



Fossil Fuels, Biofuels and Climate Change

Fermentation in a Bag –
Introduction to the Problem

What is a fuel?

Fuel: A substance used to produce heat or other forms of energy when burned



Biofuels vs Fossil Fuels

- ✦ What is a fossil fuel? List some examples.
- ✦ What is a biofuel? List some examples.
- ✦ How are fossil fuels and biofuels similar and different?

Most transportation fuels are fossil fuels

Crude oil



Gasoline
 C_8H_{18}



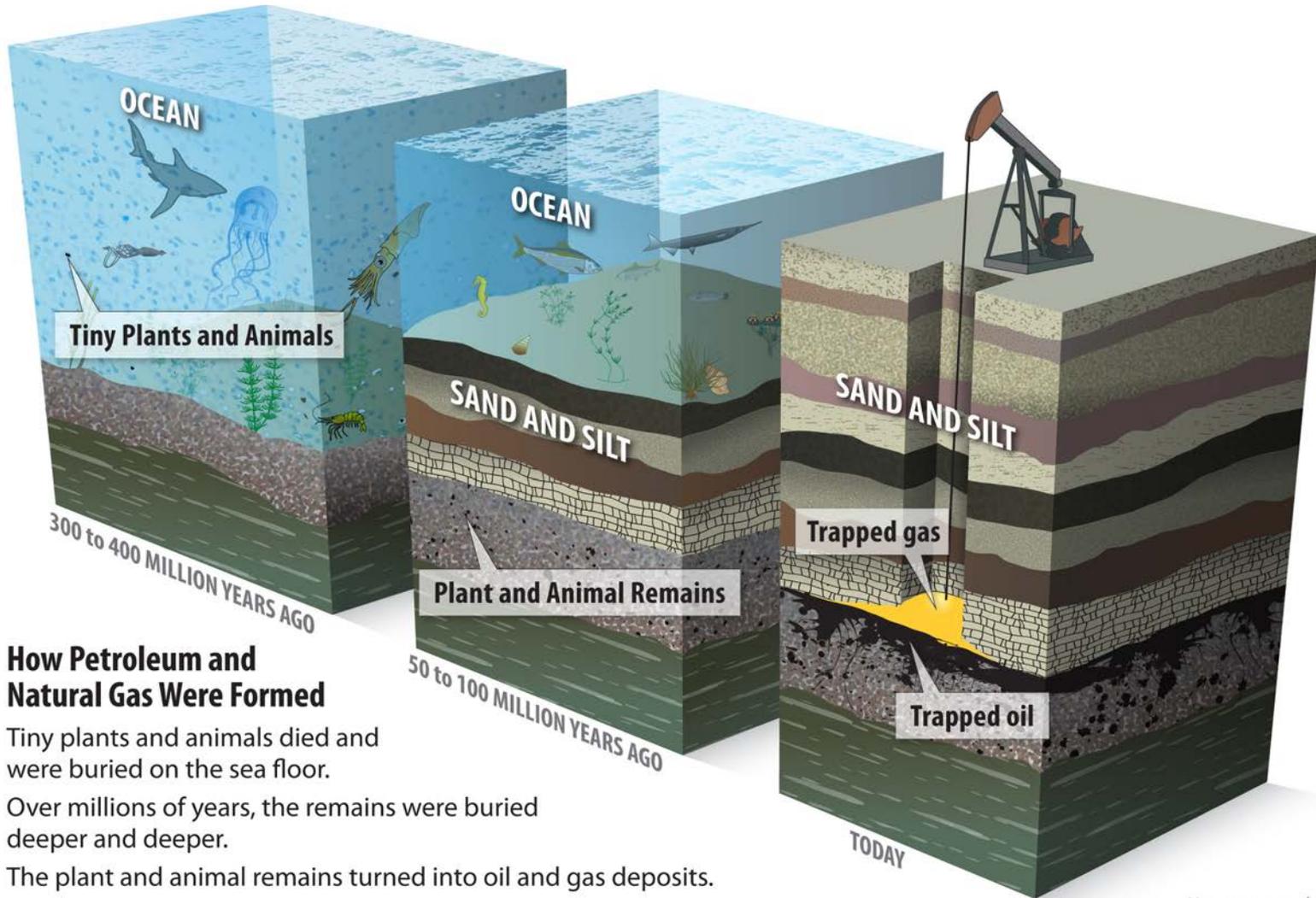
Jet fuel
 $C_{10}H_{22}$



Diesel fuel
 $C_{12}H_{26}$



Where do fossil fuels come from?



