# POWER GENERATION

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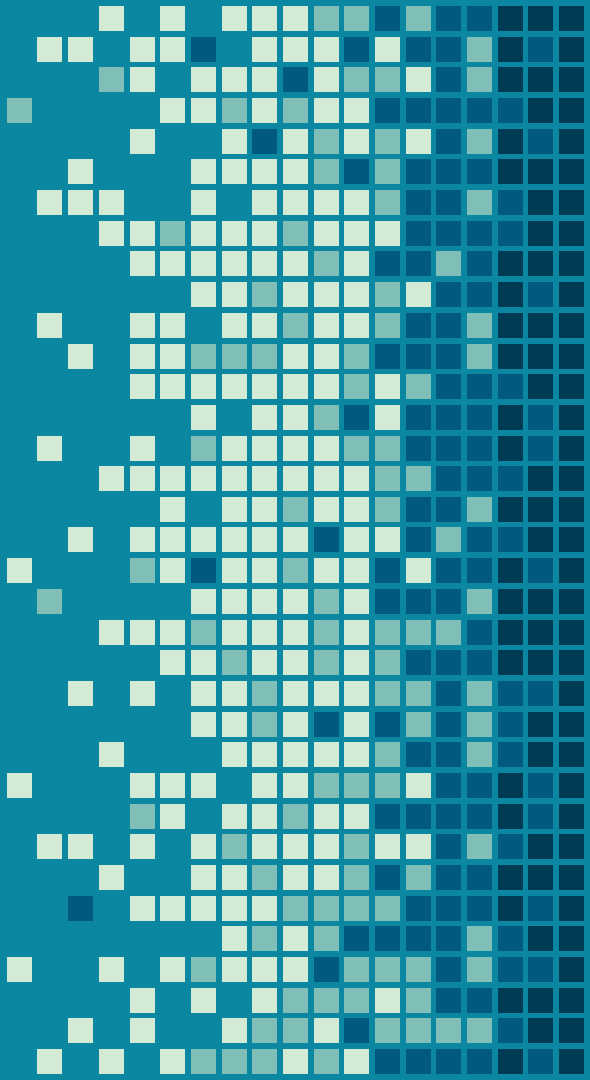


