New Jersey Electric Vehicle Infrastructure Stakeholder Group Meeting #4

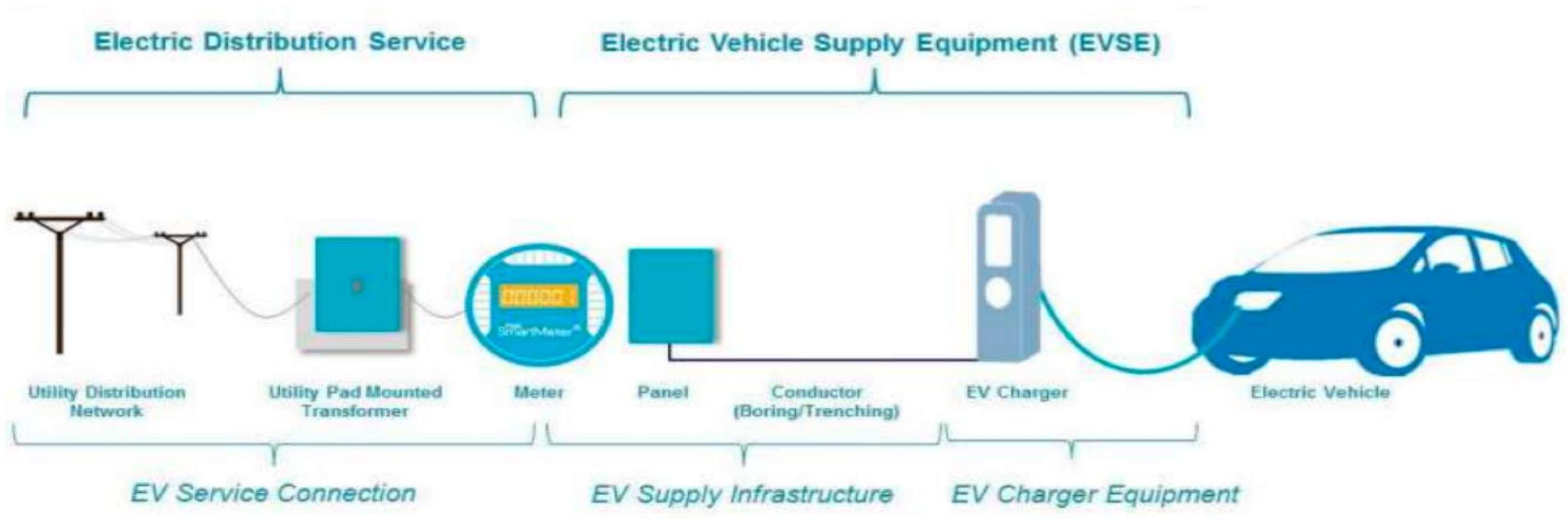
Mike Winka

New Jersey Board of Public Utilities

Office of Policy and Planning

January 22, 2018

TASK 1.1
WHAT ARE THE BOUNDARY CONDITIONS



Except in the Energy efficiency Analysis

EV vs ICE Wells to wheels

Not emissions reductions or jobs or reduced health impacts

What is the Definition for Energy Efficiency EE

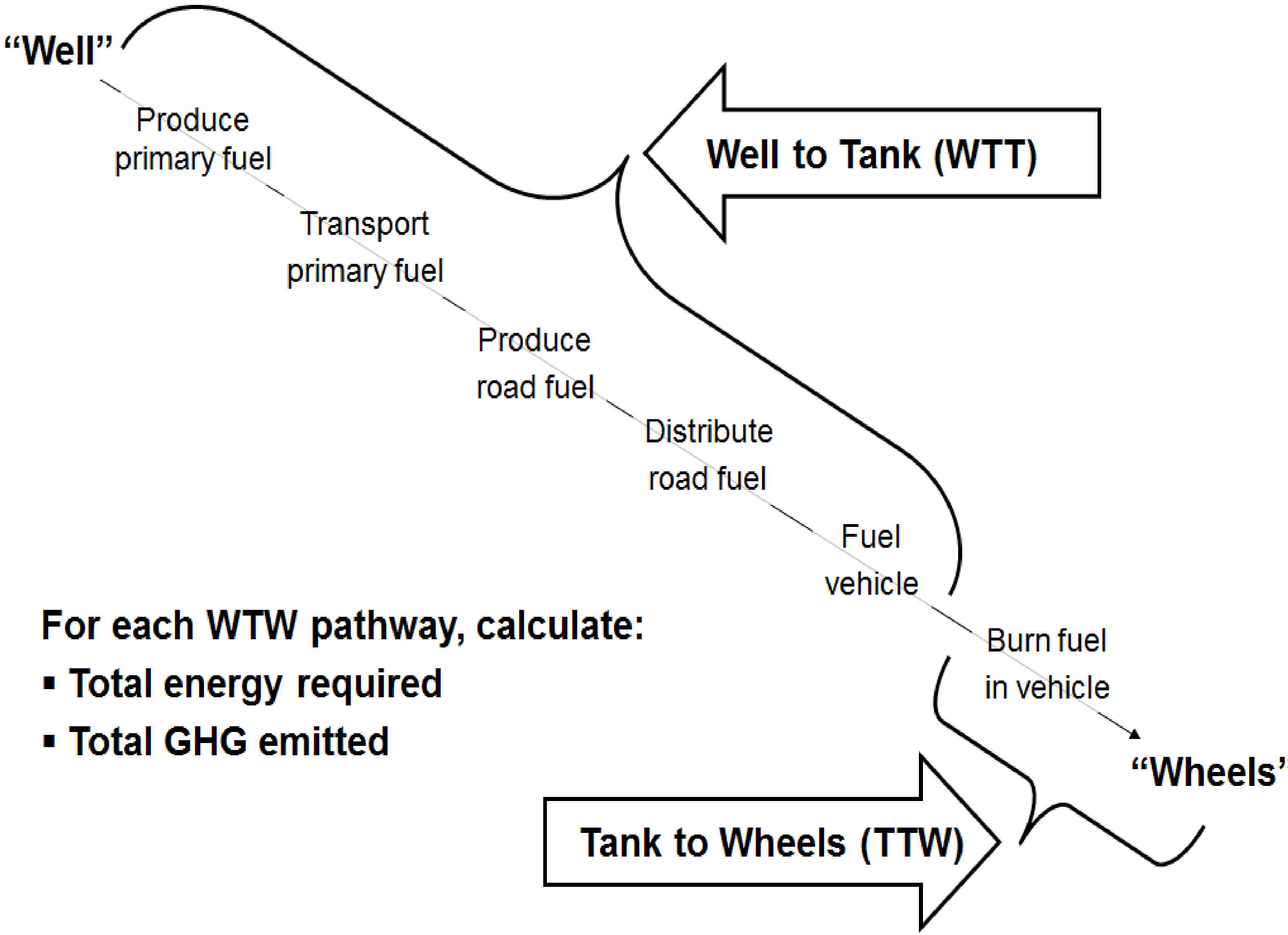
There is not a “standard” definition for energy efficiency that is used across all sectors and technologies

According to USDOE - Lawrence Berkeley Labs - Energy efficiency is "using less energy to provide the same service“.

According to the International Energy Association - Energy efficiency is to delivers more services for the same energy input, or the same services for less energy input.

According to US EIA an increase in energy efficiency is when either energy inputs are reduced for a given level of service, or there are increased or enhanced services for a given amount of energy inputs.

