

# Plug-in hybrid vehicles: The alternative to the alternative



“The development of plug-in electric hybrid vehicles will enable us to wean ourselves away from gasoline for the bulk of our urban transportation needs, free us from dependency on middle east oil, and greatly improve the air quality in the cities throughout the world.”

Richard Smalley

# We all agree that it's time to *Set America Free*



## National Defense Council Foundation

*A 501(c)(3) nonprofit think tank serving US national security interests since 1978*

TRANSFER



of

WEALTH

# Terror's next target

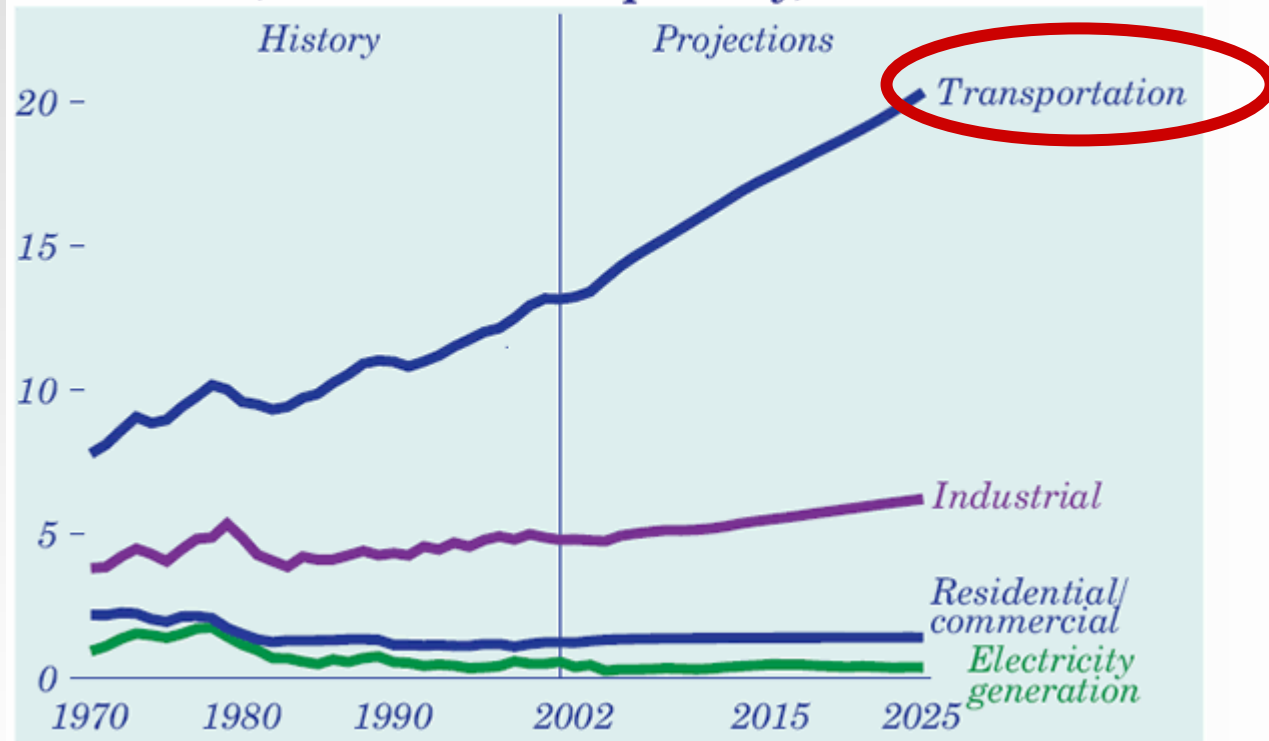
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“We call our brothers in the battlefields to direct some their great efforts towards the oil wells and pipelines. The killing of 10 American soldiers in nothing compared to the impact of the rise in oil prices on America and the disruption that it causes in the international economy. The focus must be on oil. America will collapse if it collapses economically.” *jihadist website, October 2004*