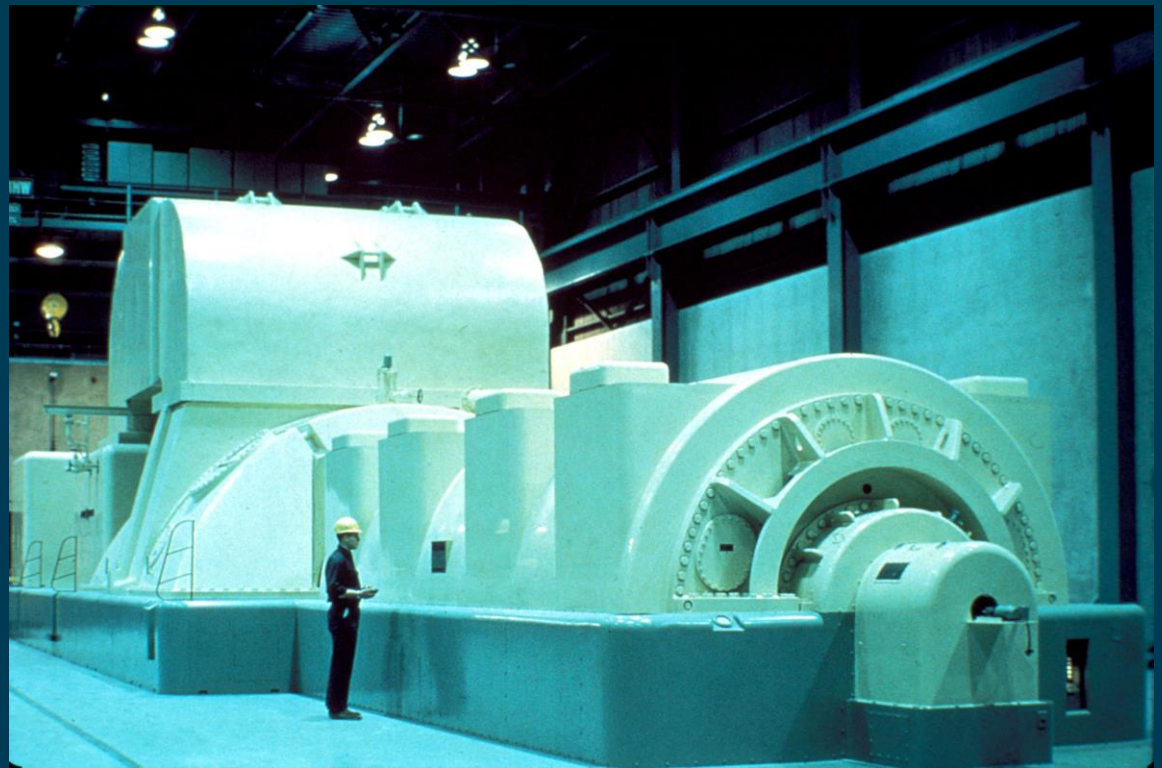
# Energy 101

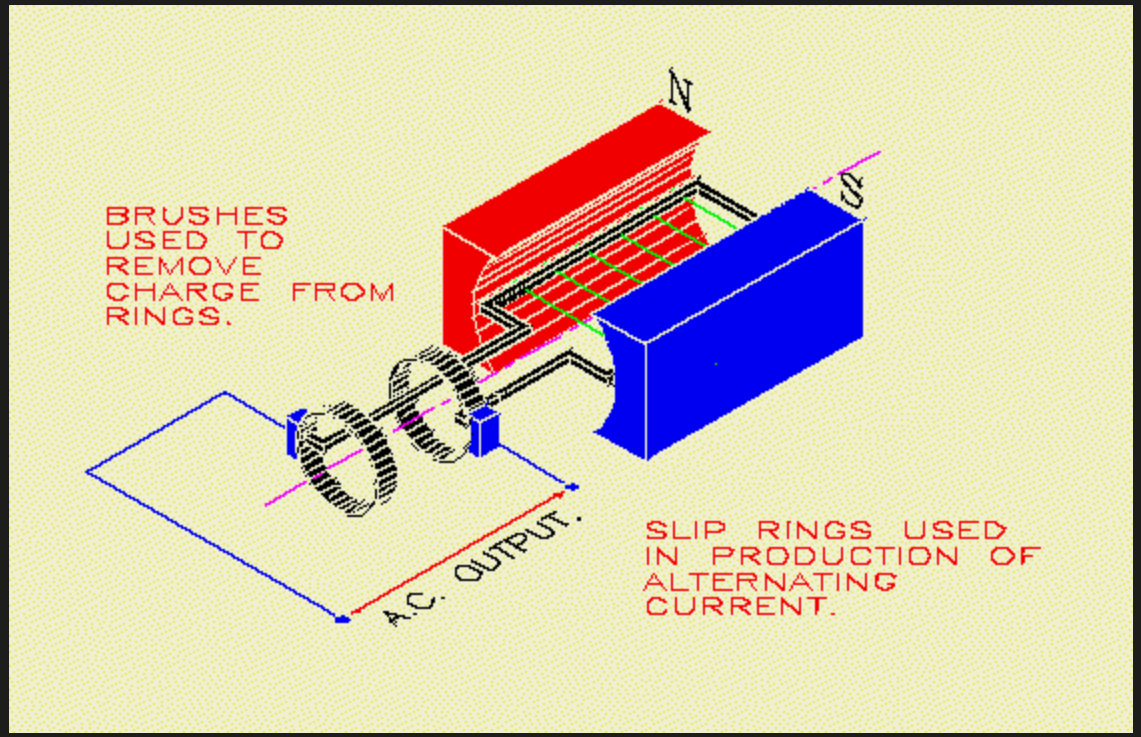
- Introduction
- https://www.youtube.com/watch?v=20Vb6hlLQSg

