

Electric System Losses to Inefficiency

60 Units

Lost Through Inefficient Generation and Waste Heat



10 Units

Lost Through Transmission and Distribution on Peak



10 Units

Wasted Through Inefficient Grounding



100 Units >>

Energy Within Fossil Fuel

40 Units >>

Of Energy Fed to National Grid

30 Units







Of Energy Supplied



20 Units
of Energy Actually
Utilized

Quiz of the Day

How Can We:

-  **Lower Consumers' Total Energy Bills?**
-  **Significantly Improve Efficiency & Reliability of the Electric Grid?**
-  **Significantly Improve Economic Health of the U.S. Electricity Industry?**
-  **Reduce U.S. Dependency on Foreign Oil by as Much as 6.5 M Barrels/Day?**
-  **Substantially Reduce Greenhouse Gas Emissions?**
-  **Significantly Improve Urban Air Quality?**

The Answer



**THE CASHBACK
HYBRID**



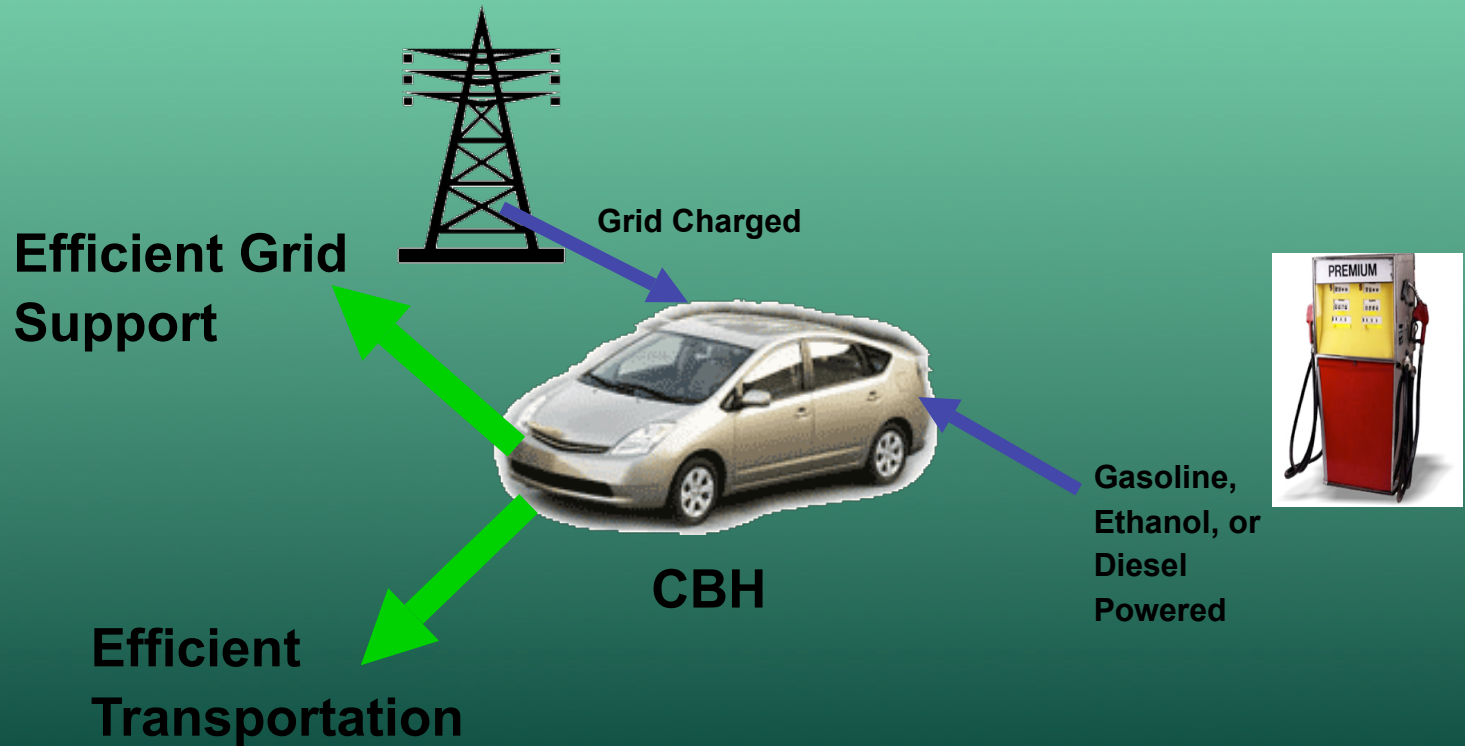
Three Types of Hybrids

- ★ Hybrid → Gasoline/Electric /45 mpg (HEV)
- ★ Plug-In Hybrid → HEV + Bigger Battery + One Way Plug (PHEV)
 - Recharged with Plug @ Home or Work
 - Additional Batteries Extend Electric Range to ~ 30-60 Miles
 - 100-150 mpg Equivalent
 - Most Drivers < 30 Miles/Trip 300 Days/Year 1.2 Hours/Day
- ★ CASHBACK Hybrid → PHEV + Intelligence
 - SMART Plug-In with Electronic Chip
 - 2-Way Communication
 - Can Recharge from Grid and **Supply Power to Grid!!**



CASHBACK Hybrid

Dual Fuel & Dual Benefits



CBH Electric System Benefits

★ Efficient Grid Management

- Ancillary Services (Spinning Reserve & Regulation)
- Dispatchable Reactive Power
- Peak Demand Services (Demand Response)
- Reduced Operating and Planning Reserves
- Distribution/Substation Level Support
- Reduced Line Losses
- Improved Power Plant Efficiency
- Improved Load Factor

