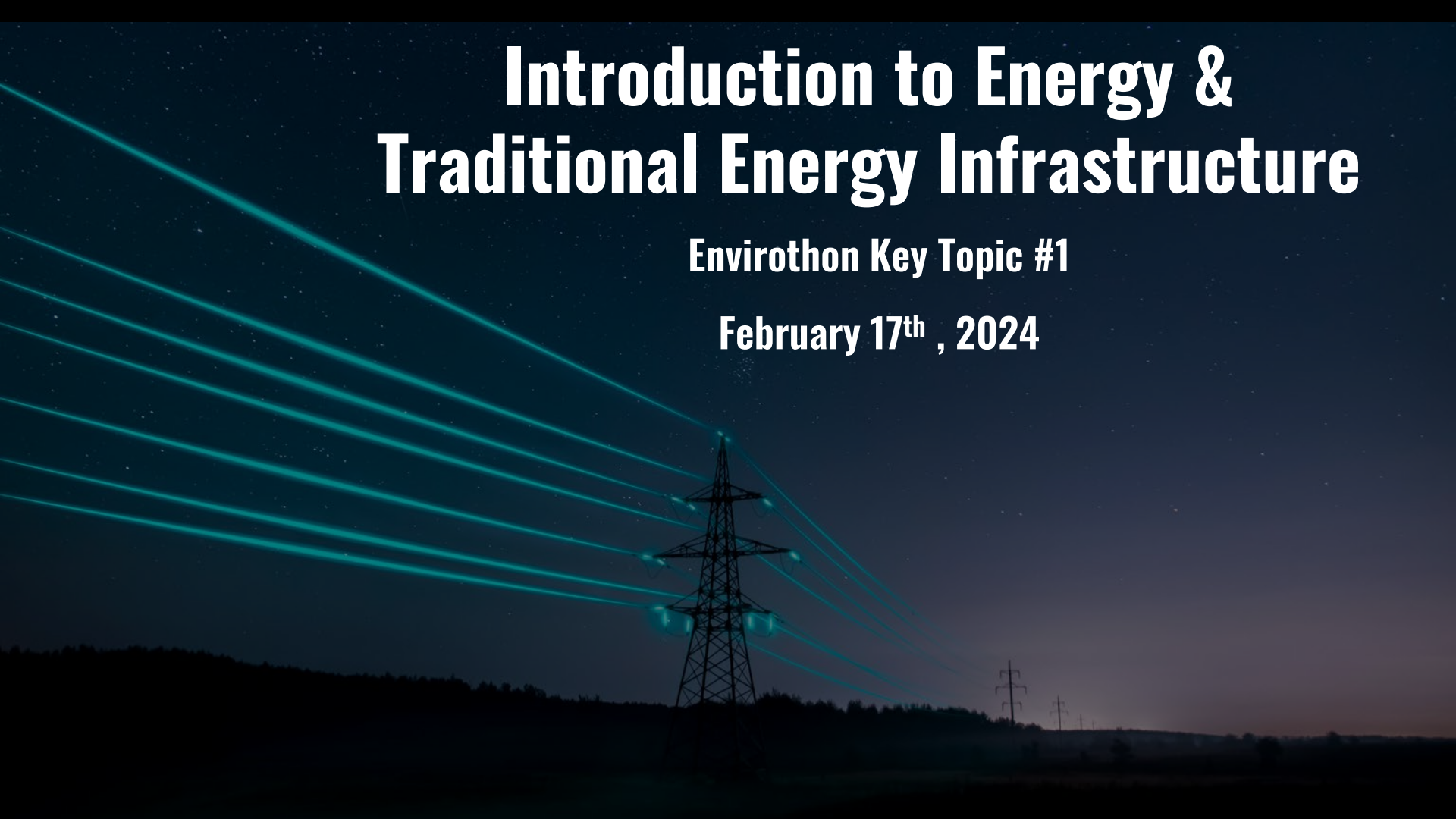

DELAWARE
ENVIROTHON™



Introduction to Energy & Traditional Energy Infrastructure

Envirothon Key Topic #1

February 17th , 2024

What is Energy ?

