

Coal



Coal Basics

- Most abundant of fossil fuels
- World's largest energy source
- Type of rock composed of organic matter having been trapped and compressed underground
- Classified into four varieties
- Constraints to future use more environmental concerns than availability

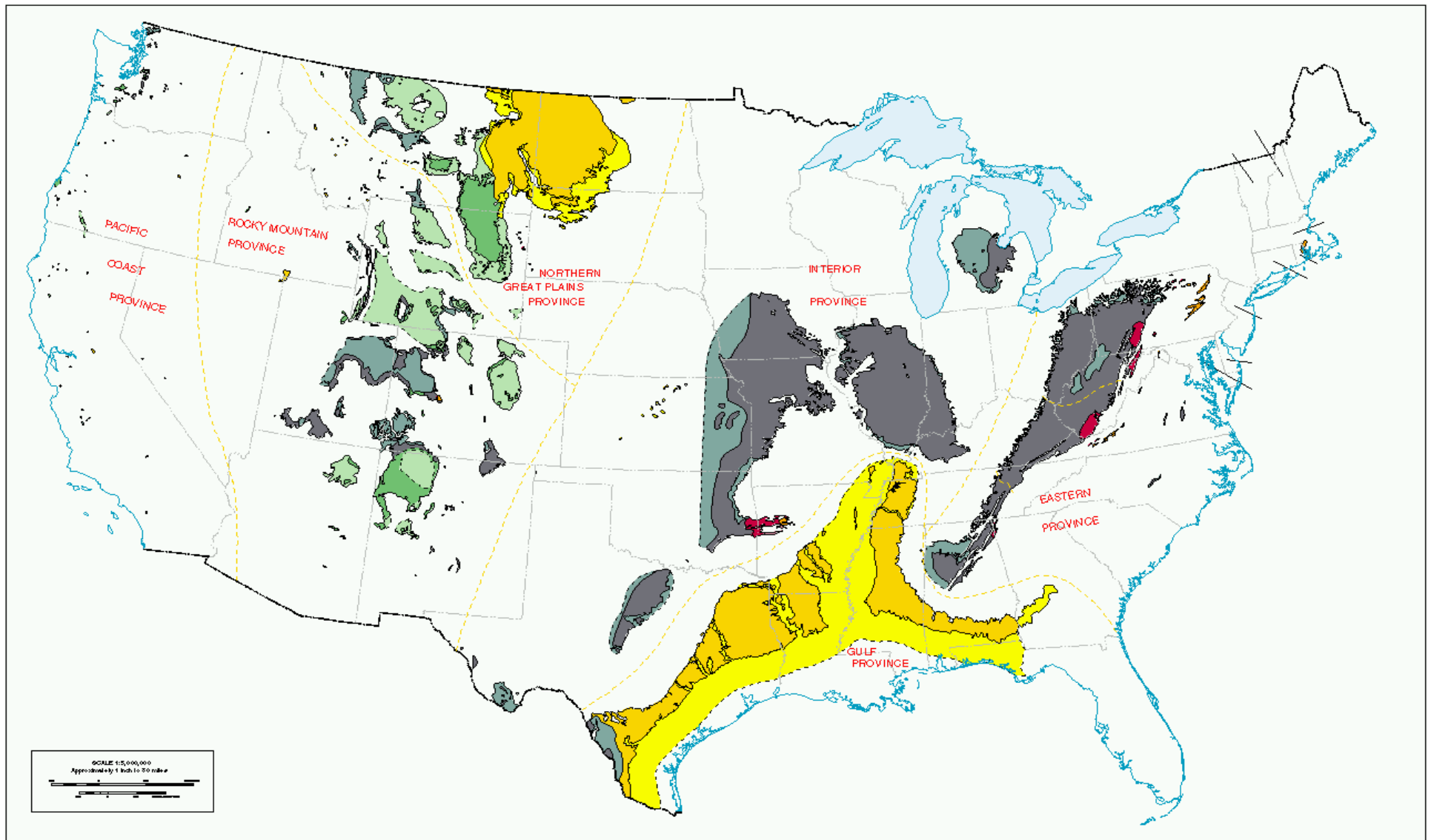
Coal Varieties

- Lignite (brown coal)
 - Relative youngest, softest
 - Least valuable, lowest energy density
- Sub-bituminous
 - Higher energy density
 - Over 40 percent of US production
- Bituminous
 - Highest energy density
 - Half of US production
- Anthracite
 - Metamorphic, 86-97% carbon
 - Less abundant

