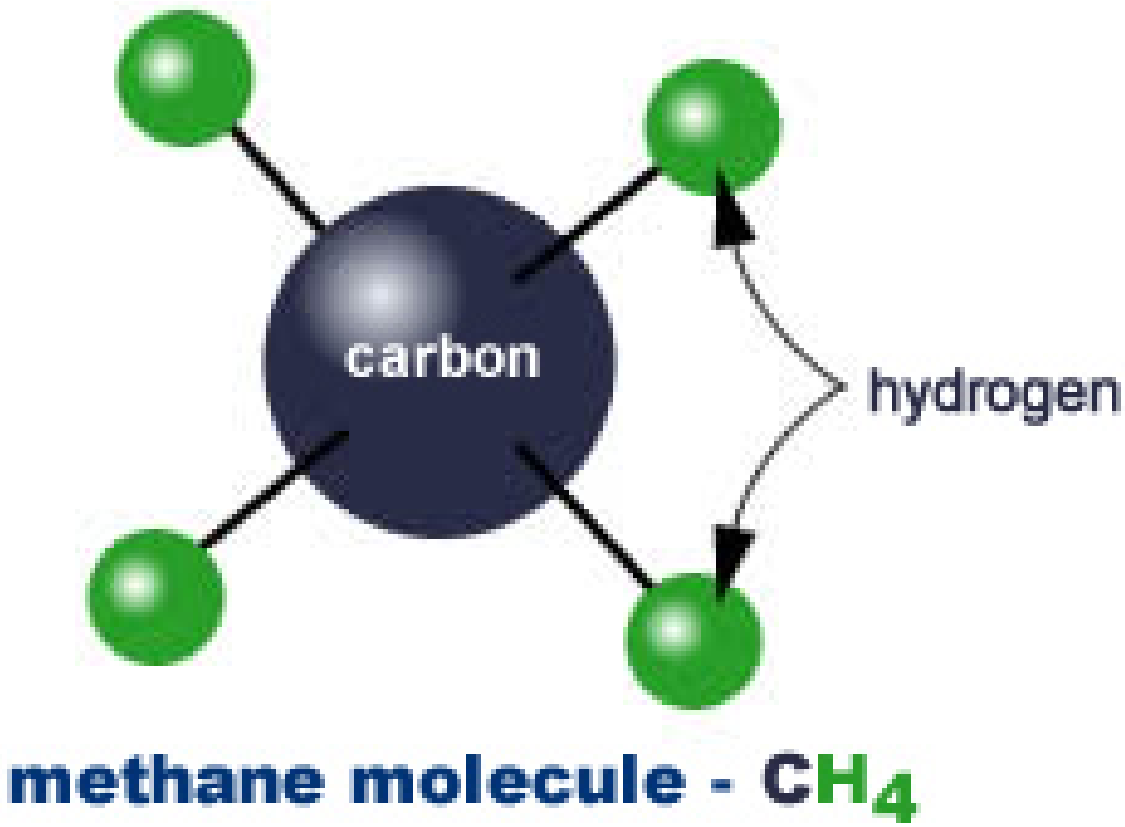
One Big (Simple) Idea

Michael Taylor

CH_4

Methane molecule

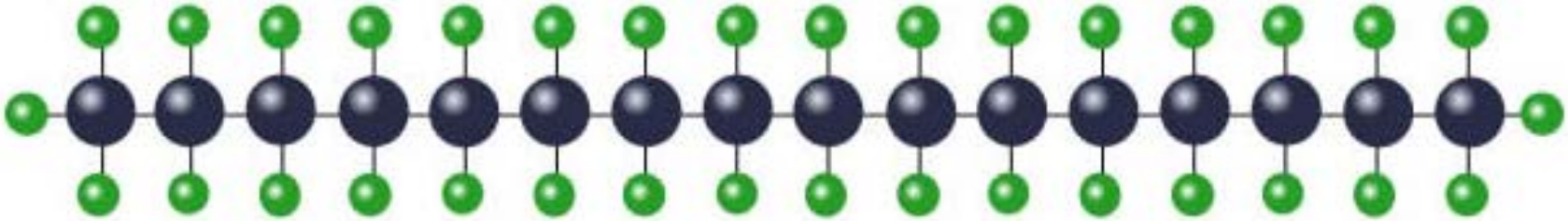


Gasoline molecule

carbon molecule

hydrogen molecule

Diesel molecule



typical diesel chemical composition

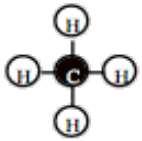
cetane, or n-hexadecane is typical of diesel fuel - $C_{16}H_{34}$

