Solving the Energy Resource Problem

Solving the Problem Requires an Understanding of:

- *Economic Usefulness*
- *Energy Profit Ratio*

Economic Usefulness Determinants

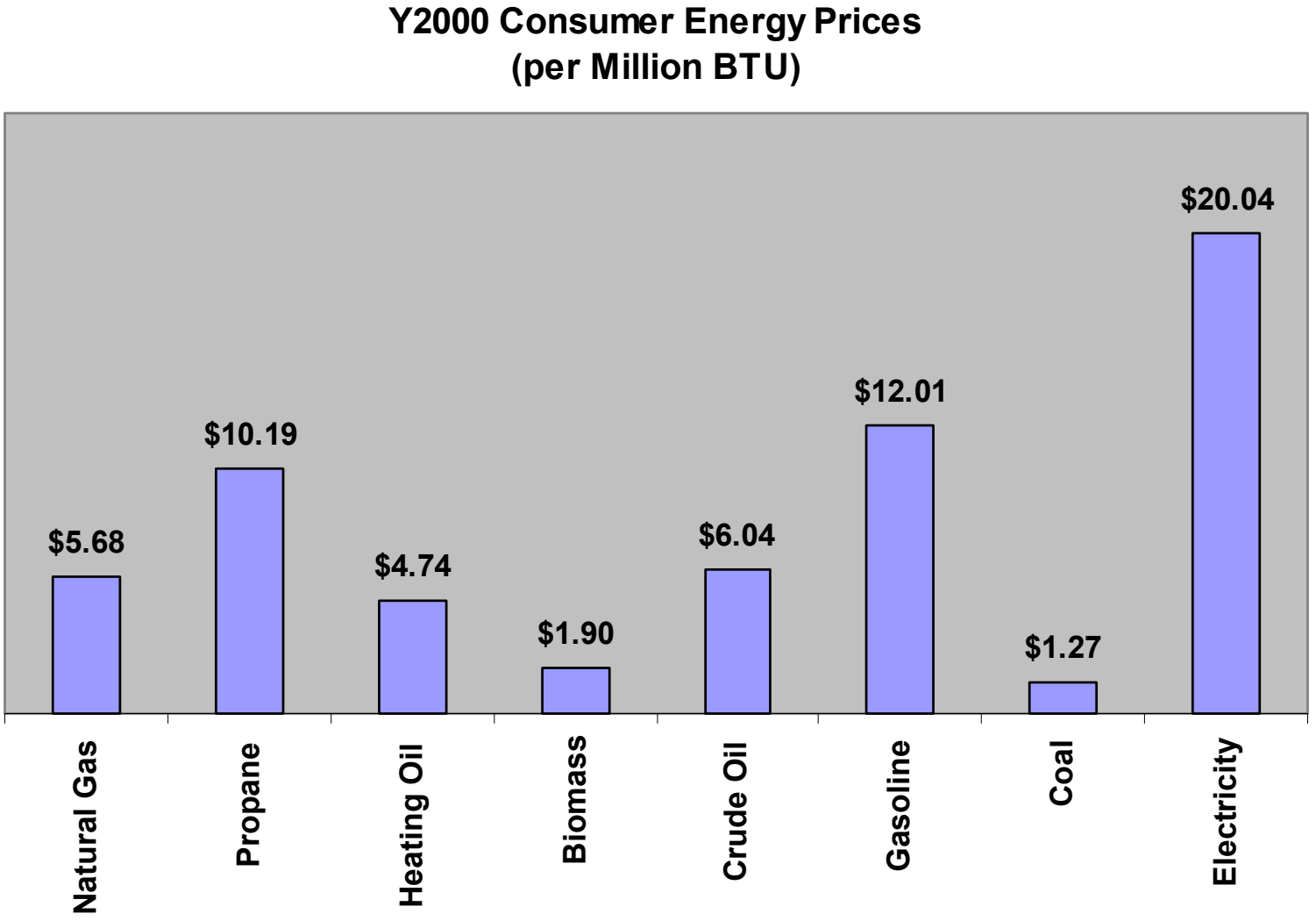
Physical Form: Solid/Liquid/Gas

(transportability, energy density)

