

ENERGY

ENERGY

Energy is capacity to do work, produce motion, force or carry out transformation

Types of Energy

1. Conventional Energy Resources

2. Nonconventional Energy Resources

Types of Energy on Durability

1. Nonrenewable Energy Resources

2. Renewable Energy Resources

WORLD ENERGY CONSUMPTION

- ❑ Fossil Fuel- 76%
- ❑ Nuclear Energy 6%
- ❑ Solar Energy
- ❑ Tidal Energy
- ❑ Wind Energy
- ❑ Hydropower Energy
- ❑ Biomass Energy- 11%

7%



ENERGY RESOURCES

- Fossil Fuel
- Nuclear Energy
- Solar Energy
- Tidal Energy
- Wind Energy
- Hydroelectrical Energy
- Biomass Energy
- Hydrogen Energy

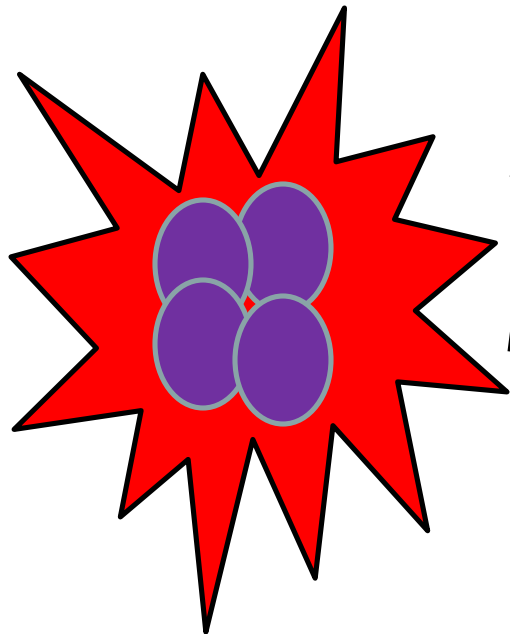
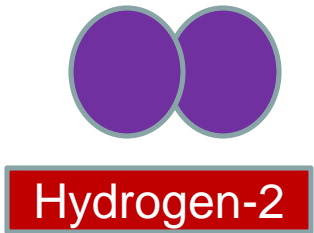
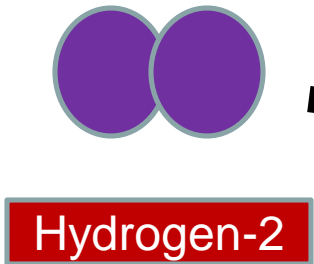
Fossil Fuel

- Coal
- Petroleum
- Liquefied Petroleum Gas (L.P.G.)
- Natural Gas
- Compressed Natural Gas (C.N.G.)
- Synthetic Natural Gas

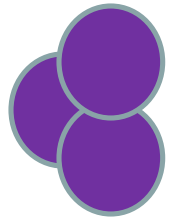
Nuclear Energy

Nuclear Fission

Nuclear Fusion



1 Billion C



Nuclear Fusion

Advantages of Nuclear Energy

- Low Cost
- Low Mining Areas Required
- More Productivity in Small land use
- Less pollution