carbon molecule

hydrogen molecule

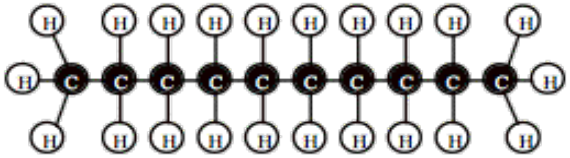
Hydrogen-Carbon Ratios of Fuels

Methane Gas



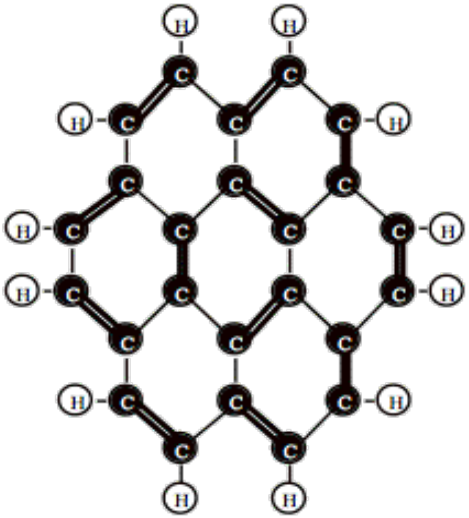
H:C = 4:1

Typical Oil

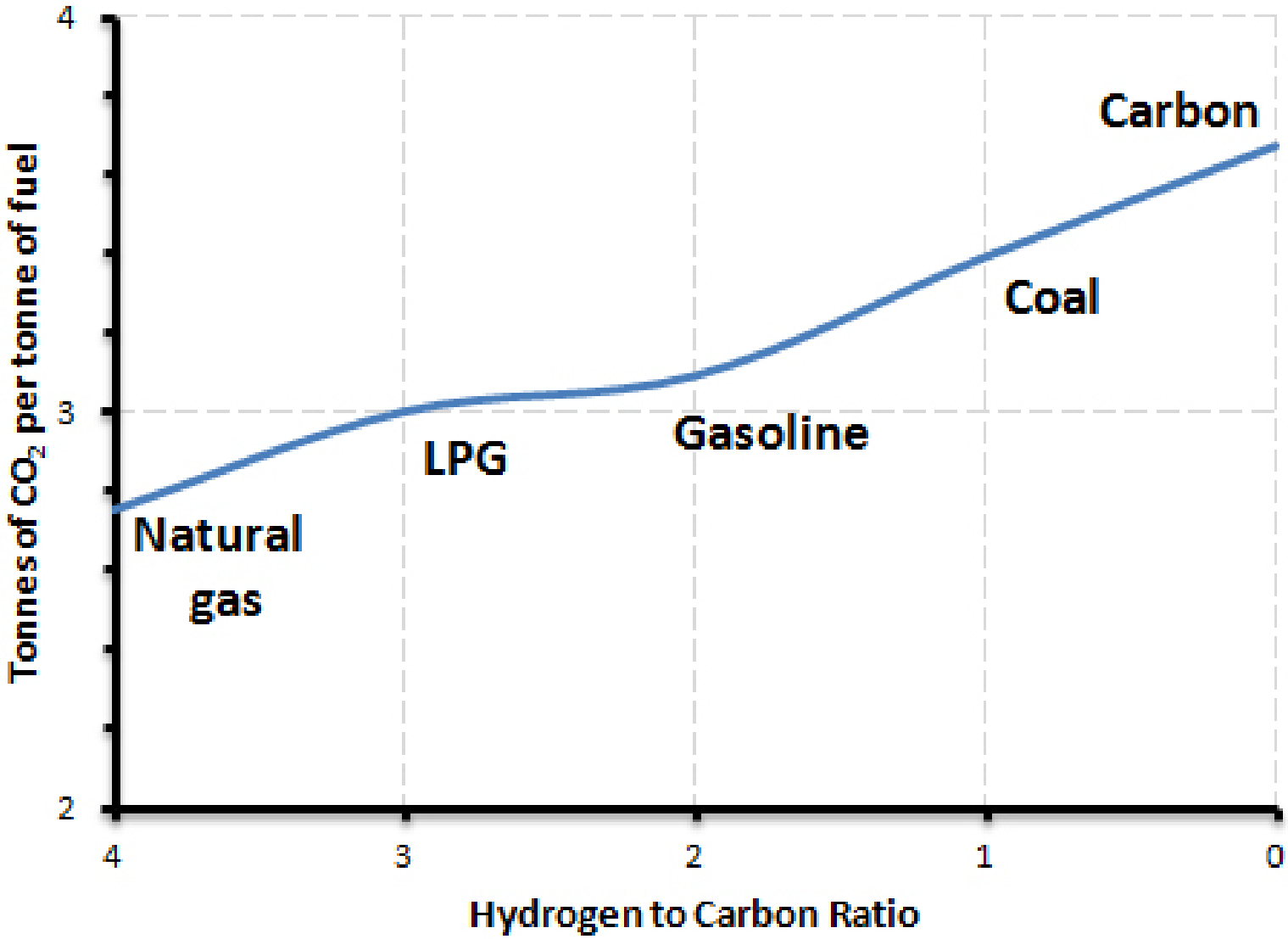


