



ANSI WORKSHOP
Standards and Codes for
Electric Drive Vehicles



American National Standards Institute

Advanced Electric Drive Vehicle Education Program

April 5, 2011

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Consortium,

West Virginia University

Today's Objectives

- Overview of the National Alternative Fuels Training Consortium (NAFTC)
- Overview of the Advanced Electric Drive (AED) Vehicle Education Program
- Importance of Codes & Standards in Training & Developing Training



The National Alternative Fuels Training Consortium



Mission Statement

“To improve air quality and decrease U.S. dependence on foreign oil by promoting, supporting, and expanding the use of advanced technology vehicles and alternative fuel vehicles.”

The NAFTC is a program of West Virginia University and is headquartered in Morgantown, WV.

It is the only nationwide curricula development and training organization that focuses on alternative fuel and advanced technology vehicles.



Nationwide Network of Training Centers

- The NAFTC consists of 50 National Training Centers throughout the U.S.



What we do at the NAFTC

... because clean air & energy independence matter!

What we do...

The NAFTC's mission is to educate the nation about alternative transportation technologies. The NAFTC provides a vital part of the infrastructure necessary for alternative fuel and advanced technology vehicles to become a viable option in transportation. Through the development and delivery of many kinds of training from state-of-the-art, in-depth technical training to brief informative presentations for the general public, the NAFTC has brought the awareness of alternative transportation technologies to millions. Our education and awareness efforts to increase the nation's energy security and improve air quality are embodied in our motto, "Because Clean Air and Energy Independence Matter."

Curriculum Development
NAFTC curriculum is developed based on the most up-to-date industry information. Before being released it undergoes a rigorous examination by professional alternative instructors and technicians.

Training—Courses/Workshops
Learn the basics or gain in-depth knowledge of alternative fuels and advanced technology vehicles by attending one of over 20 courses and workshops.

Education/Outreach
The NAFTC conducts education and outreach events such as its primary event, National AFD Day Odyssey.

Offering over 20 Courses and Workshops

COURSES

- Clean Air and Energy Interdependence: An Overview of Alternative Fuels and Advanced Technology Vehicles
- Overview of Hybrid and Advanced Technology Vehicles
- Hybrid Gas Vehicles: CNG Cylinder Operation
- Light Duty Natural Gas Vehicles
- Home Use of Compressed Gas Appliances
- Localized Natural Gas Vehicles
- "Newer" Ethanol Fuel
- Propane Vehicle Training
- Fuel Cell and Alternative Handling MPV Applications
- Hydrogen Fuel Cell Engines and Fuel Cell Technologies
- A Basic Understanding of Battery-Electric and Hybrid Electric Vehicles
- Fuel Response Safety Training: Hybrid Electric Vehicles (Introduction)
- Fuel Response Safety Training: Hydrogen and Hydrogen Vehicles (Introduction)

WORKSHOPS

- Introduction to Alternative Fuels and Advanced Technology Vehicles
- Introduction to Battery-Powered Electric Vehicles
- Introduction to Hybrid Electric Vehicles
- Introduction to Hydrogen Fuel Cell Vehicles and Fuel Cell Vehicles
- Introduction to Ethanol Vehicles
- Introduction to Biobased Natural Gas Vehicles
- Introduction to Propane Vehicles
- Overview of Ethanol and Flex Fuel Vehicles for Technicians
- Fuel Response Safety Training: Hybrid Electric Vehicles
- Fuel Response Safety Training: Hydrogen and Hydrogen Vehicles

Over 10,000 technicians have been trained from industry, academic, and governmental organizations

- U.S. Air Force
- U.S. Postal Service
- U.S. Department of Energy
- U.S. Environmental Protection Agency
- U.S. General Services Administration
- U.S. National Park Service
- NASA
- California Highway Patrol
- Baltimore Gas & Electric
- North Dakota World
- Alaska MARSA
- City of Phoenix
- Province of New York Bus Service
- Greater Chamber of Regional Transit Authority
- City of Louisville, Kentucky
- Many others

NAFTC education and awareness products:

NAFTC eNews — A quarterly e-newsletter providing highlights and construction activity updates.