# AC GENERATOR

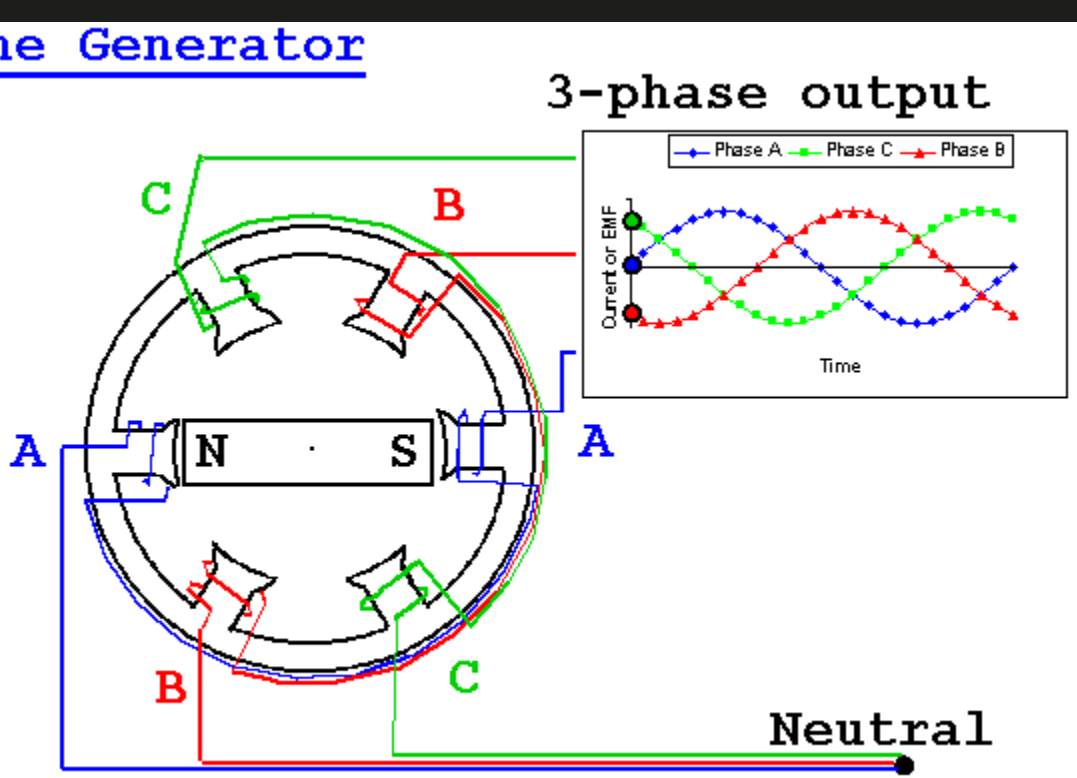
# Generator

- Converts mechanical energy into electrical energy.




BRUSHES USED TO REMOVE CHARGE FROM RINGS.
N
S
A.C. OUTPUT.
SLIP RINGS USED IN PRODUCTION OF ALTERNATING CURRENT.

