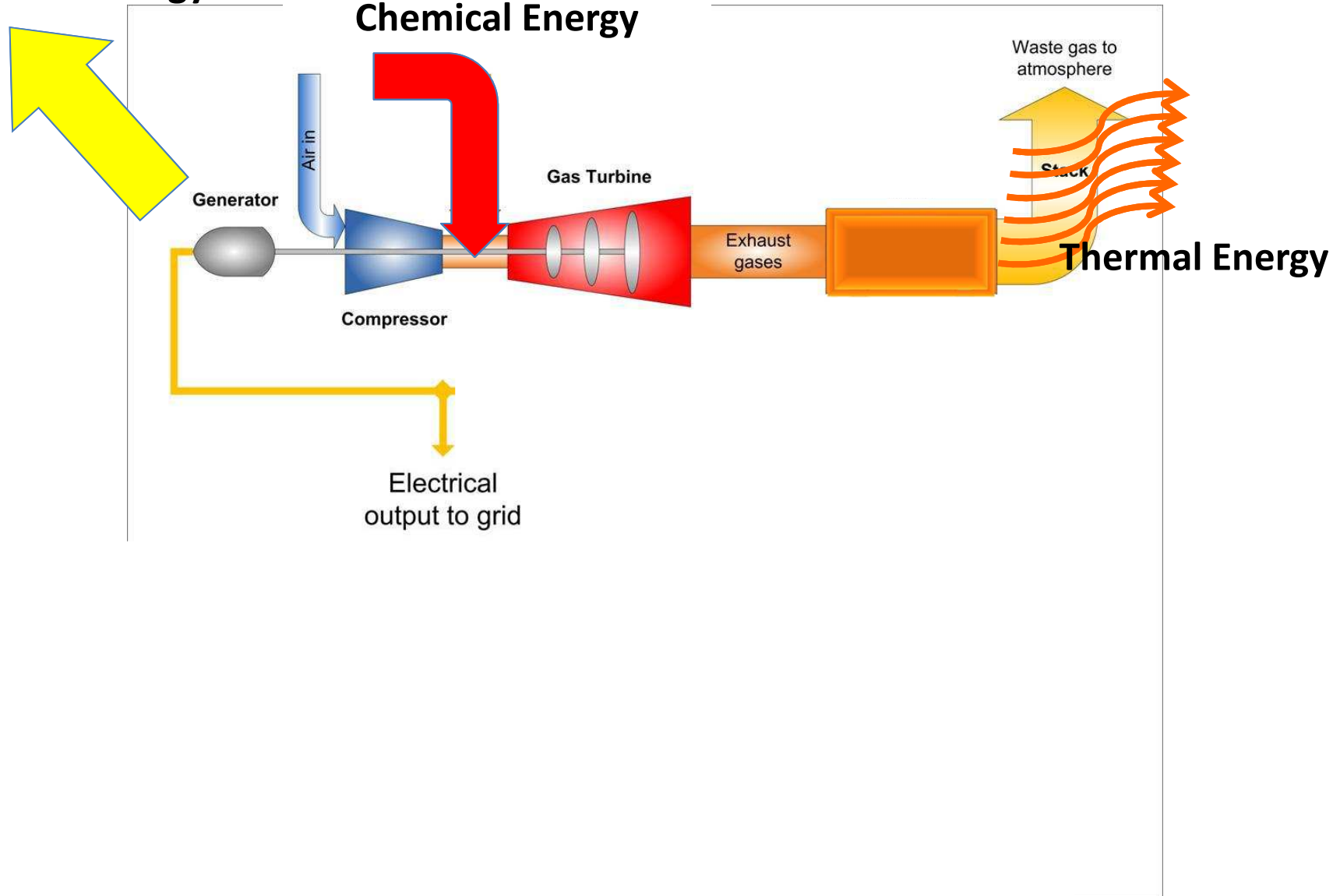


# Natural Gas Power

Electrical Energy

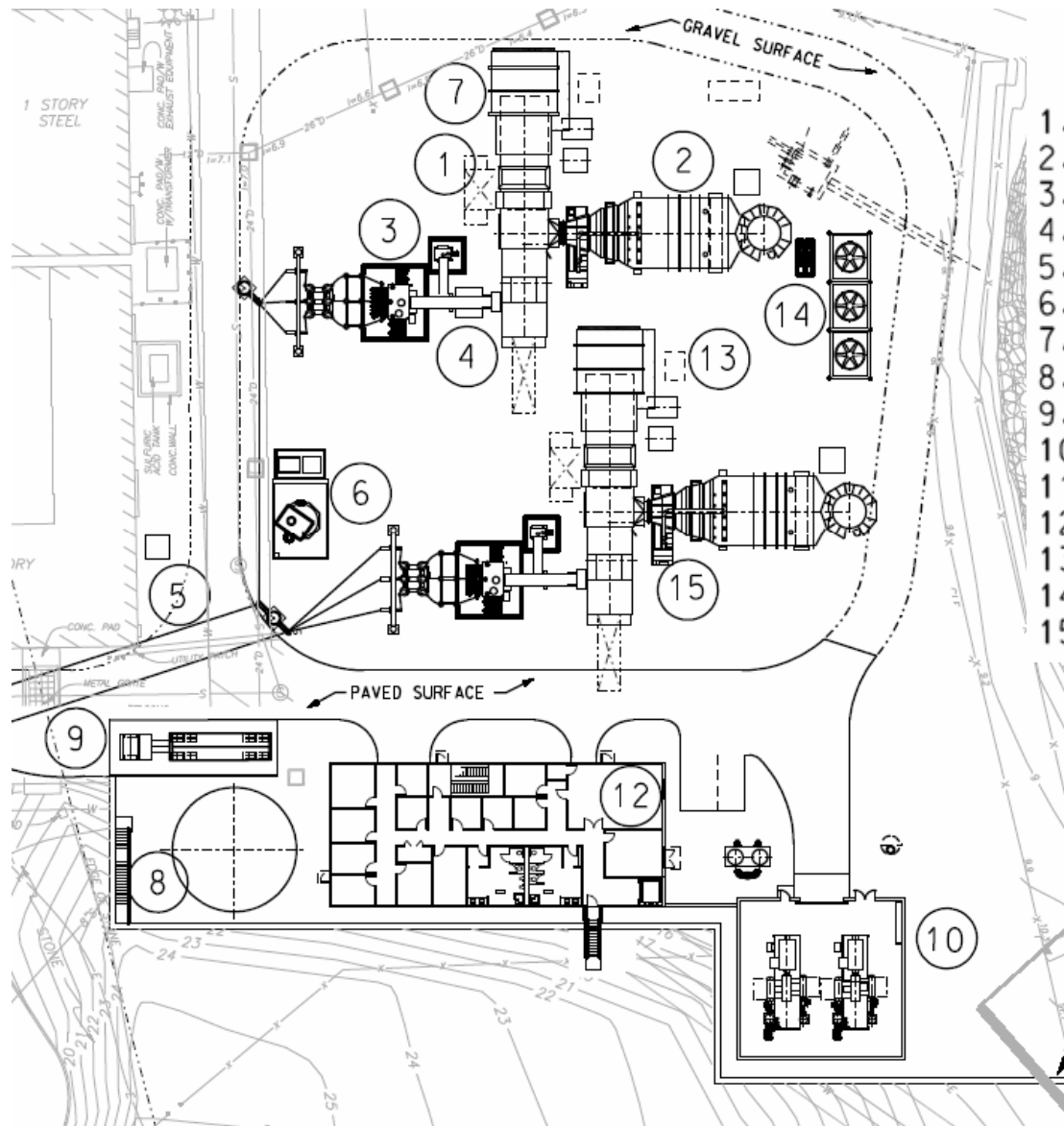


# BELD Watson II Plant



- 112 MW
- 2 56 MW Rolls-Royce Gas Turbine Generators
- Braintree, MA
- Municipal-owned



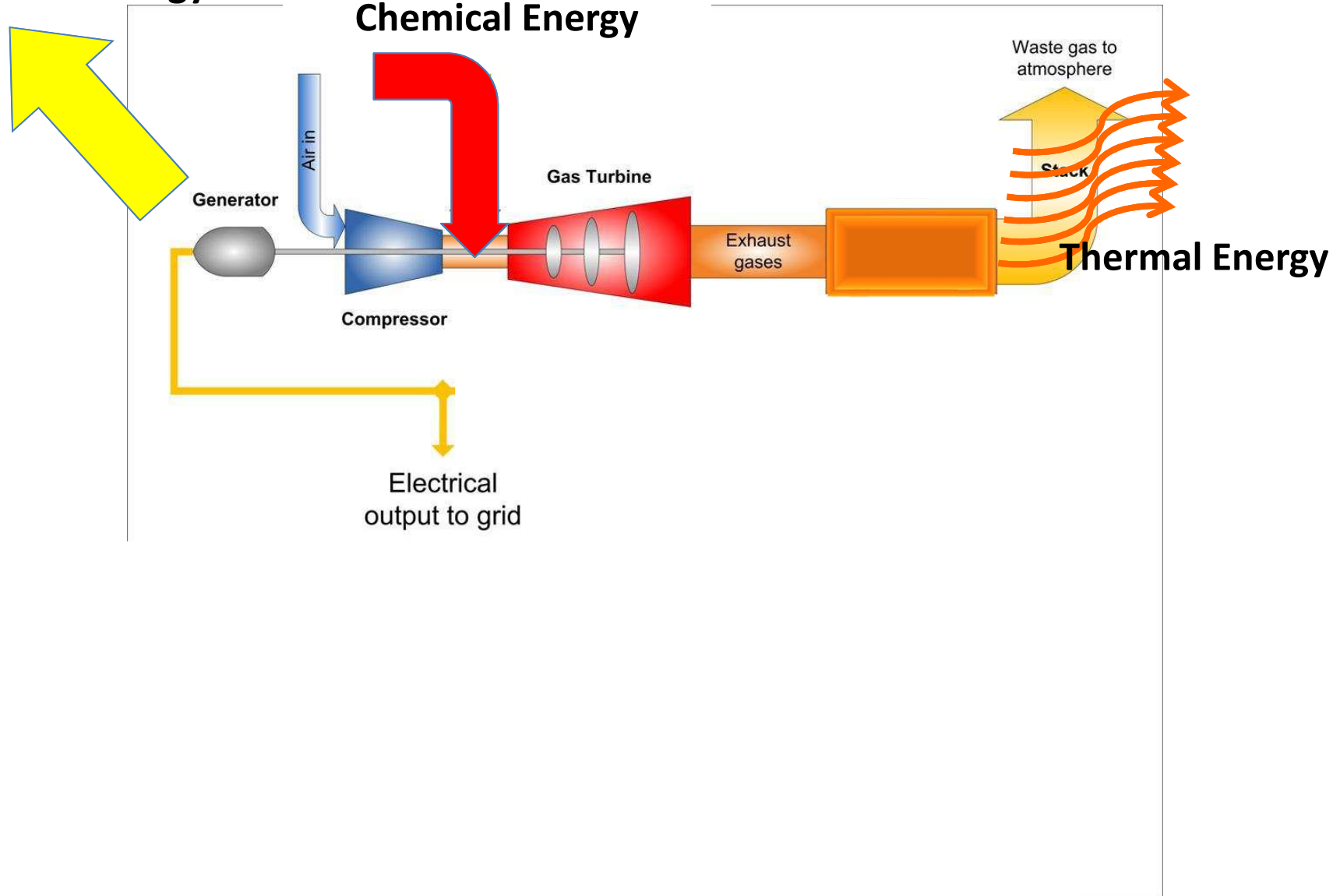


### EQUIPMENT LEGEND

1. TRENT 60 COMBUSTION TURBINE
2. SCR
3. MAIN STEP UP TRANSFORMER
4. AUX XFMR/SWITCHGEAR
5. CONSTRUCTION XFMR
6. AMMONIA STORAGE TANK
7. INLET AIR FILTER
8. DEMIN STORAGE TANK
9. DEMIN TRAILER
10. GAS COMPRESSORS
11. (Not used)
12. CONTROL/ELEC/ADMIN BLDG
13. WATER WASH DRN TANK
14. LUBE OIL COOLING SKID
15. AMMONIA INJ SKID