The eAboard — An award-winning e-newsletter of industry highlights and construction news and activities.

Webinars — Cost-effective industry information and training opportunities.

•Curriculum Development

•Training

•Outreach and Education

•Program Management



State-of-the-Art Curriculum Development

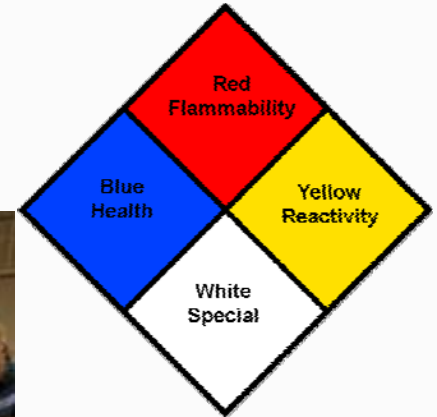


- Over 25 courses and workshops
 - Available on all types of alternative fuel and advanced technology vehicles
 - Customizable to meet needs and requirements of the audience
 - Codes and Standards are an essential piece of development (use of SMEs to develop training materials)



Training

- Classroom study
- Online study
- Lab activities
- Hands-on shop applications
- Review of codes and standards
- State of the Art Training Facility



Training Impact

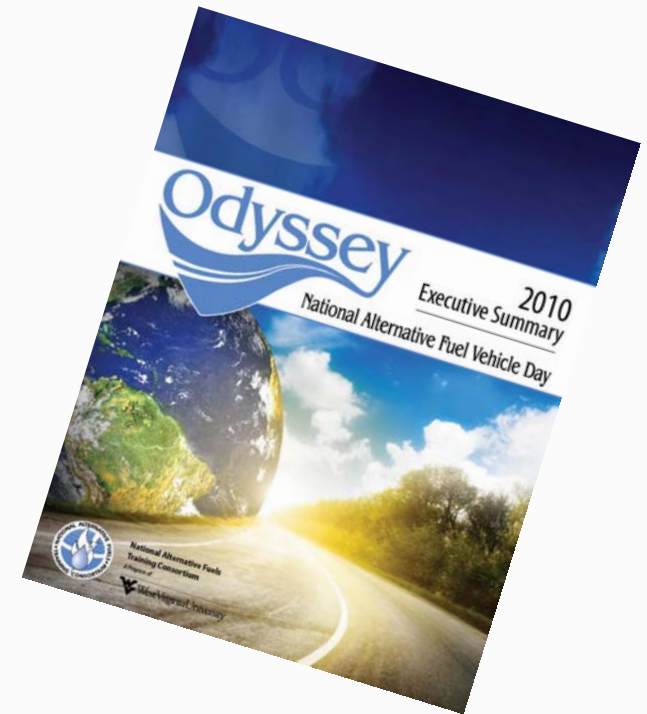
- The NAFTC has delivered more than 1,400 technical courses, training more than 25,000 individuals from the following audiences:
 - Instructors (Train-the-Trainer)
 - Pre-service and In-service automotive technicians
 - First Responders
 - Fleet managers
 - Government and industry representatives
 - Students
 - Consumers
 - Others
- The NAFTC has conducted more than 1,500 workshops and education/awareness events with more than 550,000 attendees



Outreach and Education

- National AFV Day Odyssey
 - Largest biennial nationwide education and outreach event held to promote the use of alternative fuel and advanced technology vehicles

- The NAFTC also attends, exhibits, and presents at numerous conferences and meetings



Advanced Electric Drive Vehicle Education Program

- **Funded by the US Department of Energy and AARA Funding**
 - Total project funding \$8,600,000
 - Federal project funding \$6,900,000
 - Timeline: December 18, 2009 - December 17, 2012