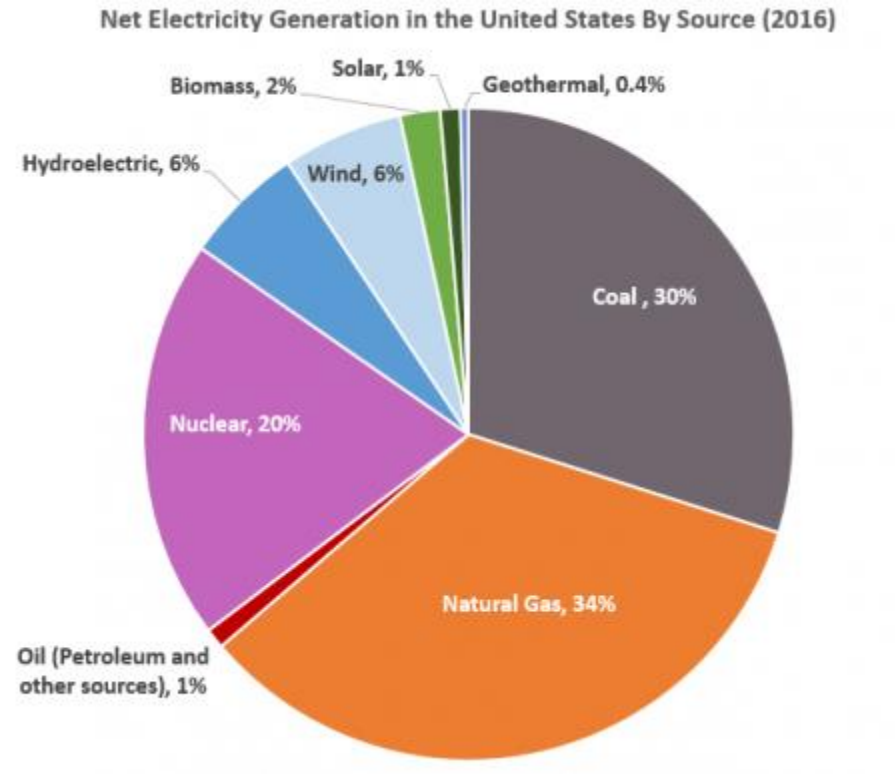
# The Generator



# POWER GENERATION

# Types of Power Plants

- Thermal Power Plants – 90% of plants
- Renewable Energy Sources
- Storage Power Plants


Net Electricity Generation in the United States By Source (2016)
Biomass, 2%
Solar, 1%
Geothermal, 0.4%
Hydroelectric, 6%
Wind, 6%
Coal , 30%
Nuclear, 20%
Natural Gas, 34%
Oil (Petroleum and other sources), 1%