Chemical Form: Combustibility

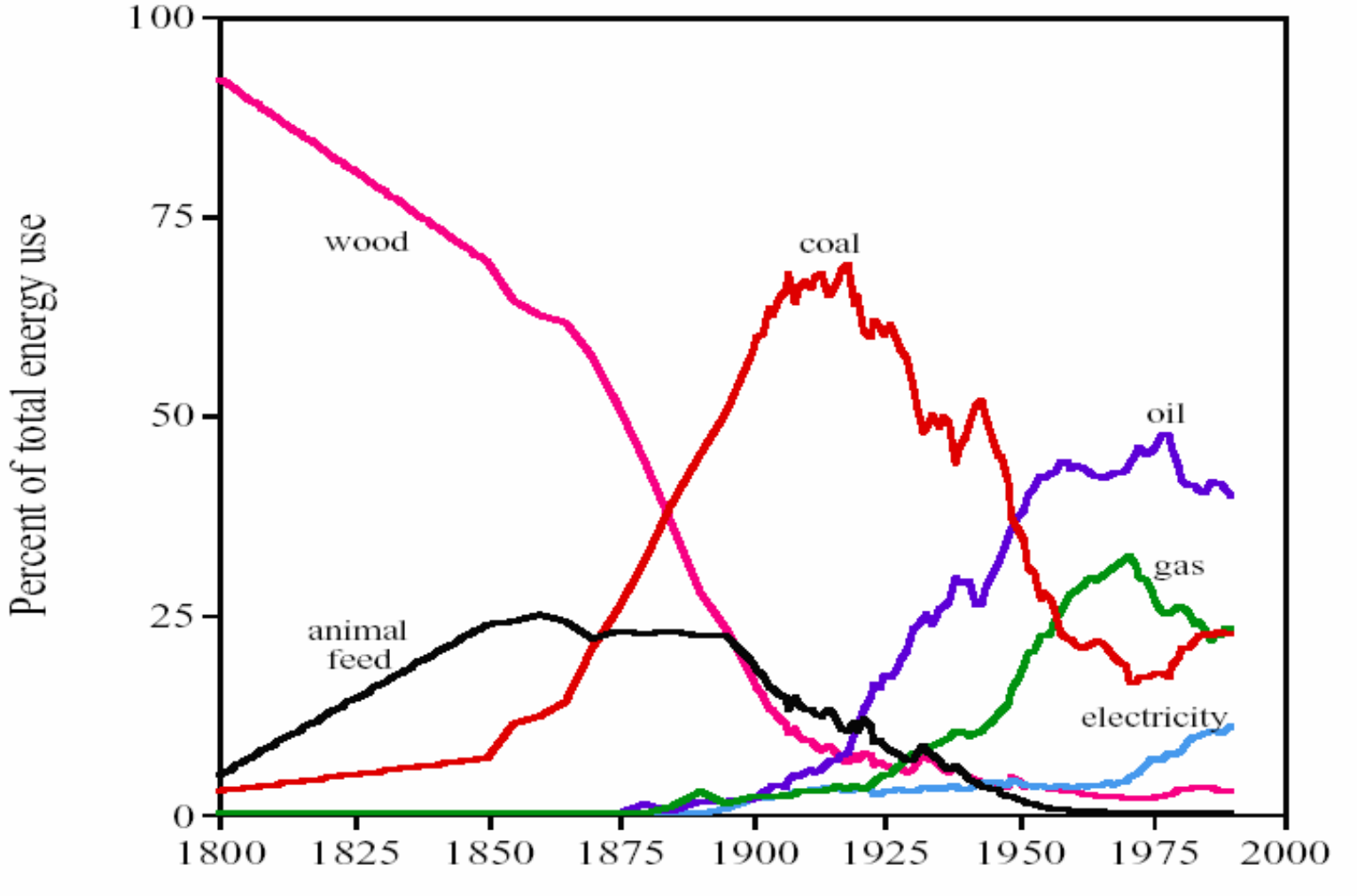
(efficiency, cleanliness)

Economic Usefulness is reflected in the price.