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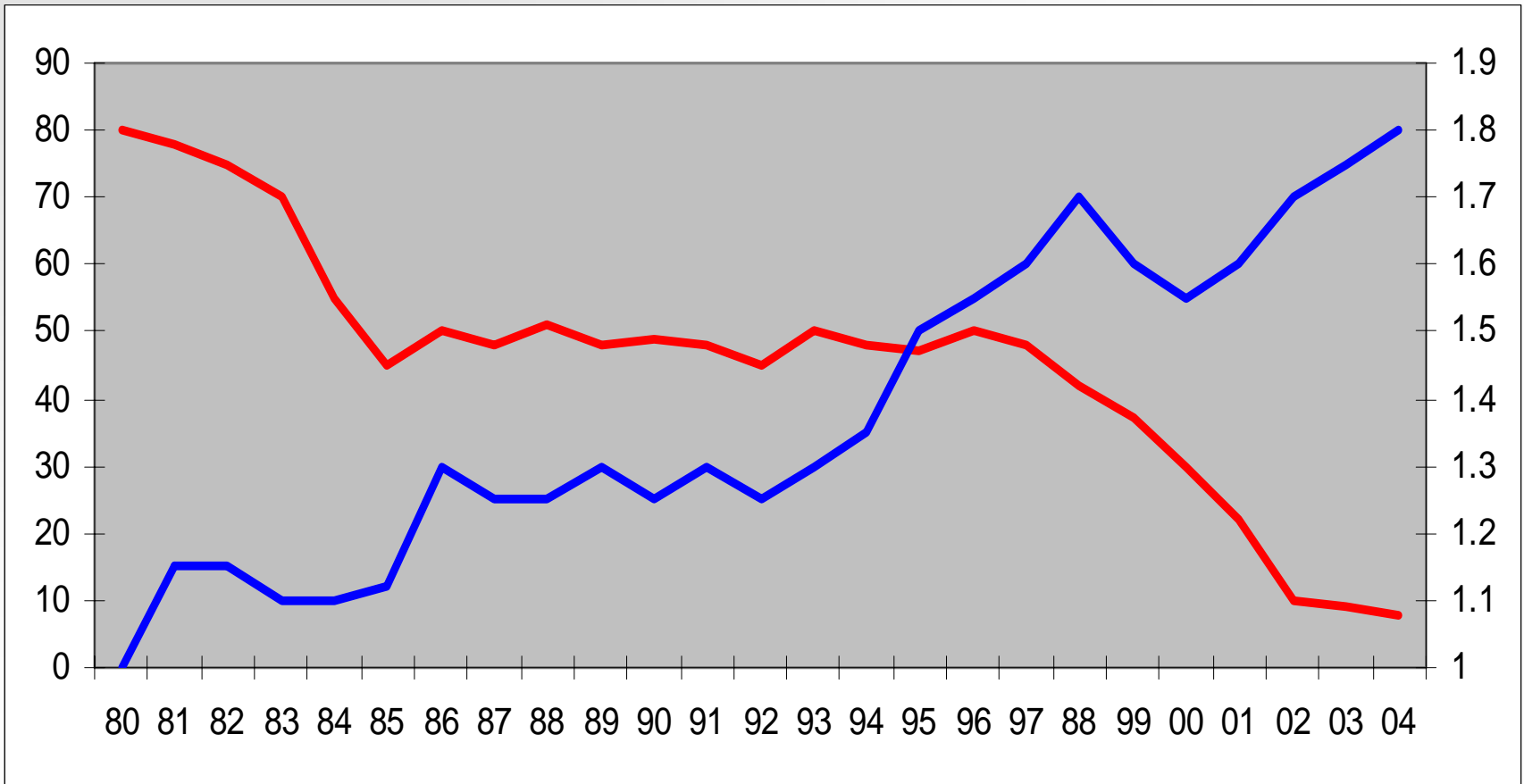
**Figure 102. Petroleum consumption by sector, 1970-2025 (million barrels per day)**



Energy Information Administration, Annual Energy Review 2002, DOE/EIA-0384(2002) (Washington, DC, October 2003).

