U.S. Emergency Responder Safety Training for Advanced Electric Drive Vehicles

Andrew Klock
Sr. Project Manager
National Fire Protection Association
June 9, 2010

Project ID: ARRAVT036

This presentation does not contain any proprietary, confidential, or otherwise restricted information
(All Photos courtesy of NREL Photographic Information Exchange)

Project Overview

Timeline

Start – February 2010
End date – February 2013
10% complete

Budget

Total project funding

DOE share: $ 4,354,135.

Contractor's share: $ 1,088, 534.

Barriers

- First Responders not taking EV hazards seriously
- Fire Service not able to financially sustain training model

Partners

International Association of Fire Fighters (IAFF)
International Association of Fire Chiefs (IAFC)
National Volunteer Fire Council (NVFC)
International Fire Marshals Association (IFMA)
National Association of State Fire Marshals (NASFM)
Metropolitan Fire Chiefs
U.S. Fire Administration (USFA)
North American Fire Training Directors (NAFTD)
Alliance of Automobile Manufactures (AAM)
Association of International Automobile Manufactures (AIAM)
National Renewable Energy Lab (NREL)
State Farm Insurance
National Highway Traffic and Safety Association (NHTSA)

NFPA Advanced EV First Responder Training

Power to Protect: Prepare to Respond

Relevance

Objective: Implement a comprehensive Emergency Responder Training Program based on NFPA codes and standards for Advanced Electric Drive Vehicles.

- Reach 1.1 million fire service members.
- Reduce fire fighter and civilian EV concerns, injuries & deaths.
- Offer courses to EMS and Law Enforcement.
- Develop Emergency Responder Web Portal for all EV safety training and info.
- Develop awareness for Public on EV Safety.

NFPA Advanced EV First Responder Training

Impact of Training Program

Relevance

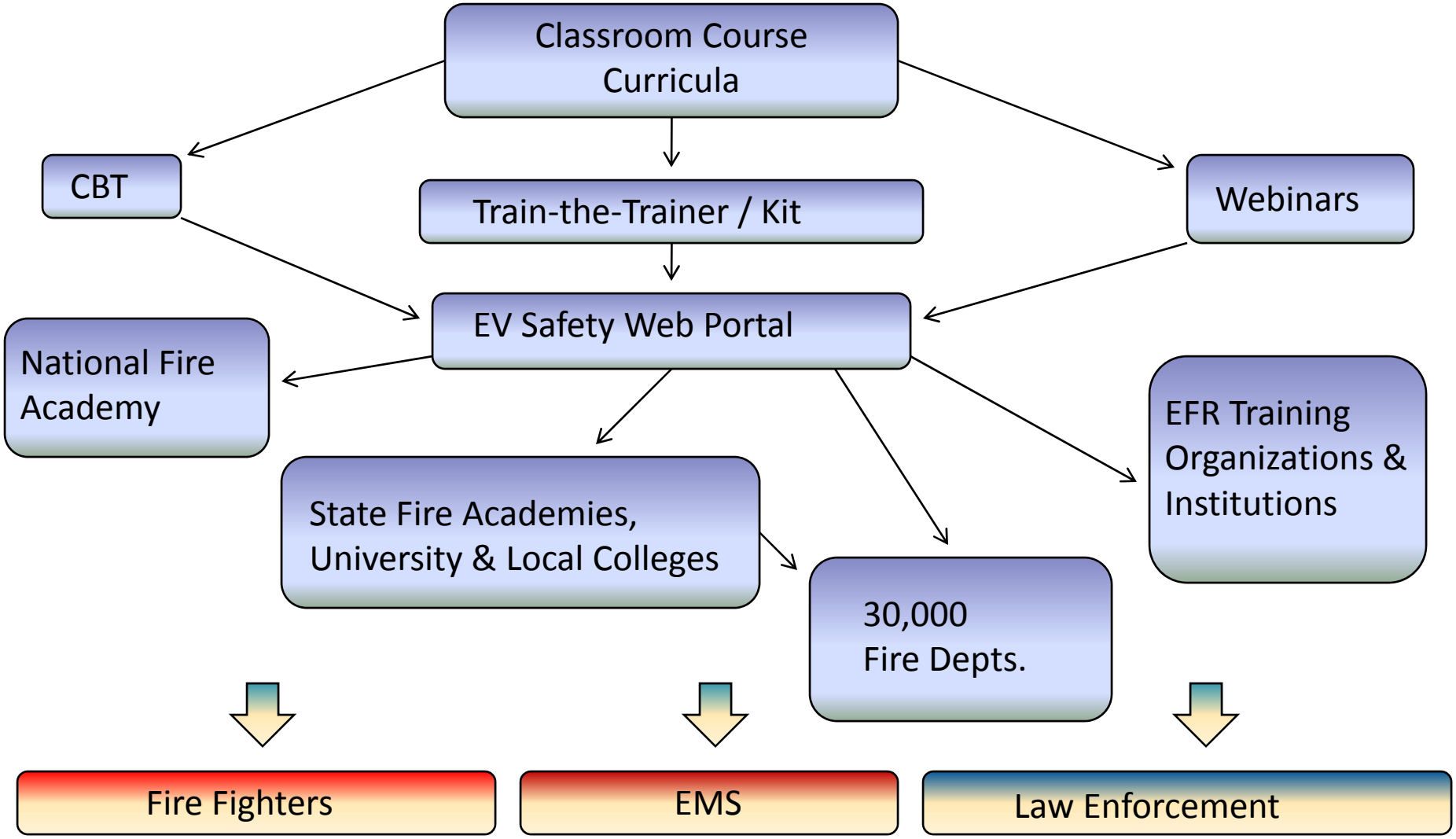
Impact: If emergency response EV knowledge is not spread effectively to first responders, property damage, injury, loss of life, public acceptance and, consequently, overall goal of accelerating high volume production of advanced EV vehicles in the U.S. will be in jeopardy.