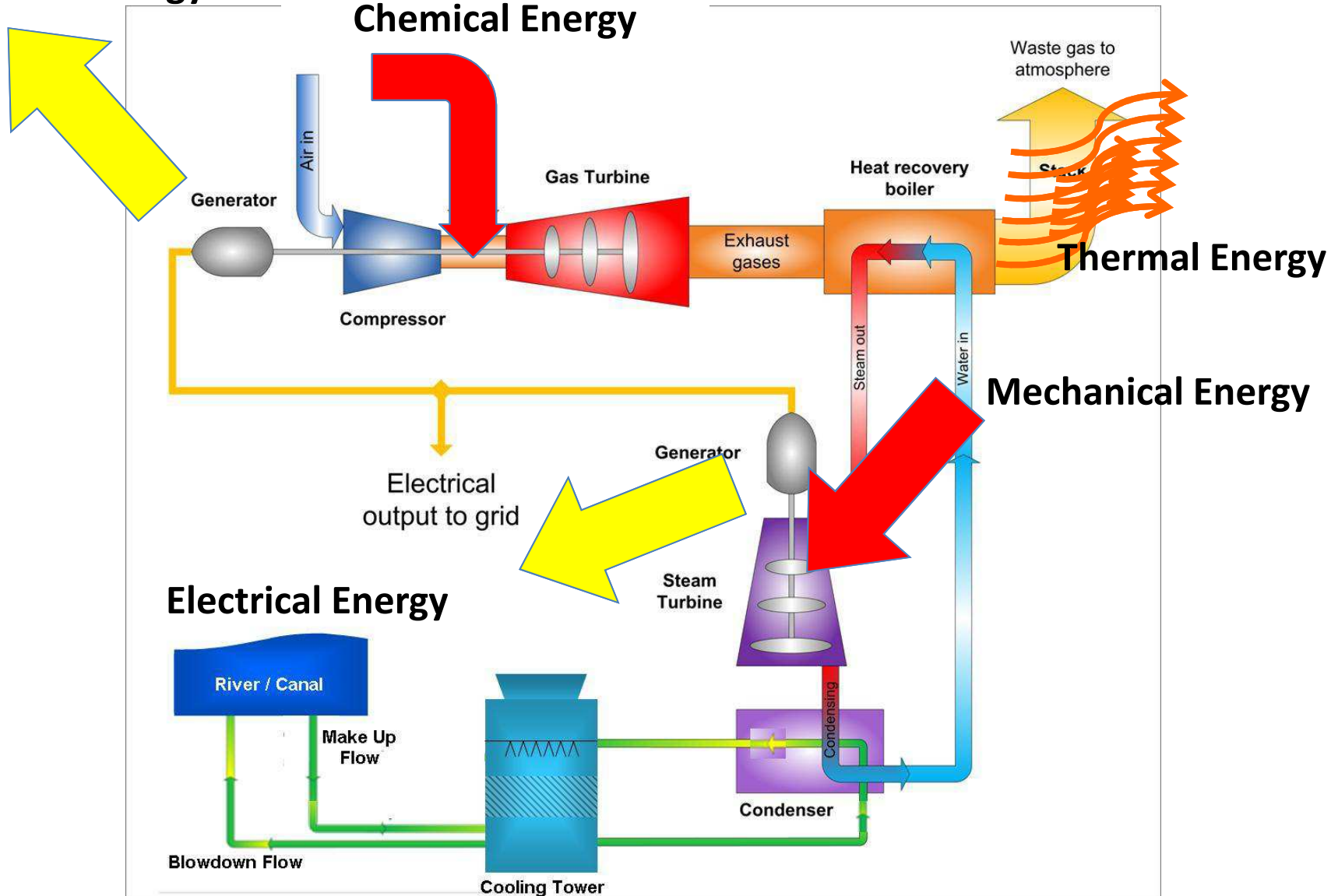
# Natural Gas Power

Electrical Energy



# Natural Gas Power

Electrical Energy



# Mystic Generating Station



- 1,968 MW
  - 2 combined cycle gas turbines, 1 gas/oil
  - Charlestown on the Mystic River
  - Owned by Exelon (Chicago)
- 
- Gas delivered at least partially by LNG tanker ships
  - Bought by Exelon with Fore River plant for \$1.1B in 2011
  - Supplies almost 1/3 of power to NE Mass / Boston

# Fore River Generating Station



- 688 MW
  - 3 gas turbines, 1 steam turbine combined cycle
  - Across from BELD
  - Owned by Exelon (Chicago)
- 
- Built by Raytheon in 2003; lost \$106M on project



# Stony Brook Power Plant



- 441 MW
  - 354 MW CC gas/oil w/3 turbines, 172 MW oil
  - Ludlow
  - MA Municipal Wholesale Electric Co
- 
- Support municipal utilities by issuing MA tax-exempt bonds