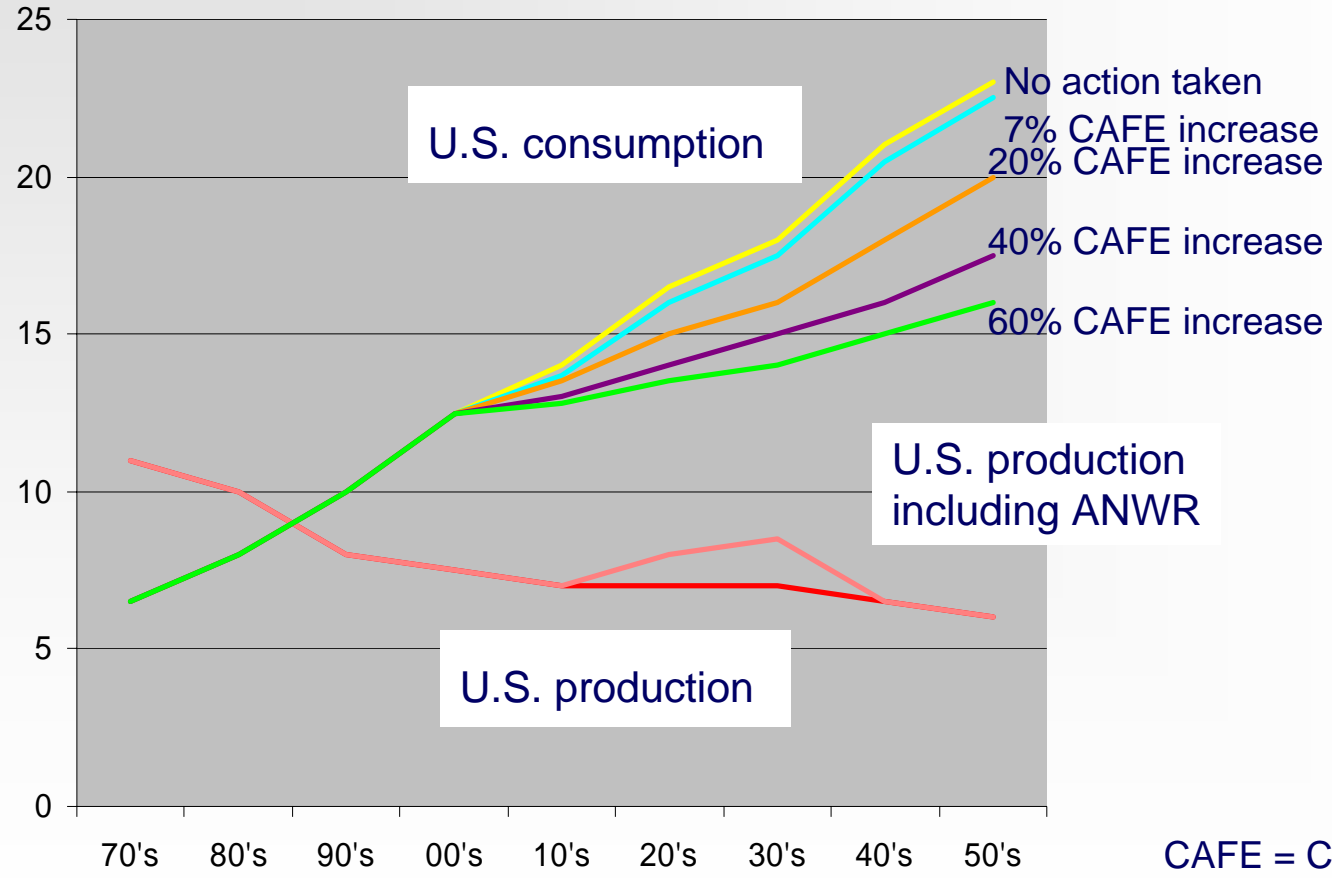


In the past 25 years Brazil's fuel consumption grew by 80% yet the country's oil dependence dropped from 80% to 10%.