AED Partners

- National Alternative Fuels Training Consortium
- NAFTC National Training Centers
- West Virginia University
- West Virginia University Research Corporation
- MotorWeek
- Advanced Vehicle Research Center
- AutoExposure
- WV and SC Department of Education
- US Dept. of Energy Clean Cities Coalition(s)



AED Vehicle Education Program Goals

- **Goal 1:** Create an **external advisory committee** to provide input on project-related activities
- **Goal 2:** Develop and provide **Career and Technology 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 of the on the subject of advanced electric drive vehicles



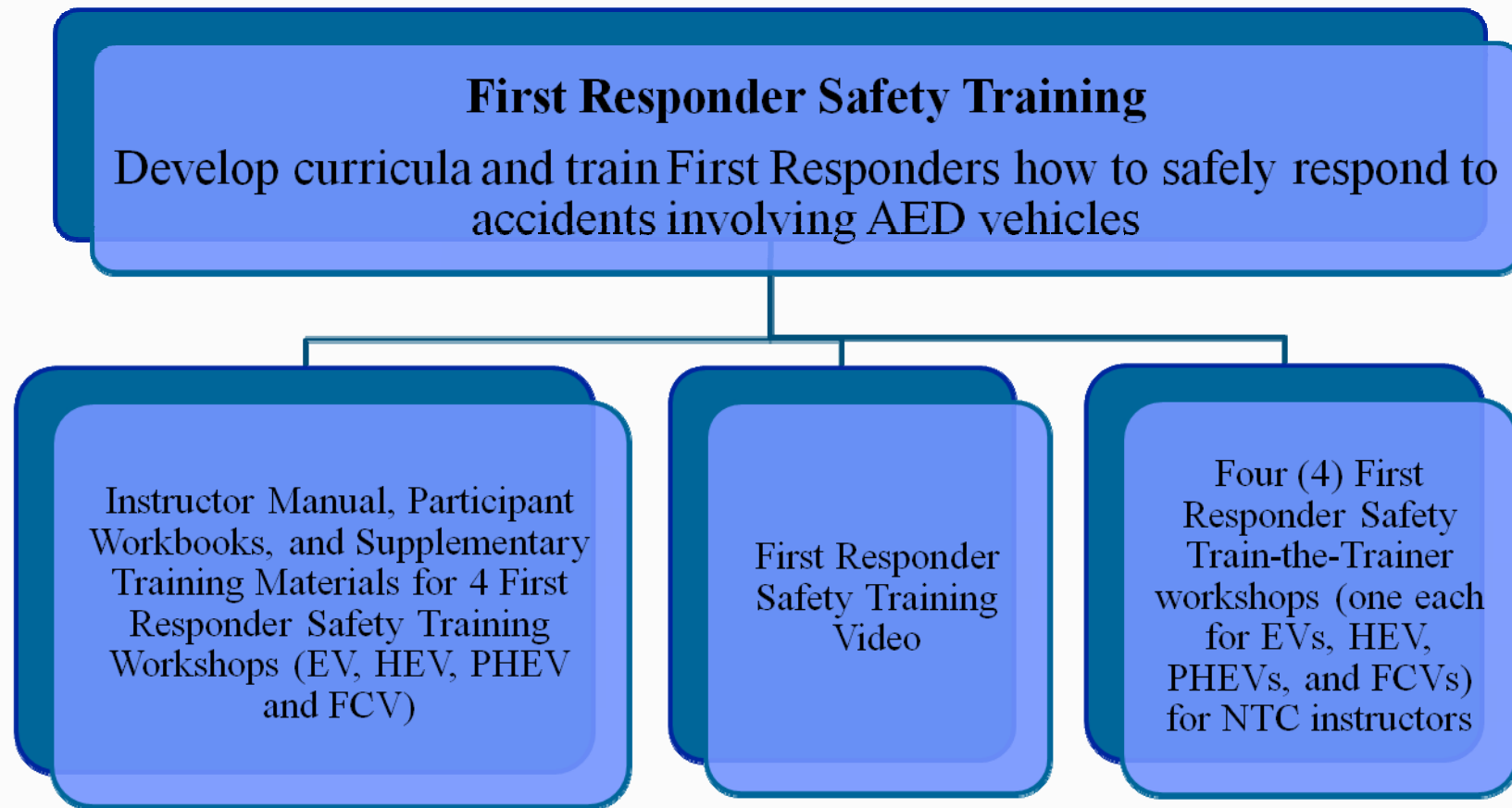
AED Vehicle Education Program Breakdown

Focus of Program:

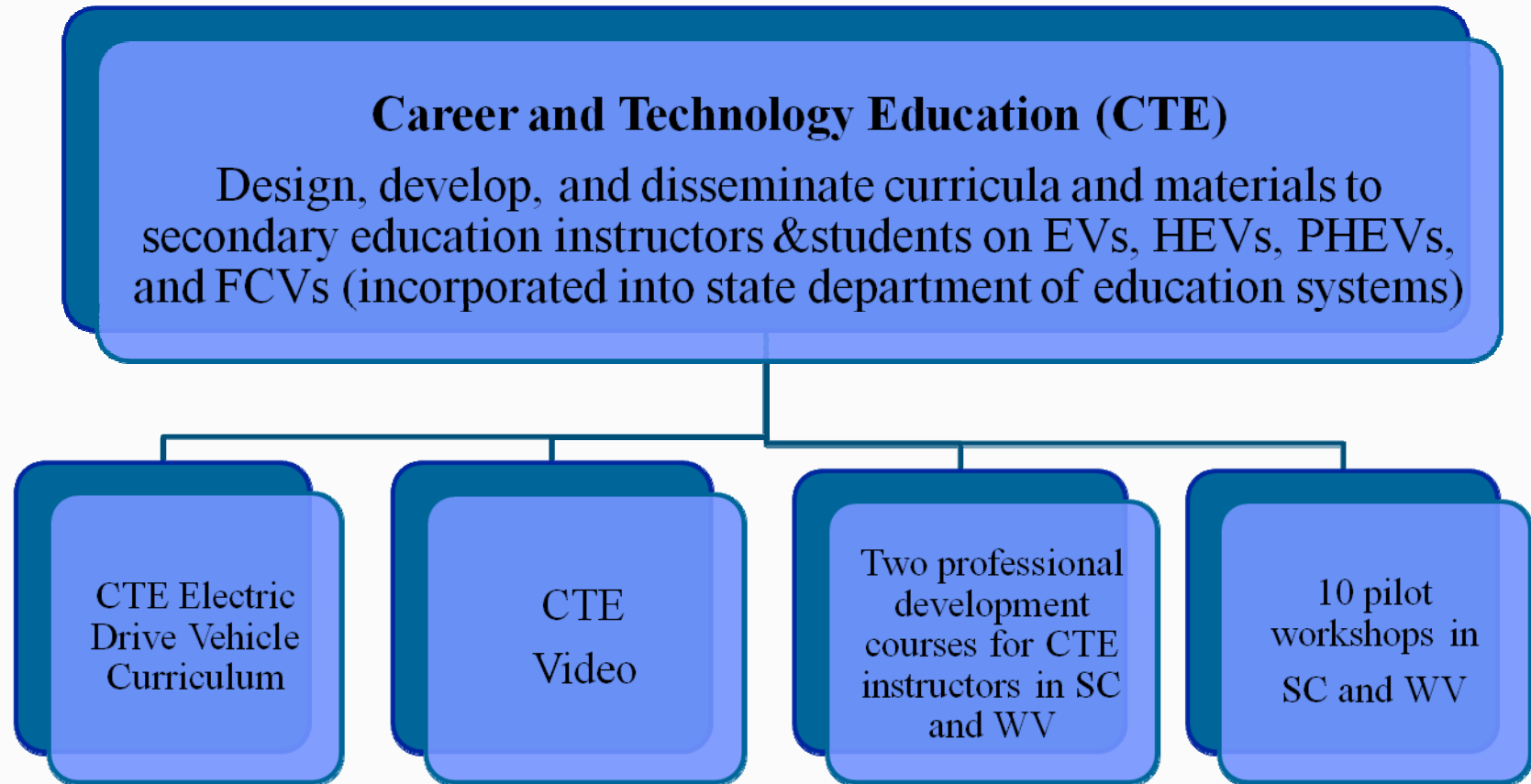
- Curricula Development
- Training
- Outreach and Education