★ Storage & Integration of Renewables

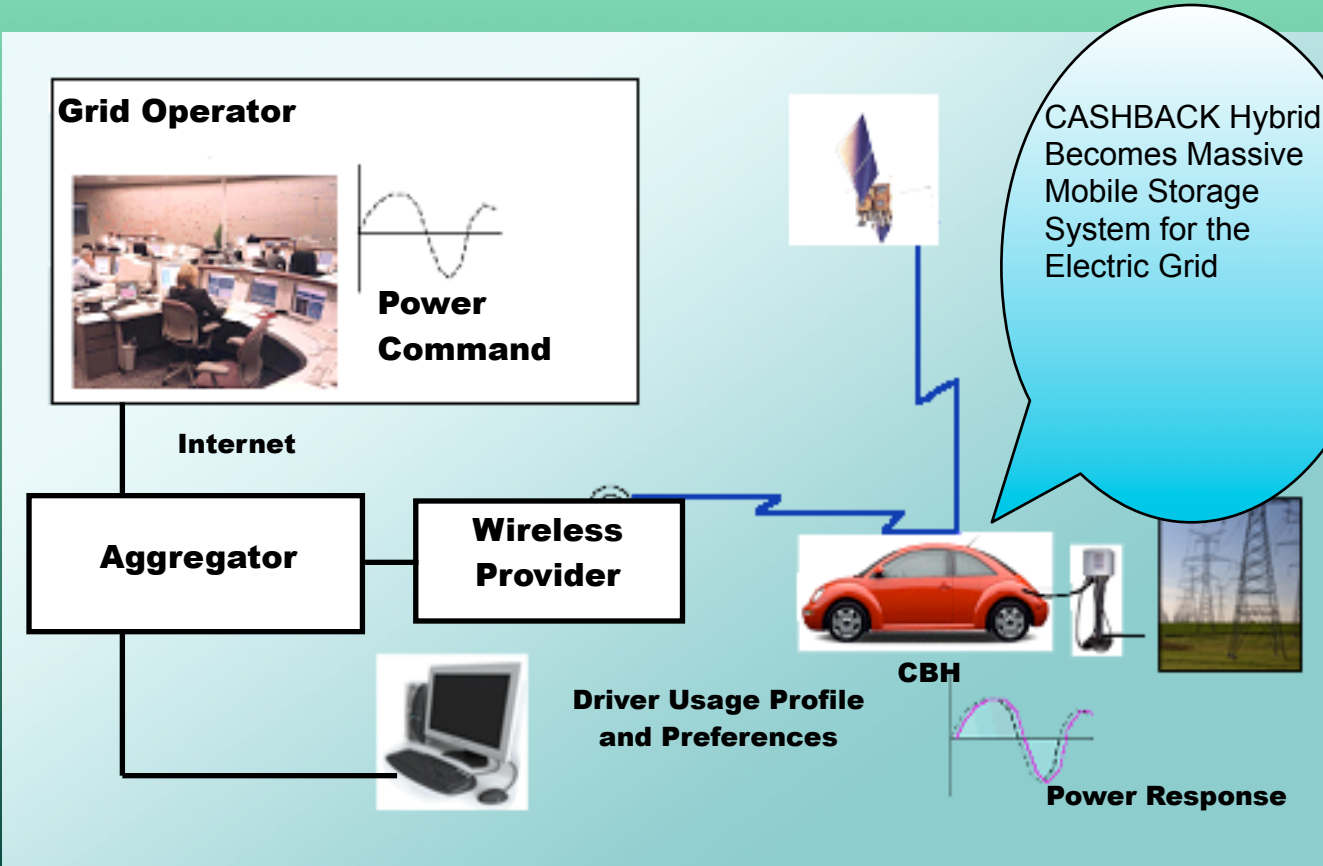
★ Emergency Power Supply

- 1 CBH Power 4 Houses @ Ave Load 1.5 kW/house. (Hello St. Louis)