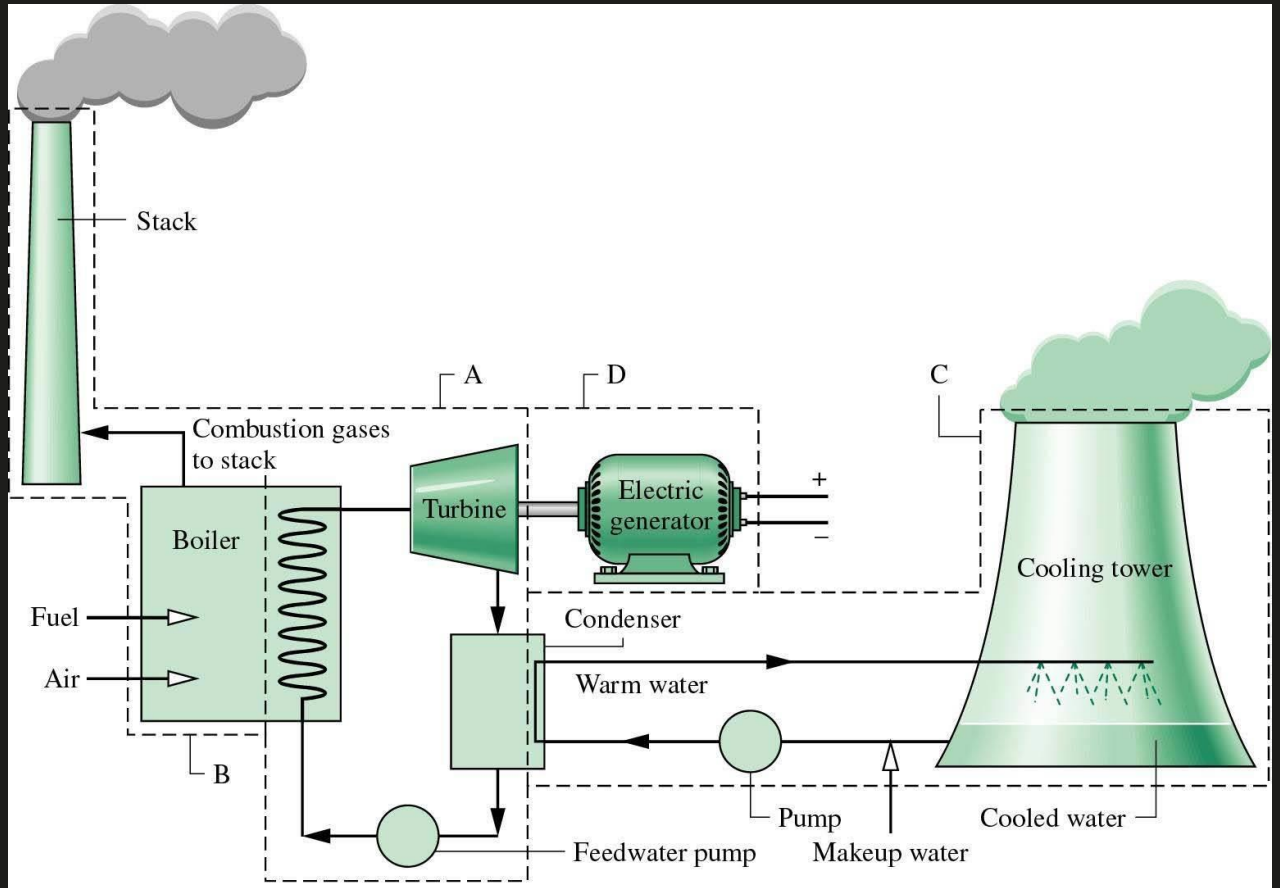
# Thermal Power Plants

- Coal
- Natural Gas
- Nuclear

# Alabama Power – Plant Simulation

- https://www.youtube.com/watch?v=0ftI-WM6wms

# Thermal Power Plants



# Renewable Energy Sources

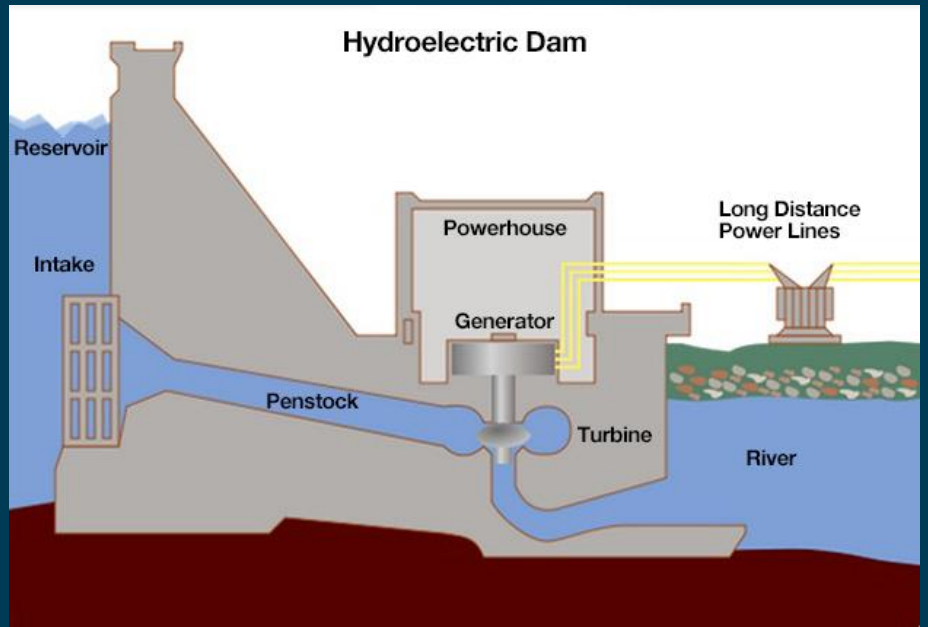
- Hydroelectric
- Solar
- Wind
- Marine
- Osmosis
- Biomass

# Storage Power Plants

- How can we use a dam to help store power?

