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Government Performance and Results Act (GPRA) Study

DOE Merit Review
28 February, 2008

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Argonne National Laboratory
Sponsored by Lee Slezak

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

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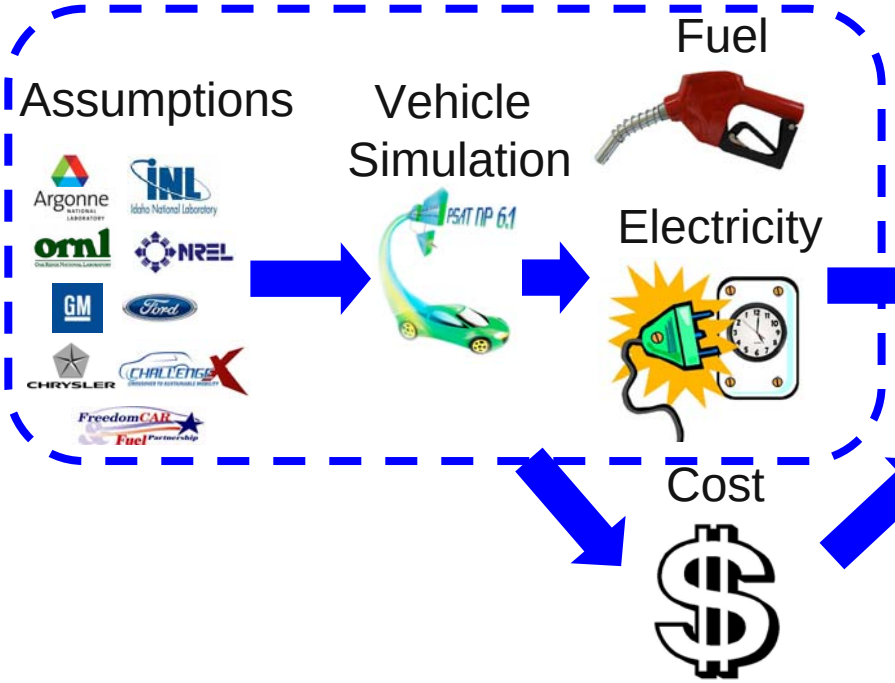
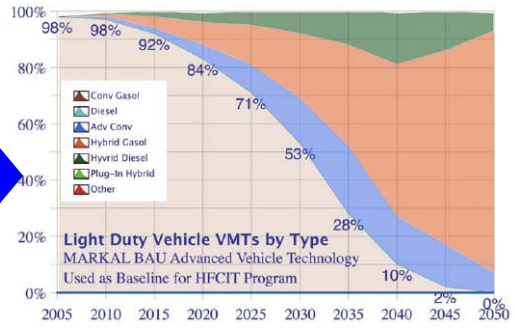
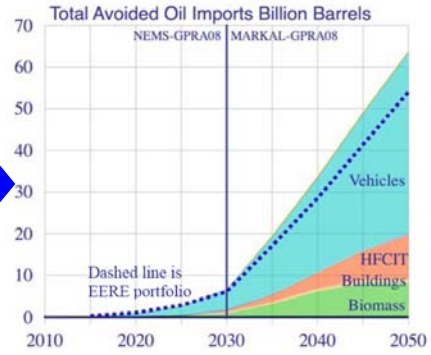
Evaluate Vehicle Fuel Economy of Advanced Technologies

- Developed as an input to the Government Performance and Results Act (GPRA) evaluates the amount of fuel saved due to the introduction of new technologies.
- Used to evaluate cost/benefit of DOE sponsored projects
- $300K / year budget - $170K spent to date