- **Energy**
  - The ability to do work
  - EVERYTHING has energy
    - Wood
    - Gasoline
    - Wind
  - E = power X time
- **1st Law of Thermodynamics**
  - Energy cannot be created or destroyed – it can only change forms

- **Form of Energy**
  - Potential – Stored Energy
    - Nuclear
    - Chemical
    - Mechanical
    - Gravitational
  - Kinetic – Energy of Motion
    - Electrical
    - Electromagnetic
    - Thermal
    - Motion
    - Sonic

Energy Units

- **Energy Units**
  - Untis are a way to express a quanity
  - Unit of time, length, velocity, volume, weight, ect.

British Thermal Unit (Btu):

The amount of energy it takes to heat **one pound** of water **1-degree Fahrenheit**

Unit Conversions:

1 kWh = ~3,412 Btu
1 ccf = ~103,000 Btu
1 gal gas = ~125,000 Btu
1 gal oil = ~139,000 Btu
1 Btu = ~1,055 J

What is Power?

- **Power**
  - The rate at which energy is converted
  - Power is **energy per unit time**
    - P = E/t

Power Units :
Btu/hr
Watt (W)
Horsepower

Watt (W):

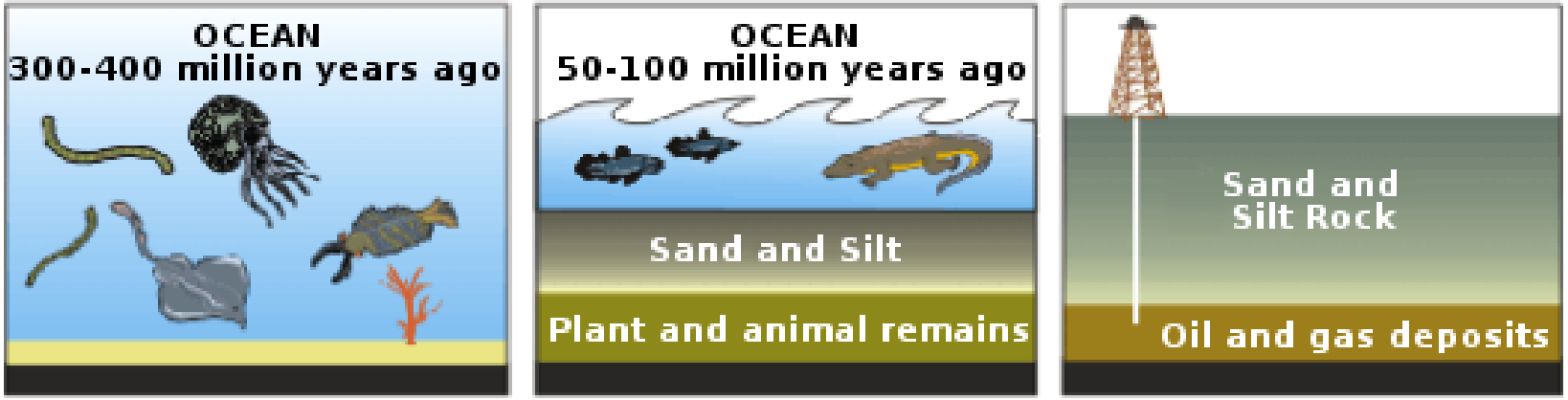
Equal to one joule per second

Non-Renewable Fuels

- **Non-renewable Fuels (“non-renewables”)**
  - Not renewable on a human timescale
- **Fossil Fuels**
  - Fossilized hydrocarbons derived through natural processes from organic material
    - Fossilized: converted from its origional form over millions of years
    - Hydrocarbon: made mostly of hyrdrogen and carbon
    - Organic Material: living or recently living