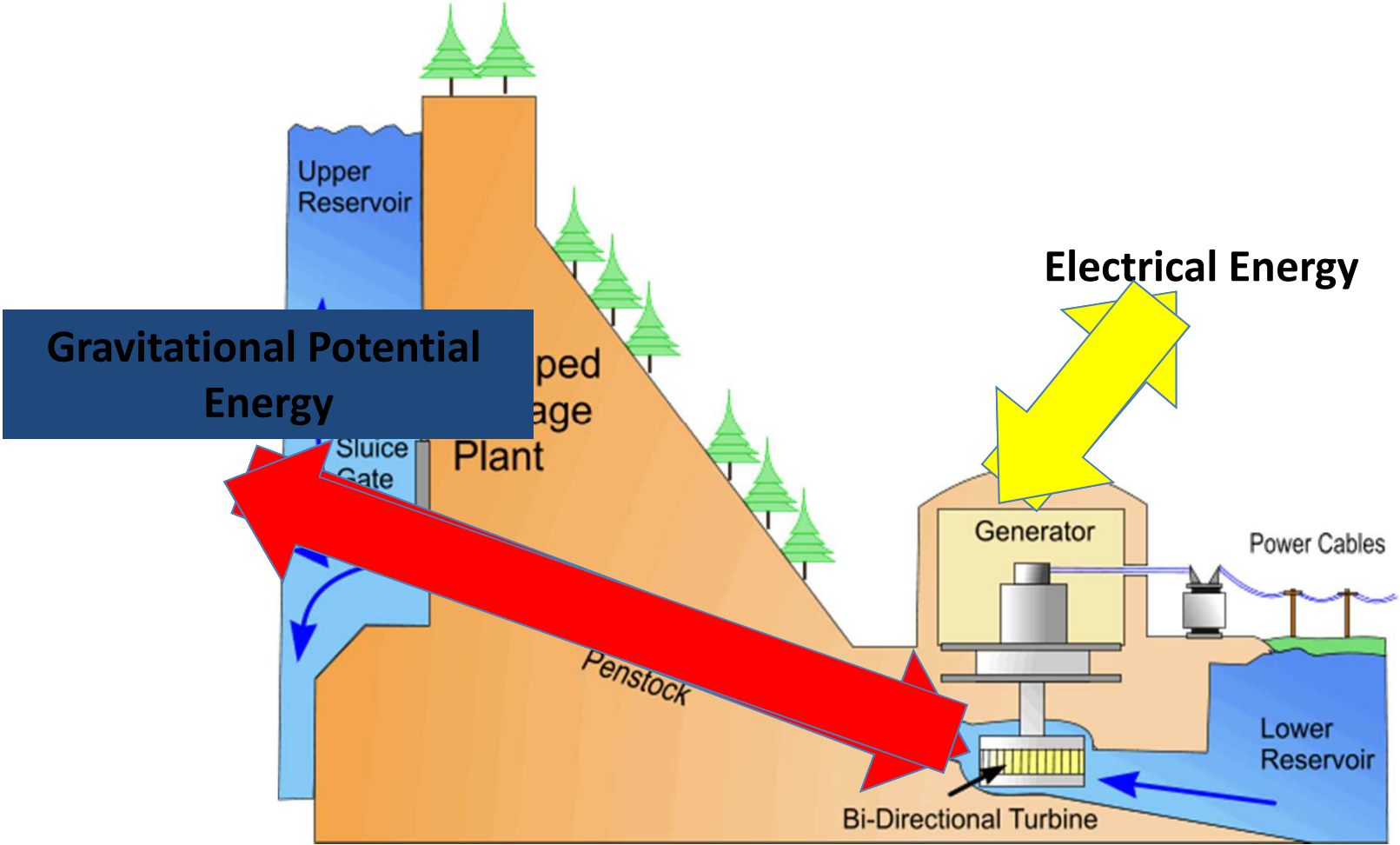
# ANP Bellingham

## ANP Blackstone



- GDF Suez (Paris)
- Built as a pair in 2002
- Each has 2 289 MW gas turbine combined cycle generators

# Hydroelectric Power



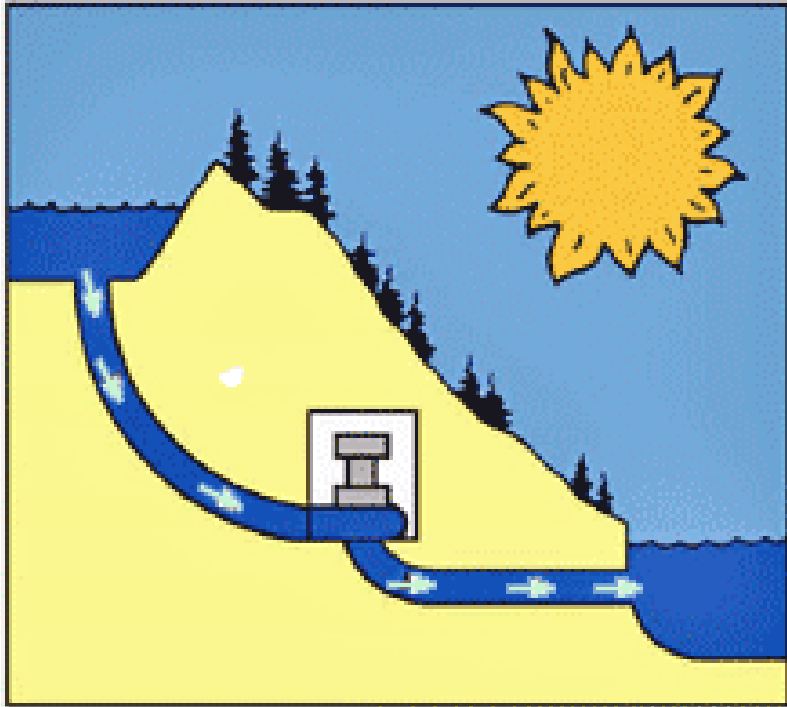
# Holyoke Hydroelectric Plant



- 43MW
- 8,309 mi<sup>2</sup> watershed
- 2,290 acre-foot reservoir
- 30' high, 985' long dam