# The Oil Gap in the Transportation Sector

Mil barrels/ day



CAFE = Corporate Average Fuel Efficiency = average mpg

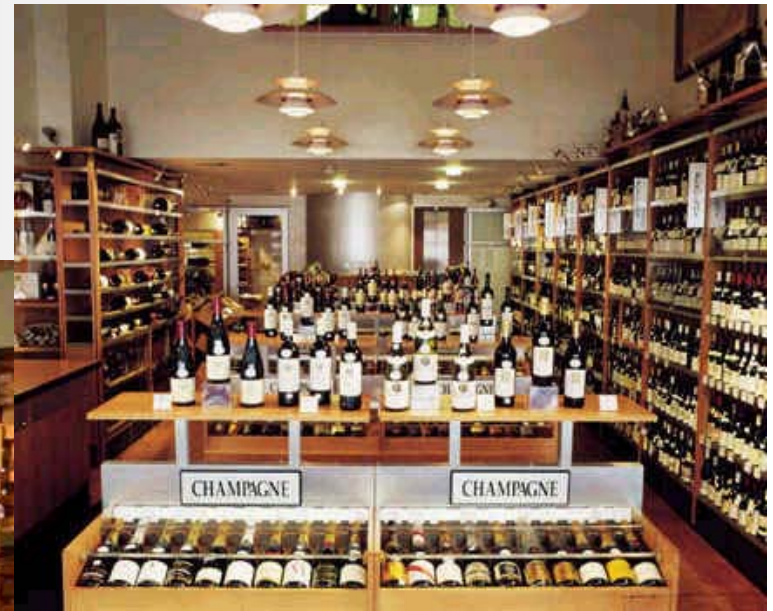


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**The problem is miles per gallon  
of GASOLINE  
not miles per BTU**

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We have choice in every aspect of our lives...