How Petroleum and Natural Gas Were Formed

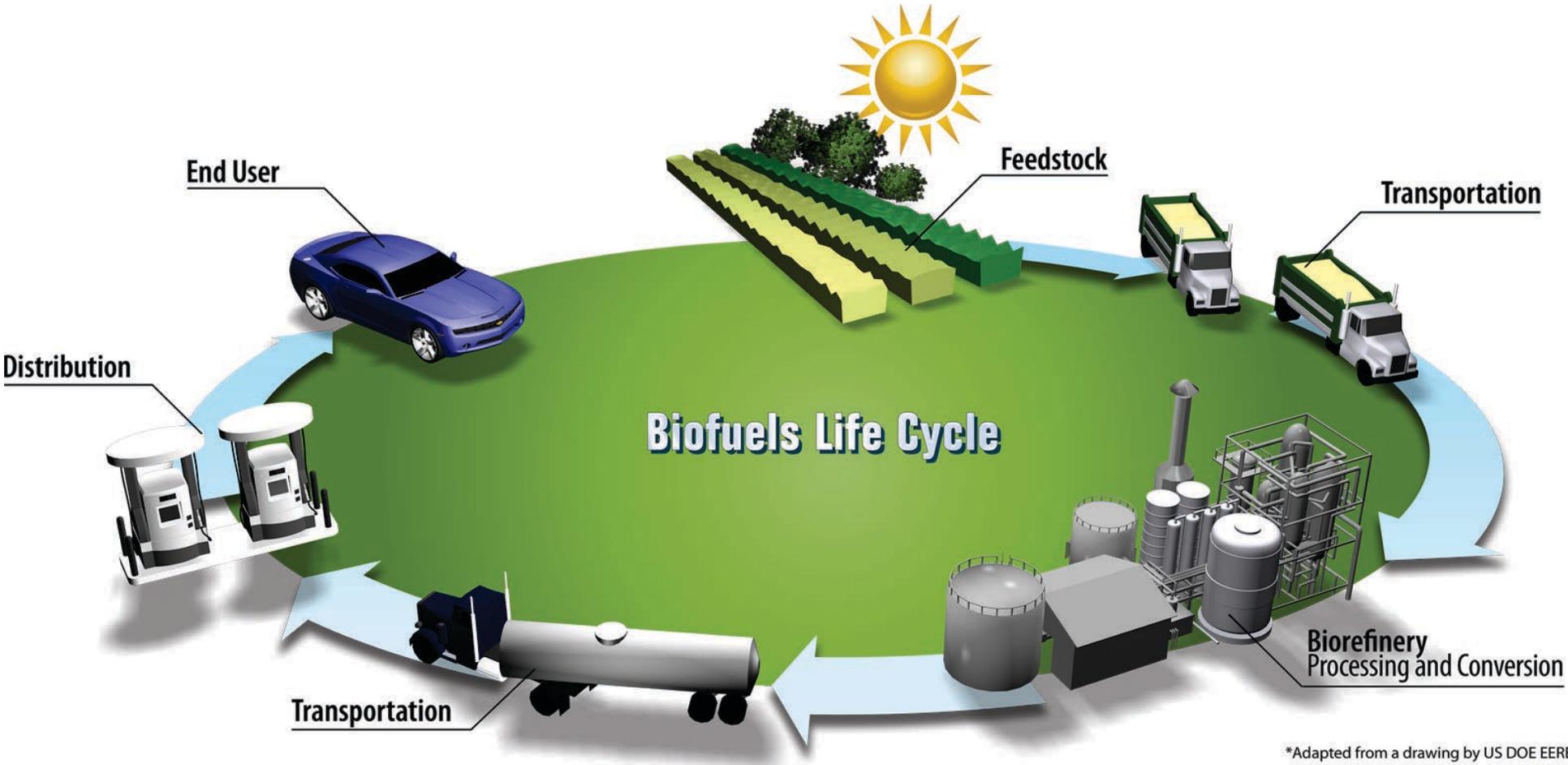
Tiny plants and animals died and were buried on the sea floor.

Over millions of years, the remains were buried deeper and deeper.

The plant and animal remains turned into oil and gas deposits.