Project Impact on Barriers:

- NFPA offering & marketing to Emergency Responders should result in EV training acceptance and wide scale knowledge transfer.
- Ongoing research & partnerships with high level Fire Service and Auto Manufacturers should result in creative future alternate funding options.
- Increased Public awareness on EV safety should result in faster adoption of new technology.

Training Development & Distribution Plan

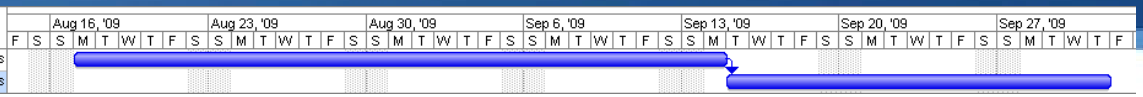
Approach



Project Milestones

Approach

ID	Task Name	Duration
1	Construction	21 days
2	Delivery	13 days



2010

Q1

- Review Historical Data
- First Responder Research
- Project Kickoff Meetings
- Hire Communications Firm

Q2

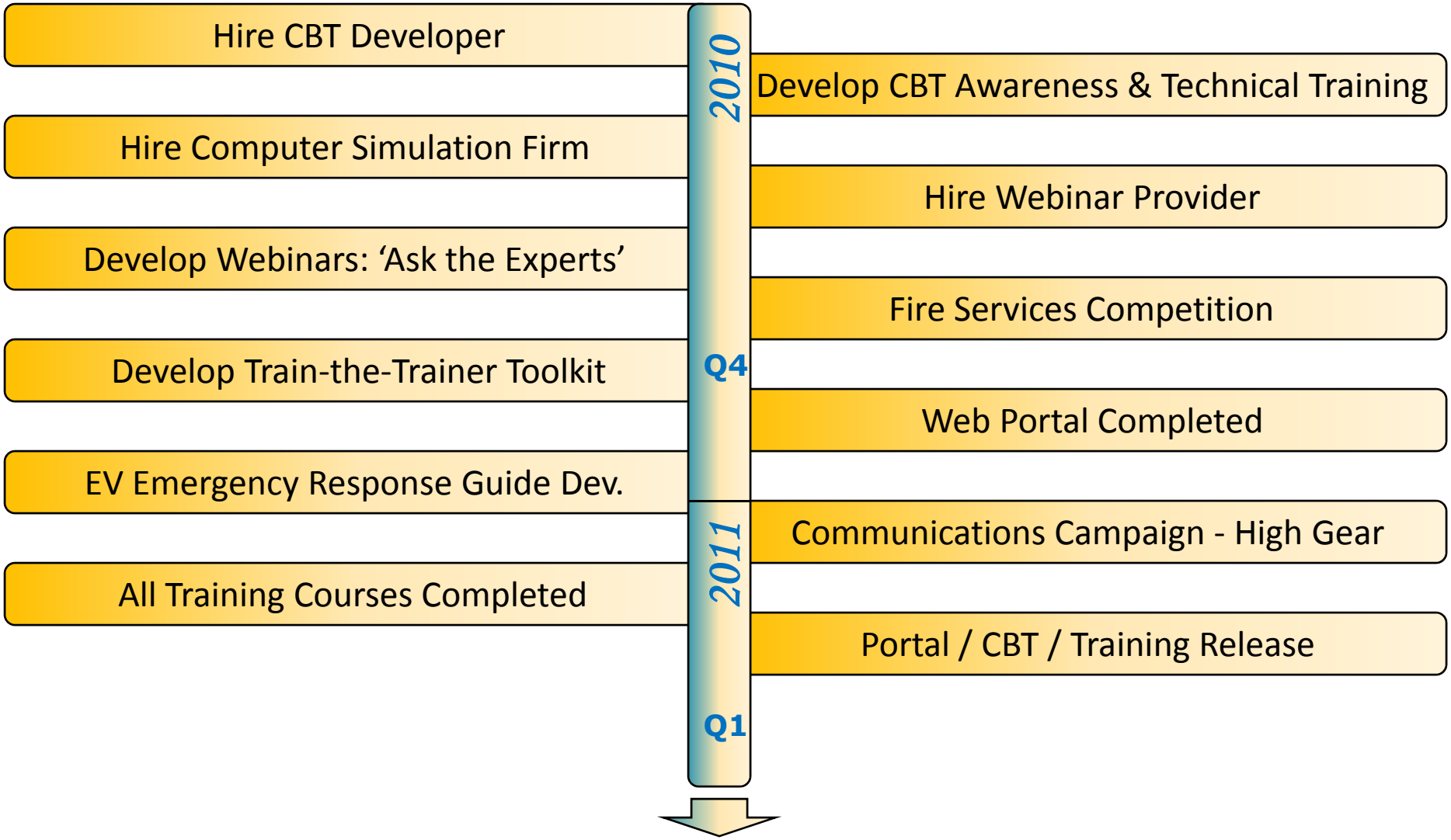
- Plan Communications Campaign
- Web Portal Development
- Compile Safety Information
- Hire Web Development Firm
- Hire EV Content Development Team

Q3

- Review all Material
- Hire Training Development Team
- Hire SME Technical Review Panel
- Field Visits/Filming Fire Co's
- Develop Curriculum