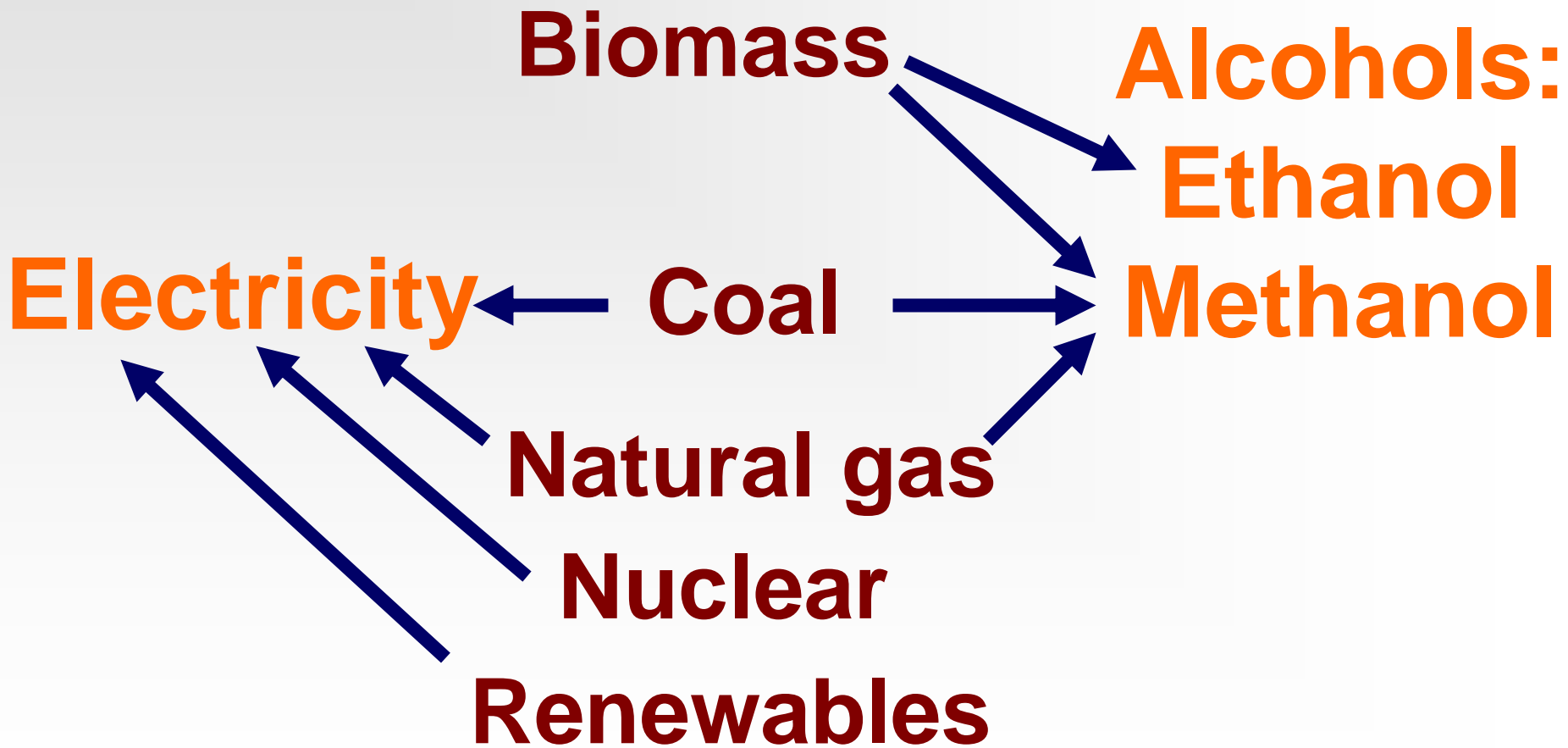


...but not when it comes to transportation fuel



# Energy Security through fuel choice



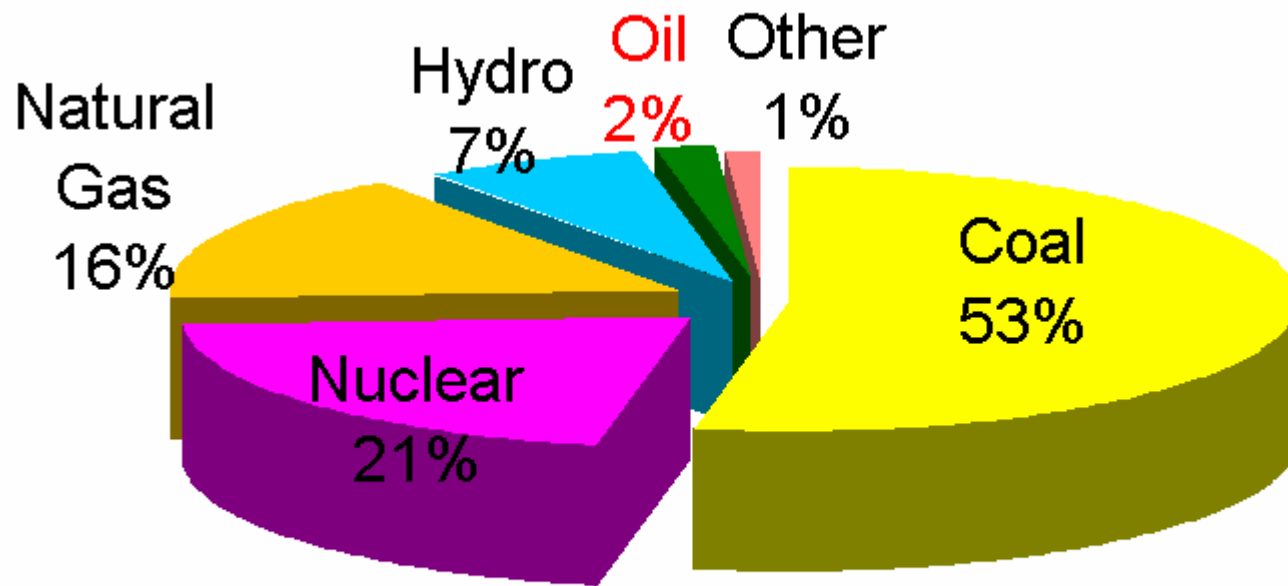


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Electricity is a domestically  
generated transportation fuel!