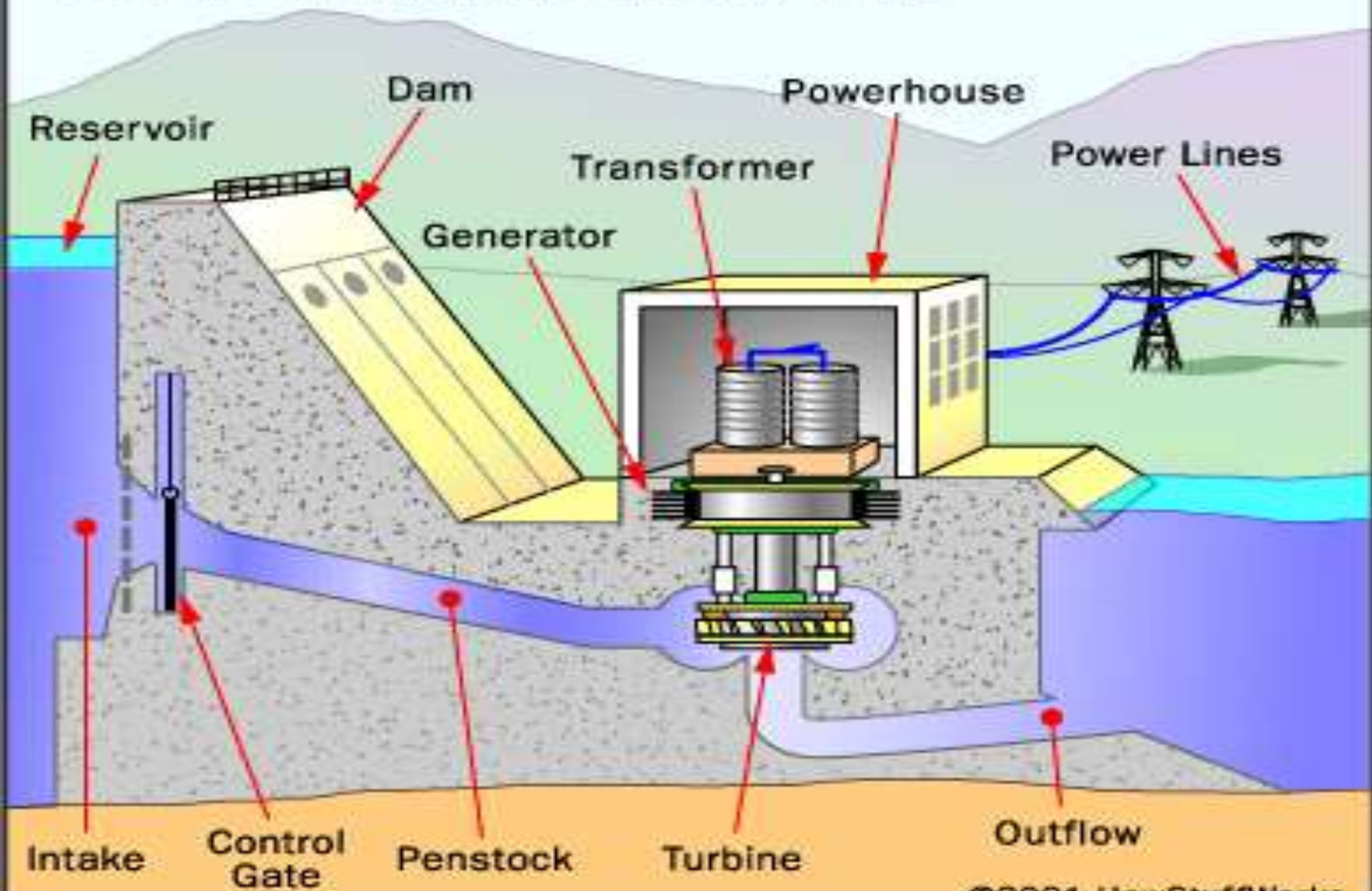
Disadvantages of Nuclear Energy

- Available in only few countries**
- Thermal Pollution**
- Radioactive wastes management**
- Accident can hazards in vast area**

Hydropower Plants



Inside a Hydropower Plant



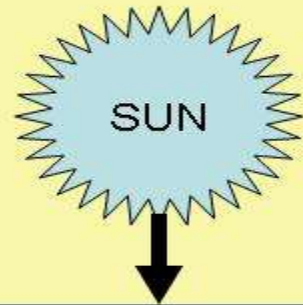
Advantages of Hydropower Energy

- Electricity generation
- Irrigation
- Drinking Water Supply
- Non Polluted Energy Resources

Disadvantages of Hydropower Energy

- Non useful for long term irrigation
- Loss of flora and Fauna
- Disaster
- Resettlement
- Rehabilitation

Solar Energy



SOLAR ENERGY USES



Heat

- Process heat biomass
- Solar thermal heat



Electricity

- Photovoltaic cells
- Solar Thermal power
- Wind mills



Mechanical Energy

- Wind mills



Chemical Energy

- Biochemical Conversion

1. Traditional uses-

The solar energy is used for drying, cloths, grains and preservation of eatable food.

2. Modern uses

- 1. Photovoltaic cells**
- 2. Solar cooker**
- 3. Solar water heater**
- 4. Solar furnace**
- 5. Solar power plant**

Solar Energy-

Sun is renewable source of energy on earth.

These are of two categories.