Project Milestones

Approach



Fire Service Technical Panel Information Learned

Progress

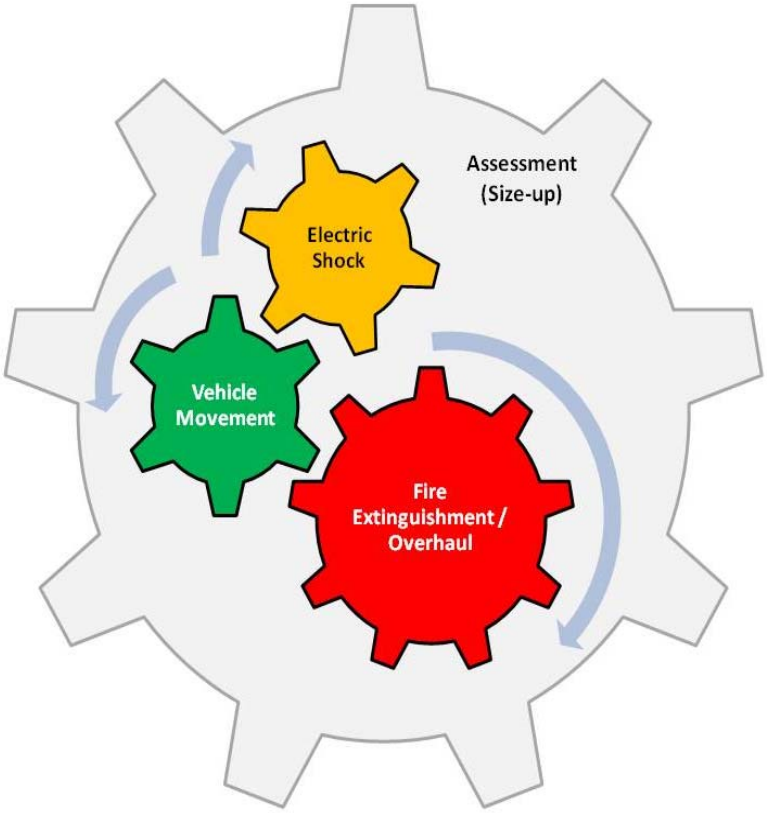
Held 2 Fire Service Technical Committee Meetings

- ✓ Fire fighters do not have a general understanding of EV hazards.
- ✓ First responder education is somewhat of a priority training topic.
  - Better response if mixed with hazmat or extrication training.
- ✓ Training should include fuel cell vehicles, infrastructure & HEVs.
- ✓ Blended learning is preferred
  - Train-Trainer, Classroom, CBT, Webinar, DVD & Simulation.
- ✓ New SOP may not change first responders handling of EV Incidents.

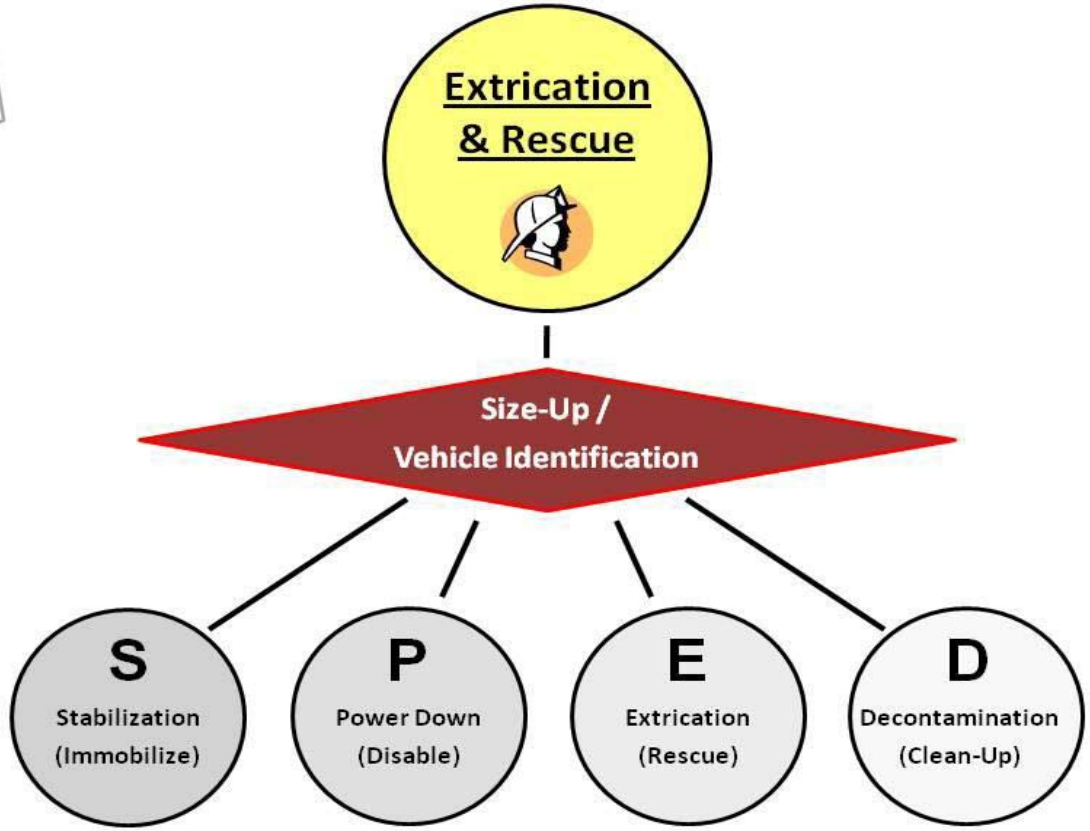
Panel includes members of International Association of Fire Chiefs, International Association of Fire Fighters, National Volunteer Fire Council, International Fire Marshals Association, National Association of State Fire Marshals, the Metro Chiefs and Fire Service Section of NFPA and key fire service representatives from NFPA Tech Committees.