★ Electric Transit Power Support

- Can Power Traction Spikes for Local Rail

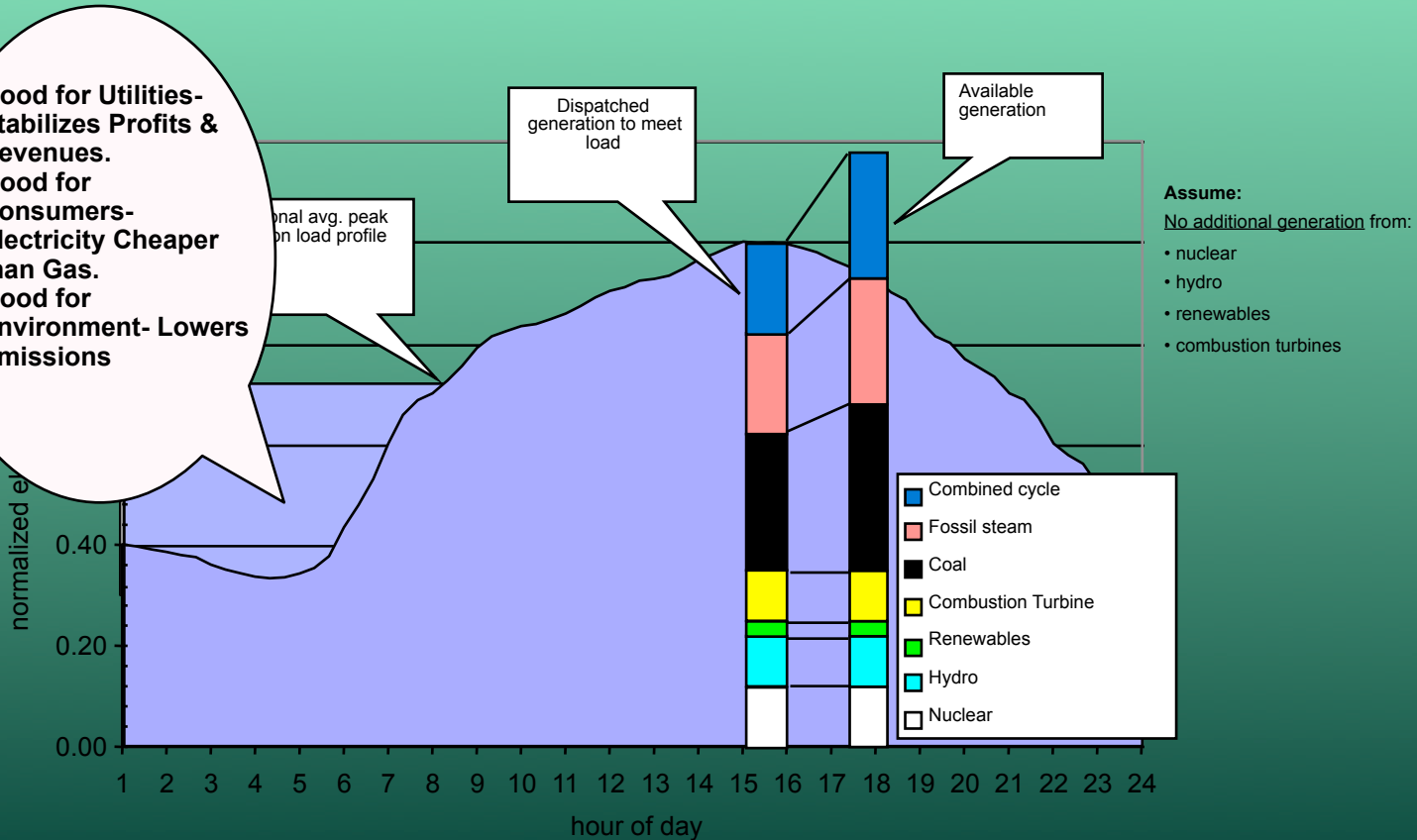
CASHBACK Hybrid Grid Support



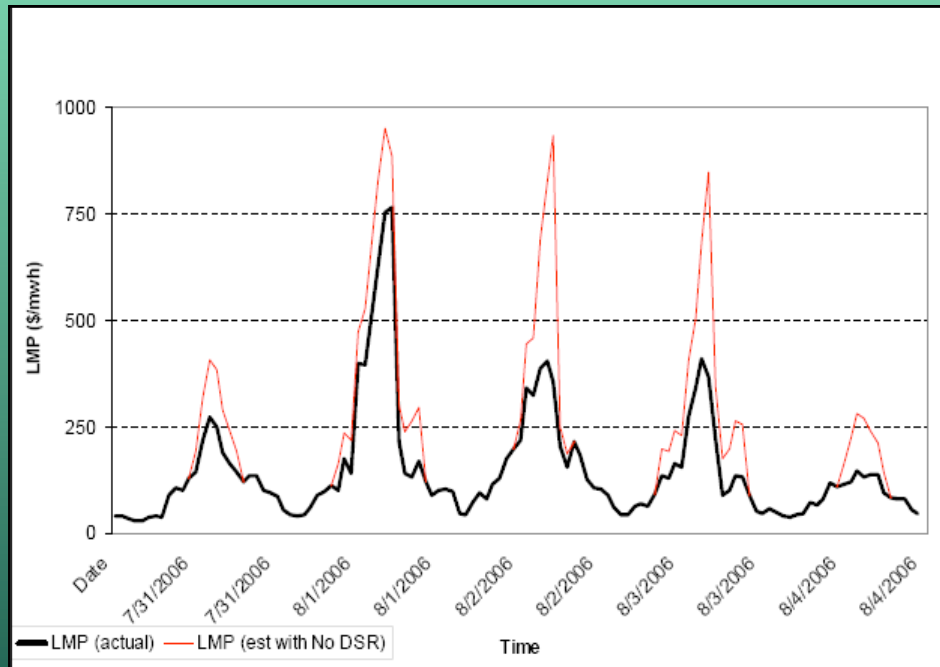
CBH Supports & Improves the Grid

The Grid Supports CBH

Good for Utilities-
Stabilizes Profits &
Revenues.
Good for
Consumers-
Electricity Cheaper
than Gas.
Good for
Environment- Lowers
Emissions