(a) Active Heat Collectors-

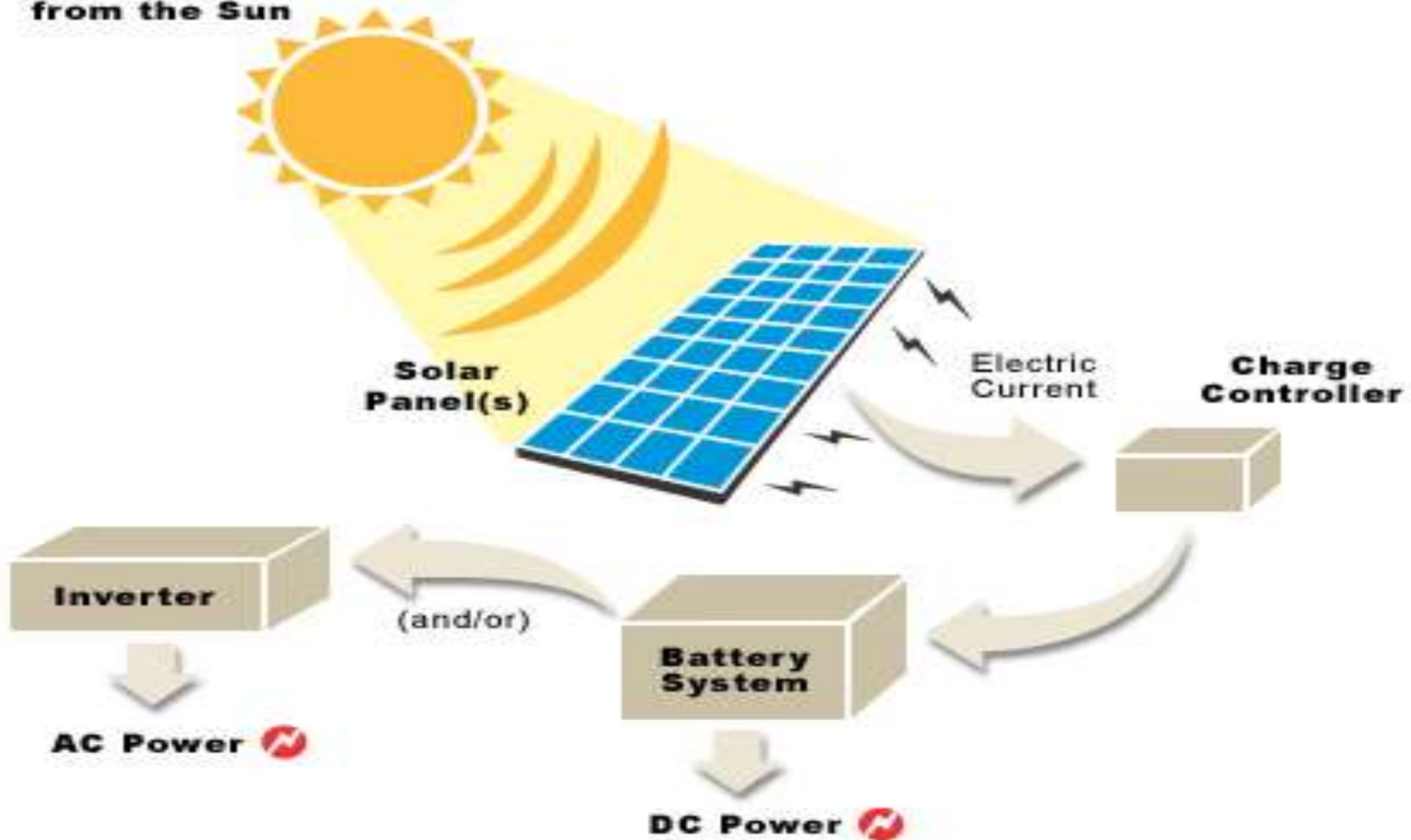
These are heat absorbing medium through a collector which is normally placed on the top of the building

(b) Passive Heat Collectors

These collectors absorbed the heat during day and release during night. eg. Stones, glass, bricks, etc.