Approach to Extrication & Rescue Identifying EV Risks & Procedures

Progress



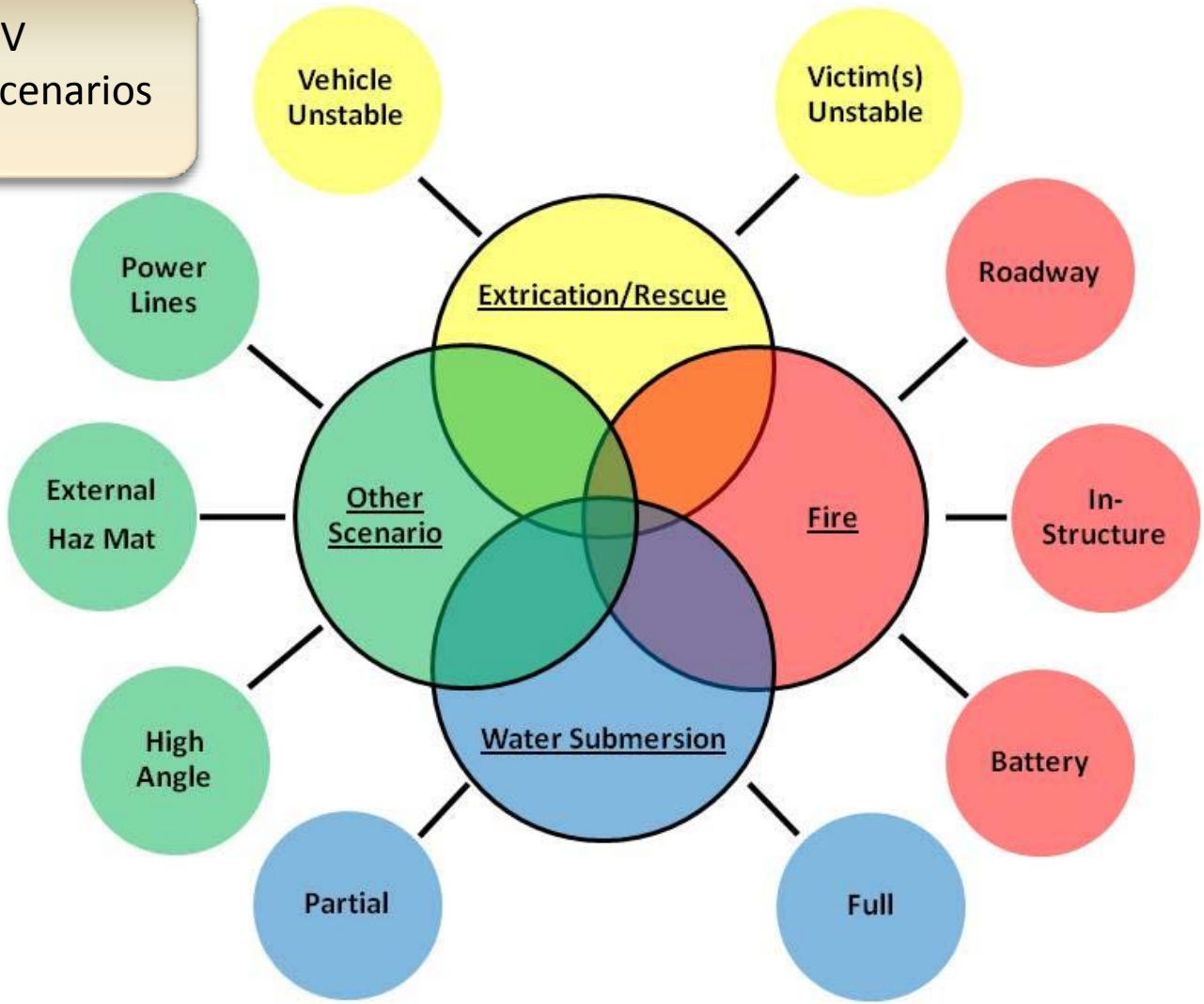
- Attended Detroit Fire Service Workshop on EVs
- Facilitated SME breakout session