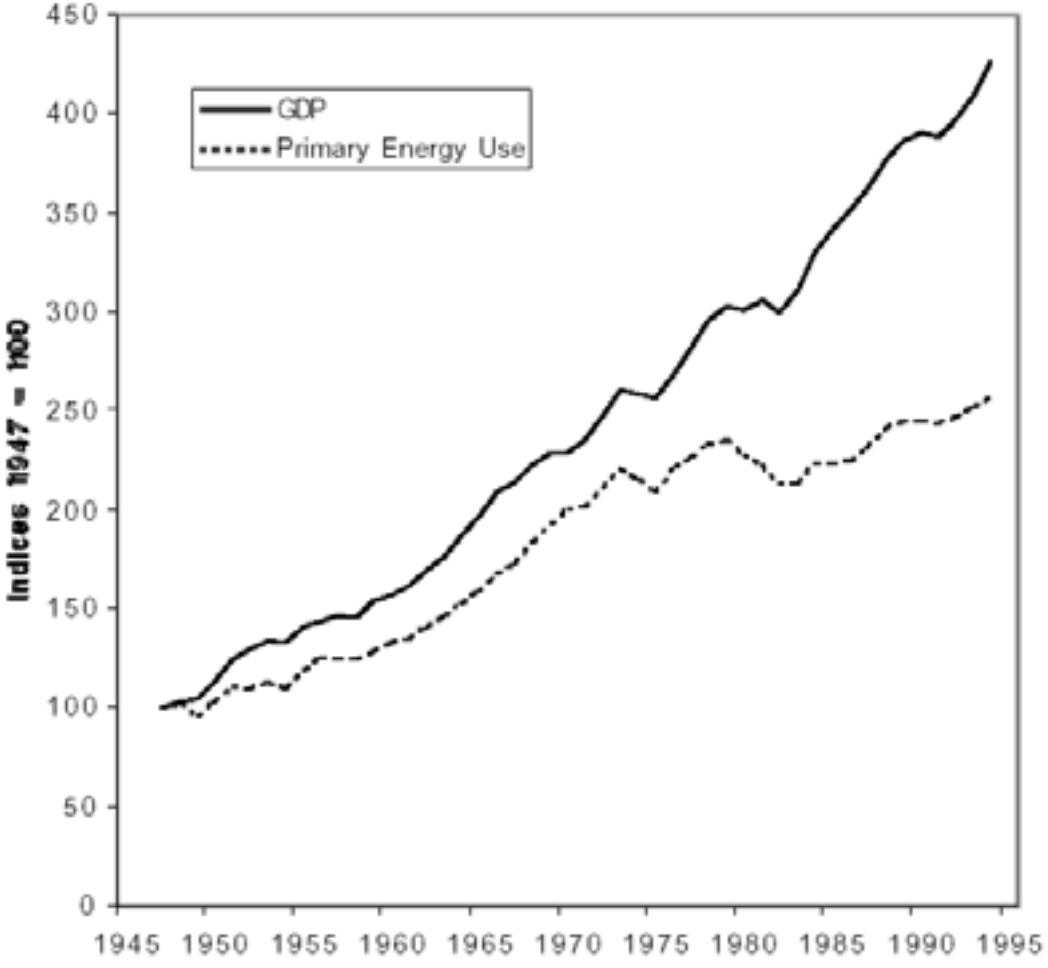
Source: Energy Information Administration

Economic Usefulness is the driver of change.