1. Photovoltaic cells

Solar Irradiance
from the Sun



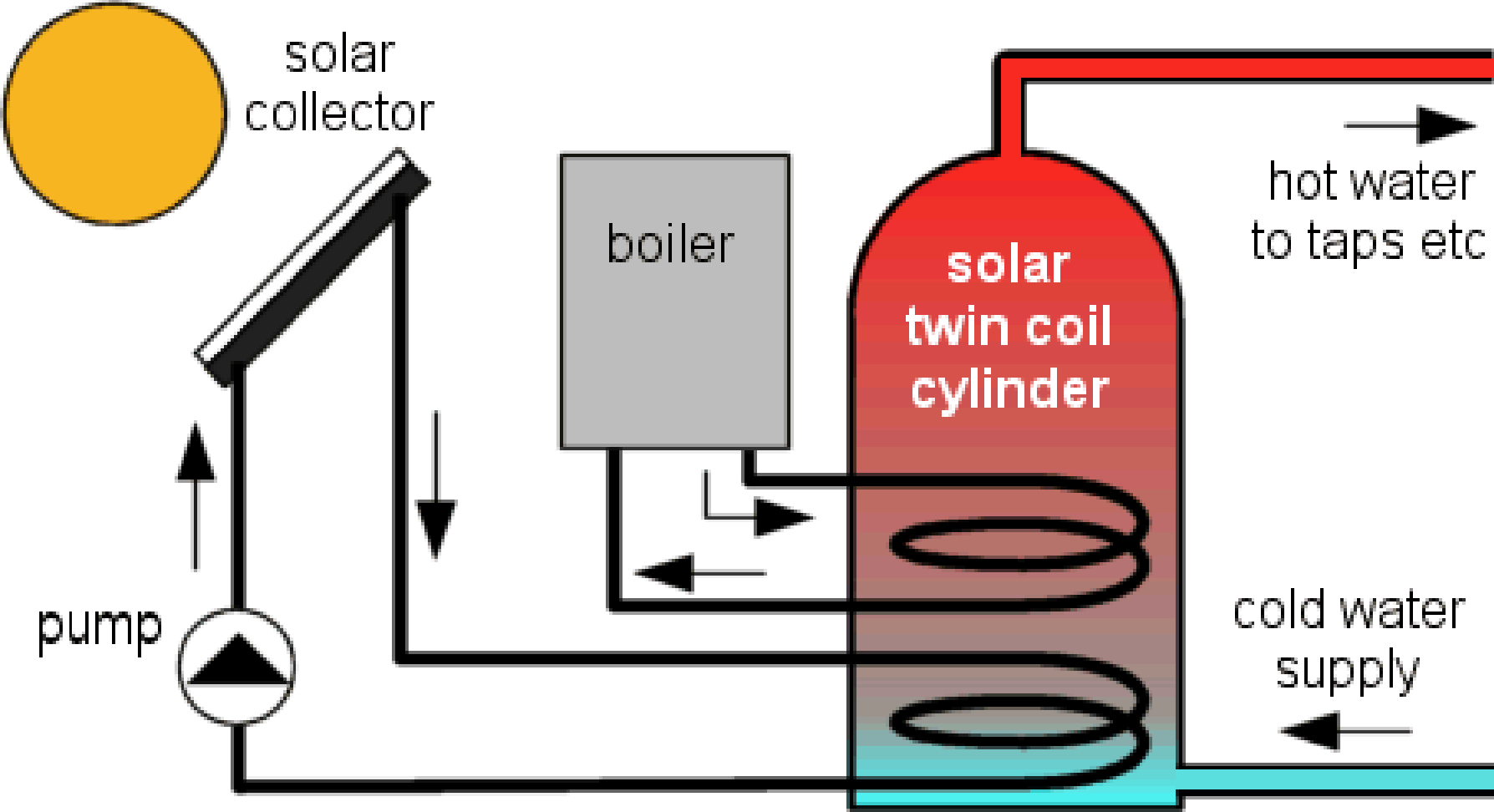
Solar Cooker



Solar Water Heater



Working of Solar Water Heater

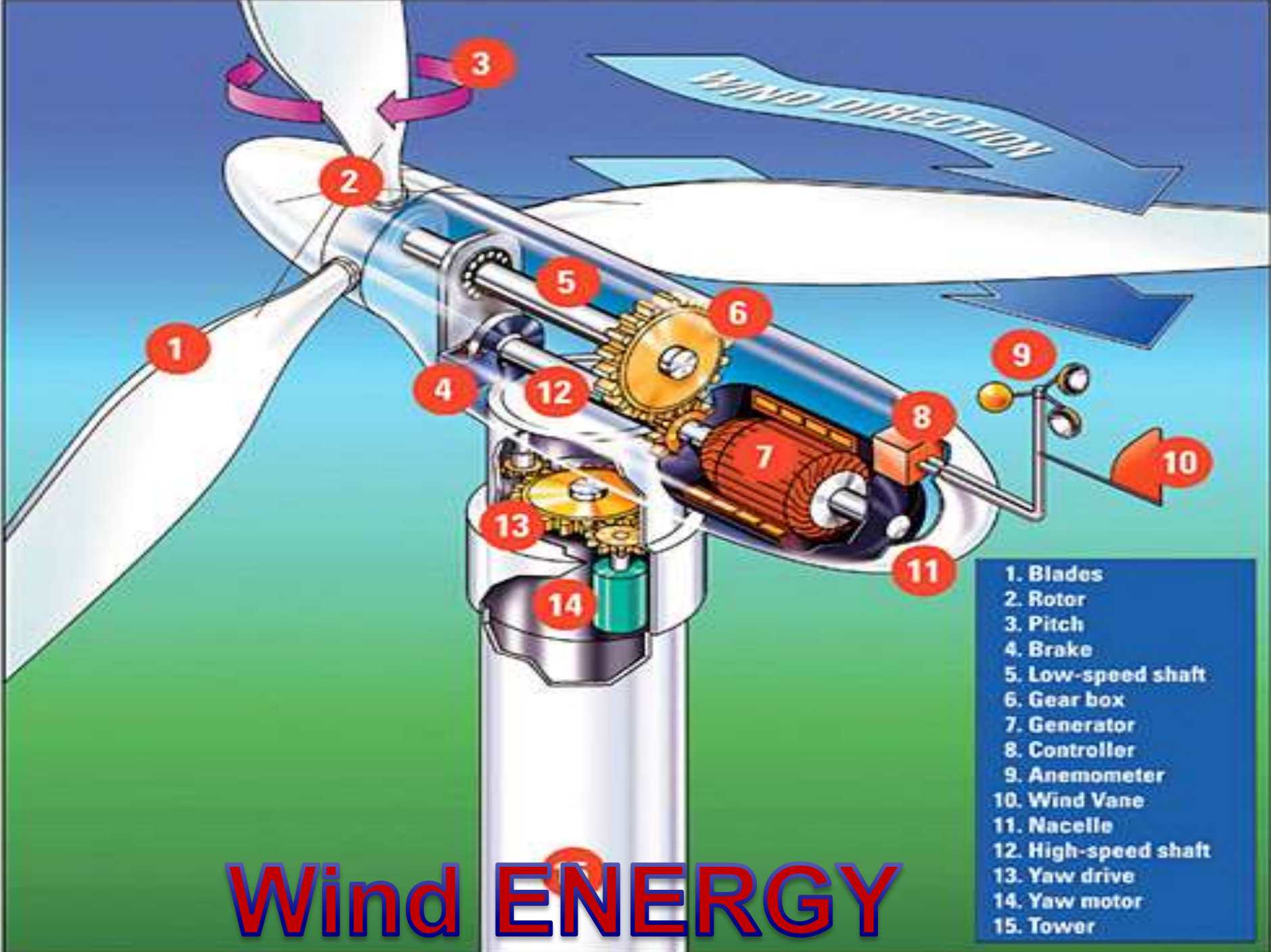


Solar Thermal Power Plant



Solar Furnace





- 1. Blades
- 2. Rotor
- 3. Pitch
- 4. Brake
- 5. Low-speed shaft
- 6. Gear box
- 7. Generator
- 8. Controller
- 9. Anemometer
- 10. Wind Vane
- 11. Nacelle
- 12. High-speed shaft
- 13. Yaw drive
- 14. Yaw motor
- 15. Tower

Wind ENERGY

Advantages of Wind Energy

- Low cost energy generation**
- Produce energy due to high efficiency**
- Land below the turbines can be used for the agriculture**
- Pollution free**
- The operation and maintenance is not very high**

Disadvantages of Wind Energy

❑ Required steady wind

❑ In absence of steady wind a backup system is necessary

❑ Noisy turbines make in suitable environment for location

BIOMASS ENERGY

- 1. Direct Incineration**
- 2. Thermo chemical conversion**
- 3. Biochemical conversion**