Note: not to scale

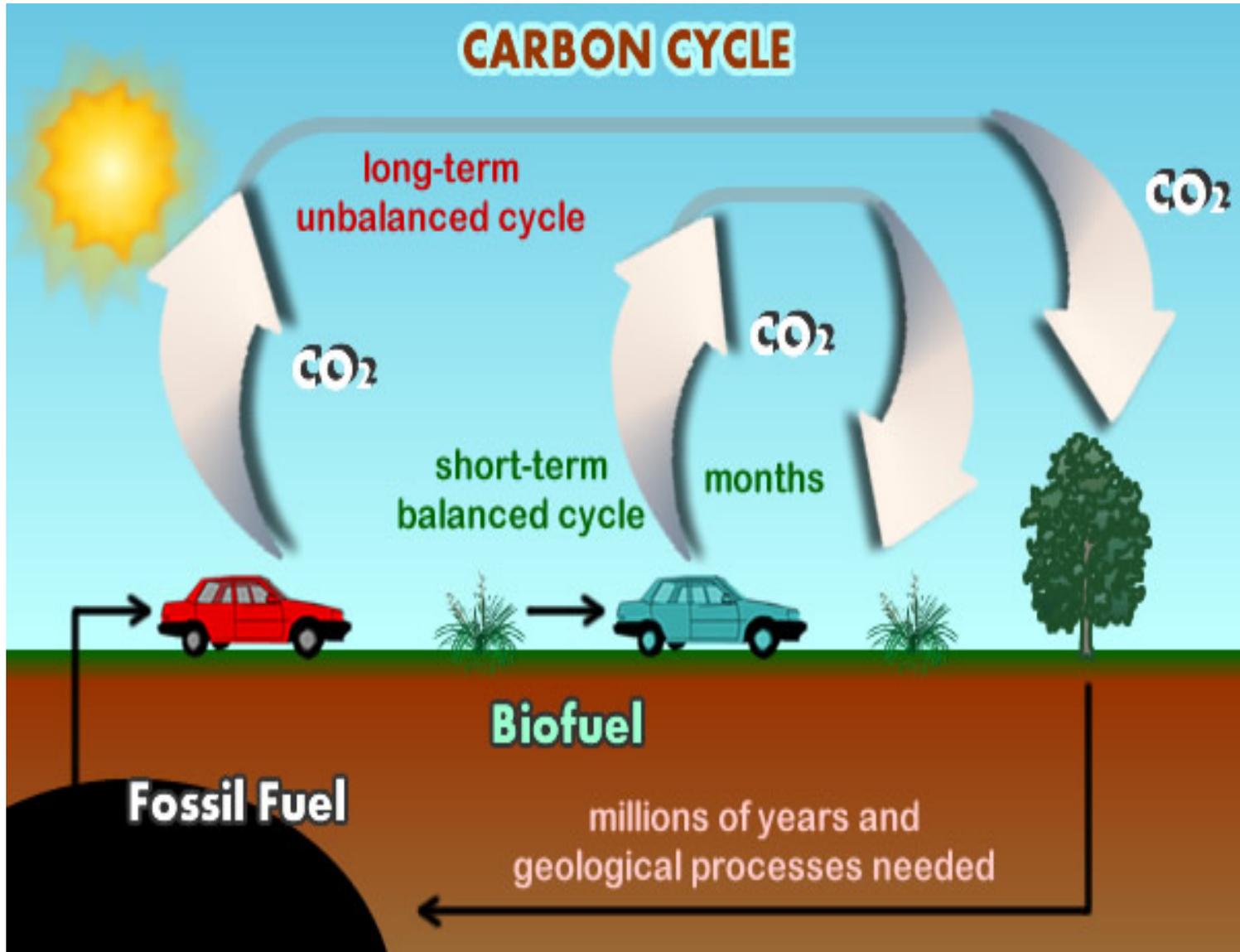
Where do biofuels come from?



*Adapted from a drawing by US DOE EER

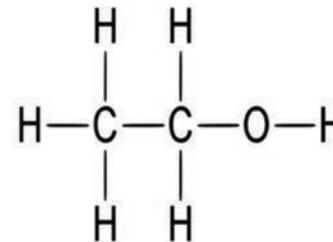
Biofuels vs Fossil Fuels

- ✧ How could replacing fossil fuels with biofuels help with the climate change problem?

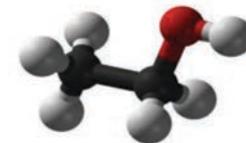


Ethanol

- ✘ Clear liquid
- ✘ Chemical formula: C_2H_5OH
- ✘ Made from plant sugars
- ✘ Some uses:
 - ✘ Transportation fuel
 - ✘ Alcoholic beverages
 - ✘ Antiseptics
 - ✘ Solvents (cleaning products)



2-D structure



3-D structure