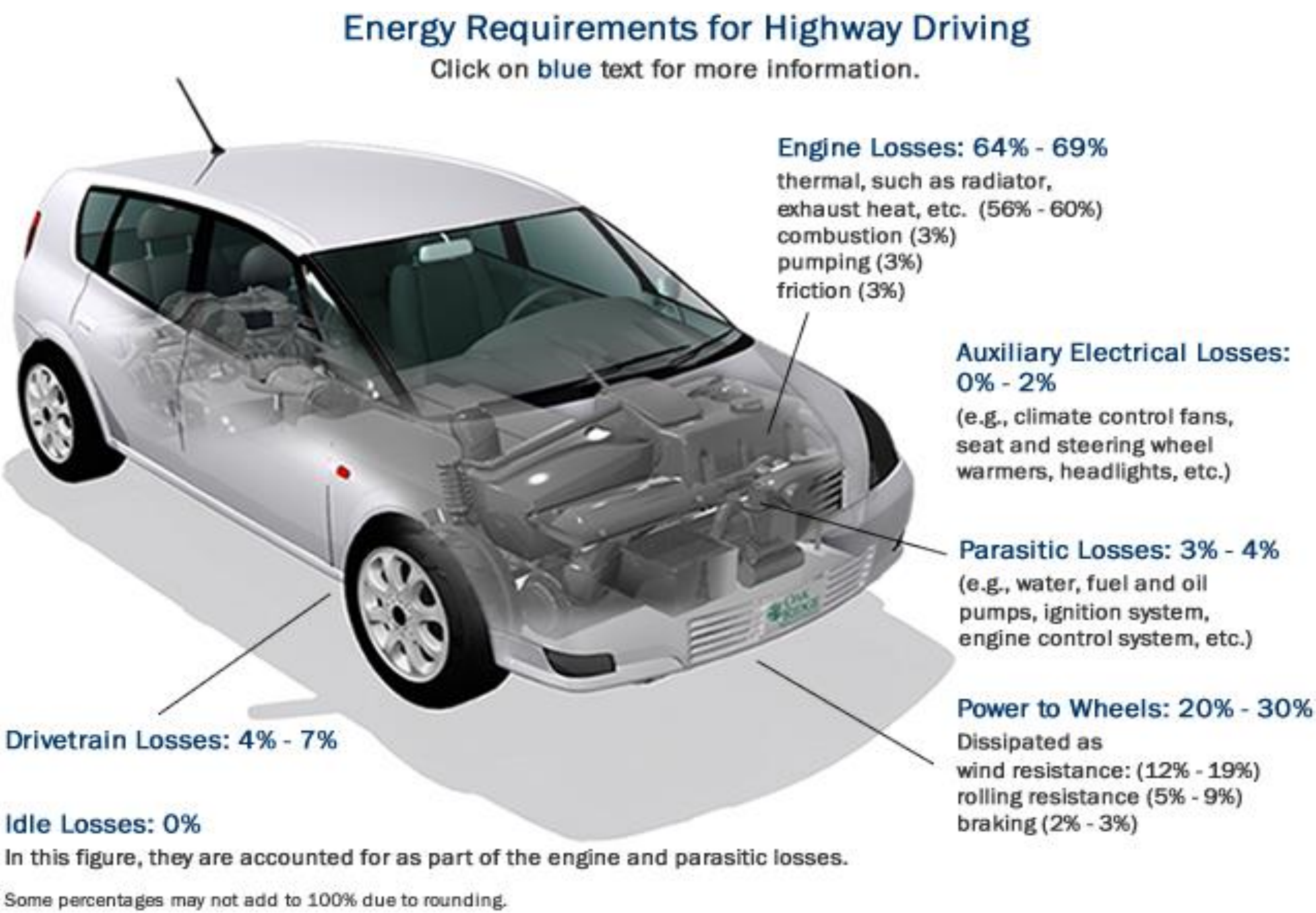
"Take the Stairs--Be More Energy Efficient"