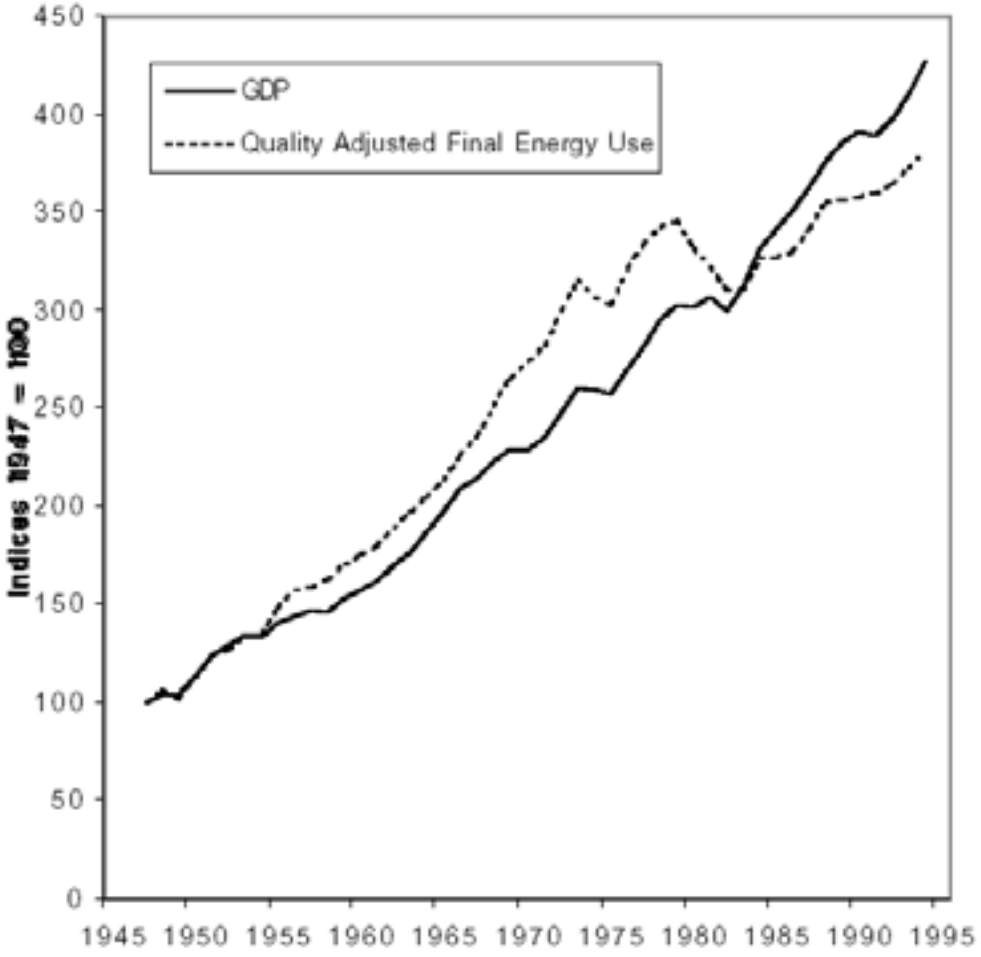
Source: David I. Stern, Rensselaer Polytechnic Institute

Figure 4. U.S. GDP and Primary Unadjusted Energy Use



Notes: GDP is in constant dollars i.e. adjusted for inflation. Energy use is the sum of primary energy BTUs.

Figure 7. U.S. GDP and Quality Adjusted Final Energy Use



Notes: GDP is in constant dollars i.e. adjusted for inflation. Energy use is a Divisia index of the principal final energy use categories – oil, natural gas, coal, electricity, biofuels etc. The different fuels are weighted according to their average prices.