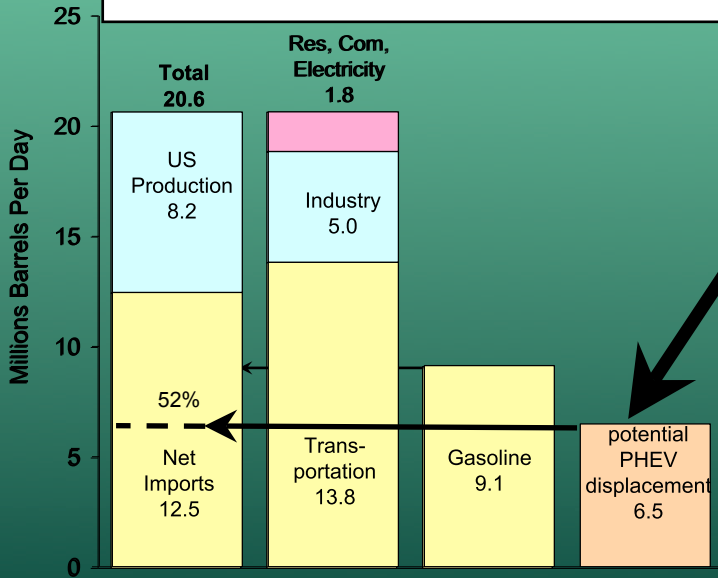
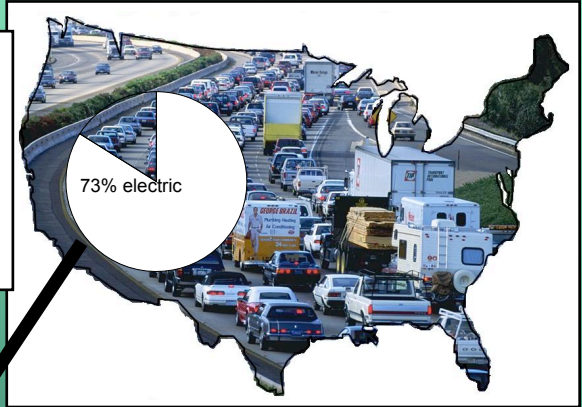


\$650 Million in Consumer Savings from Demand Response- PJM



Can Idle Capacity of Grid be Used to Substantially Reduce Dependence on Foreign Oil?

Idle (Off-Peak) Capacity of Grid Could Supply 73% of Energy Needs of Current cars, SUVs, pickup trucks, and vans – CBHs... without adding generation or T&D capacity



- Displaces 6.5 MMBpd (52% Import)
- Increases Electric Sales
- Reduces GHG emissions by 27%
- Emissions Move > tailpipes to smokestack
- ... cheaper to clean up

Introduces vast electricity storage potential for the grid!!

Source: EIA, Annual Energy Review 2005 & PNNL

What Are Potential Emission Reduction Benefits?

- Reduced GHG Emissions in ALL Regions., Except MAPP (Total 27% Reduction)
- Increased Total SOx and PM10 Emissions
- But Improved Urban Criteria Emissions in All Regions. Emissions Moved from Tailpipes to Power Plant Where They Are Now Easier to Control and Reduce

VOC: Urban	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CO: Urban	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NOx: Urban	0.10	0.11	0.11	0.10	0.09	0.11	0.11	0.10	0.11	0.10	0.10	0.11	0.10
PM10: Urban	0.60	0.62	0.62	0.60	0.58	0.62	0.61	0.61	0.62	0.61	0.61	0.62	0.61
SOx: Urban	0.35	0.04	0.14	0.30	0.51	0.05	0.17	0.22	0.12	0.31	0.20	0.04	0.19