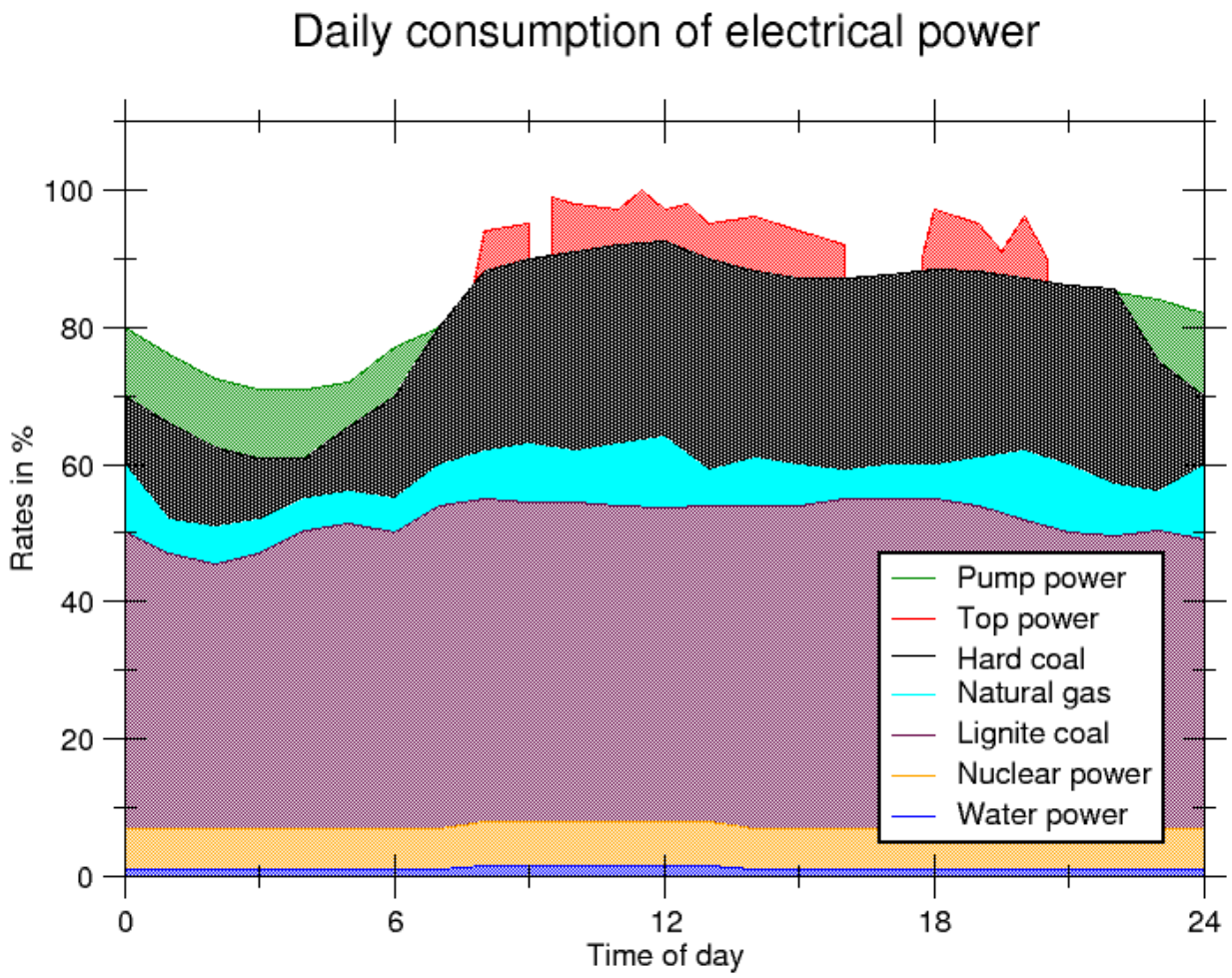
# Hydroelectric Dam Stations

- Exactly like the water analogy for electricity!
- One of the primary type of storage power plants.



# Power Plants by Load

- Base load power plants run continually.
  - Highly optimized for low fuel cost.
  - Don't start or stop quickly during changes in system load.
- Peaking power plants meet the daily peak load (may only be a couple hours a day).
  - Operating cost is always higher than base load plants.
  - They ensure security of the system during load peaks.
- Load following power plants follow the variations in the daily and weekly load.
  - Lower cost than peaking plants and more flexibility than base load plants.


Daily consumption of electrical power
Rates in %
100
80
60
40
20
0
0
6
12
18
24
Time of day
Pump power
Top power
Hard coal
Natural gas
Lignite coal
Nuclear power
Water power