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# Government Performance and Results Act (GPRA) Study

DOE Merit Review  
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U.S. Department  
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**U.S. Department of Energy**

**Energy Efficiency and Renewable Energy**

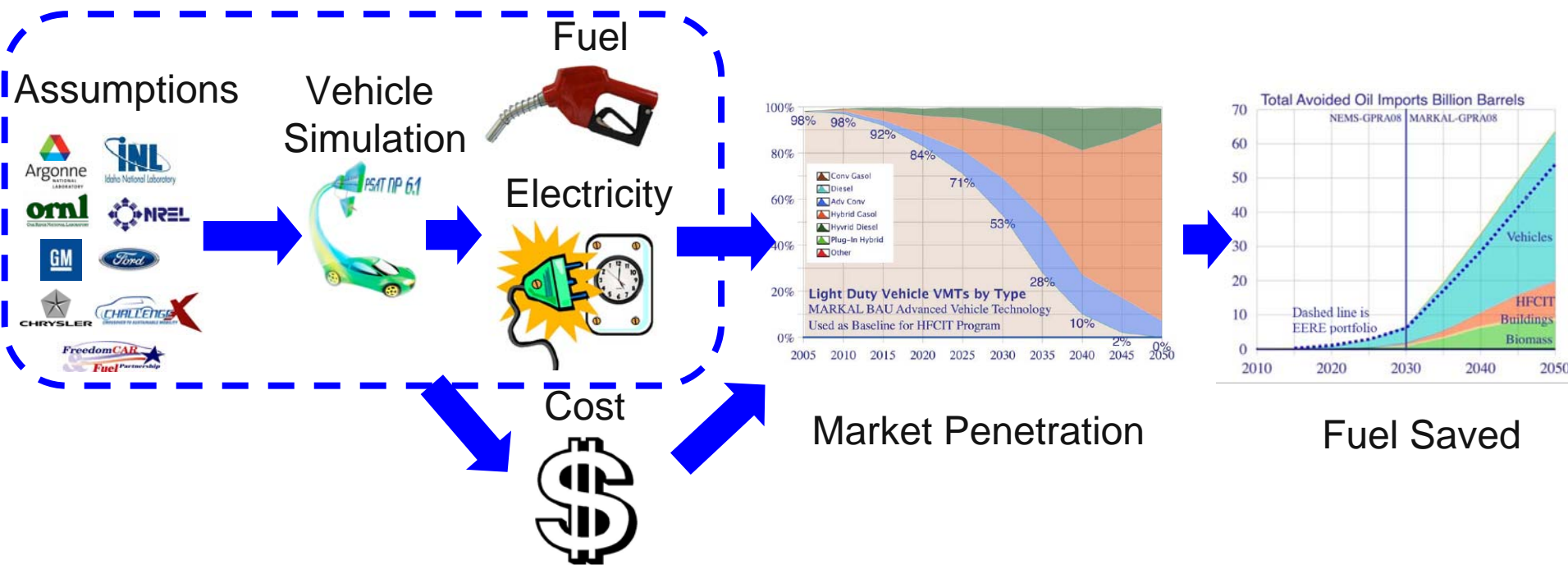
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

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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