H:C = 2:1

Typical Coal



H:C = 0.5:1


4
3
2
Tonnes of CO_2 per tonne of fuel
Carbon
Coal
Gasoline
LPG
Natural gas
4
3
2
1
0
Hydrogen to Carbon Ratio

Combustion Reaction

-: Example :-

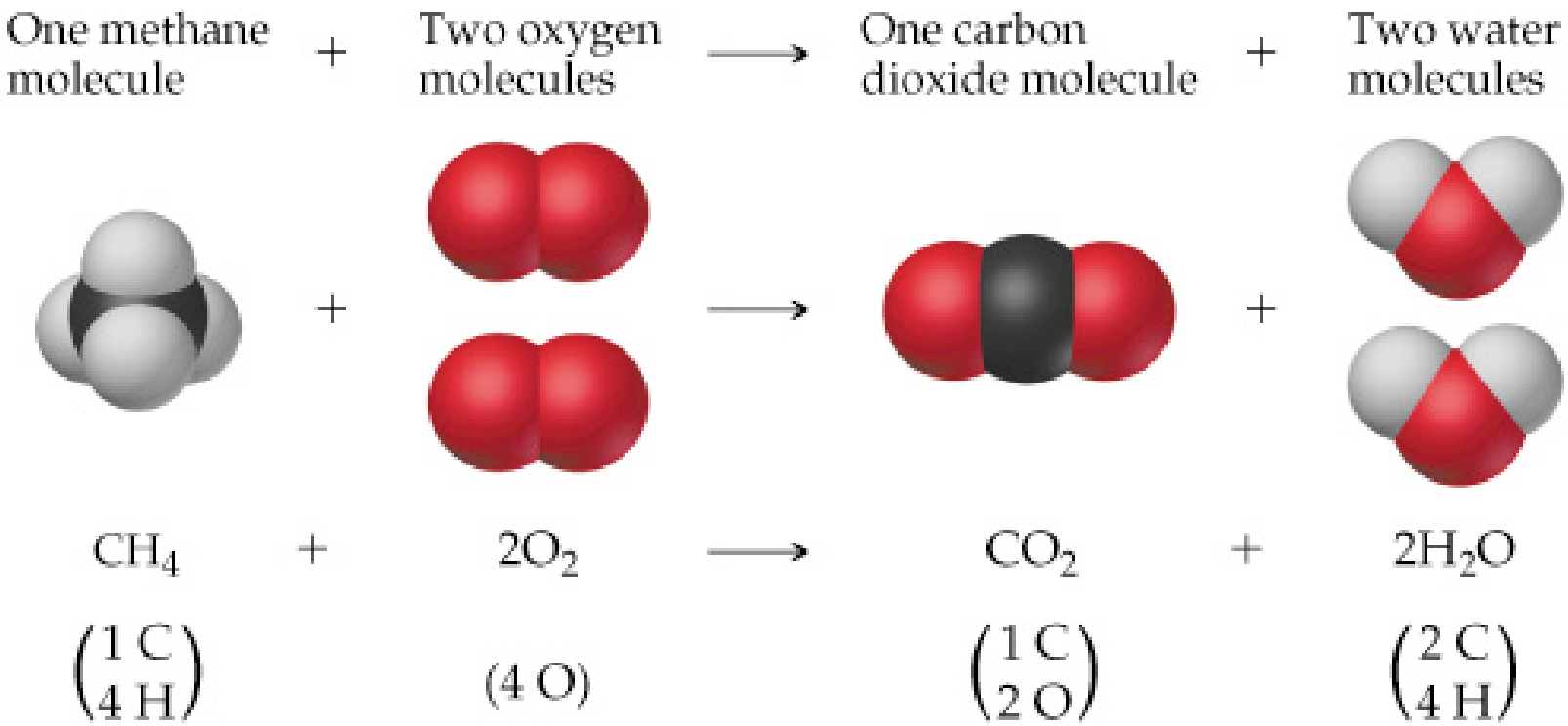
In general:

$$C_xH_y + O_2 \longrightarrow CO_2 + H_2O$$

Products in combustion are ALWAYS carbon dioxide

And water.

Methane Combustion



Gasoline Combustion

Two gasoline molecules	+	25 oxygen molecules	→	18 water molecules	+	16 carbon dioxide molecules

$$2C_8H_{18} + 25O_2 \rightarrow 18H_2O + 16\ CO_2$$

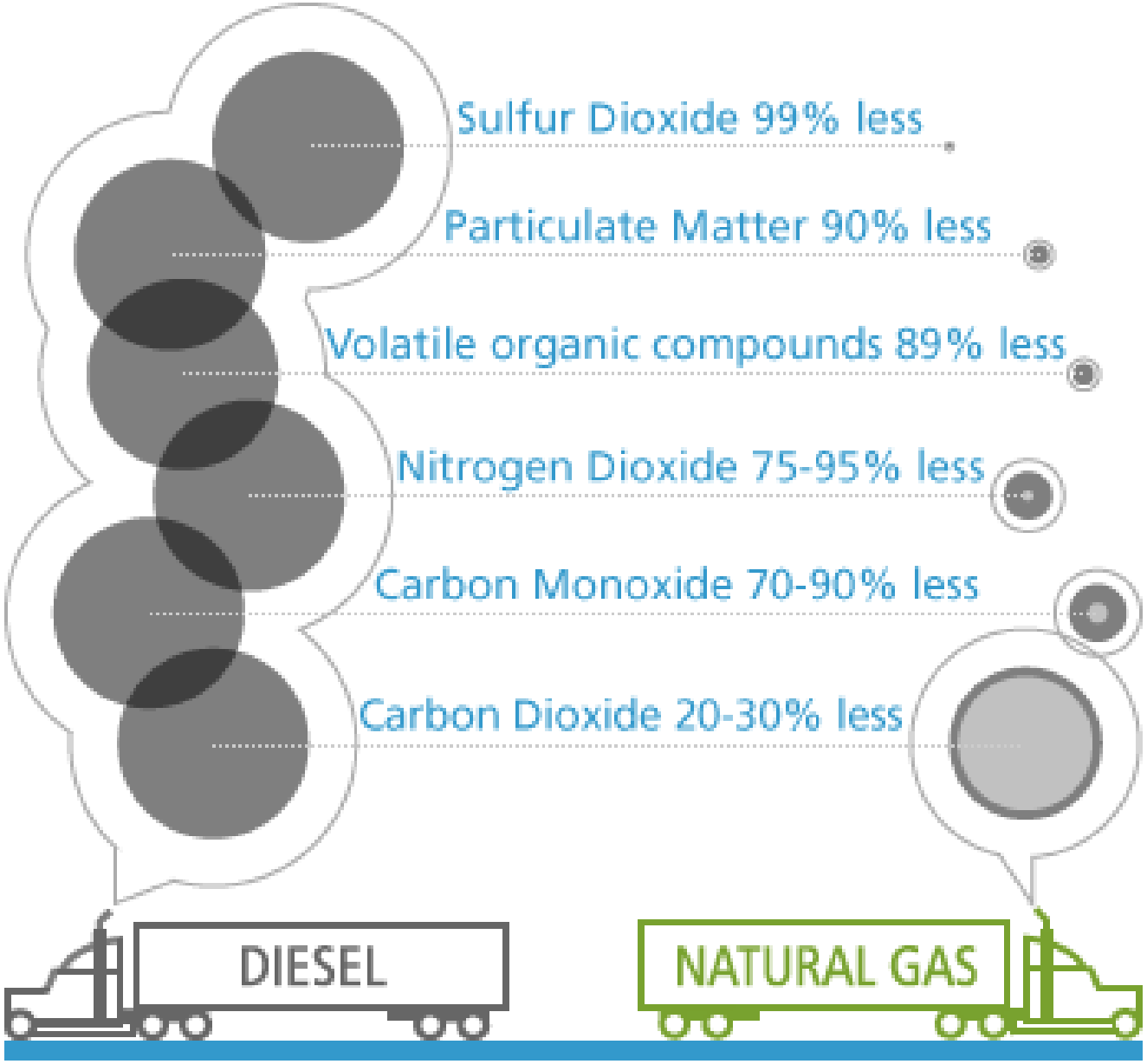
(octane + oxygen → water + carbon dioxide + energy)

Diesel combustion

Two diesel molecules	+	49 oxygen molecules	→	34 water molecules	+	32 carbon dioxide molecules

$$2C_{16}H_{24} + 49O_2 \rightarrow 34H_2O + 32\ CO_2$$

(diesel + oxygen → water + carbon dioxide + energy)



