



Electric Vehicle Global Technical Regulation

Working Group Meeting
April 23-25, 2012

1



Why Electrification?

Ford's electrified vehicles are part of the company's broad commitment to delivering affordable, best-in-class fuel efficiency to the masses.

2



More than 150,000 on the road

First hybrid SUV introduced
(Escape Hybrid)



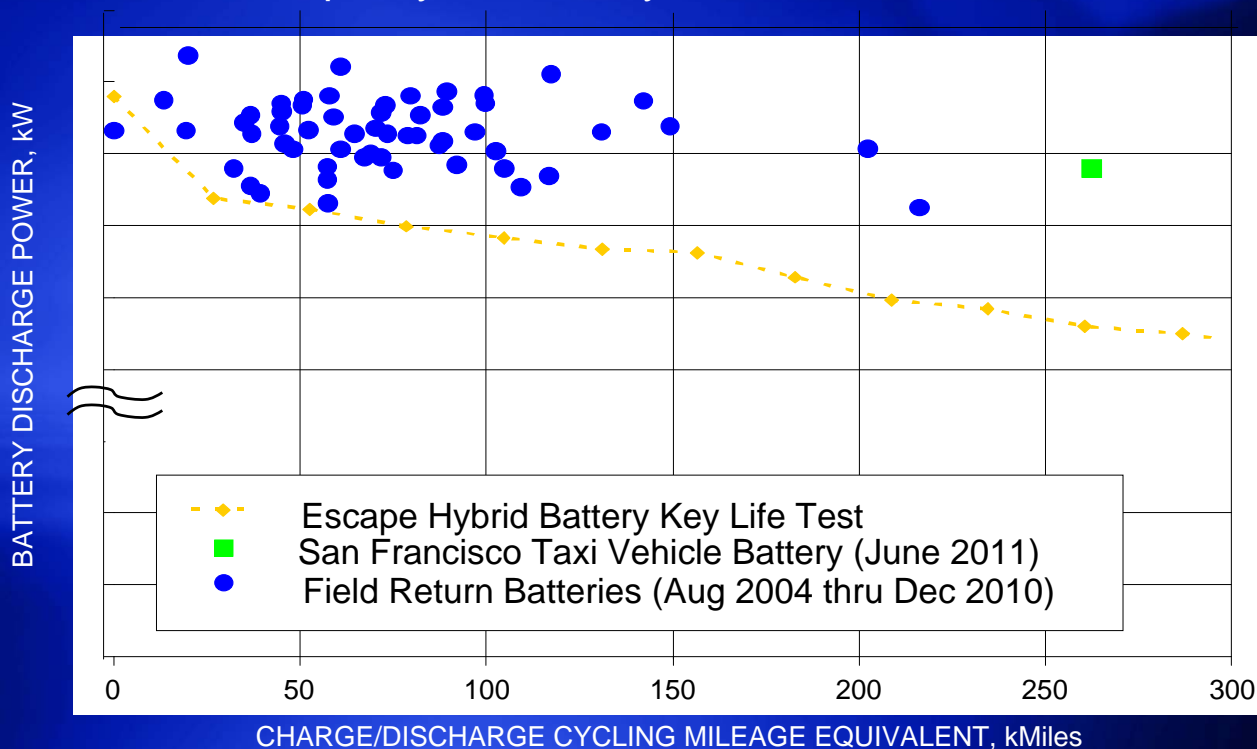
Highly fuel-efficient mid-size sedan
(Fusion Hybrid)



3



Escape Hybrid Battery Field Data vs. KLT



4



RELIABILITY NOT AN ACCIDENT

Researching and developing modern electrified vehicles
for more than 10 years

1996



Cell Testing and Research

1998



Ford Ranger Electric

2004



Ford Escape Hybrid

2009



Ford Fusion Hybrid

2010



Lincoln MKZ Hybrid

RELIABILITY NOT AN ACCIDENT

Researching and developing modern electrified vehicles
for more than 10 years

- ▶ Choose the best parts
- ▶ Simulate their use with computer modeling
- ▶ Test the actual parts on bench and in-vehicle
- ▶ Correlate the two and then verify with real prototypes





Electrification Strategy

- The Ford Electrification Strategy includes six new electrified vehicles in North America by 2012 and in Europe by 2013

- Focus Electric
- C-MAX Energi
- C-MAX Hybrid
- Fusion Hybrid
- Fusion Energi
- Lincoln MKZ Hybrid



- Ford is planning for hybrid and electric vehicles to make up 10% to 25% of Ford's vehicle fleet by 2020

Global Electrification Product Plan

2010 CY

2015 CY

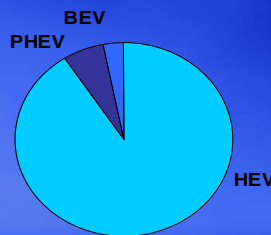
2020

Ford Global Volume

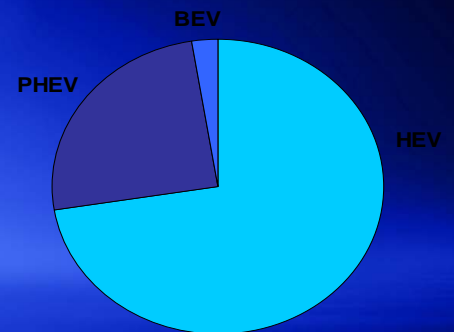
% of total Ford volume



1%



2-5%



10-25%



- Portfolio Approach = HEV/PHEV/BEV (customer-driven)
- Global Flexibility = Electrify Highest Volume Platforms
- Best Value = HEVs Remain Highest Volume
- Affordability Remains Key = Sharing Common Components



Ford is actively involved in the development of Electrified Vehicle Regulations and Standards.