# Large Number of Vehicles...

Vehicle Classes



Timeframes

Current

2010

2015

2030

2045

Powertrain Configurations

Conventional



ICE HEV



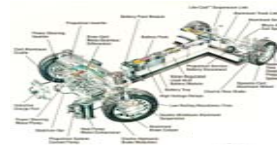
PHEV



Fuel Cell



Electric



Fuels

Gasoline



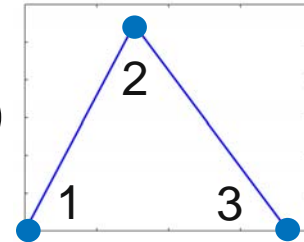
Diesel



H<sub>2</sub>

Risk Analysis

Triangular Uncertainty



1 = 10%

2 = 50%

3 = 90%

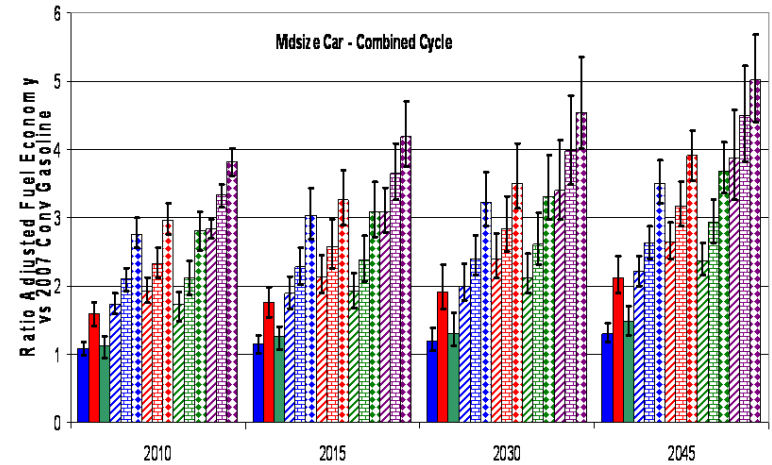
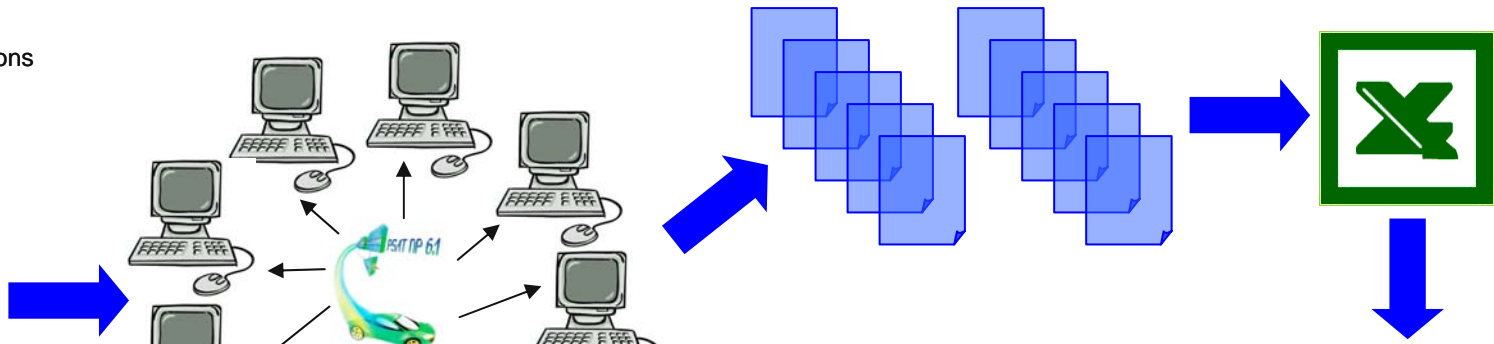
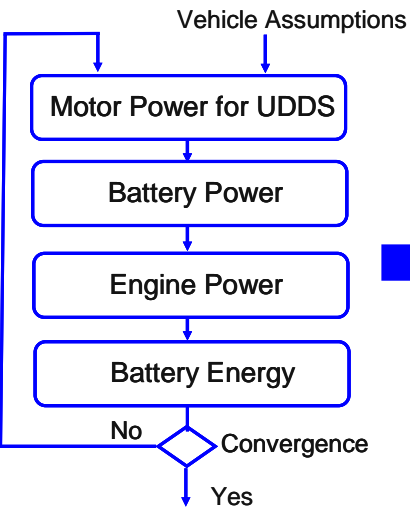
> 700 Vehicles

# ... Requires Development of Process

Vehicles Automatically Sized

Distributed Computing

Automated Post-processing



# Future GPRA Studies Will Require Increased Complexity

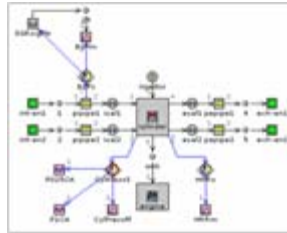
New Vehicle Classes



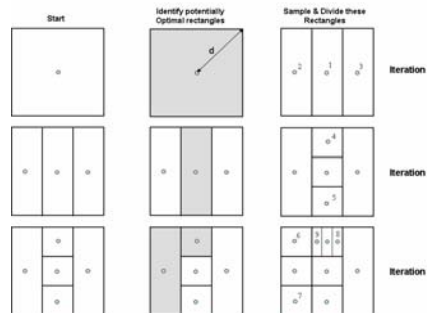
New Fuels



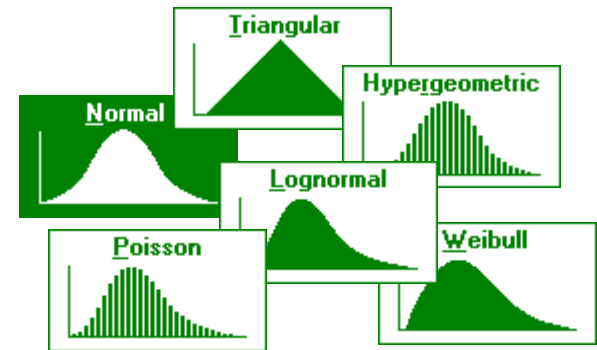
Detailed models required to represent future technologies



Use of optimization tool for component sizing and control strategy tuning



Monte-Carlo Risk Analysis



New Powertrain Configurations



New Vehicle Test Procedures

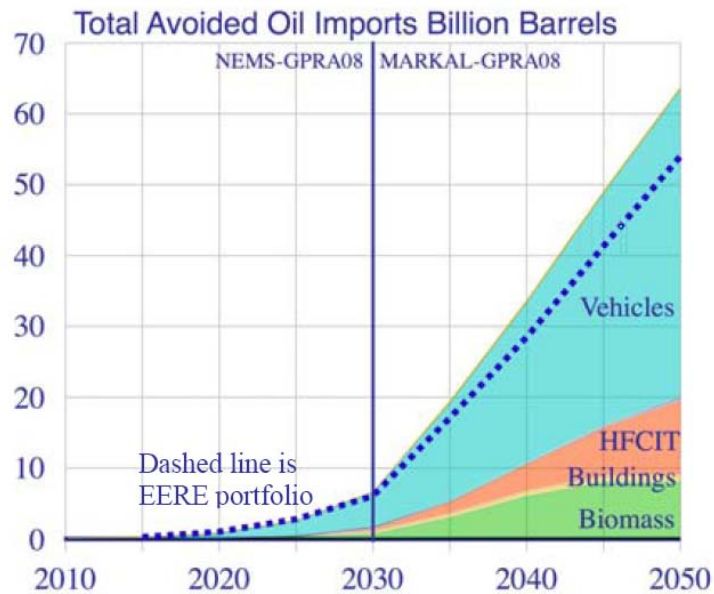


$$\text{City FE} = 0.905 \times \frac{1}{\text{Start FC} + \text{Running FC}}, \text{ where}$$

$$\text{StartFC (gallons per mile)} = 0.33 \times \left( \frac{(0.76 \times \text{StartFuel}_{15}) + (0.24 \times \text{StartFuel}_{20})}{4.1} \right)$$

# 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](http://www1.eere.energy.gov/ba/pba/2008_benefits.html)