1. Direct Incineration

2. Thermo chemical conversion

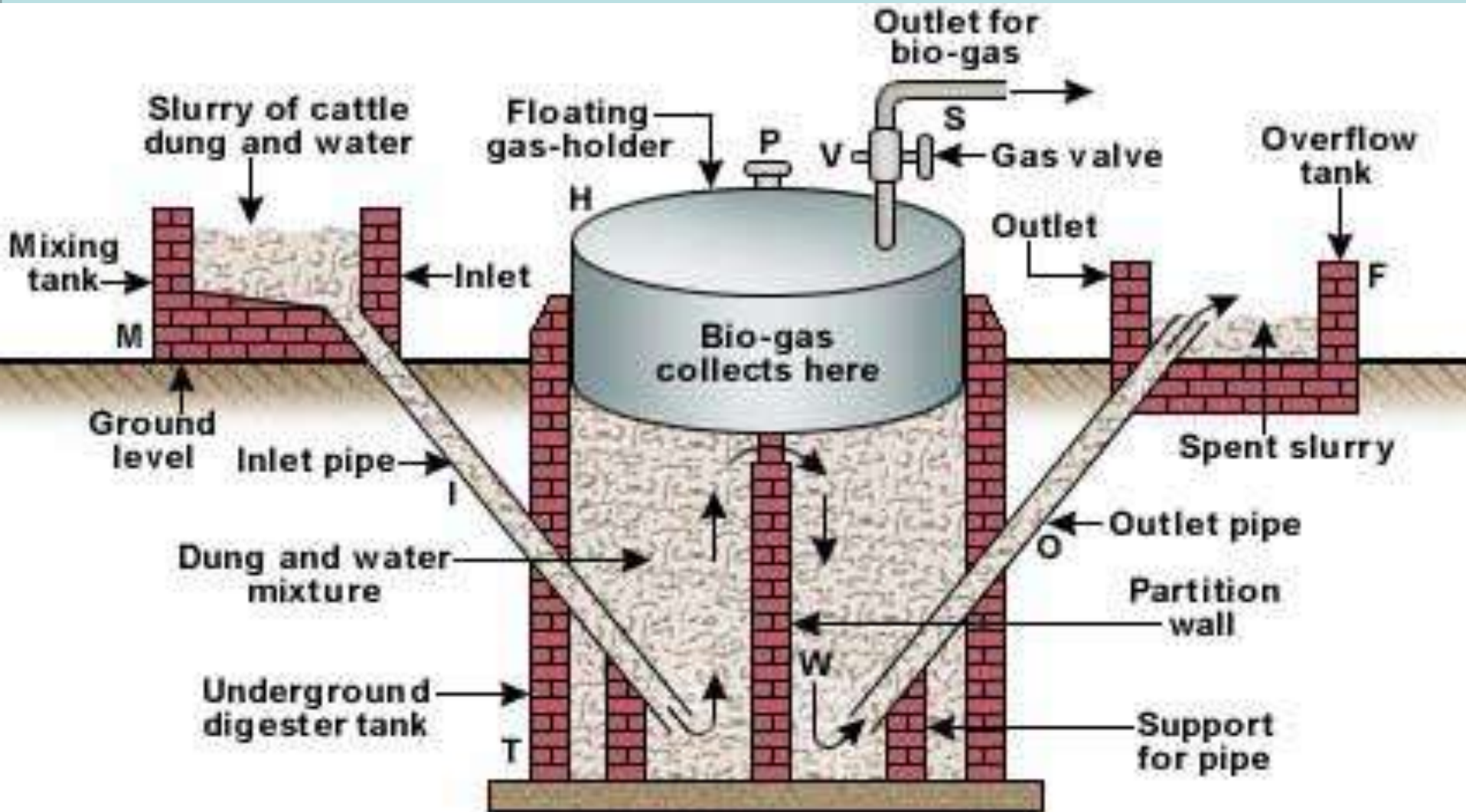
3. Biochemical conversion

- 1. Biogas Production**
- 2. Biofuel Production**

Biogas Production

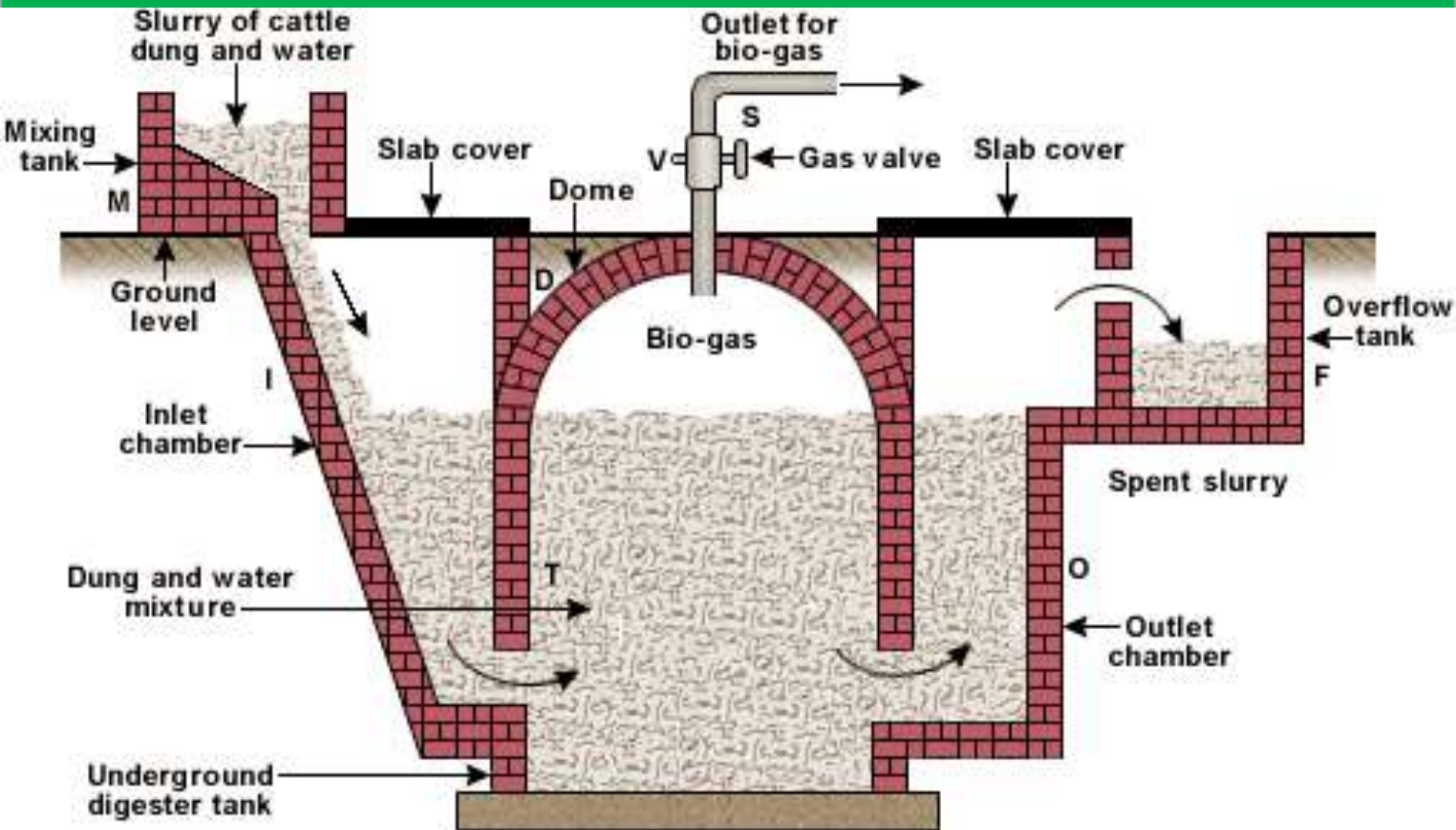
1. Floating dome type
2. Fixed dome type

1. Floating dome type



Floating gas-holder type bio-gas plant.