- Spawning route for shortnose sturgeon
- Fish lifts (elevators) and counting rooms

# Pumped Storage

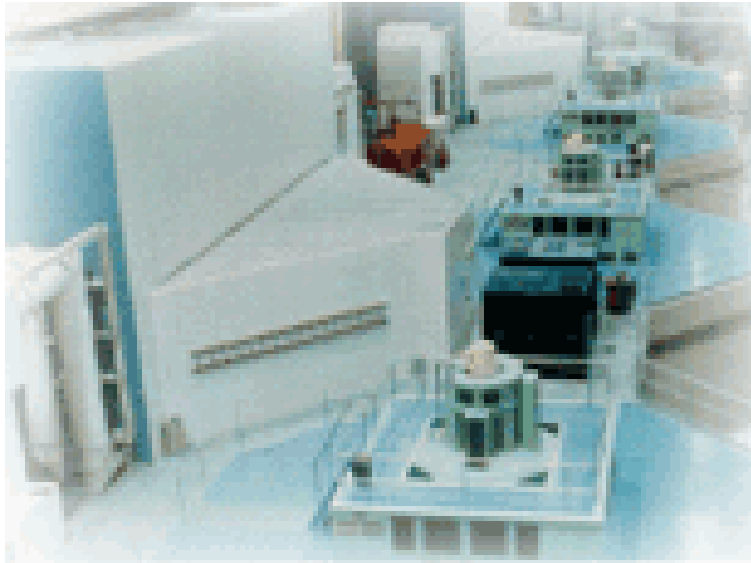


Daytime: Water flows downhill through turbines, producing electricity



Nighttime: Water pumped uphill to reservoir for tomorrow's use

# Northfield Mountain Station



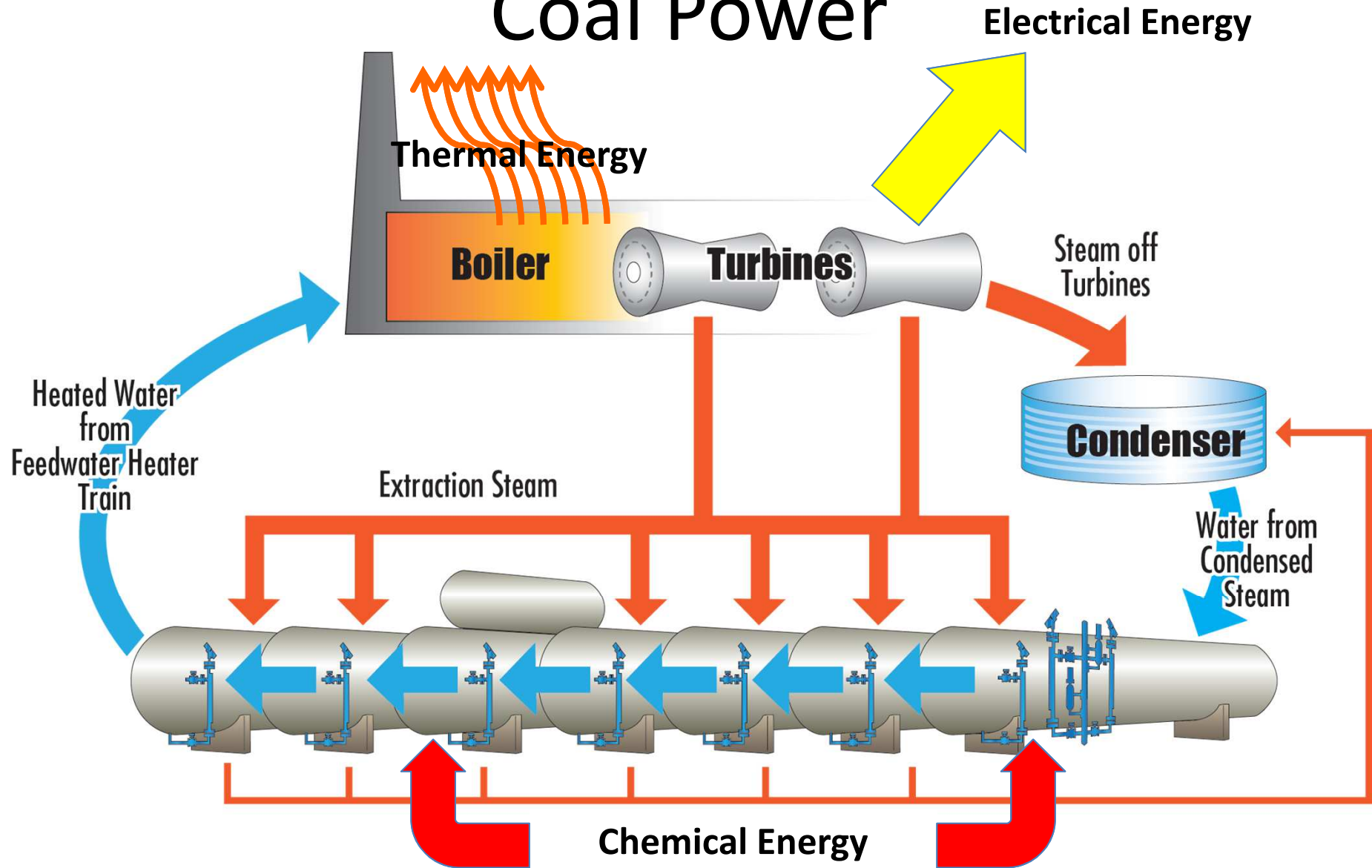
- 1,124 MW
  - 4 reversible turbine / pumps
  - Underground in Northfield, upriver from Turners Falls dam
  - Owned by GDF Suez (Paris)
- 
- Water pumped into upper reservoir using nuclear and fossil generated power during low usage times
  - Released through underground shaft to generate power flowing back to lower reservoir