Market Penetration



Fuel Saved

Large Number of Vehicles…

Vehicle Classes

⊗

Timeframes

Current

2010

2015

2030

2045

⊗

Powertrain Configurations

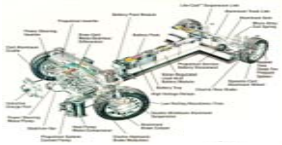
Conventional

ICE HEV

PHEV

Fuel Cell

Electric



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Fuels

Gasoline

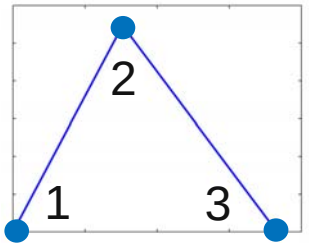
Diesel

H_2

⊗

Risk Analysis

Triangular Uncertainty



1 = 10%
2 = 50%
3 = 90%

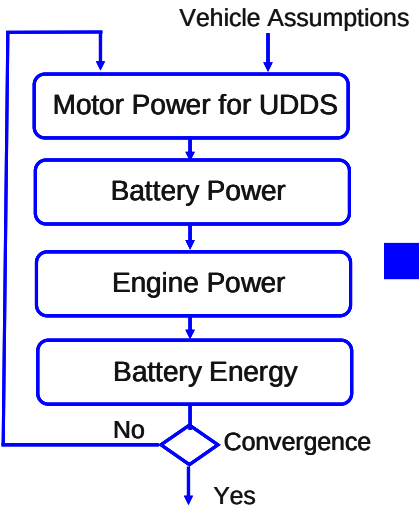
> 700 Vehicles

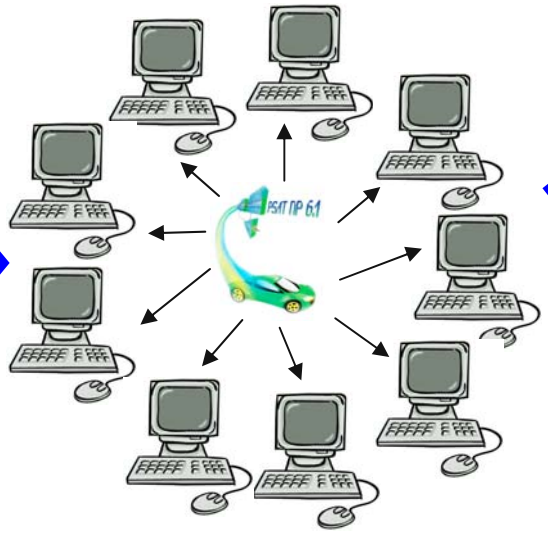
… Requires Development of Process

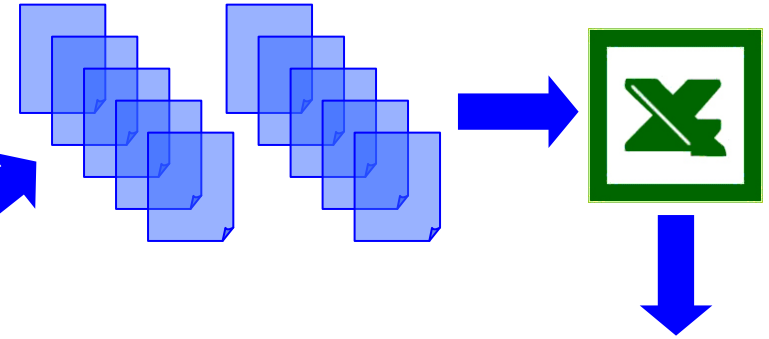
Vehicles Automatically Sized

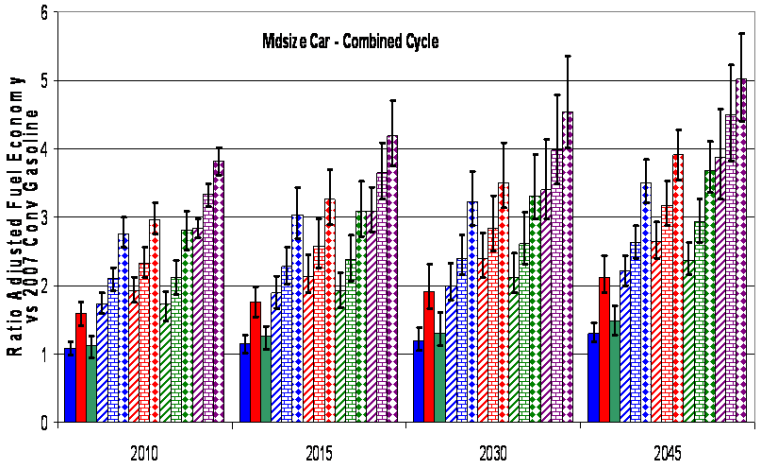
Distributed Computing

Automated Post-processing







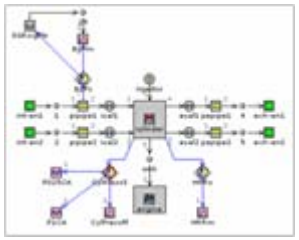


Future GPRA Studies Will Require Increased Complexity

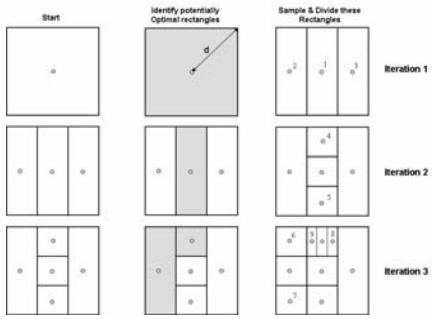
New Vehicle Classes

New Fuels