AED Vehicle Education Program Curriculum Development



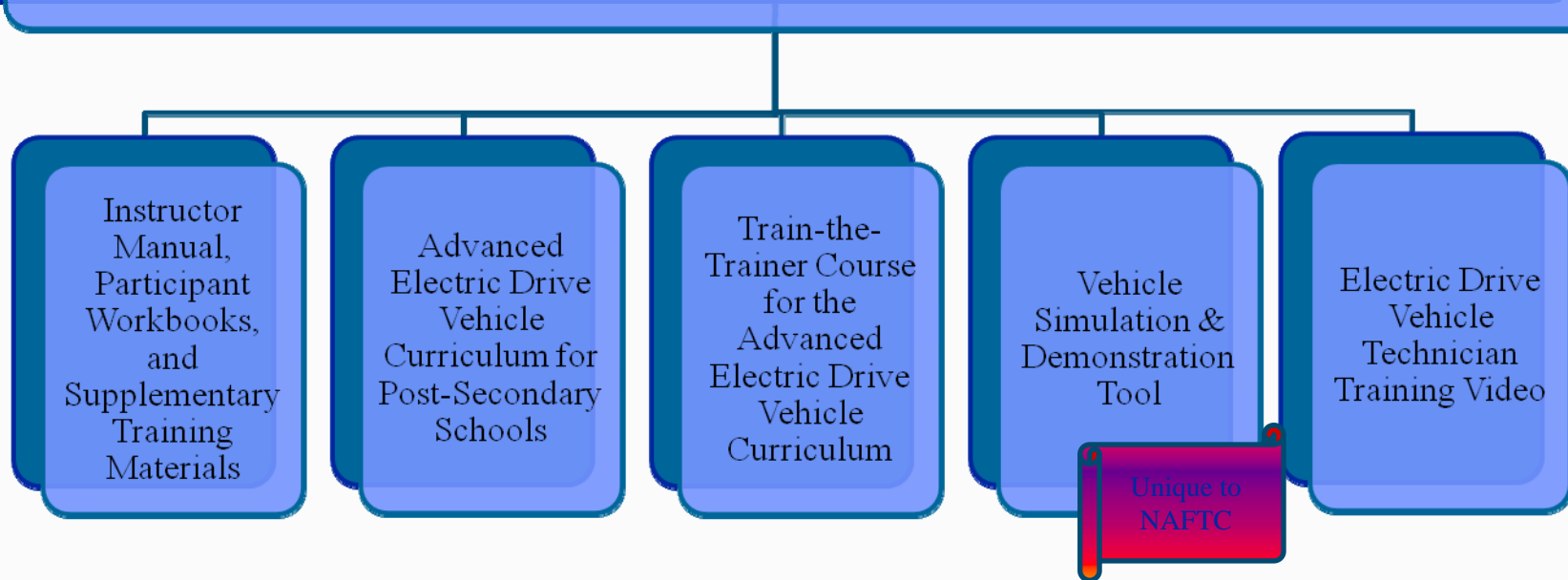
AED Vehicle Education Program Curriculum Development



