



# Ford's Electrification Future

Ford's electrification strategy involves three types of electrified vehicles – Hybrid Electric Vehicle (HEV), Battery Electric Vehicle (BEV) and Plug-in Hybrid Electric Vehicle (PHEV) – to provide consumers with significant fuel economy improvements and reduced CO<sub>2</sub> emissions without compromising the driving experience

Ford's electrification strategy will deliver a suite of electrified vehicles to market by 2012, including:

- Ford Transit Connect BEV small commercial van in 2010
- Ford Focus BEV passenger car in 2011
- Next-generation hybrid in 2012
- Plug-in hybrid in 2012

The electrification strategy builds on Ford's vision for bringing affordable technology to millions.

## Hybrid Electric Vehicle (HEV)



## Battery Electric Vehicle (BEV)



## Plug-in Hybrid Electric Vehicle (PHEV)



### What is it

The Hybrid Electric Vehicle combines an internal combustion engine with an electric motor and battery. Electric power is used for vehicle launch and lower-speed operation. The internal combustion engine takes over for higher demand operation and charges the battery

Battery Electric Vehicles do not use a drop of fuel. Instead of an internal combustion engine, the BEV features a high-voltage electric motor, which takes its power from a battery pack charged by plugging in to a 120- or 240-volt outlet

Plug-in Hybrid Electric Vehicles combine HEV technology with a high-voltage storage battery like that used in a BEV. Ford has developed what is known as a blended PHEV – optimally first using the charge of the battery and then running in regular hybrid mode for the best possible fuel, smallest battery and most affordable customer solution. On startup, it operates in charge-depletion mode, providing up to 30 equivalent electric miles of range, and then switches to charge-sustaining hybrid mode for continued optimal fuel economy

### Fuel economy/range

About 70 percent better than comparable non-hybrid models. The new 2010 Fusion HEV achieves 41 mpg city, eight miles better than Toyota Camry Hybrid and over 700 miles on a tank of fuel

Up to 100 miles on a charge

Far fewer trips to the fuel station. Charge-depleting maximum fuel economy operating range of approximately 30 miles

### Engine

High-efficiency Atkinson cycle in combination with motor

N/A

High-efficiency Atkinson cycle in combination with motor

### Motor

High-voltage electric motor-generator

High-voltage electric motor-generator

High-voltage electric motor-generator

### Emissions

Partial Zero Emission Vehicle (PZEV)

Zero Emission Vehicle (ZEV)

Partial Zero Emission Vehicle (PZEV)

### Battery type

Nickel metal hydride (Ni-MH)

Lithium-ion (Li-ion)

Lithium-ion (Li-ion)

### Regenerative braking

Yes

Yes

Yes

### Charging time

Requires no electrical infrastructure connection

Plugs in to standard outlets. The production model will be rechargeable from 220- or 120-volt outlets, with respective charging times of six and 12 hours

Plugs in to standard 120-volt outlet. Ideal for overnight charging in non-peak usage times. Requires seven hours charging time

### Customer usage

Flexible for a wide range of customer use, with excellent urban fuel economy

For customers with shorter, predictable daily trips of less than 100 miles total

Real-world city driving for optimal fuel economy. Ideal for longer commutes than a BEV

### Ford experience

Five years of production experience with the world's most fuel-efficient SUVs, Ford Escape and Mercury Mariner HEV, and America's most fuel-efficient midsize cars, Ford Fusion and Mercury Milan HEVs

Prior development and demonstration fleets, including Ford Ranger EV

Units from a fleet of 21 Escape PHEV test vehicles are already in testing with the 10 utilities/research organizations and the U.S. Department of Energy