Coal Use and Availability

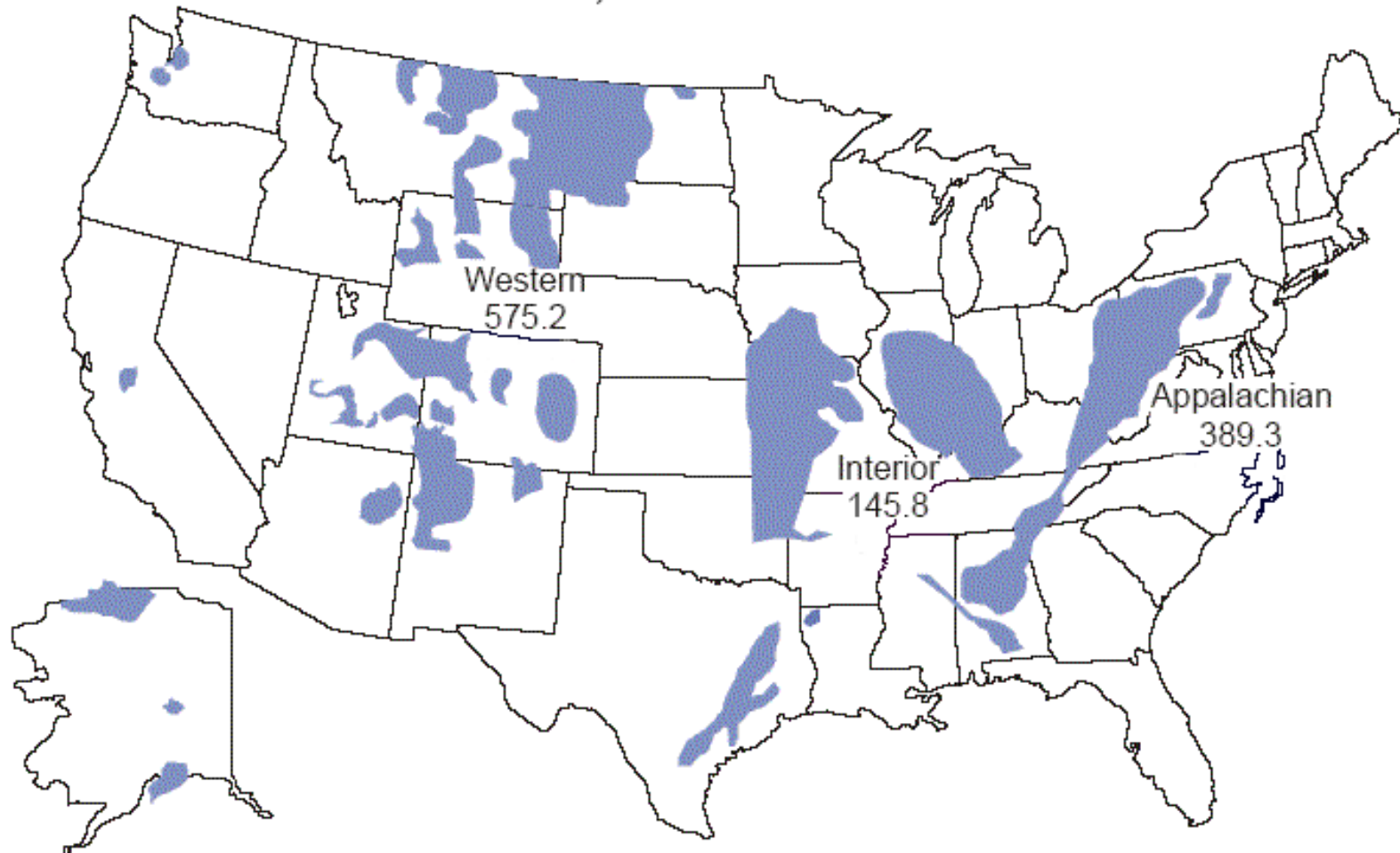
- World consumption roughly 5.5 billion short tons annually
 - 67% shipped to electricity producers
 - 30% shipped to industrial users
 - Remaining 3% for commercial and residential heat
- Estimates of world's recoverable reserves in 2004 were 998 billion short tons
 - Enough for over 200 years at current rate of consumption
 - Largest reserves by location:
 - 27% -United States
 - 17% -Russia
 - 13% -China
 - 9% -Australia