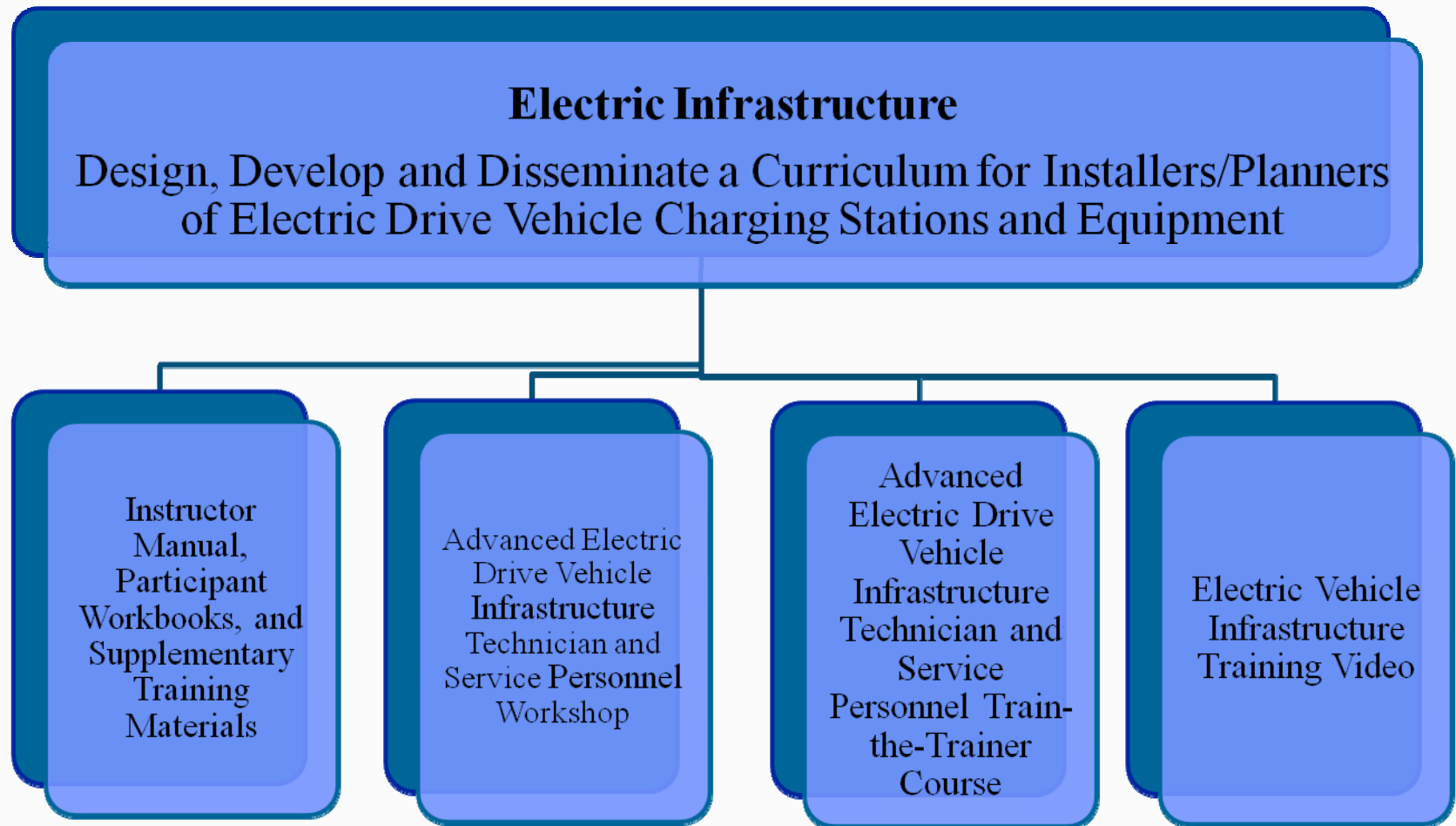
AED Vehicle Education Program Curriculum Development

Advanced Electric Drive Vehicle Technician

Design, develop and disseminate a curriculum for pre- and in-service automotive technicians to diagnose, repair and maintain AED vehicles