Non-Renewable Fuels

Petroleum and natural gas formation



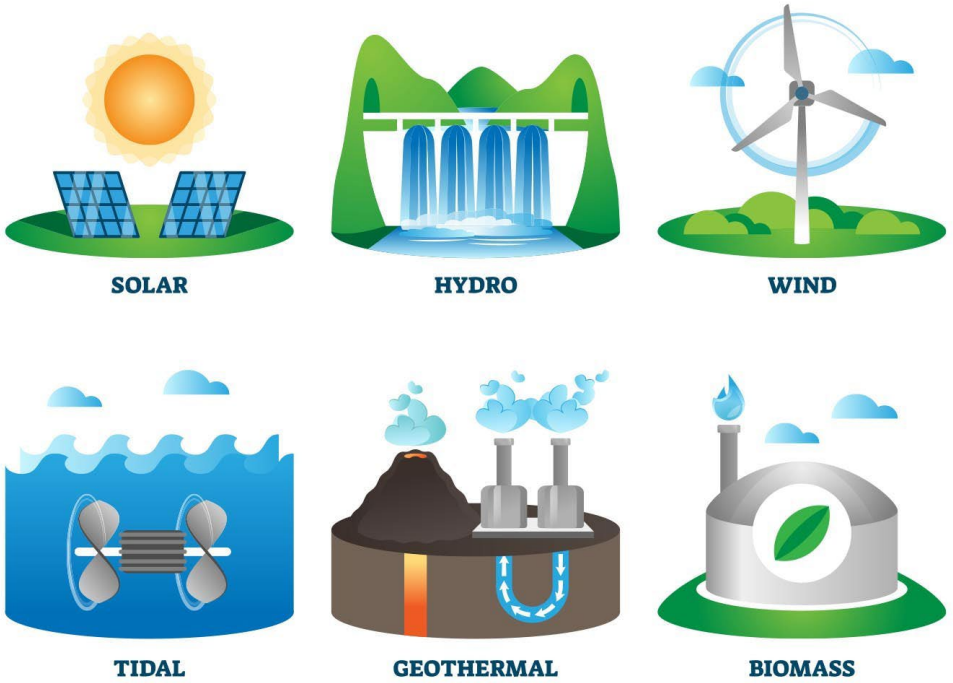
Tiny sea plants and animals died and were buried on the ocean floor. Over time they were covered by layers of silt and sand.

Over millions of years, the remains were buried deeper and deeper. The enormous heat and pressure turned them into oil and gas.

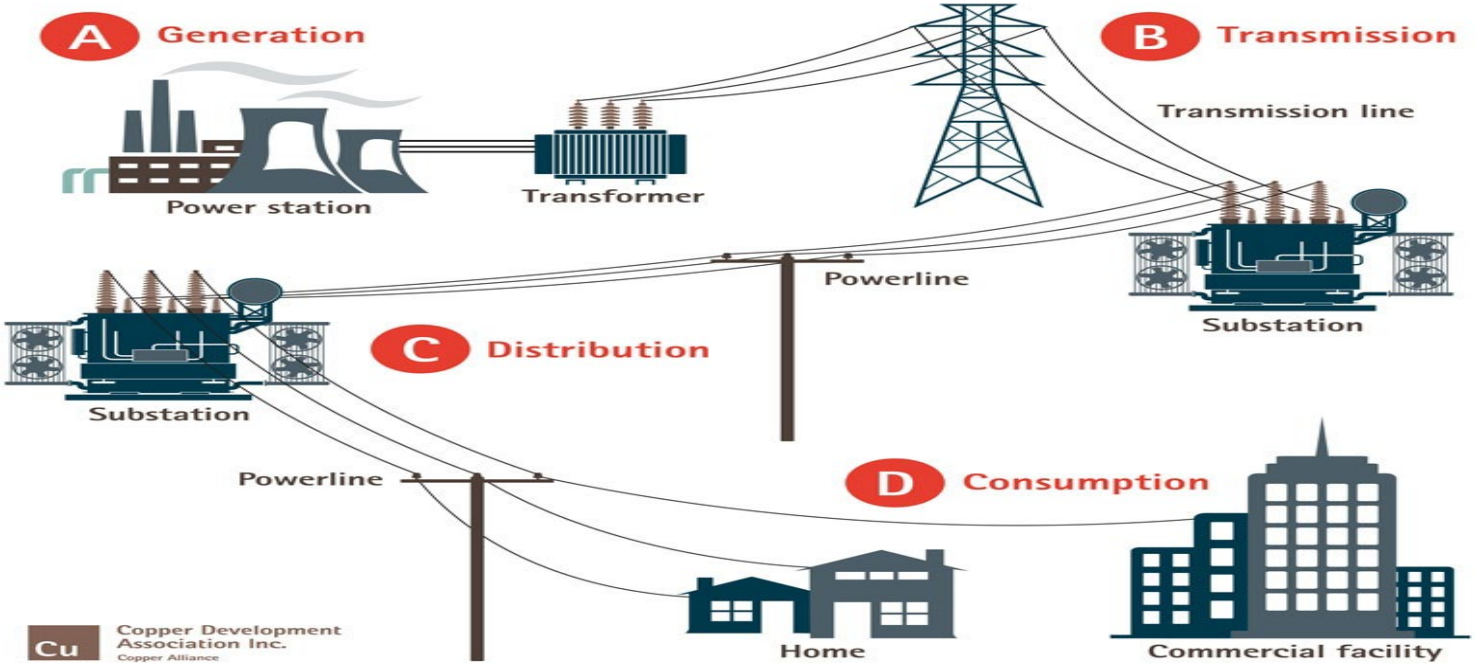
Today we drill down through layers of sand, silt and rock to reach the rock formations that contain oil and gas deposits.

