Power
• Cattle

• Water (historical, modern)

• Fossil fuel, nuclear, geothermal

• The problem of transport

• Superconductivity

• Leaving a superconducting magnet on forever

• Wind variability

• Superconductive wind turbines
Industrial revolution
Problem of transportation

• Early industrial revolution in rural areas with water drop

• Need to move power where it is needed
  • Coal, oil, natural gas (move fuel)
  • Electricity (send power)
Pittsburgh 1940
Pittsburgh 1940

- 10:55 am
Hydro power—the original green energy
Wind
Solar
Super conductors
Superconductors

- At cold temperatures wave-motion of electrons becomes dominant feature
- Resistance drops to zero
- Strong magnets
- Zero power loss
- Magnets turned on, unplugged and left on forever…
Superconducting magnets
ITER magnet
Superconducting transmission line
Superconducting generators