2.Fixed dome type



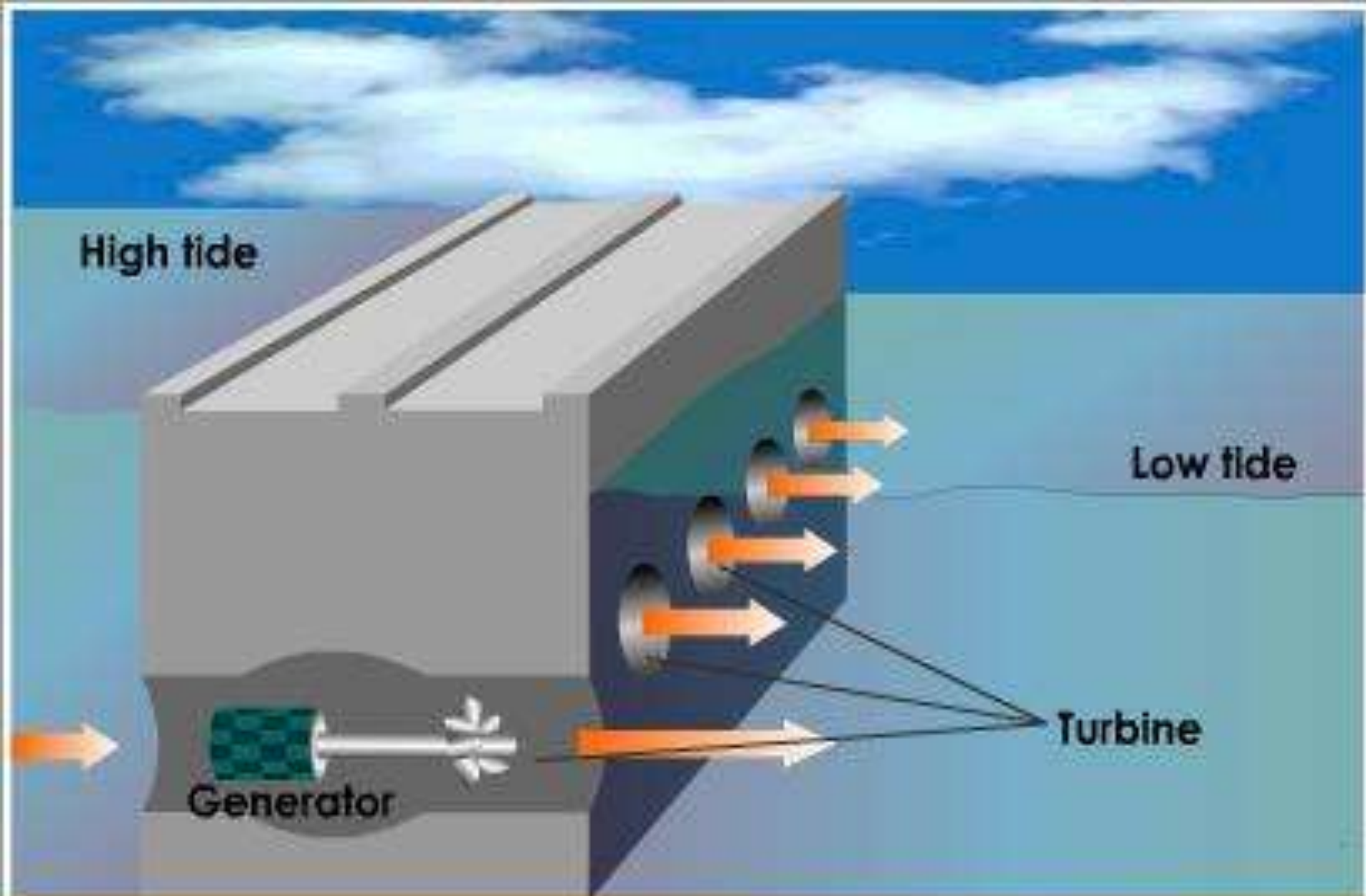
Fixed-dome type bio-gas plant.