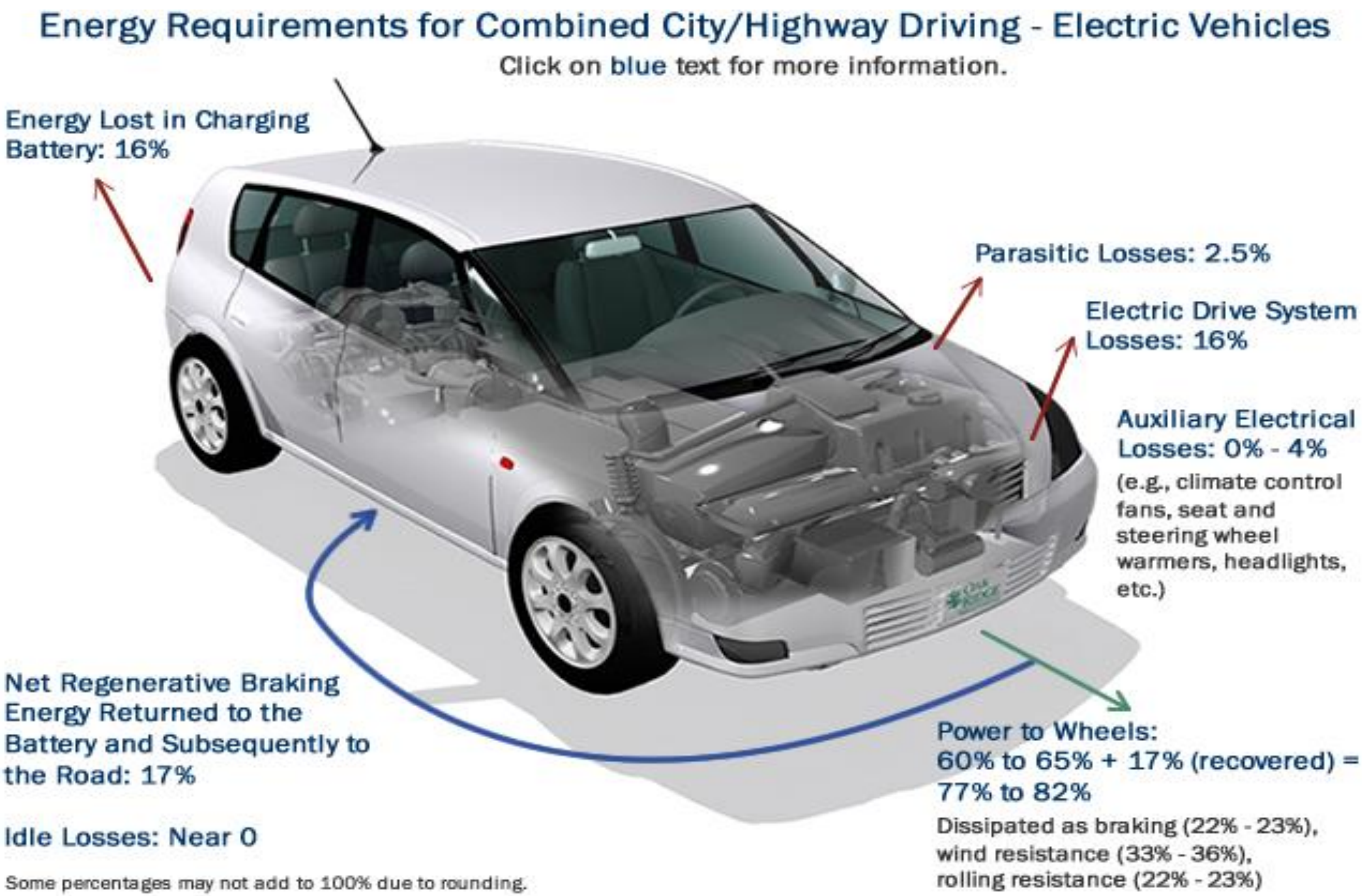
For each WTW pathway, calculate:

- **Total energy required**
- **Total GHG emitted**

www.Fuel Economy.com by USDOE & USEPA
Where the Energy Goes: Gasoline Vehicles



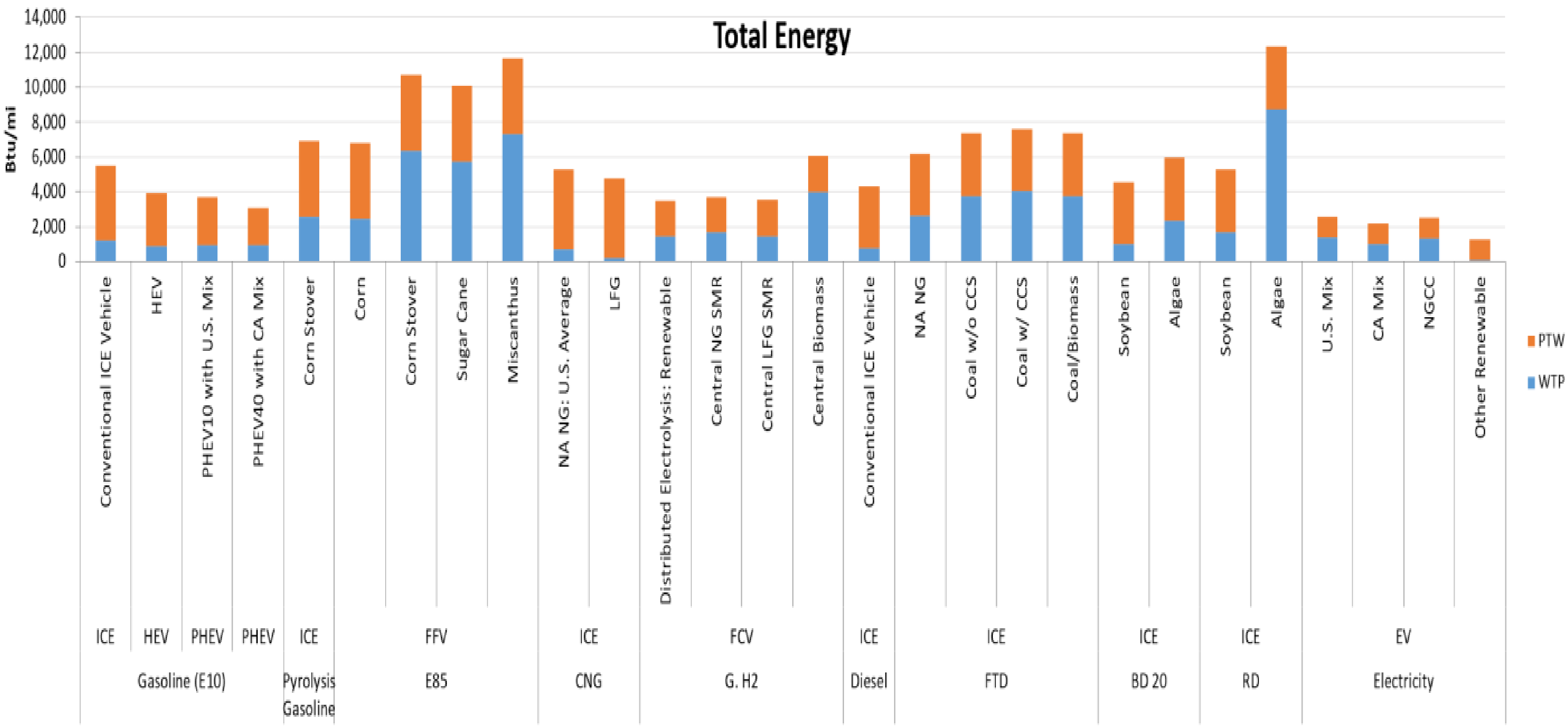
www.Fuel Economy.com by USDOE & USEPA
Where the Energy Goes: Electric Vehicles



