDERWAY
 - Coordinators handbook complete
 - Site recruitment underway
 - Marketing and outreach underway
- Marketing and Website
 - Website complete and maintenance on-going
 - Event calendar complete and on-going
 - Whitepaper publishing complete and on-going
 - Subscription to RSS feeds complete and on-going
 - Database development complete and on-going
 - Partnership development underway
- Jobs creation and retention
 - 17.73 Retained Direct Full Time Employment (FTE) Jobs
 - 4 Created direct Full Time Employment (FTE) Jobs
 - 16.5 Induced job years created elsewhere in the economy as increases in income from the direct government spending*

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Partnerships & Collaborations

- Partners

- Advanced Vehicle Research Center
 - Subcontractor
 - Outside Industry
 - Partnered to develop Hybrid Vehicle Cut-away Trainer and First Responder Safety Training and technical assistance
- AutoExposure
 - Subcontractor
 - Outside Industry
 - Partnered to develop training videos
- Eaton Corporation
 - Subcontractor
 - Outside Industry
 - Partnered to develop Infrastructure curriculum and SME
- ICS Learning Group
 - Subcontractor
 - Outside Industry
 - Partnered to develop LMS and on-line courses
- MotorWeek
 - Subcontractor
 - Outside Industry
 - Partnered to develop MotorWeek TV segment
- Perfect Sky Inc
 - Subcontractor
 - Outside Industry
 - Partnering to develop CTE and Automotive Technician Curriculum
- WV & SC Departments of Education
 - Academic
 - Outside Industry
 - Partnered to assist in the development of CTE curriculum and pilot CTE curriculum

- Collaborations

- Center for National Response (CNR Tunnel)
 - Military Training Institution
 - Dissemination of trainings and support of FRST video
- Clean Cities Coalitions Nationwide
 - Outside Industry
 - Dissemination of information, National AFV Day Odyssey and networking
- First Responder SME Groups
 - Outside Industry
 - Collaboration and development of FRST Curriculum
- NAFTC Member Training Centers
 - Academic institution
 - Dissemination of trainings and support of Odyssey
- Nissan
 - Outside Industry
 - OEM specific information, training and technical assistance
- Tesla Motors Inc
 - Outside Industry
 - Collaborated on First Responder Training
- Toyota
 - Outside Industry
 - OEM specific information, training and technical assistance
- US Air Force/National Guard
 - Military Training Institution
 - Dissemination of trainings and support of FRST video



Future Work

- Completion of CTE Curriculum
 - SME Review
 - Beta testing
 - Completion of the Train-the-Trainer course
 - Piloting of courses in WV and SC
- Completion of Automotive Technician Curriculum
 - SME Review
 - Beta testing
 - Completion of Train-the-Trainer courses
 - Completion of 40 end user courses
- Completion of Infrastructure Curriculum
 - SME Review
 - Beta testing
 - Completion of Train-the-Trainer courses
 - Completion of end user courses
- Continued dissemination of end user courses for First Responder Safety Training and Automotive Technician
 - Completion of 30 end user courses
- Completion of National AFV Day Odyssey 2012
 - Develop and conduct events for over 150 sites
 - 100 Traditional
 - 50 High School
 - Reach over 100 million through media and activities
- Advisory Committee
 - On-going committee meetings



Summary

- Substantial progress made in PY1 and PY2
 - Milestone 1: Creation of Advisory Committee-STATUS COMPLETE -Meetings on-going
 - Milestone 2: Conduct of National AFV Day Odyssey 2010- STATUS COMPLETE
 - Milestone 3: Completion of MotorWeek television segment- STATUS COMPLETE
 - Milestone 4: Completion of Advanced Electric Drive Vehicle Toolkit- STATUS: COMPLETE
 - Milestone 5: Completion of First Responder Curriculum-STATUS COMPLETE -Items over and beyond requirements:
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 - Acquisition of Hybrid Engine Trainers
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 - Video development underway
 - Milestone 9: Dissemination of NAFTC NTC Courses and Workshops (all)- STATUS: UNDERWAY
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 - First Responder end-user course dissemination underway
 - Milestone 10: Conduct of National AFV Day Odyssey 2012-STATUS: UNDERWAY
 - Coordinators handbook complete
 - Site recruitment underway
 - Marketing and outreach underway
 - Jobs creation and retention
 - 17.73 Retained Direct Full Time Employment (FTE) Jobs
 - 4 Created direct Full Time Employment (FTE) Jobs
 - 16.5 Induced job years created elsewhere in the economy as increases in income from the direct government spending*
- Reached 105 Million Individuals to date
- 80 Trainers trained
- 240 end-users trained
- 24 Conferences and Presentations to date