Source: NGVAmerica, Encana Estimate, Environmental Protection Agency


DIESEL
BAD!

What is CNG?

- Compressed Natural Gas (CNG)
- Colorless, non-corrosive, non-toxic
- Same odor as natural gas
- 3,600 psi
- 1/200th the volume of natural gas
- Ambient temperature

MLGW Choctaw CNG Station

MLGW South Center CNG Station

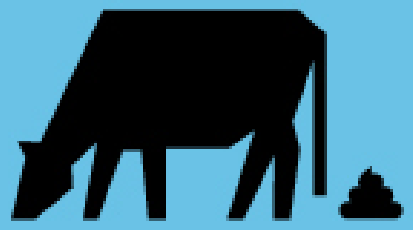
What is LNG?

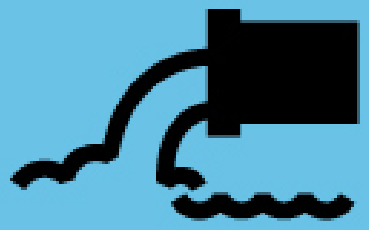
- Liquefied Natural Gas (LNG)
- Colorless, odorless, non-corrosive, non-toxic
- -260° Fahrenheit
- 1/600th the volume of natural gas
- Takes 1.72 gallons of LNG to equal 1 gallon of diesel