# Taum Sauk Mountain, MO



[http://www.rizzoassoc.com/cms/image2.php?url=images/stories/site/project\\_photos/dams/earthen/taum\\_sauk/15---ts-aerial1.jpg&size=586](http://www.rizzoassoc.com/cms/image2.php?url=images/stories/site/project_photos/dams/earthen/taum_sauk/15---ts-aerial1.jpg&size=586)

# Coal Power





# Brayton Point Power Station



- 1,538 MW
  - 3 coal-fired, 1 gas
  - Somerset at head of Narragansett Bay
  - Owned by Dominion (Richmond, VA) being sold to CA private equity firm
- 
- Dominion getting out of coal-fired business; also sold Salem Point plant last year
  - Spent over \$1B on environmental upgrades since 2005; plant sold for less

# Canal Power Plant



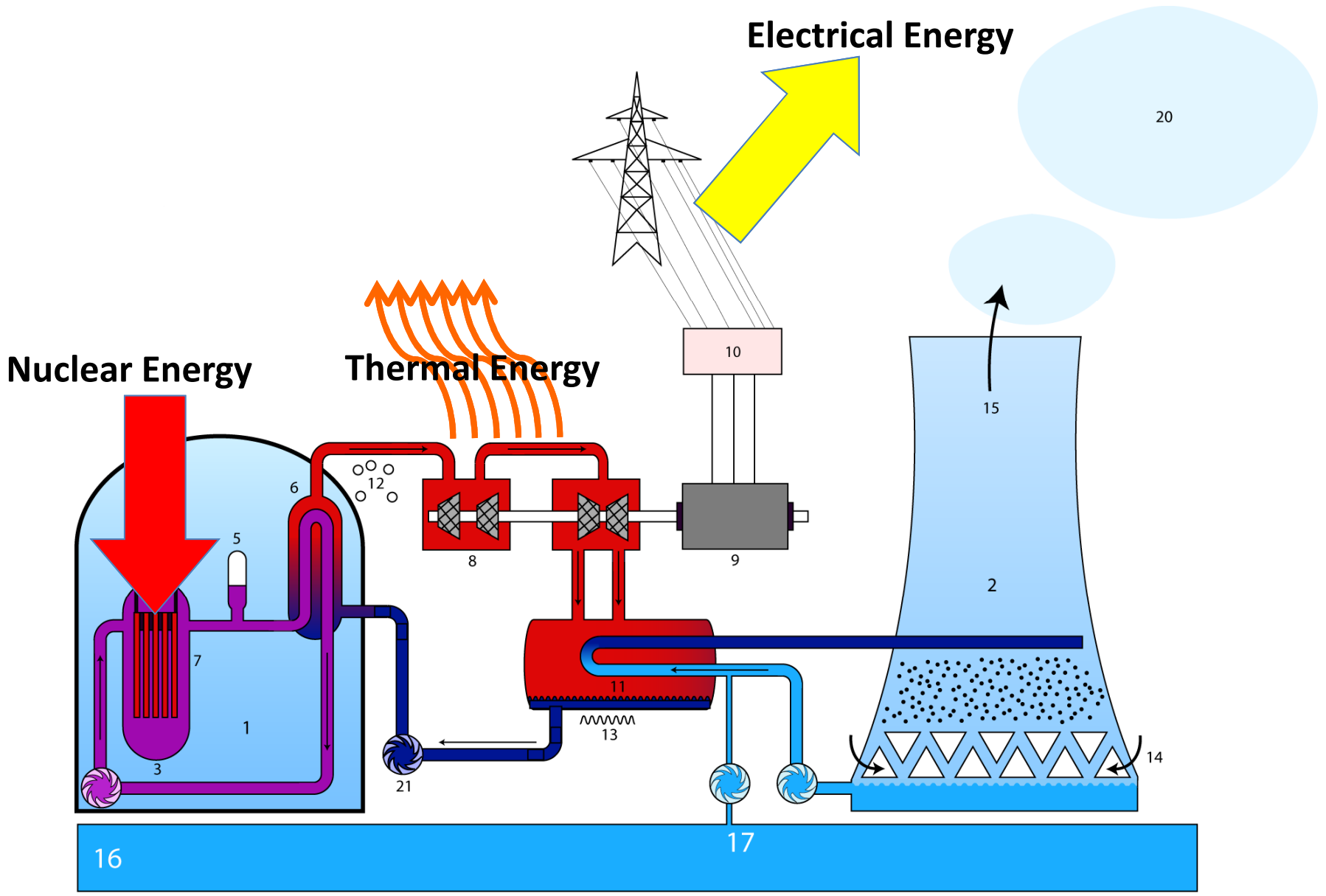
- 1,085 MW
  - 2 oil-fired steam turbines, one could use gas
  - Sandwich on CC Canal
  - Owned by GenOn (Houston)
- 
- Not generating as of 2009; maintained as emergency backup for Cape Cod
  - Sandwich concerned about loss of \$2.5M tax revenue
  - GenOn being bought by NRG Energy (Princeton, NJ)

# Salem Harbor Power Plant



- 584 MW
  - 1 oil, 1 coal
  - Salem
  - Owned by Footprint (NJ)
  - Being closed by 2014
- 
- 2 coal units already shut down
  - Started operating in 1952
  - New owner wants to replace with 630 MW combined cycle gas
  - Debate over how to deal with power shortage in NEMA/Boston