Technical Back-Up Slides



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Technical Back-Up Slides

Conferences, Exhibits & Presentations

•24 Outreach Activities to Date

2010 Conferences and Expositions

- Electric Drive Transportation Association
- National Truck Equipment Association Work Truck/Green Truck Summit
- National Hydrogen Association*
- North American Council of Automotive Teachers (NACAT)*
- National Fire Protection Association*
- EMS/Firehouse Expo
- Electric Utilities Environmental Conference*
- AltCar Expo

2011 Conferences and Expositions

- National Truck Equipment Association Work Truck/Green Truck Summit
- Electric Drive Transportation Association*
- Wayne State, Electrifying the Economy Educating the Workforce*

2011 Conferences and Expositions (continued)

- American National Standards Institute (ANSI)
- NACAT
- Plug-in 2011
- Fed Fleet
- Pittsburgh Clean Cities Annual Stakeholder Meeting*
- GSA Safety Day
- California Auto Teachers Conference

2012 Conferences and Expositions

- National Science and Engineering Festival
- EVS26*
- ACT Expo*
- Green Truck Summit
- Fire Department Instructor's Conference (FDIC)
- Automotive Training Managers Council (ATMC)

*Project presentation also conducted



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Technical Back-Up Slides

NAFTC Curriculum Development Process

- Needs analysis
 - NAFTC Member input (secondary and post-secondary)
 - Industry input
 - Secondary Instructor input (i.e. CTE Focus Groups)
- Develop materials with SME involvement throughout process
- Alpha review
 - Internally
 - Externally
 - Industry SMEs and training developers
- Beta test
 - Students
 - Instructors
 - SMEs
 - Industry Experts



Technical Back-Up Slides LMS and On-line Courses

- Learning Management system was developed to stream line on-line courses and provide easy access to course materials
 - Record keeping
 - School branding
 - Portability
 - Flexibility
 - Consistent look and feel throughout courses



Technical Back-Up Slides LMS and On-line Courses

The image displays three overlapping screenshots from a web-based course catalog and an Articulate presentation slide.

Top Left Screenshot: Shows the "National Alternative Fuels Training Consortium Online Education Center" homepage. It features a navigation menu with "HOME" and "COURSE CATALOG" highlighted. The main content area includes a welcome message and introductory text about the consortium's mission to promote cleaner transportation and advanced technology vehicle training.

Top Middle Screenshot: Shows the "Course Catalog" page. It includes a search bar, an event calendar for April 2011, and a list of courses. The calendar shows dates from 27 to 30. The course list includes:

- AED Vehicle Technician
- First Responder Safety Training Advanced Electric Drive Vehicle
- AED Career and Technical Education
- Overview of Alternative Fuels
- Overview of Biodiesel

Bottom Right Screenshot: Shows an "articulate" powered presentation slide titled "AED Vehicle Technician". The slide features a blue and white plug-in hybrid car (Toyota Prius) at a charging station. The slide content includes:

- 1. AED Vehicle Technician
- 2. Overview
- 3. Relevance
- 4. Goals
- 5. Conclusion

The presentation controls at the bottom indicate "SLIDE 1 OF 12" and "CLICK NEXT TO ADVANCE".



Technical Back-Up Slides Curriculum Development

- Animations
- Training Videos
- Educational Games
- Smart Phone Tools and Activities