MLGW LNG Production Facility

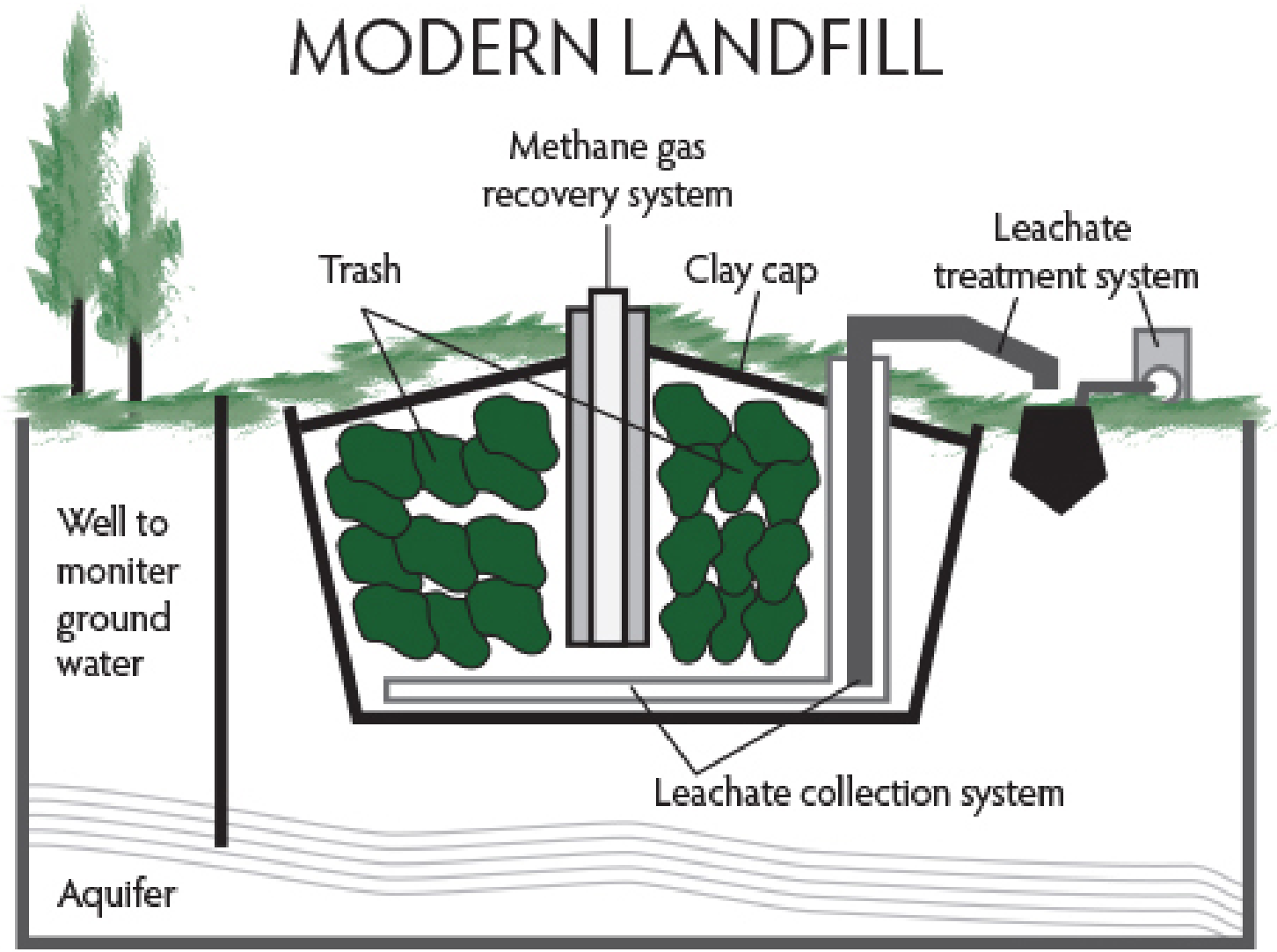
What’s Better Than Methane?

Renewable Methane



MODERN LANDFILL




Flare
Plant
Collector

RNG

IDEAS CAN BE BOTH

BIG

AND

SIMPLE