Energy Profit Ratio

a measure of return-on-investment

energy invested

energy returned

Energy Profit Ratio

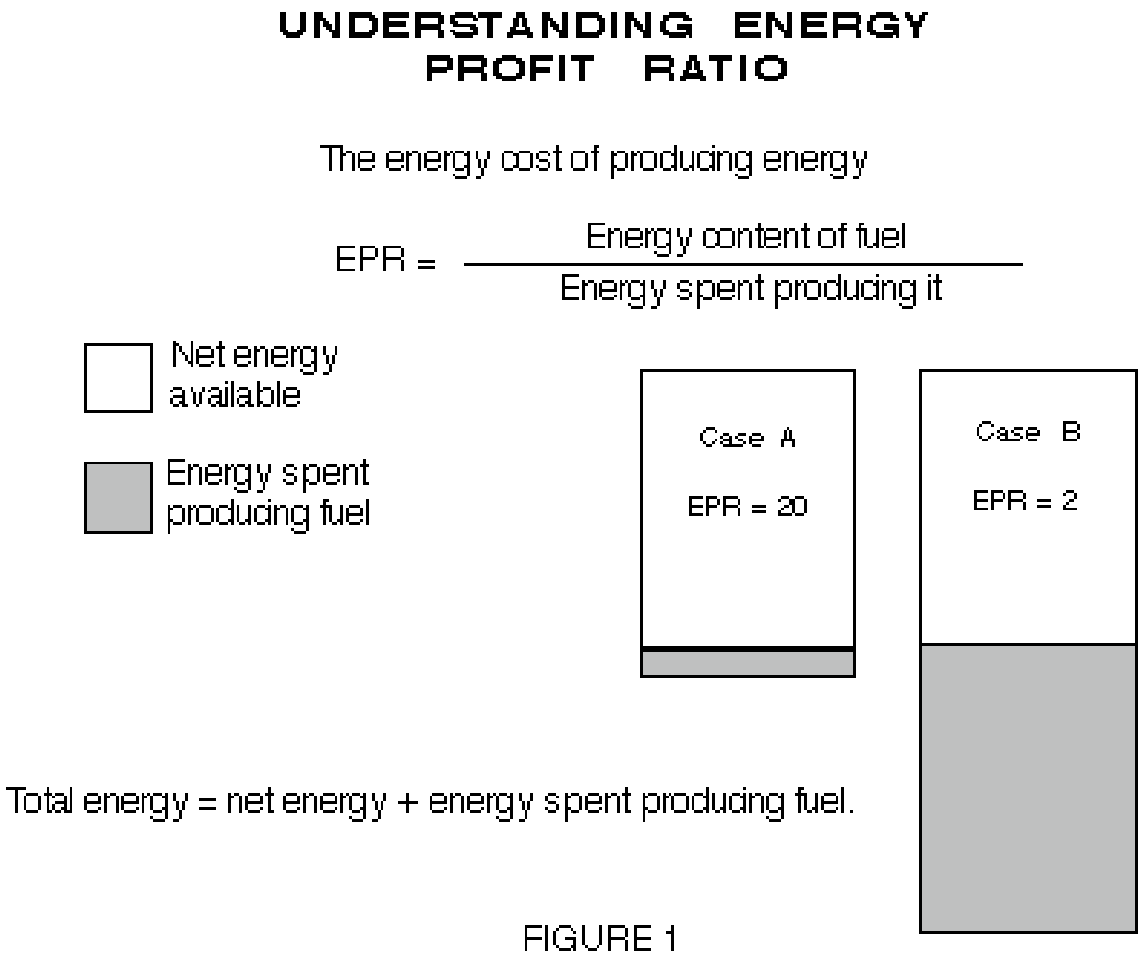
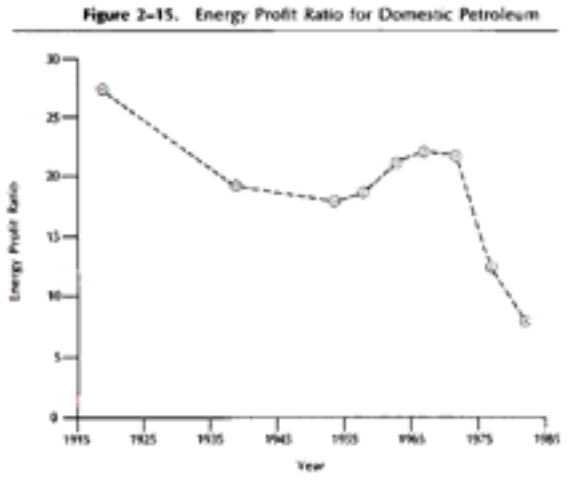
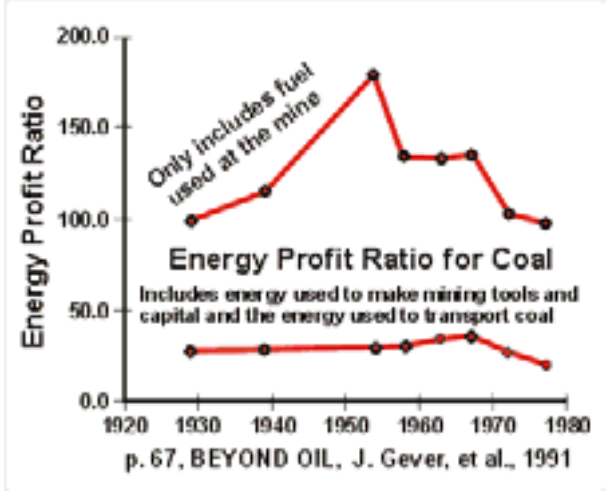


