Creating A Greener Energy Future For the Commonwealth

Alternative fuels and vehicles

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Clean Cities portfolio of alternative fuels

**Alternative Fuels**
- Electricity
- Biodiesel B100
- Ethanol (E85)
- Hydrogen
- Natural gas
- Propane (autogas)

**Fuel Blends – commonly used**
- Biodiesel/diesel blends (B2, B5, B20)
- Ethanol/gasoline blends (E10)
- Hydrogen/natural gas blends (HCNG)

- Soy Plant
Clean Cities portfolio of technologies

• Fuel Economy
  • Fuel efficiency
  • Behavioral changes
  • Vehicle maintenance initiatives
  • Vehicle miles traveled (VMT)

• Hybrids
  • Light- and Heavy-duty HEVs
  • PHEVs

• Idle Reduction
  • Heavy-duty trucks
  • School buses
  • Truck stop electrification

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Electric vehicles the future plans:

**EV Market Launch**
- Nissan Leaf
- Chevy Volt

**Ford production PHEV**
- Transit Connects fall 2011 Ford focus
- Mitsubishi Production EV
- Mercedes E Smart cars Fall 2010 (demo)

**More Models**
- June 2011 MA look for PHEV Dodge Ram truck Demo’s
- PHEV’s for Toyota
- Smith electric: All electric trucks
- BMW 1 series

**1 Mil. EV’s on the road by 2015**

- 2010
- 2011
- 2012
- 2013
- 2014
Battery electric Facts

• 100 MILE RANGE

• Battery Charging:
  - Level 1: 120 volts - 12 to 14 hours for full charge
  - Level 2: 240 volts (dryer plug) 4 to 6 hours for full charge J1772 plug now the standard.
  - Level 3 Fast charge 10 to 15 minutes (no standard yet)
  - Charging stations will come with various levels of intelligence.
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The battery electric car and truck
Biodiesel

• What is Biodiesel?
  • Biodiesel is a diesel fuel substitute.
  • Produced from Domestic Renewable Resources: any fat or oil, like vegetable oil, waste greases, animal fat or virgin Soy oil.
  • Meets health effect testing (CAA)
    • Lower emissions
    • High flash point (>300F), Safe
  • B 100 is biodegradable, Essentially non-toxic.
• It is blended with petroleum Diesel at various % levels B-5 B-10 or B-20.
The reasons:

All biodiesel blends:
• Run in Existing, unmodified engines
• Integrates with existing fuel infrastructure
• Increases lubricity
• Cuts exhaust emissions, eliminates black smoke and odor – Just ask the mechanics!
• No loss of power
• Increase in fuel mileage reports of 1 to 2 additional miles per gallon running B- 20
• With proper fuel additive no problems with gelling reported.
• Warranties are not voided despite all the rumors
• Manufacturers warranty their parts and workmanship - not FUEL!
What is the biodiesel used in?

International
Case New Holland
Cat John Deere
Cummins Detroit
& Kohler

from a 1969 Ingram roller to a 2011 Ford F450
The Entire Fleet runs on biodiesel
Hydrogen

• Many challenges technical and otherwise must be overcome before fuel cell vehicles become successful.

• Hydrogen powered vehicles can operate two ways 1. Fuel cells 2. Internal combustion engine
Natural gas/Propane

• These are some of the cleanest burning alternative fuels. These vehicles can be dedicated to one fuel or they can be bi-fuel. CNG/LNG or LPG require special engines and special tanks to hold the fuel.
Ethanol

• Currently made from corn it is blended with gasoline we all now have a E-10 in our fuel.
• There are 30 vehicles in the 2011 model year line up that take E 85.
• While the food for fuel debate rages on keep in mind that for every 3 bushels of corn that are used for fuel 1 bushel is leftover for food.
• 85% reduction of petroleum certainly has some merit if you have the availability to get the fuel
Hybrids

• Plan on at least a 30% savings on fuel with this drive train. Light or heavy duty application.
So how do I choose a fuel?

• CNG is now costs less per gallon equivalent Than Diesel.
• Hybrids – in the right application can mean a fuel savings of over 30%. ROI is 3 to 4 years
• Battery electric vehicles will operate at $1.00 per gallon equivalent
• Biodiesel (B20) can increase MPG by 1 to 2 miles
Alternative fueled vehicles

- Wheel Loader using biodiesel, Propane lawnmower, symbols on vehicles that can use E-85 & a Hybrid Ford Fusion
No silver bullet

Take a look at fleet and find the operations that alternative fueled vehicles will work and

GO FOR IT!

And when prices of fuel gets to $6.00 issue bikes!