EV Emergency Scenarios

Progress

- Identified EV Emergency Scenarios to address



Fire Services & Electrical Codes & Standards Identification

Progress

Standards for Fire Service

- NFPA 1500: Occupational Safety & Health Standards for Fire Fighters
- NFPA 1000: Fire Fighter Professional Qualifications Series
- NFPA 1600: Disaster Planning and Emergency Preparedness
- NFPA 472: Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents
- NFPA 1670: Standards for Technical Rescue Incidents
- NFPA 921: Fire Investigation

National Electric Code

- Article 625: Electric Vehicle Charging Stations
- Article 626: Electrified Truck Parking Spaces
- Article 220: Residential power consumption and how EV charging infrastructure will effect power consumption and emergency responders

- Related Activities: Photovoltaic Cells; Fuel Cell Tech; Smart Grid Tech

NFPA Divisions and Roles
Project Work Distribution

Progress

▪ Research Foundation	Contacts, Research, NREL, Auto Manuf., Fire Service Needs Assessment, Panels.
▪ Professional Development	Training Curriculum Construction Train-the-Trainer Kit eLearning Webinar & CBT Development Media, Simulation, Competition Module.
▪ Research Division	Grass Roots Fire Svc. Focus & Survey.
▪ Public Fire Service Division	Contacts, Direction, Review.
▪ Engineering Division	Content Review, Partnerships.
▪ Communications Division	Comm. Planning & Vendor Oversight.
▪ Product Development	Reference Guide Development.
▪ Statistics Team	EV, Fire, Electrical Stats.
▪ Marketing Division	Fire Fighter Focus Groups / Surveys.
▪ IS	Web / Portal Development.

Project Timeline Progress

Progress

✓ Review Historical Data

✓ First Responder Research

- ✓ Fire Protection Research Foundation
- ✓ Fire Service Technical Panel Meetings
- ✓ Training Needs Assessment

✓ Project Kickoff Meetings

- ✓ D.O.E. Kickoff Meeting – W.V.
- ✓ Fire Service EV Workshop Detroit Meeting
- ✓ NFPA Kickoff Meeting March

Hire Training Development Team

- Hire Research, Graphic, Engineering SMEs
- Hire Video / Field Operations Company
- Hire Curricula & Training Development Firm