# Nuclear Power

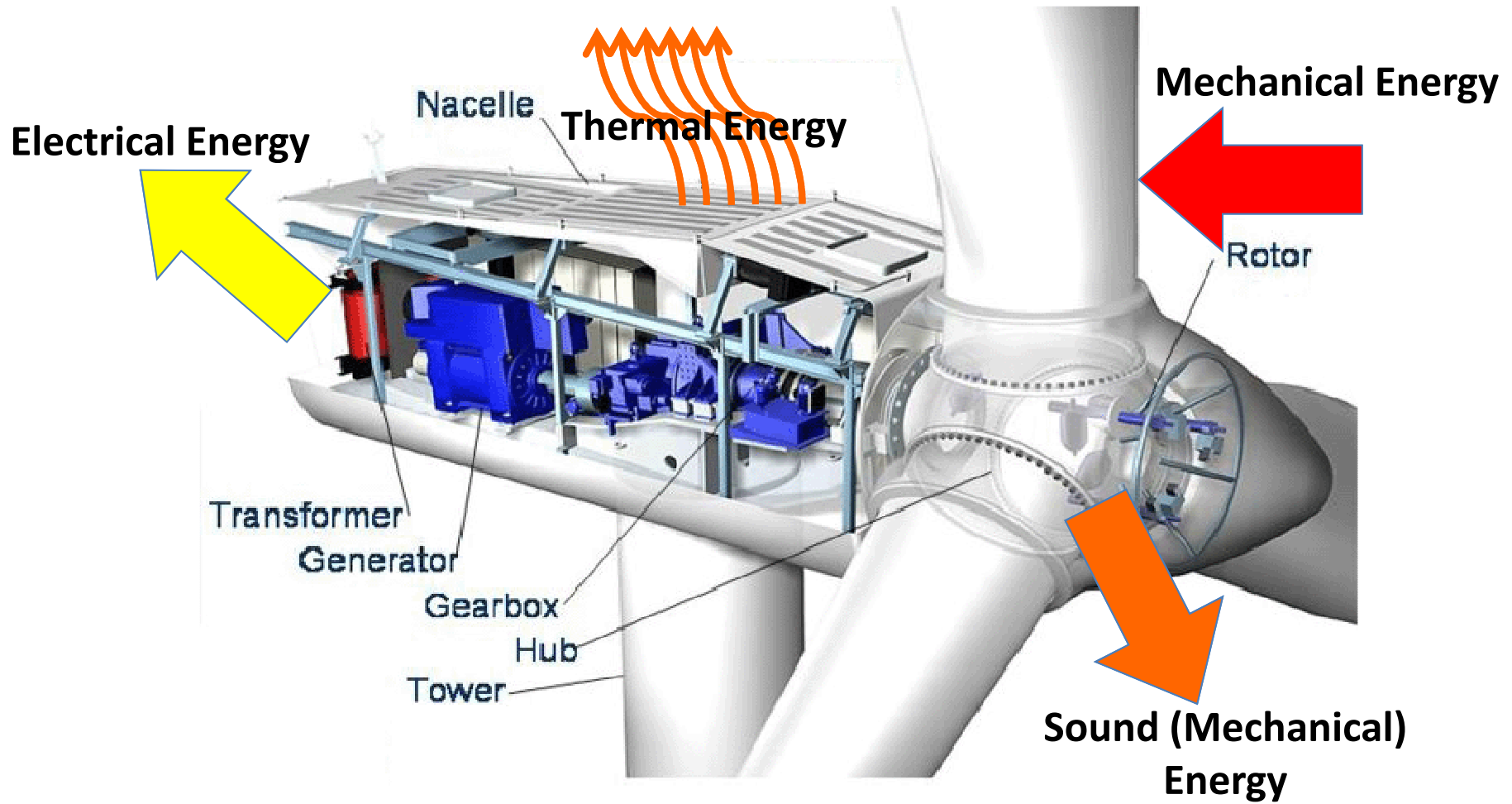


# Pilgrim Nuclear Power Station



- 677 MW
  - 1 GE Boiling Water Reactor
  - Plymouth
  - Owned by Entergy (New Orleans)
- 
- Operates 24x7x365 at full power – 10% of MA demand
  - Started operating in 1972
  - Seeking to renew license to operate until 2032
  - Cooled by Cape Cod Bay (no cooling tower)