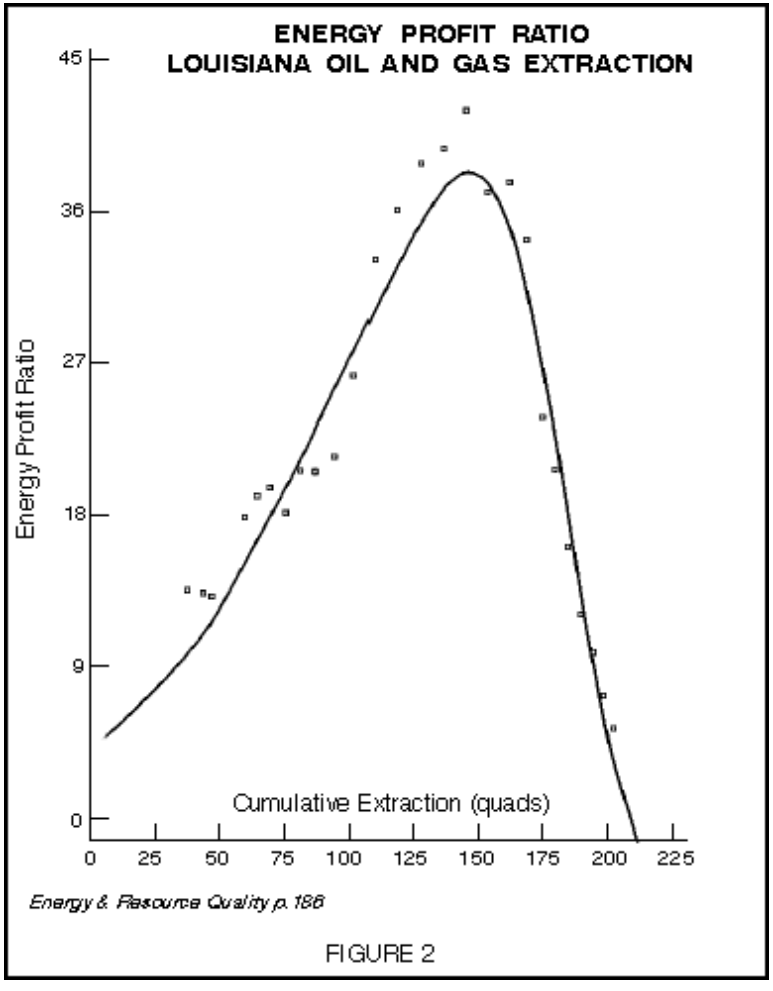
FIGURE 1

Source: Institute for Sustainability and Technology Policy

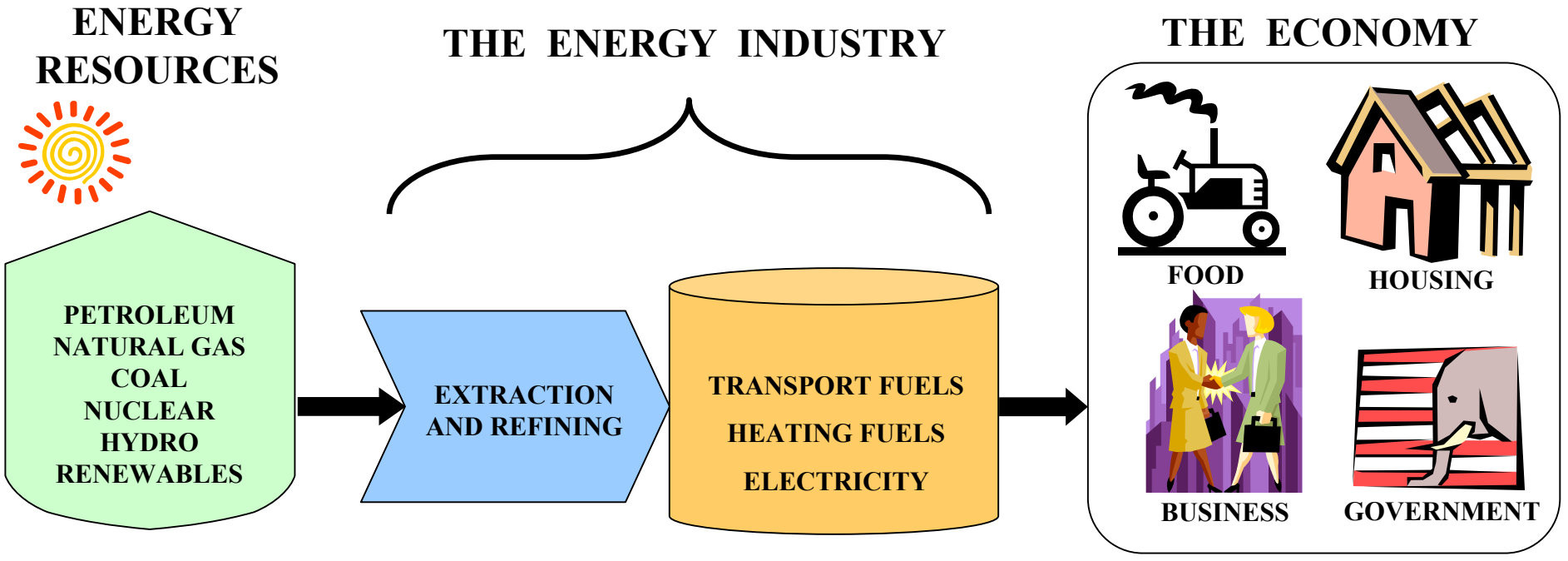