AED Vehicle Education Program Curriculum Development



AED Vehicle Education Program Training

98 Training courses to be conducted:

- Two (2) Train-the-Trainer workshops for CTE instructors
- Ten (10) pilot courses in CTE instructors in SC and WV
- Six (6) Train-the-Trainer courses for NAFTC National Training Centers
- Eighty (80) training courses provided by post-secondary schools (NAFTC National Training Centers)



AED Vehicle Education Program Training

Population reach:

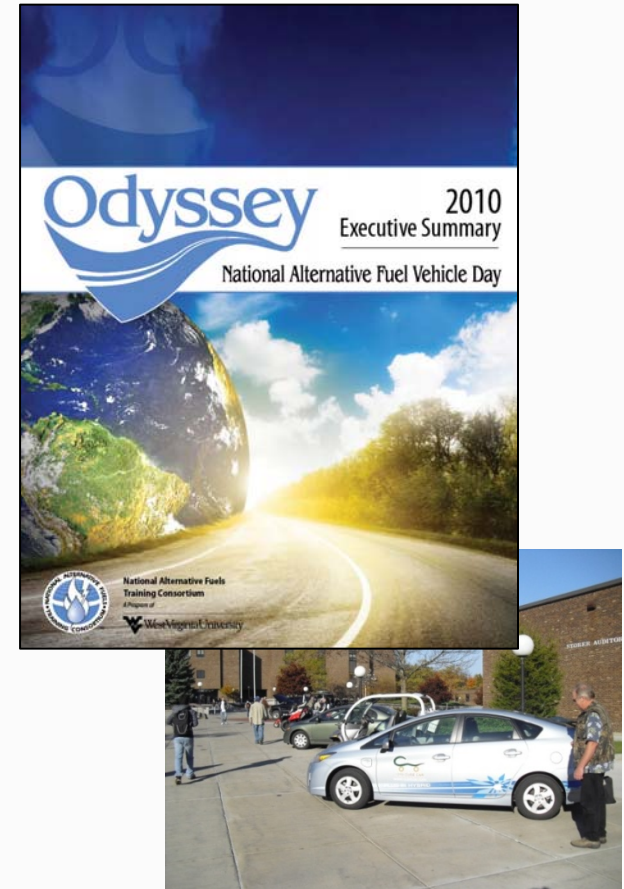
- Over 20,000 students
 - High School students and instructors
 - Pre and in-service automotive technicians
 - Auto technician/maintenance instructors
 - First Responders
 - Infrastructure technicians



Education and Outreach

■ National AFV Day Odyssey 2010

- Results:
- 105 Sites
- 26 High School Sites
- Nearly 200,000 Attendees
- Approximately 75 Million Reached Through Media Exposure



Education and Outreach

■ National AFV Day

- Odyssey 2012 Goals
- 10 Year Anniversary
- 100 Sites
- 50 High School Sites
- Goal to reach 75 million



Education and Outreach

■ Marketing

- Advanced Electric Drive Toolkit and videos
- MotorWeek television segment
- AED 101 video
- Trade shows and conferences
 - Nearly 38,000 reached to date
- Strategic partnerships

■ Media Relations

- Press releases and media advisories
- Social media
 - Facebook
 - LinkedIn
 - Twitter



Education and Outreach

■ Website

- Consumer information
- Technical information
- Events calendar
- Press room and library
- Videos and podcasts
- Vehicle Simulation & Demonstration Software Tool
- Consumer information area
- White papers
- RSS feeds and technical bulletins



AED Vehicle Education Program Impact

- Over 20,000 Students will be trained in Advanced Electric Drive technical skills
- Students will be more employable and marketable over traditional graduates
- Training will provide required critical skills needed for new technologies
- Training will continue to be offered throughout the country after project completion (with potential reach of over 100,000 individuals)
- Codes and standards information will be disseminated to nationwide audiences



2011- Year of the Electric Drive Vehicle

- Imperative that EDV codes and standards are communicated throughout the US to their target audience
- AED Vehicle Education Program will assist with this important task



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