2. Biofuel

Ethanol

Advantages biomass energy

- Plant can continuous supply of gas
- Low cost energy resources
- Reduces pollution
- Gives clear fuel
- Biofertilizers
- Reduce the dispersion of diseases



Tidal Energy

Advantages Tidal Energy

- ❑ Low cost energy resources
- ❑ Non polluted
- ❑ Barrage area can be use for marine fisheries

Disadvantages Tidal Energy

- ❑ It need backup system during low tide
- ❑ Poor awareness about this energy

Hydrogen can be obtain by following ways

- ❑ Thermal dissociation
- ❑ Chemical dissociation
- ❑ Electric dissociation
- ❑ Photolytic dissociation



Hydrogen as an alternative
source of energy

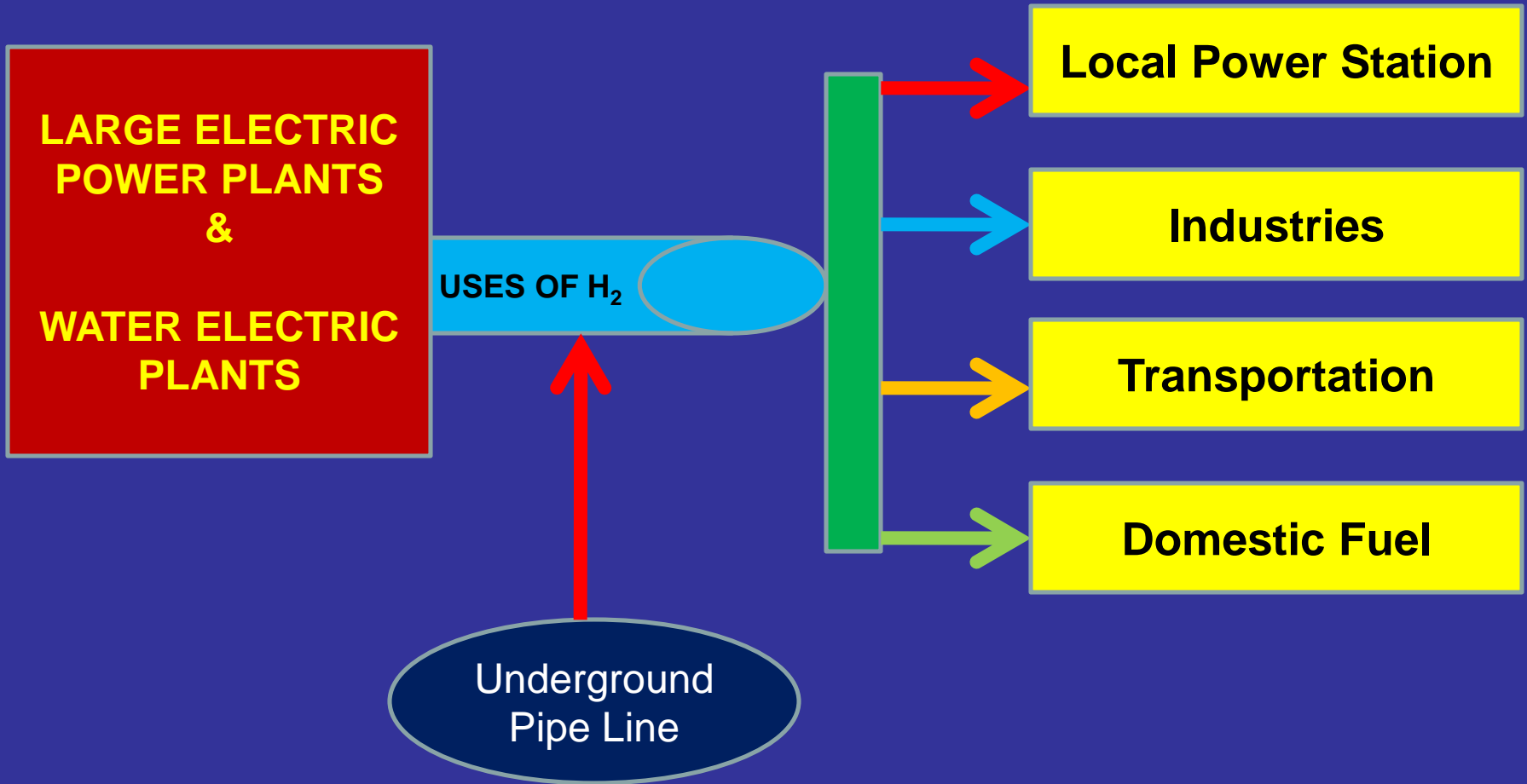
Thermal dissociation

Chemical dissociation

Electric dissociation



Photolytic dissociation



Advantages of Hydrogen Fuel

- Clean fuel
- Non Polluting
- High Calorific Value
- After Burning it Release Water
- Raw material for H₂ is Available in Huge Amount

Disadvantages of Hydrogen Fuel

- ❑ High inflammable and explosive in nature Calorific Value
- ❑ Its Storage and Transportation Needs High Safety Measures
Dissociation of H_2 is Not Available for Large Scale