2010

Q1

Q2

✓ DOE Grant Awarded Feb. 4, 2010

✓ Communications Development

- ✓ RFP Sent
  - Logo, Branding, Public Media, Web Ads
  - Tradeshows, Events, Portal Wireframe
- ✓ Proposals being Reviewed
- ✓ Selection & Hire Vendor by April

Hire EV Content Development Team

- RFP
- Condensing ERGs into EFG Templates & DB

Hire Web Portal Development Firm

Project Partnerships

Collaboration

International Association of Fire Fighters (IAFF)
International Association of Fire Chiefs (IAFC)
National Volunteer Fire Council (NVFC)
International Fire Marshals Association (IFMA)
National Association of State Fire Marshals (NASFM)
Metropolitan Fire Chiefs
U.S. Fire Administration (USFA)
North American Fire Training Directors (NAFTD)

Fire Service Technical Committee: assisting with needs assessment & direction for training development

Alliance of Automobile Manufactures (AAM)
Association of International Automobile Manufactures (AIAM)
Auto Manufacturers

EV ERGs, No-Cut Graphics, Power Down Sequences

National Renewable Energy Lab (NREL) – Tech Questions & Trends
State Farm Insurance – Safety Issues, Crash Test Results
National Highway Traffic and Safety Association (NHTSA) – Stats, Tests

Proposed Future Project Timeline
3rd Qtr 2010

Proposed Future

Compile Safety Information
- Gather Data from Auto Manufacturers
- Create Central Reference DB

Field Visits/Filming Fire Co's
- Accident SOPs, EV Extrications
- Video for training modules

Develop CBT Modules
- Hire CBT Developer
- Construct Awareness & Technical modules
- Self paced learn/watch/try simulation

2010

Q3

Hire SME Technical Review Panel
- Identify EV SME Specialists
- Hire Panel to Review Train Content & Curricula
- Review all Material Produced

Develop Classroom Training
- Construct curricula & supporting materials

Develop Train-the-Trainer Toolkit
- Construct curriculum, workbooks, materials

Proposed Future Project Timeline
4th Qtr 2010 – 1st Qtr 2011

Proposed Future

Develop Webinar Courses
- Choose Webinar Platform / Hire Instructors
- Construct basic EV components/operation