# Wind Power



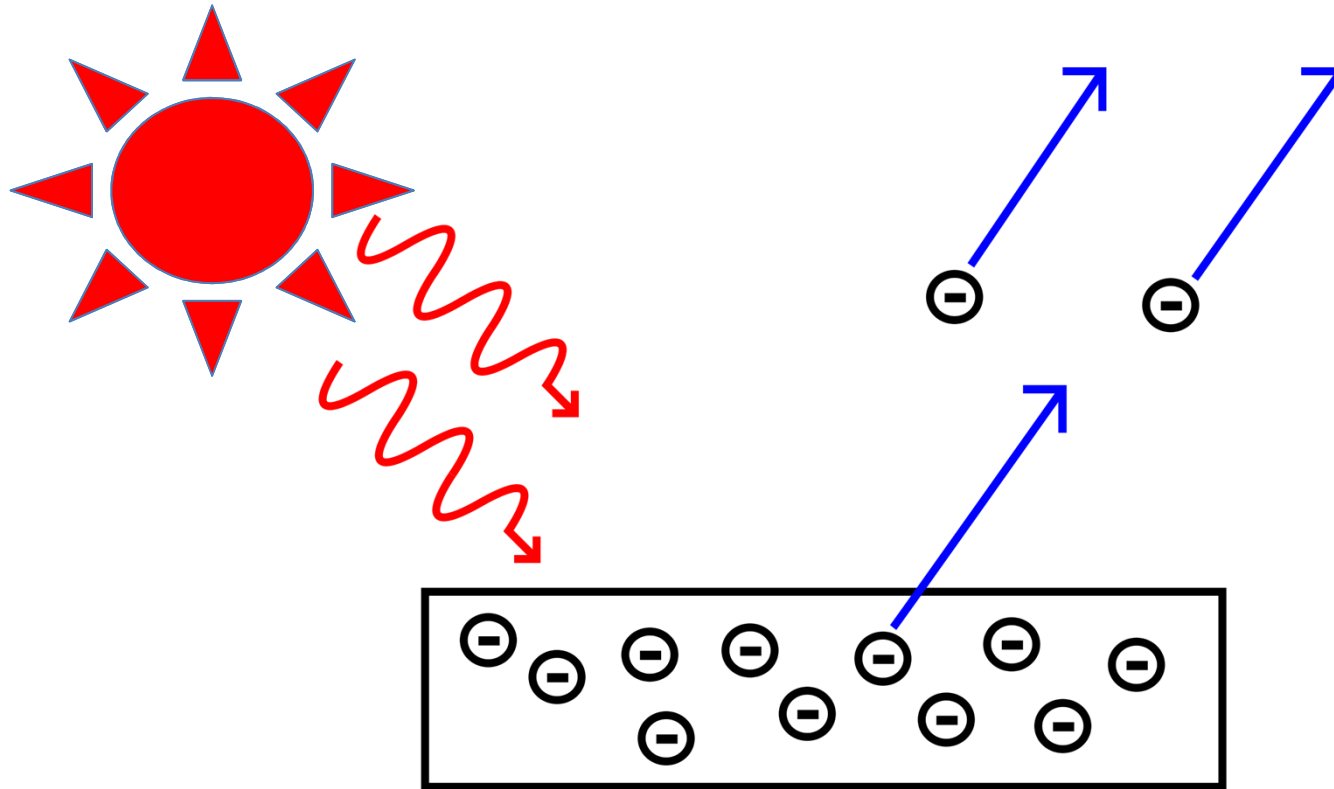


**“On shore”  
Altamont Pass, California  
1000 MW**

**“Offshore”  
Greater Gabbard, UK  
504 MW**

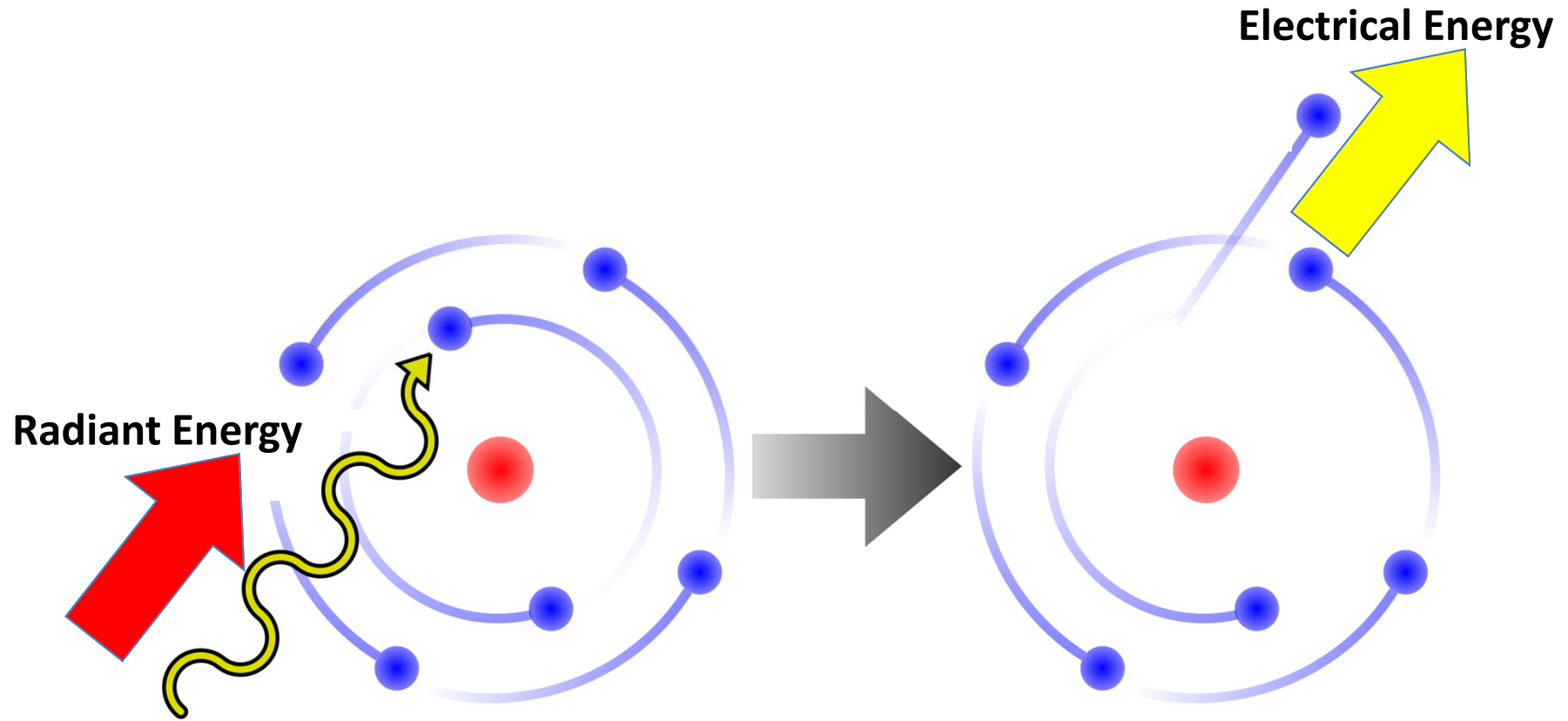


# Solar “Photo-Voltaic” Power





# Solar PV Power



# Solar PV Power



**Rooftop**



**Solar “Farms”**

*Shown: 11 MW on 90 acres  
Portugal*

# Solar “Thermal” Power



# Solar Power