RAP REPORT TTW ENERGY EFFICIENCY

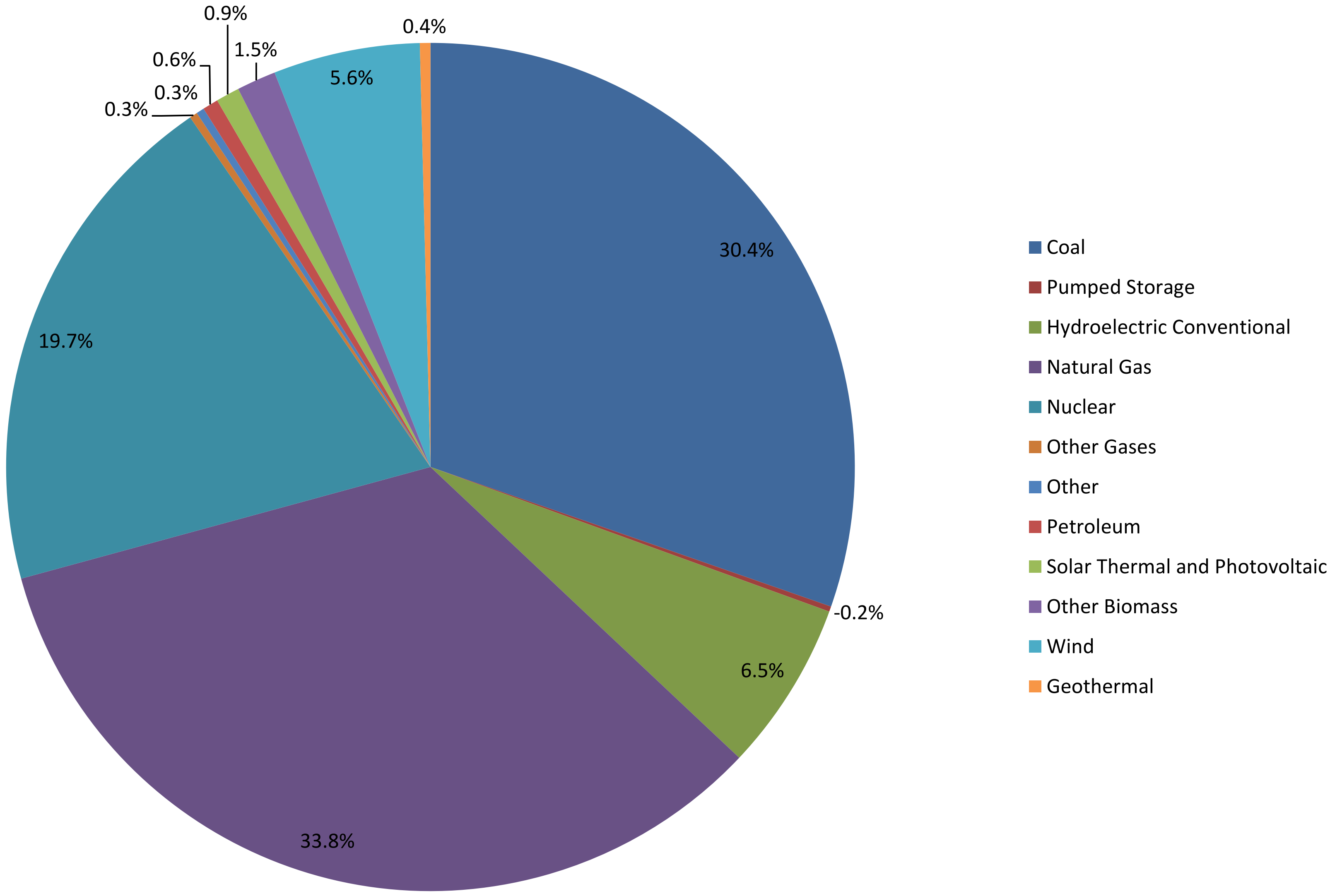
USDOE / USEPA Fuel Economy- the overall energy efficiency of ICE vehicles range from 12 to 30% while EV energy efficiency range from 72 to 94%. The range of efficiency depends driving condition, vehicle load, vehicle size and the person behind the wheel but in the overall energy efficiency evaluation EV and clear more efficiency than ICE vehicles.