EV Emergency Response Guide Dev.
- Schematics, High Voltage Locations, SOPs

Computer Based Simulation
- Hire firm to construct computer simulations

Portal / CBT / Training Approved

2010

Q4

2011

Q1

Hire Computer Simulation Firm
- Construct Operation Simulations

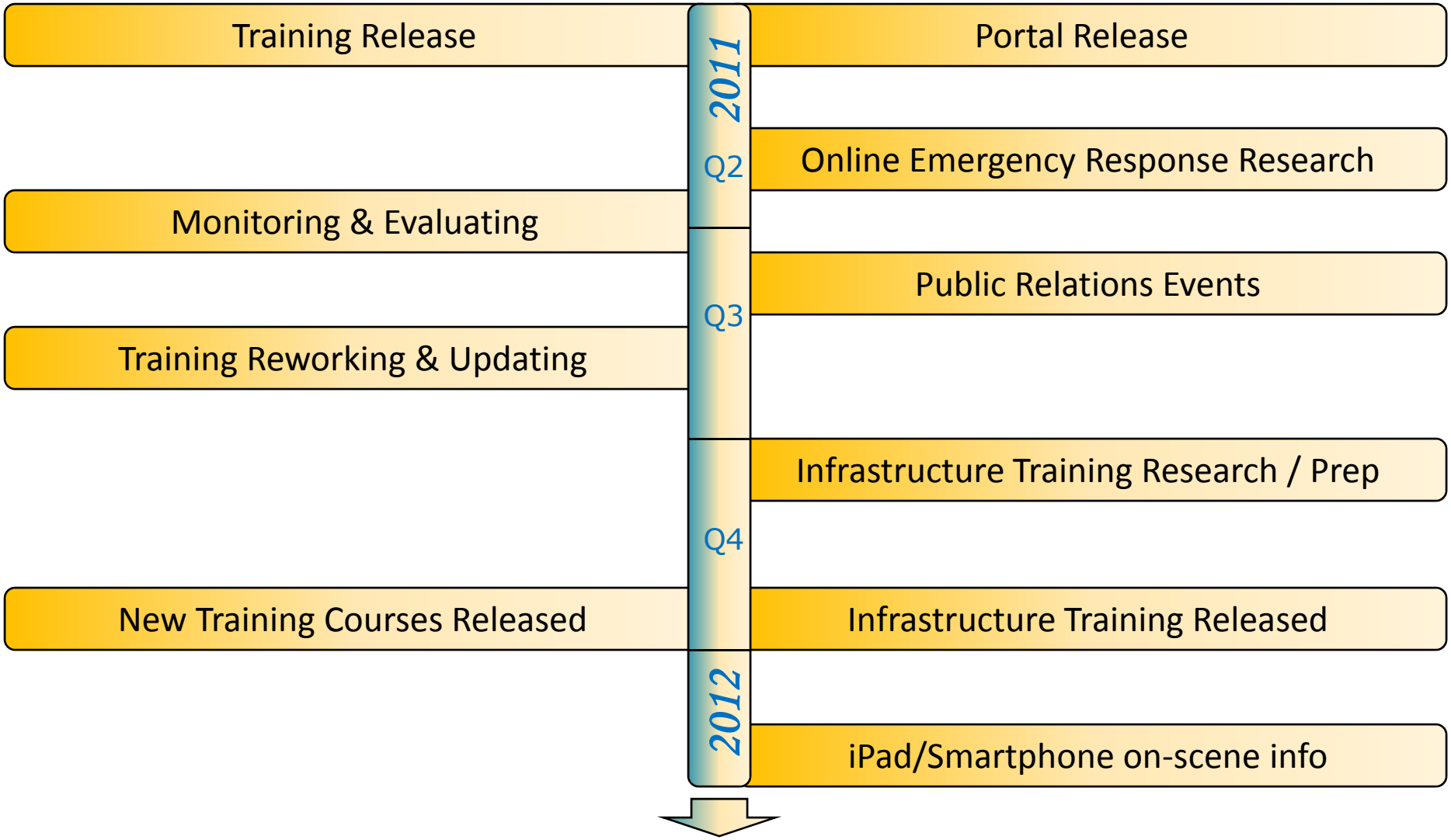
Fire Services Competition
- Fire Fighters compete in educational game
- Advance interest in EV safety

Communications Campaign - High Gear
- Media Campaign, Events, Training

Proposed Future Project Timeline

2nd Qtr 2011 – 1st Qtr 2012

Proposed Future



NFPA Advanced EV First Responder Training

Power to Protect: Prepare to Respond

Summary

Relevance: Effective EV knowledge transfer to Emergency Responders will reduce property damage, injury, loss of life, and help achieve public acceptance of high volume Advanced EV production in the U.S.

Approach: Through a carefully planned and executed development and distribution strategy, NFPA will offer a high value, standards based training programs to U.S. Emergency Responders (Fire Service, EMS, Law Enforcement).

Accomplishments/Progress: Formed Tech Committees, attended EV workshops and gathered Fire Service needs. Arrived at initial direction for ER Advanced EV training program. A communications plan has been established and is underway, and SMEs are being hired to create a blended learning program to reach as many ERs as possible.

Collaborations: Active partnerships with High Level Fire Service Organizations, NREL, NHTSA, Insurance and Automobile Manufacturers offers a high degree of needs assessment, direction, vital auto safety data and statistics, to enhance the development of a high quality program, resulting in more nation-wide acceptance.

Proposed Future Work: Continuing to develop standards based training content & curriculum, verification with SME review teams, instructor material and field reference guides for all U.S. Emergency Responders.

National Fire Protection Association
1 Batterymarch Park, Quincy, MA

Andrew Klock
617-984-7089

Project ID: ARRAVT036

aklock@nfpa.org