Coal Supply Chains:
From Mines to Port of Richmond

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Coal (kōl) n.: A black or brownish-black solid, combustible substance formed by the partial decomposition of vegetable matter without access to air.

Coal rank indicates the progressive alteration, or coalification, from lignite to anthracite (and based on fixed carbon, volatile matter, and heating value):

- **Lignite** contains approximately 9 to 17 million British Thermal Unit (BTU) per ton
- **Subbituminous** ranges from 16 to 24 million BTU per ton
- **Bituminous** ranges from 19 to 30 million BTU per ton
- **Anthracite** contains approximately 22 to 28 million BTU per ton
COAL CLASSIFICATION AND USES

**Carbon/Energy Content of Coal**
- High

**Moisture Content of Coal**
- Low Rank Coals (47%)
  - Lignite (17%)
    - Largely power generation
  - Sub-Bituminous (30%)
    - Power generation, Cement manufacture, Industrial uses
- Hard Coal (53%)
  - Bituminous (52%)
    - Thermal Steam Coal
    - Metallurgical Coking Coal
  - Anthracite (-1%)
    - Manufacture of iron and steel
    - Domestic/industrial including smokeless fuel
Statistics on Usage of Coal & Other Fuels

- 87.1% of world's total energy production comes from fossil fuels
- 40% of the world’s electricity comes from coal

Sources of total U.S. electricity generation in 2014:

- Coal = 39%
- Natural gas = 27%
- Nuclear = 19%
- Hydropower = 6%
- Other renewables = 7%
  - Biomass = 1.7%
  - Geothermal = 0.4%
  - Solar = 0.4%
  - Wind = 4.4%
- Petroleum = 1%
- Other gases < 1%
Union Pacific Railroad Routes from Uintah Basin Mines (Utah & Colorado) to the Bay Area
Utah Mines in Uintah Basin

(11,700 BTU, 0.8 SO₂)
Colorado Mines in Uintah Basin

(11,700 BTU, 0.8 SO₂)
Beckwourth Pass 5,221’
Feather River Route

Donner Summit 7,056’
Coal being loaded Levin-Richmond Terminal
Where does it go?
Mine in Datong, Shanxi Province, China’s “Capital of Coal”
New Cooling Tower Coal-Fired Power Plant, Tonghua, China
China's coal supply and demand, 2000-2013

billion short tons

Note: Production and imports exceed consumption and exports resulting in an inventory build.
Total primary energy consumption in China by fuel type, 2012

- Coal: 66%
- Oil: 20%
- Natural gas: 5%
- Hydroelectric power: 8%
- Nuclear: <1%
- Other renewables: 1%

106 quadrillion British thermal units
Coal ships travel from Richmond to Petacalco electrical power plant Guerrero
Petacalco electrical power plant, Latin-America’s largest
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