GREET MODEL RESULTS – ENERGY USAGE
WELL TO PUMP AND PUMP TO WHEEL – FULL WELLS TO WHEEL

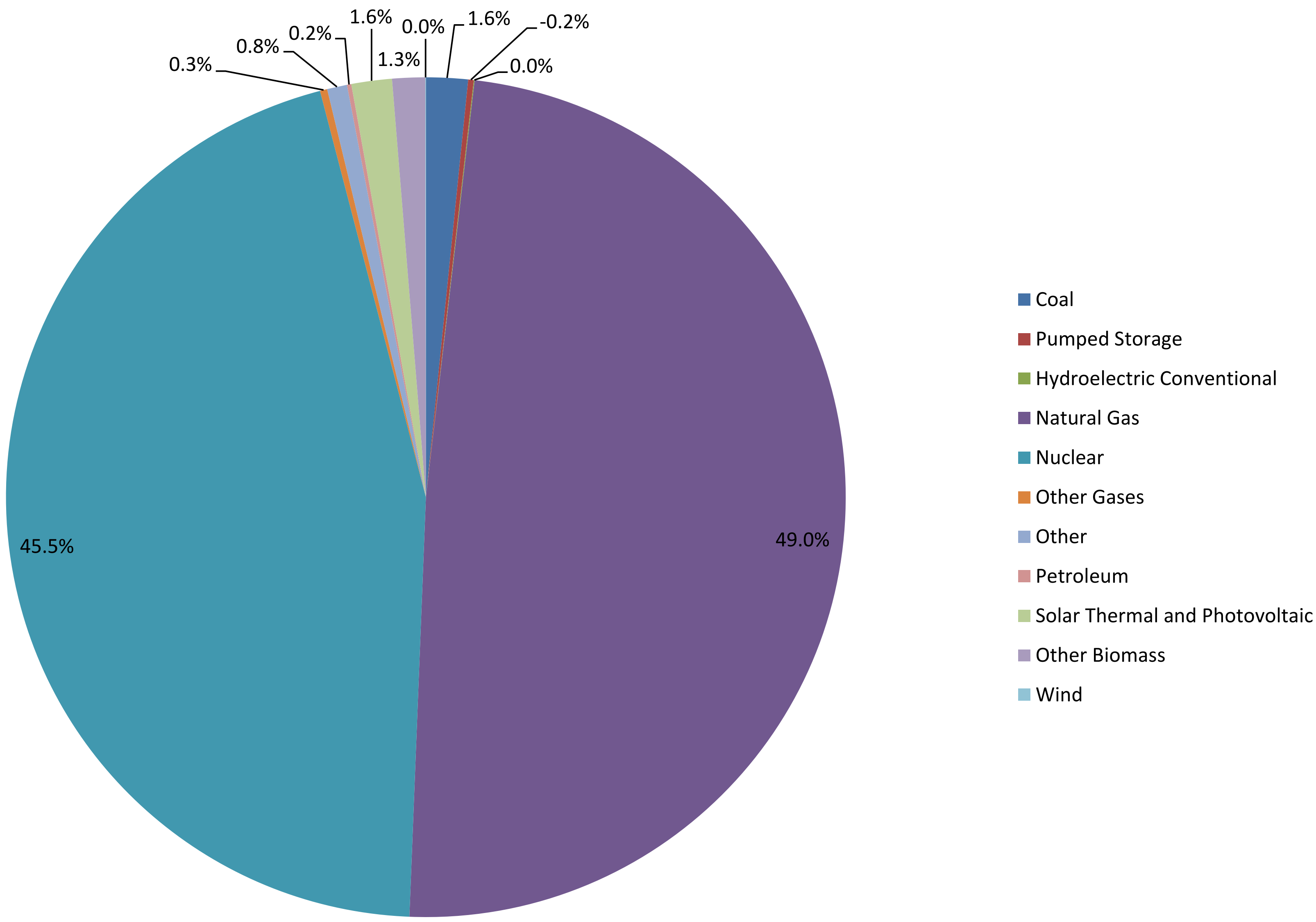


(see https://greet.es.anl.gov/publication-c2g-2016-report and https://greet.es.anl.gov/index.php?content=greetdotnet)

US Electric Generation by Fuel Source Annual Average 2016



New Jersey Electric Generation by fuel source Annual avg 11/16-10/17



Heat Rate by Prime Mover and Energy Source per EIA

		Eff
Coal Avg	10,045 Btu/kWh	34%
Natural gas CC	7,652 Btu/kWh	45%
Natural gas GT	9,179 Btu/kWh	37%
Natural gas IC	11,214 Btu/kWh	30%
Natural gas avg	7,870 Btu/kWh	43%
Nuclear	10.459 Btu/kWh	33%
Wind		26%
Solar PV		12%
Hydro		90%

TASK 1.1 QUESTIONS

1 USDOE – AFDC Findings

1.1 Are the analysis and findings of the USDOE AFDC and ANL accurate and supported by other independent analysis? If so please cite why? If not please cite why not?

1.2 Should the NJBPU run the ARL GREET model for several different types of EV, ICE vehicles and other alternate fuel vehicles under different New Jersey driving conditions for various New Jersey electric generation mixes? Or not?

2 of 2

TASK 1.1 QUESTIONS

2 Energy Efficiency

2.1 Would an EV fueled by electricity from the current New Jersey electric generation sources be more efficient, less efficient or the same level of energy efficiency than the EVs noted in the ANL analysis? If so why? If not why not?

2.2 Would an EV fueled by a New Jersey electric generation mix meet the definition of conserving energy in the definition for energy efficiency as set forth at N.J.S.A. 48:3-98.1? If so why? If not why not?