# Electricity sources

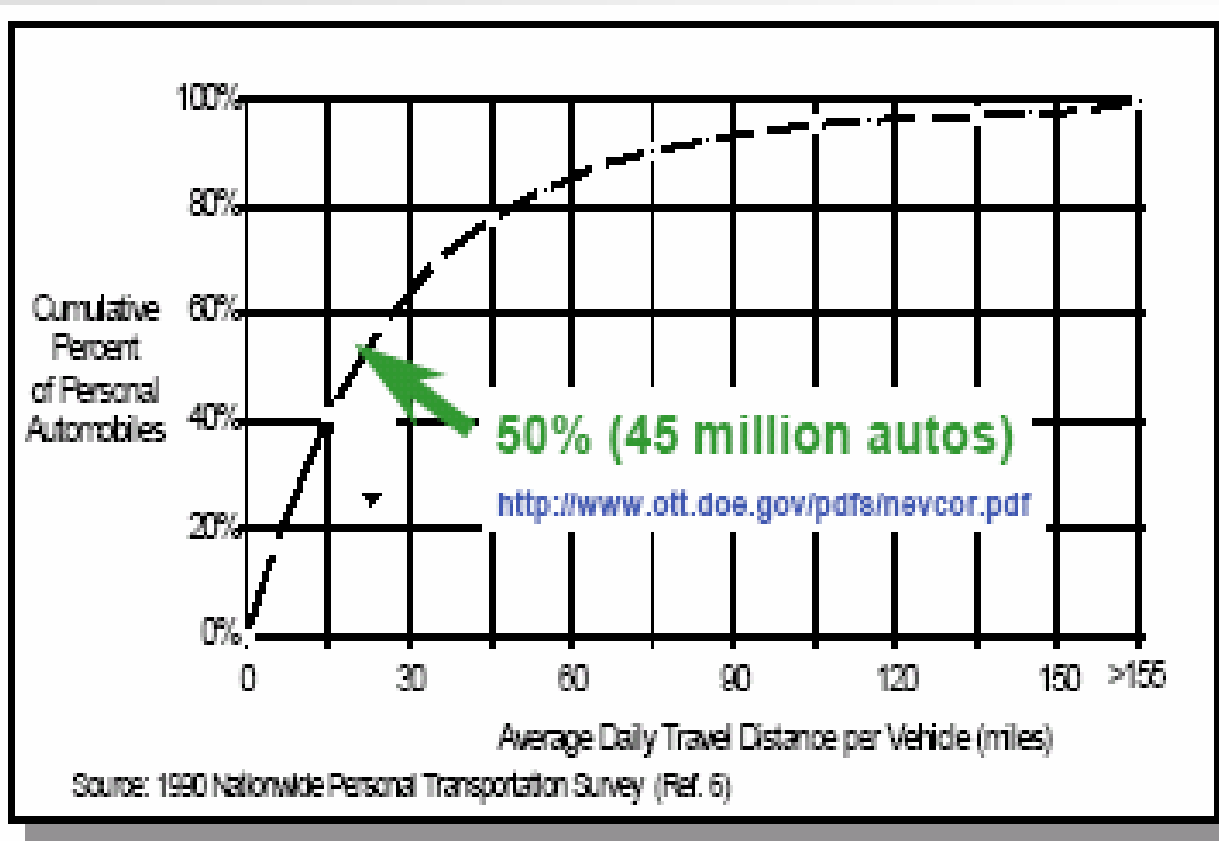




# Plug-in Hybrid Electric Vehicles (PHEV)

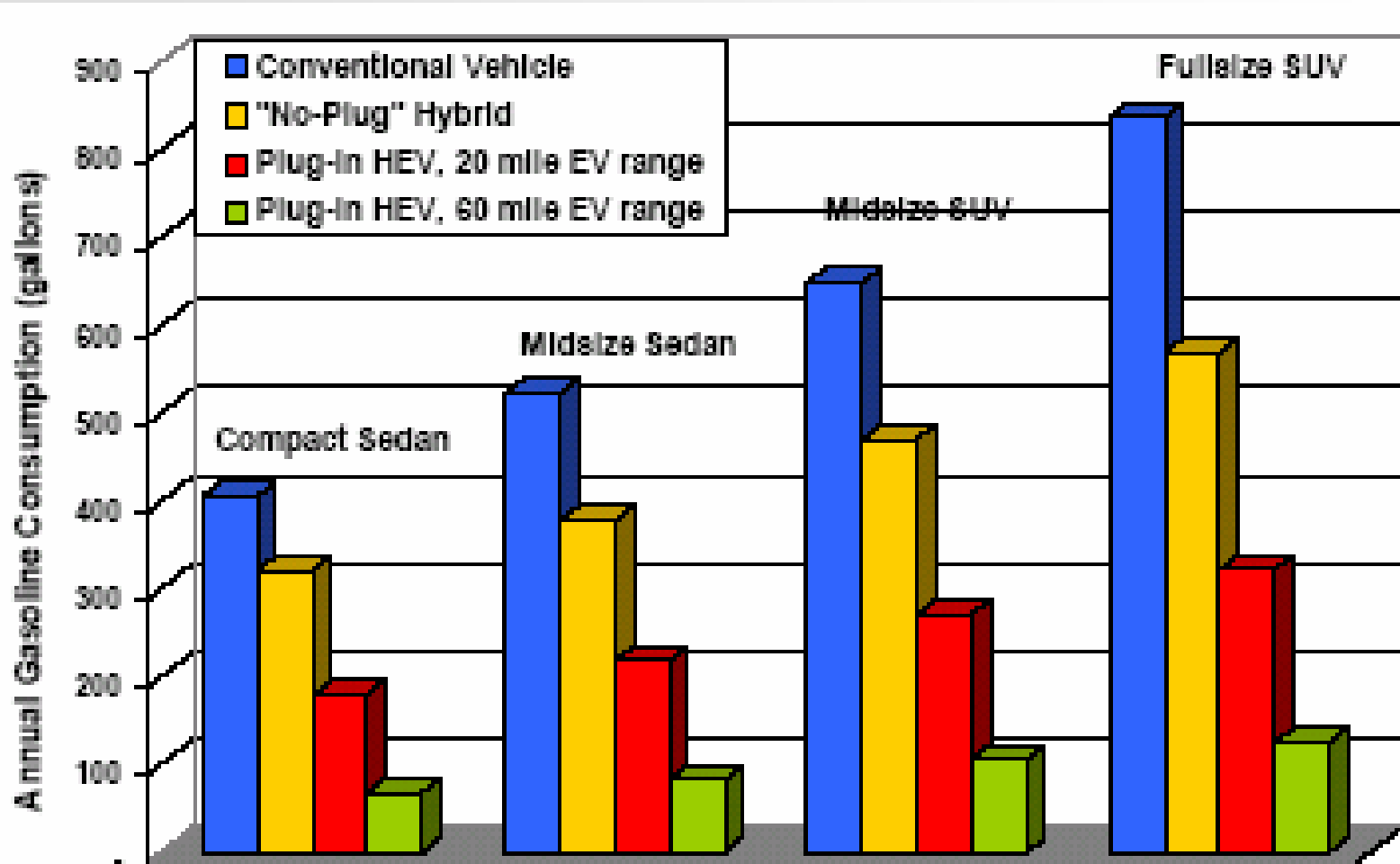
- Think of them as electric vehicles with an auxiliary fuel tank, or “souped-up hybrids.”
- All electric range for a portion of the daily driving cycle.
- Night time charging means significantly lower fuel cost.
- When the charge is used up, the car automatically keeps running on the fuel in the fuel tank.
- Performance equal to that of current vehicles.