Energy Profit Ratio Studies



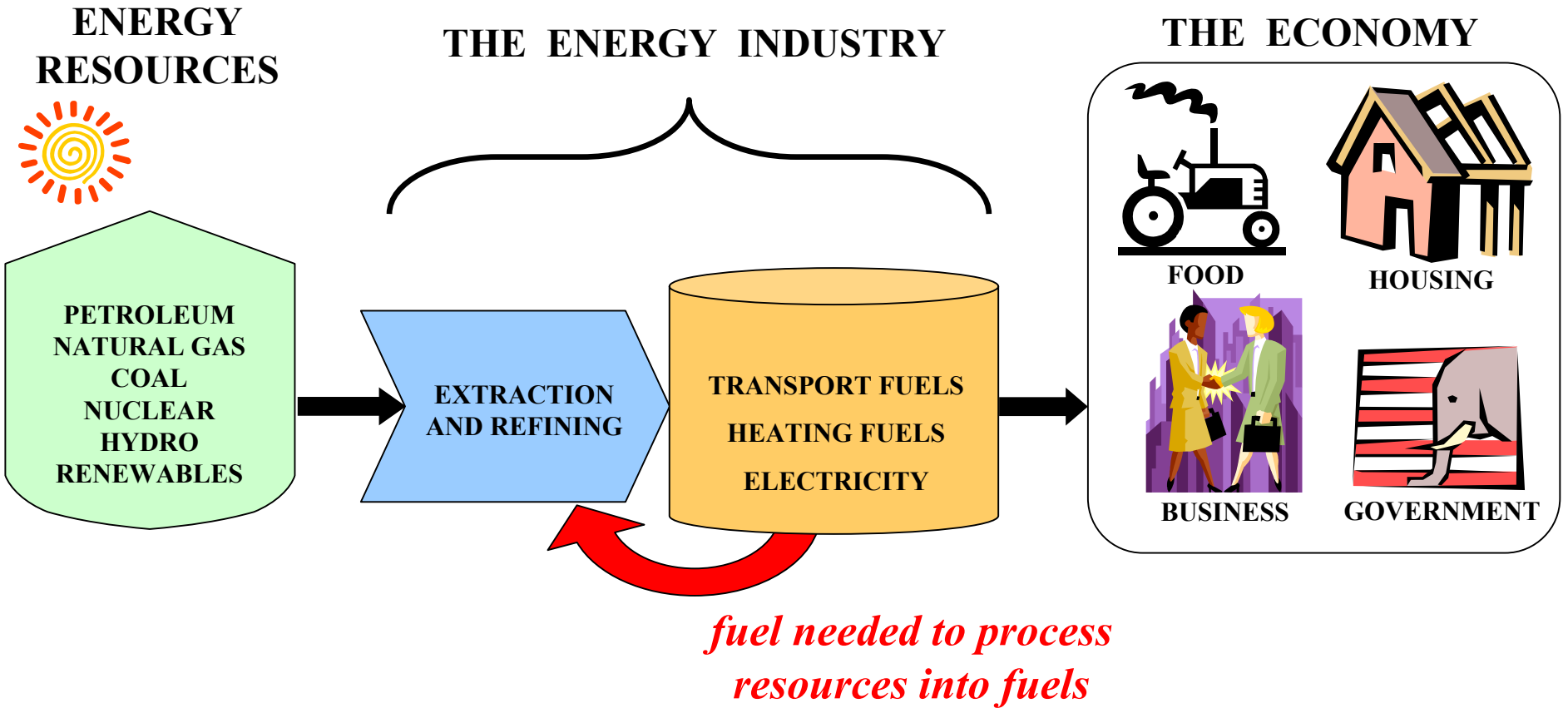




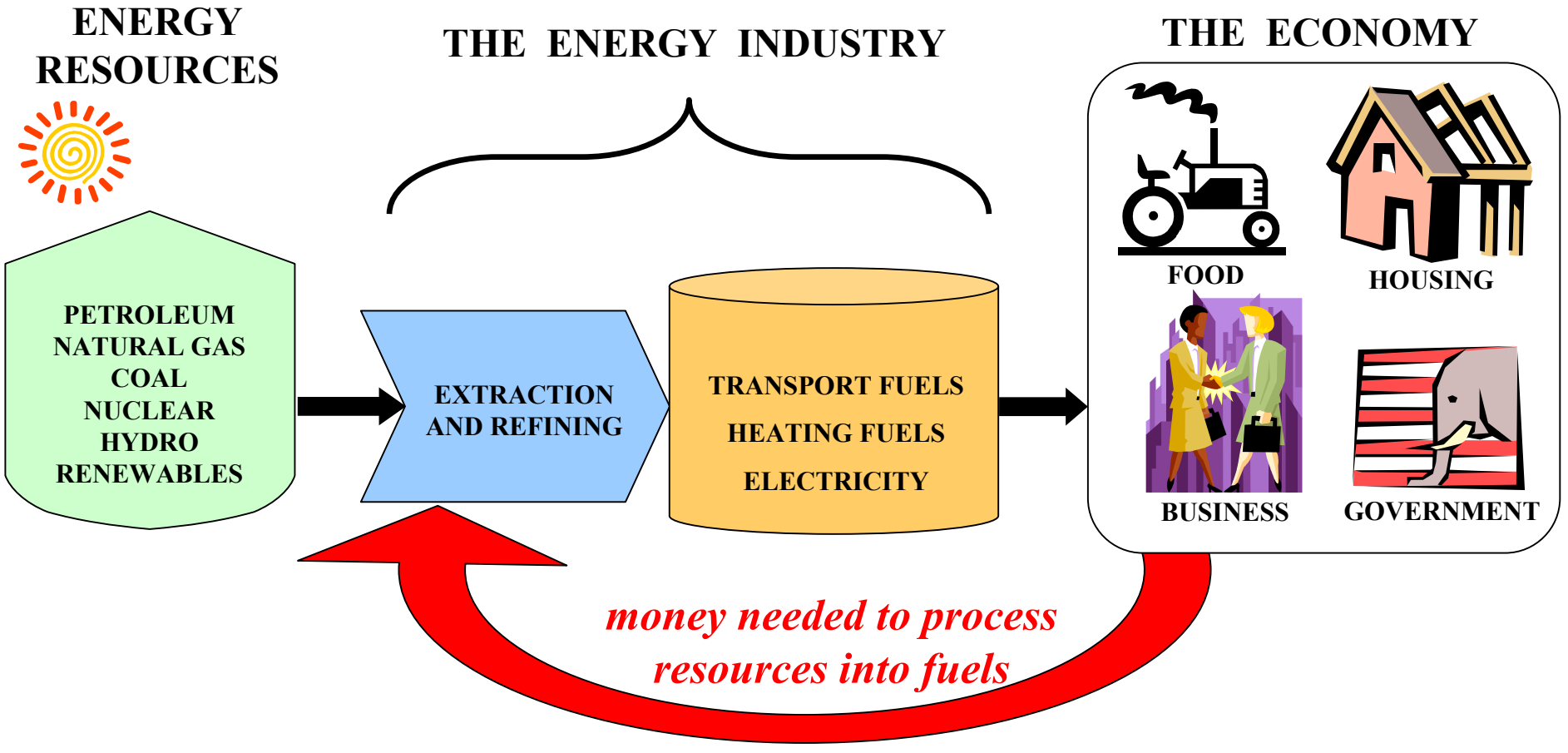
The Energy-Economy Relationship



The "Energy-Cost" of Making Fuels (this is physics)



The "Dollar-Cost" of Making Fuels (this is economics)



The Limiting Nature of Energy-Resource Degradation