Variety and Location of U.S. Coal Reserves



U.S. Coal Production

U.S. Total: 1,111.5 Million Short Tons

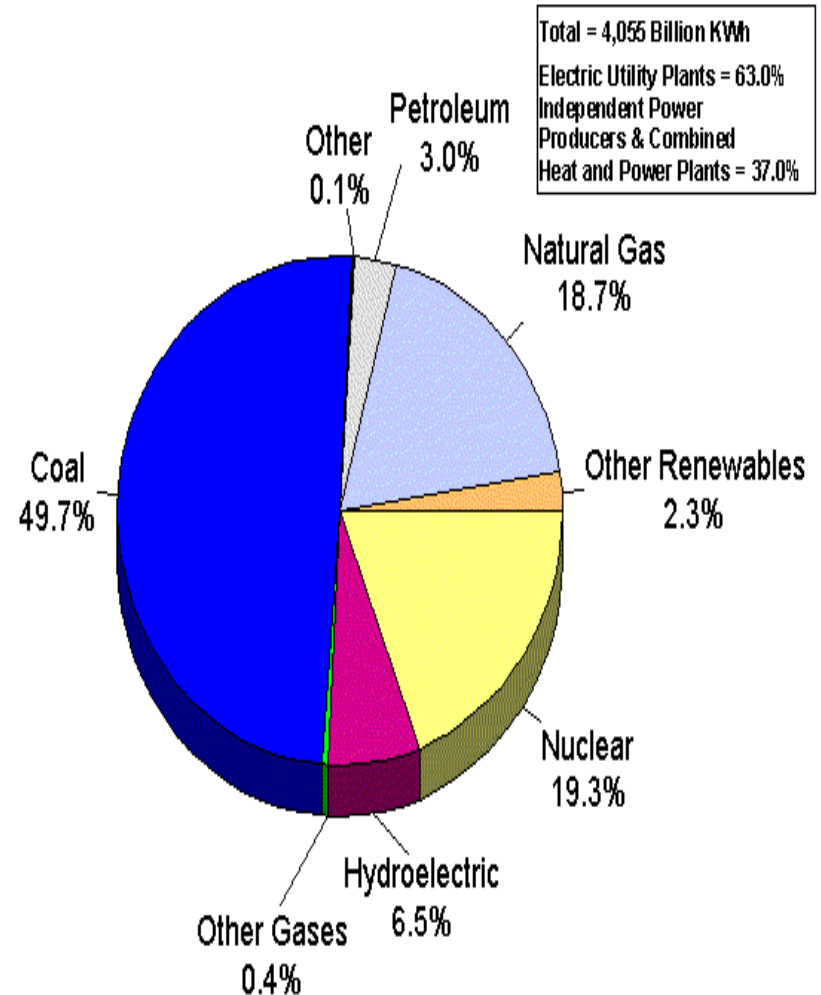


Extraction and Transportation

- Two different mining techniques- surface or underground
 - Surface mining is cheaper
 - Coal seam must be no deeper than 200ft
 - Accounts for 67% of US production while only 40% of world production
- Coal typically must go to a preparation plant to first be processed- increasing its heating value
- Shipping costs frequently more expensive than mining it
 - Transportation represents up to 70% of delivered cost
 - Transportation by barge cheaper, but 60% in US delivered by rail

Coal Use in United States

- Coal is the dominant source for US electricity generation
- Of the 1,125 million short tons consumed in 2005, about:
 - 92% power generation
 - 5% other industrial
 - 2% coke
 - .3% residential



Pollution/Environmental Impact

- Concerns from both mining and burning
- Problematic emissions include:
 - Sulfur
 - Nitrous oxides
 - Mercury
 - Carbon dioxide
- Coal industry uses variety of techniques to comply with Clean Air Act regulations
 - Mine low-sulfur coal varieties
 - Chemically cleaned in processing
 - Emissions “scrubbers”
- Coal accounts for roughly 80% of carbon dioxide emissions from US electricity generation

Sources used

- World Energy Council

<http://www.worldenergy.org/wec-geis/publications/reports/ser/coal/coal.asp>

- Energy Information Administration

<http://www.eia.doe.gov/fuelcoal.html>

- World Coal Institute

<http://www.worldcoal.org/index.asp>