

MODULE I: INTRODUCTION

TERMINAL OBJECTIVE

The student will be able to differentiate between myths and reality with regard to hybrid electric vehicle, plug-in hybrid electric vehicle and electric vehicle safety concerns.

ENABLING OBJECTIVES

The student will be able to:

- 1. Define HEV (hybrid electric vehicle, PHEV (plug-in hybrid electric vehicle) and EV (electric vehicle).*
 - 2. List four(4) common myths related to EV safety.*
 - 3. List two (2) actual safety concerns.*
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PROGRAM OVERVIEW

The use of electric and alternative fuel vehicles continues to increase. In fact, the industry predicts that 1/3 of all car sales by 2020 will be electric vehicles. Along with this use of newer technologies, come new challenges for emergency responders. While the hazards of electric vehicle technology are not necessarily any more serious than with internal combustion engines, the hazards are different and need to be understood before responding to incidents involving electric and hybrid electric vehicles. The purpose of this course is to introduce this new technology to emergency responders so they are able to perform their operations safely and effectively.

Course Goal

The course goal is to prepare first responders to be able to operate safely at incidents involving hybrid electric (HEV), plug-in hybrid electric (PHEV) and electric vehicles (EV).

Course Modules

1. Module I: Introduction
2. Module II: Understanding Basic Electrical Concepts and Hazards
3. Module III: Vehicle Systems and Safety Features
4. Module IV: Initial Response: Identify, Immobilize and Disable
5. Module V: Emergency Operations

DEFINITIONS

Hybrid Electric Vehicle (HEV):

A hybrid electric vehicle is a vehicle that utilizes two power sources including a conventional internal combustion engine (ICE) and an electric motor.

Plug-in Hybrid Electric Vehicle (PHEV)

A plug-in hybrid electric vehicle is a hybrid vehicle that can recharge its batteries to full charge by connecting a plug to an external electric power source such as a normal electric wall socket. A PHEV shares the characteristics of both a hybrid electric vehicle, having an electric motor and an internal combustion engine; and of an all-electric vehicle, having a plug to connect to the electrical grid.

Electric Vehicle (EV):

An electric vehicle is a vehicle which uses only an electric motor(s) for propulsion.

TIMELINE OF HEVS AND EVS

Electric vehicles have been around since the invention of the automobile. While they have not been significant in the market until recently, the value of an electric vehicle is not new. Between the late 1800's and the early 1900's the electric car was very popular. In many cases, more so than vehicles with internal combustion engines. The demise of the electric vehicle began around 1912-1913 and it was pretty much rendered obsolete by the 1930's.

- 1832-1839—First crude electric vehicle – Scottish inventor, Robert Anderson.
- 1898—Porsche builds the first hybrid
- 1900—23% of all cars manufactured were electric, and 30% of all cars in N.Y., Boston and Chicago were electric vehicles.
- 1974—Prototype hybrid Buick Skylark was built.
- 1997—Toyota Prius was introduced in Japan market.
- 1997-2000—A few thousand electric vehicles built for lease. Program canceled in 2003.
- 2006—Tesla Roadster released

GROWTH IN NUMBERS

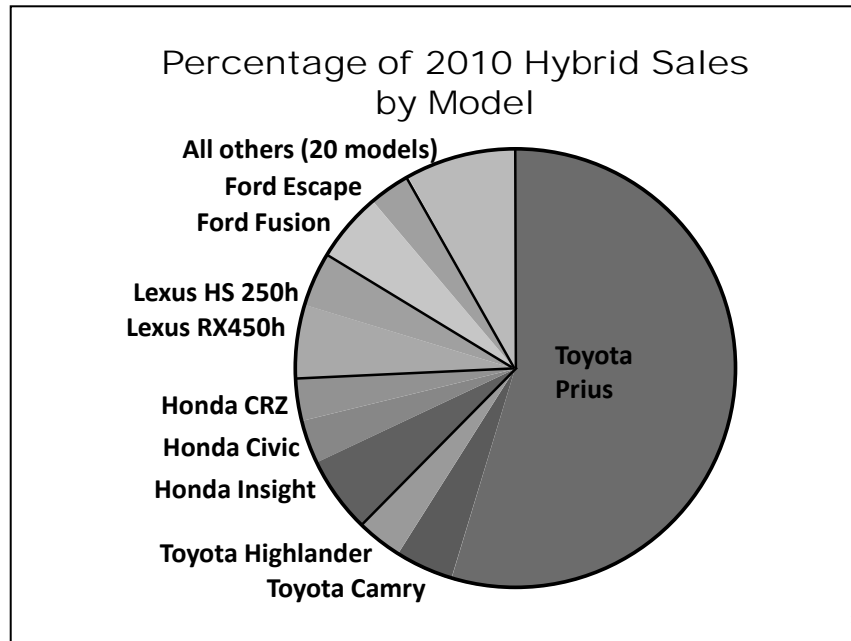
The growth of HEVs and EVs sales has been dramatic in recent years. According to the U.S. Department of Energy, approximately 5,000 HEVs were sold in 2000. In 2009, the figure was over 250,000. This is a growth of 500% in nine years.

The majority of the hybrid sales were divided among ten models. These are the hybrid cars that you are most likely to see on the road:

- Toyota Prius
- Toyota Camry
- Toyota Highlander
- Honda Insight
- Honda Civic
- Honda CRZ
- Lexus RX450h

- Lexus Hs250h
- Ford Fusion
- Ford Escape

The Toyota Prius is by far the most popular of any of these models.



SUMMARY

HEVs and EVs are here to stay and will become more widely used each year. While different in technology than traditional autos, a trained emergency responder is at no increased risk during emergency operations. The key to safety and effectiveness understands the technology involved and how it impacts operations.

1. Program Overview
2. Myths vs. Reality
3. Definitions
4. Timeline of HEVs and EVs
5. Growth in Numbers