# Half of all cars on the road travel a total of 20 miles per day or less



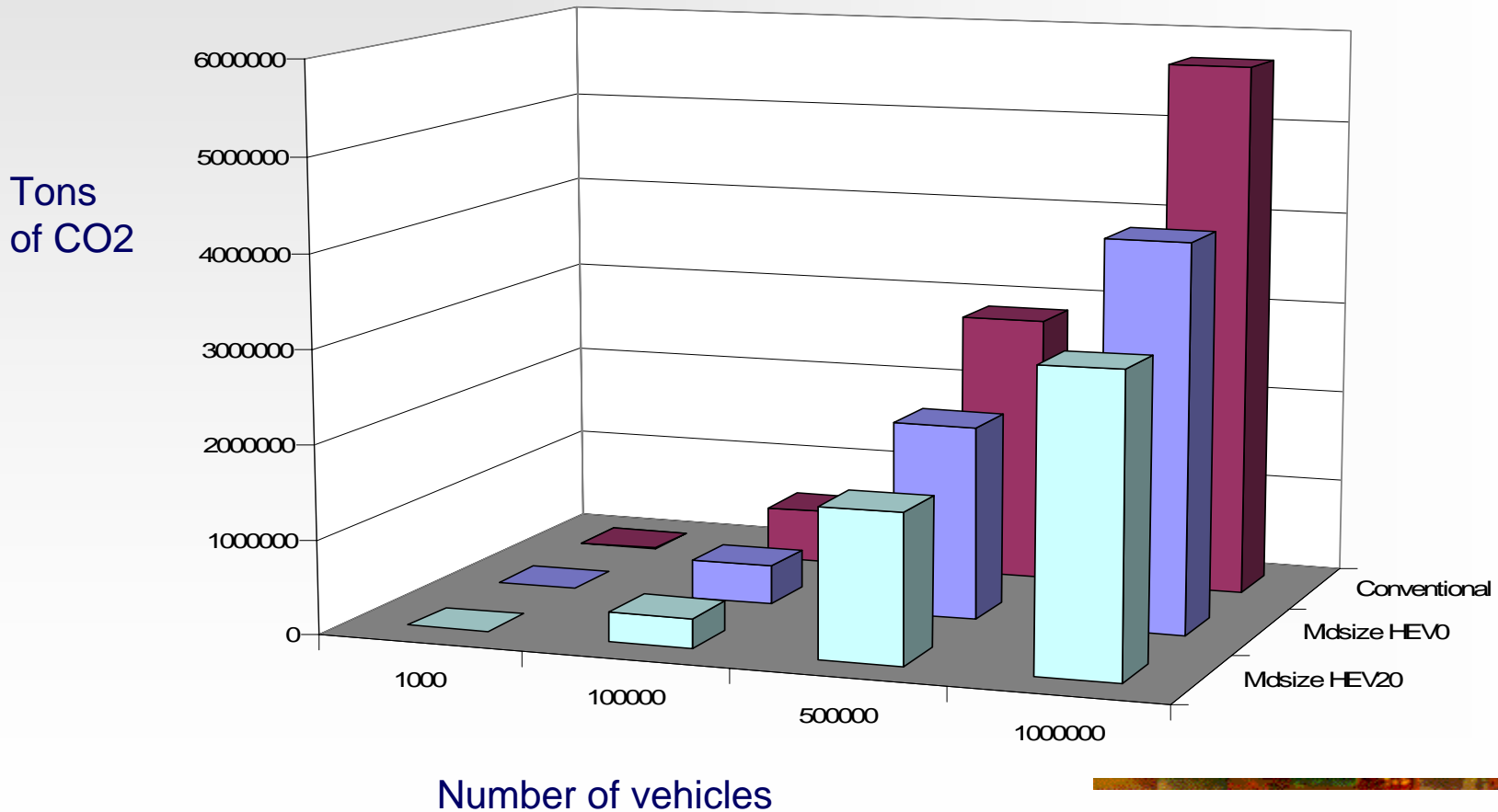
Depending on the battery size, the first 20-60 miles of driving in a PHEV would be essentially all electric

# Greatly reduced annual gasoline consumption



**Compare the fuel consumption of a PHEV full size SUV to that of a conventional compact sedan!**

# PHEV vs. Hybrid and Conventional Tons of CO<sub>2</sub> Produced



# PHEV benefits

- Cheap fuel: 3 cents/mile vs. 10 cents for gasoline.
- Lower maintenance costs.
- No need for infrastructure change.
- Shifting from imported to domestic fuel.
- Allowing utilities to enter the transportation fuel market.
- The only car that gets cleaner as its gets older.

# Market penetration



# Electricity vs. Hydrogen

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End-use technologies are long-term.

Hydrogen storage is difficult.

Too many conversions.

Safety.

National infrastructure is expensive.

**PLUG-IN HYBRIDS: THE LOGICAL CHOICE**

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# A multi fuel vehicle

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**Methanol**

**Ethanol**

**Gasoline**

**Electricity**



# **Bottom line: System of Systems**

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**PHEV + FFV fueled with 80% alcohol and 20% gasoline = 400-500 miles per gallon of gasoline!**

**If by 2025, all cars on the road are hybrids and half are plug-in hybrid vehicles, U.S. oil imports would drop by 8 million barrels per day (mbd).**

**If all of these cars were also FFV, U.S. oil imports would drop by as much as 12 mbd.**

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**BIN LADEN HATES  
THIS CAR.**



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# **It's time to Set America Free**



[\*\*http://www.SetAmericaFree.org\*\*](http://www.SetAmericaFree.org)

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