Fuels are classified based on several factors, such as their state, origin, and combustion characteristics. Below is a comprehensive classification of fuels:

### ****1. Classification Based on Physical State****

#### ****Solid Fuels****

* Examples: Coal, wood, peat, charcoal, lignite, biomass.
* Characteristics:
  + High carbon content.
  + Relatively low efficiency compared to liquid and gaseous fuels.
  + Used in power plants, domestic heating, and industrial furnaces.

#### ****Liquid Fuels****

* Examples: Petrol (gasoline), diesel, kerosene, ethanol, biodiesel.
* Characteristics:
  + High energy density.
  + Easy to store and transport.
  + Commonly used in vehicles, power generation, and heating.

#### ****Gaseous Fuels****

* Examples: Natural gas, LPG (Liquefied Petroleum Gas), biogas, hydrogen, producer gas.
* Characteristics:
  + Cleaner combustion with higher efficiency.
  + Require special handling and storage due to flammability and pressure requirements.

### ****2. Classification Based on Origin****

#### ****Natural Fuels****

* Derived directly from natural sources without extensive processing.
* Examples: Coal, wood, crude oil, natural gas.
* Characteristics: Abundant and relatively inexpensive in raw form.

#### ****Artificial Fuels****

* Processed or synthesized from natural fuels.
* Examples: Coke, charcoal, kerosene, synthetic fuels, hydrogen.
* Characteristics: Improved properties like higher calorific value and controlled combustion.

### ****3. Classification Based on Combustion Properties****

#### ****Primary Fuels****

* Naturally available and directly usable.
* Examples: Wood, coal, crude oil, natural gas.

#### ****Secondary Fuels****

* Derived or processed from primary fuels.
* Examples: Petrol (from crude oil), coke (from coal), LPG (from natural gas).

### ****4. Classification Based on Calorific Value****

#### ****High-Calorific Value Fuels****

* Fuels that release a large amount of energy during combustion.
* Examples: Petrol, diesel, natural gas.

#### ****Low-Calorific Value Fuels****

* Fuels with relatively lower energy content.
* Examples: Peat, wood, low-grade coal.

### ****5. Classification Based on Carbon Content****

#### ****Fossil Fuels****

* Derived from the decomposition of organic matter over millions of years.
* Examples: Coal, petroleum, natural gas.

#### ****Biofuels****

* Produced from living or recently living organisms.
* Examples: Ethanol, biodiesel, biogas.

### ****6. Classification Based on Usage****

#### ****Domestic Fuels****

* Used in households for cooking, heating, and lighting.
* Examples: LPG, kerosene, firewood.

#### ****Industrial Fuels****

* Used in industries for power generation, metallurgy, and chemical processes.
* Examples: Coal, furnace oil, natural gas.

#### ****Transport Fuels****

* Used for running vehicles, ships, and airplanes.
* Examples: Petrol, diesel, aviation fuel.

### ****7. Classification Based on Environmental Impact****

#### ****Clean Fuels****

* Produce minimal pollutants.
* Examples: Natural gas, hydrogen, ethanol.

#### ****Polluting Fuels****

* Produce significant emissions during combustion.
* Examples: Coal, heavy fuel oil.

### ****8. Emerging Fuel Types****

#### ****Renewable Fuels****

* Fuels replenished naturally.
* Examples: Bioethanol, biodiesel, hydrogen from renewable sources.

#### ****Non-Renewable Fuels****

* Finite and deplete with use.
* Examples: Coal, petroleum, natural gas.