Source: PNNL

Economic Benefits to the Electric Utility Industry

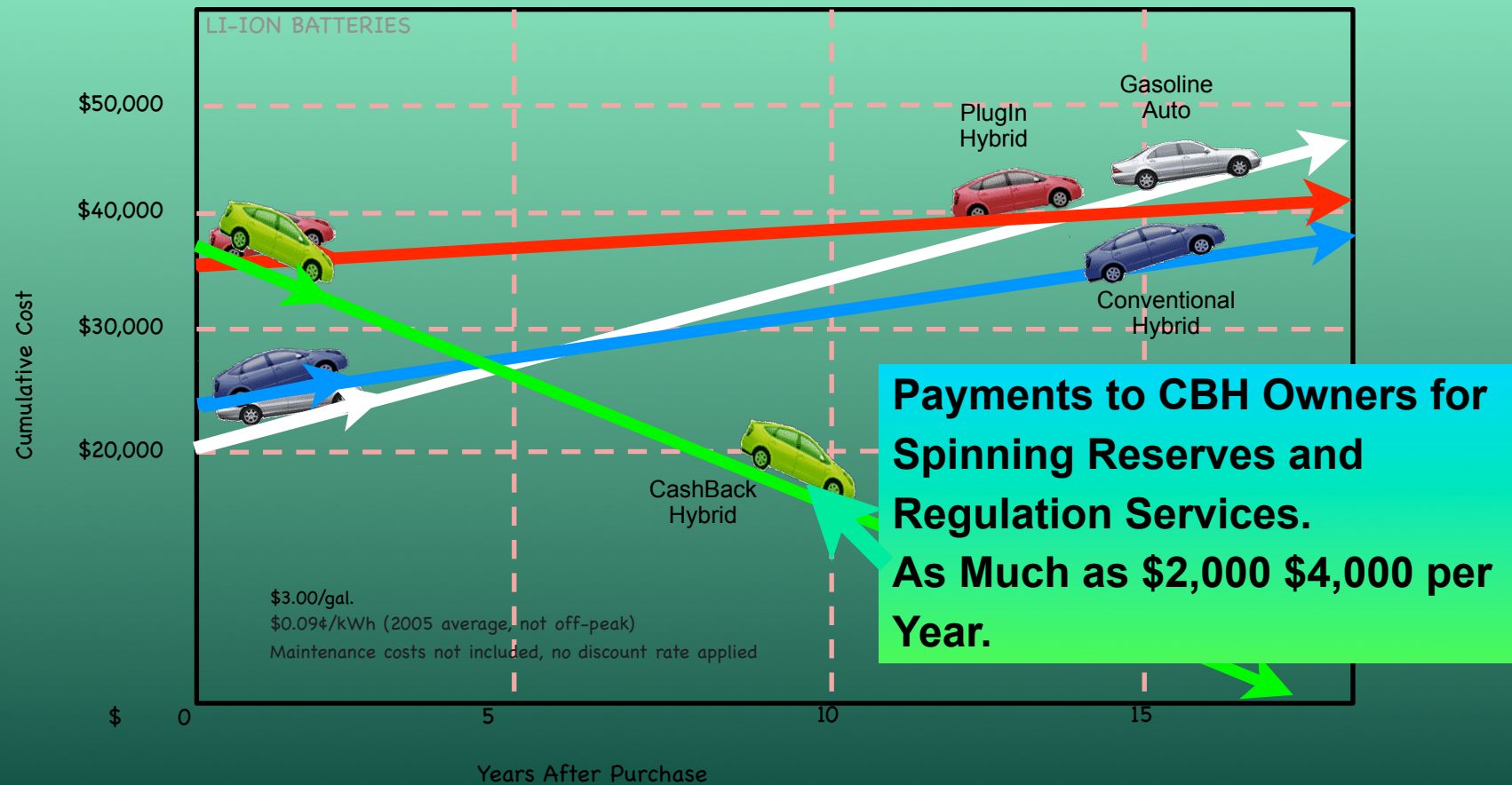
- ★ No New Investment....Use Scarce Capital Elsewhere
- ★ Increases Revenues from Residential Customers for Additional Off-Peak Consumption
- ★ Spreads Fixed Costs of Generation, Transmission, Distribution Over More kWh – Average Fixed Costs Are Reduced

Will Consumers Pay More for CBHs? (The Compact Fluorescent Syndrome)

- **Green Image, “feel-good factor”**
- **Reduced Petroleum Use and Lower Fuel Costs**
- **Reduced Air Pollution and CO₂**
- **National Energy Security**
- **Less Maintenance**
- **Reduced Fill-Ups**
- **Convenience of Home Recharging (Off-Peak)**
- **Improved Acceleration (High Torque of Electric Motors)**
- **Tax Incentives??**

The “Cash Back” in the CBH-

Why Consumers Don’t Have to Pay More



Conclusions

★ The CASHBACK Hybrid :

- Will Save Their Owners Money on Their Total Energy Bills
- Will Cost Less Than a Conventional Gasoline Car in 5 Years or Less of Ownership (Incorporate Savings into Financing to Lower 1st Costs)
- Will Improve the Overall Efficiency of the Electric System and Save All Consumers on Their Electric Bills
- Will Reduce GHG and Urban Pollution
- Will Reduce Foreign Oil Imports
- Will Improve Electric Grid Reliability and Security