2.3 Would an EV fueled by a New Jersey electric generation mix meet the definition of using less electricity or natural gas in the definition for energy efficiency as set forth at N.J.S.A. 48:3-98.1? If so why? If not why not?

TASK 1.1 QUESTIONS ELECTRIC INFRASTRUCTURE

3.0 Electric Systems Impacts

3.1 What could be the expected percentage increase in electric energy attributable to EVs result in by 2025, 2030 and 2050?

3.2 What could be the expected impacts and costs on generation, transmission and distribution systems 2025, 2030 and 2050?

TASK 1.1 QUESTIONS

4.0 Grid Integration, Demand Response and Vehicle to Grid (V2G)

4.1 What is the state of the technology that could allow the EV to be utilized as a demand response technology? What is the availability of the technology now and how/when will that availability evolve?

4.2 V2G: Is the two way communication of the EV to the grid a commercially available technology or not? If so why? If not why not? What is the availability of the technology now and how/when will that availability evolve?

4.3 Could the EV electric customer access the energy markets directly, through an aggregator or Network Operations Center (NOC), through the electric utility or blockchain?

4.4 If the EV could be utilized as a demand response technology in a two way communication with the grid, distribution and/or transmission, would the EV meet the definition of demand side management in N.J.S.A. 48:3-51?

TASK 1.1 QUESTIONS

4.0 Grid Integration, Demand Response and Vehicle to Grid (V2G)

4.5 What are the types and level of benefits to the grid of EVs in a demand response program and what would be the overall costs to develop and implement this program?

4.5 If the EV is not using less electricity or natural gas per the definition for energy efficiency as set forth at N.J.S.A. 48:3-98.1 and the EV could be utilized as demand response for the EV to meet the definition of demand side management in N.J.S.A. 48:3-51, what could be the expected impacts on the grid for increased generation capacity by 2025, 2030 and 2050? What could be the level of costs and over what timeframe?

4.6 If there is an increase in electric energy usage from the increase in EV but not a generation capacity increase because of demand response of EV what would the increase efficiency of the grid be in 2025, 2030 and 2050?

TASK 1.1 QUESTIONS

5.0 Electric Vehicle Supply Equipment (EV Charging Station) State of the Competitive Market

5.1 Is vehicle charging a fully competitive market across all market sectors? If not which market sectors are not competitive and why not? Which market sectors are competitive?

5.2 If the charging market sections are not competitive should the utilities be allowed to develop managed charging programs for the non-competitive charging market sections? If not why not?

5.3 If the charging market sections are competitive should the utilities be allowed to develop managed charging programs for the competitive charging market sections? If not why not?

5.4 If the utilities are allowed to develop managed charging programs is there a time limit or other criterion that should be imposed on this participation? If so what timeframe? Should any utility managed charging program have a sunset date?

5.5 If the utilities are allowed to develop managed charging programs what guidelines should be developed for this participation? If not why not?

TASK 1.1 QUESTIONS

6.0 Utility Role in "Charge Ready"

6.1 Should electric utilities engage in rate-based "Charge Ready" programs? What additional measures beyond Charge Ready are appropriate in non-competitive markets? Should utilities offer rebates on EV chargers or own/operate EV chargers in non-competitive markets?

7.0 Advanced Metering Infrastructure (AMI) - Smart Grid / Smart Meters

7.1 What policies should the Board establish to take advantage of AMI, Smart Grid / Smart Meters with respect to the EV market?

7.2 Would a utility managed charging program support and supplement any smart grid (SG) or automatic meter initiatives (AMI)? If not why not and what programs should be developed instead of AMI? If so what would be the level and value of the benefit to and from the AMI programs. If not describe why not and what would be the level of value in any other program?

REVIEW OF PROCESS & NEXT STEPS

NJBPU staff established a stakeholder process to solicit input on plug-in electric vehicle (EV) infrastructure.

The Board direct staff to:

Prepare a report with recommendations to accelerate EV infrastructure adoption – not EV's directly but if EV usage is increasing what Infrastructure upgrade may be needed.

Prepare and present to the Board a draft report on the issues and recommendations within 180 days.

Get policy input for final report