Renewable Fuels

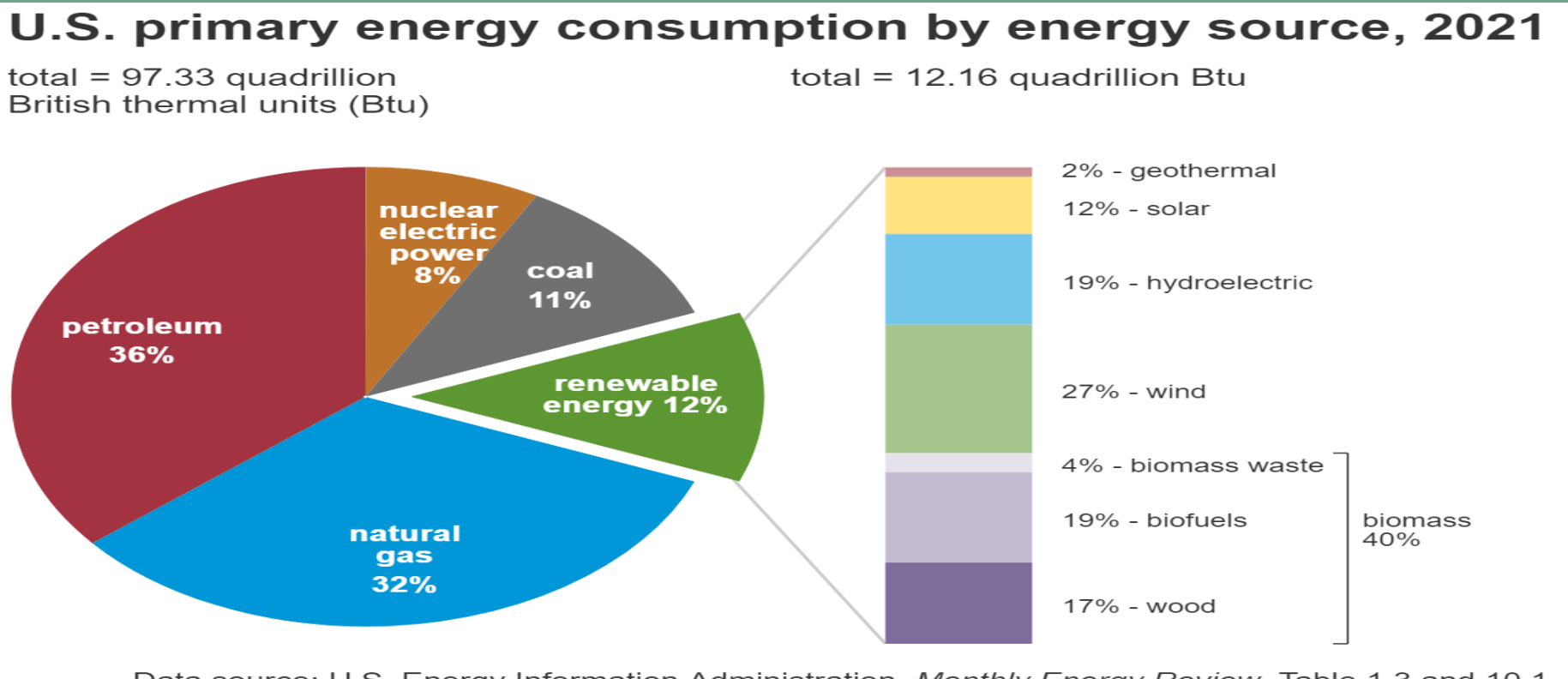
- **Renewable Fuel ("renewables")**
  - Are produced by source that are renewable on a human time scale



Energy Infrastructure



Global Fuel Mix



Questions ?