Ford NHTSA RESS Safety: Overview

| | |
|------------------|---|
| Scope | Electrified Vehicle Li-Ion Battery |
| Purpose | Develop Safety Test Methods & Performance Safety Metrics |
| Timing | Sept. 30, 2011 – Sept. 29, 2013 |
| Tasks | <ul style="list-style-type: none"> • Single Failure • Single Failure + Loss of Control System |
| Candidate Faults | <ul style="list-style-type: none"> • <u>Mechanical</u>: Crush, Penetration, Vibration, etc. • <u>Electrical</u>: Overcharge, Short Circuit, Overdischarge, etc. • <u>Thermal</u>: Fire Resistance, Thermal Control, etc. |

| | |
|---------------|--|
| Ford Approach | BEV Cells, Modules and Packs |
| | Subcontract with Ricardo |
| | Fault Tree Analysis |
| | Focus on Overcharge & Mechanical Crush |





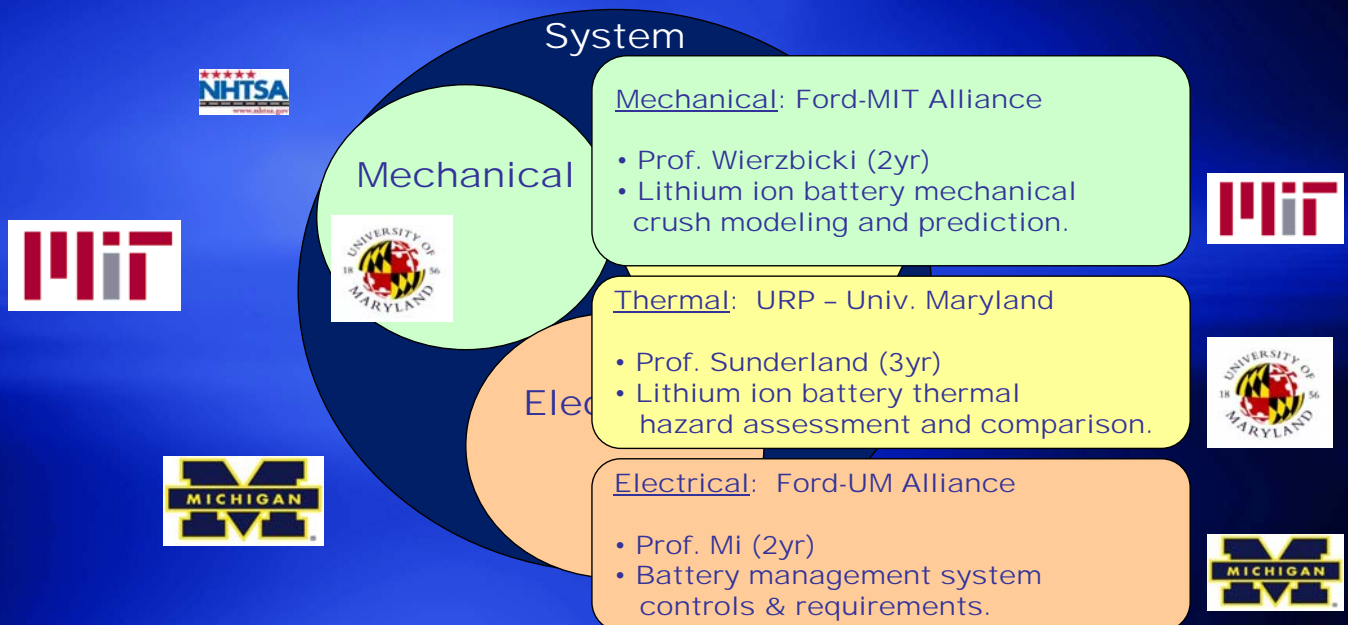
Battery Standards Committees

- Started – Nov. 2009
- Membership
 - 462 Representatives
 - ~150 companies
 - OEM's
 - Suppliers
 - Government
 - Academia
- Specific Topics
 - 18 Committees
 - Interaction
 - Inter-related
- Steering Committee
 - Initiated July 2011
 - Strategic move for organization
 - All Committees report to Steering Committee



Battery Safety Research Activity

Battery Safety Ford Research Activity





In summary.....

- Ford is committed to be fully engaged in support of the EV GTR development.
- Benefits will result from truly common requirements.

END