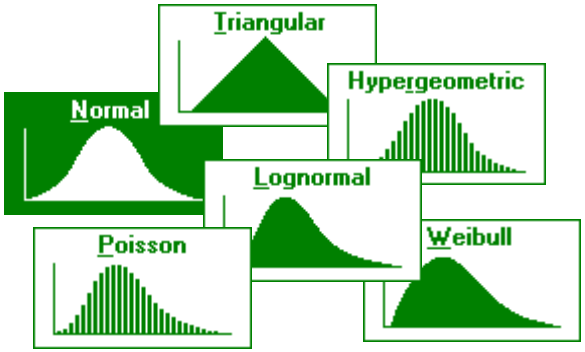
Detailed models required to represent future technologies



Use of optimization tool for component sizing and control strategy tuning



Monte-Carlo Risk Analysis



New Powertrain Configurations

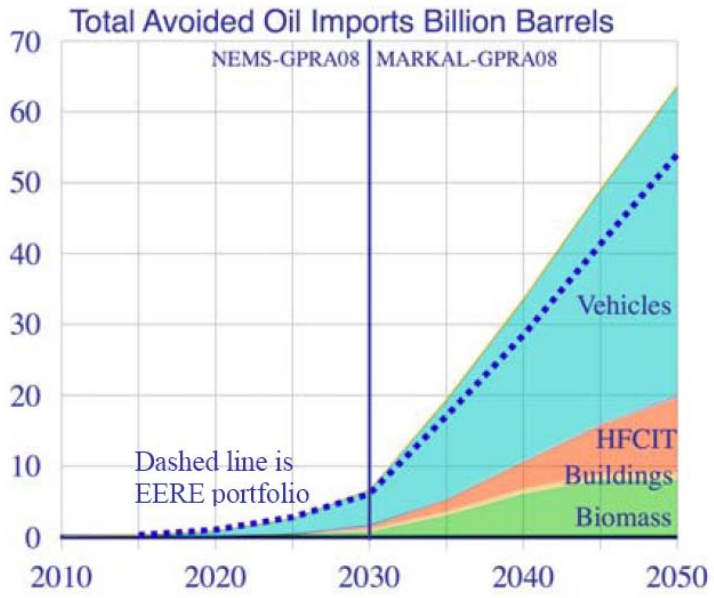
New Vehicle Test Procedures

$$City\ FE = 0.905 \times \frac{1}{Start\ FC + Running\ FC}\ , \text{where}$$

$$StartFC\ (gallons\ per\ mile) = 0.33 \times \left(\frac{(0.76 \times StartFuel_{75}) + (0.24 \times StartFuel_{20})}{4.1} \right)$$

PSAT Will Continue to Evaluate the Vehicle Technologies Program Benefits

- Generate fuel economy estimation of advanced component and powertrain configurations for several timeframes
- Address uncertainty of each assumption
- Results used to support other DOE studies (e.g. MultiPath)



Results from GPRA 2008 DOE Report

References

http://www1.eere.energy.gov/ba/pba/2008_benefits.html