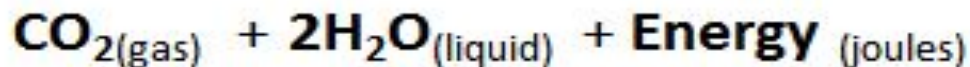
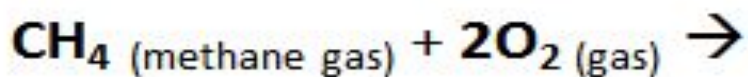




*Carbon Dioxide Production from
Burning Fossil Fuels*

What happens when fossil fuels (like natural gas) burn?

Carbon dioxide is produced



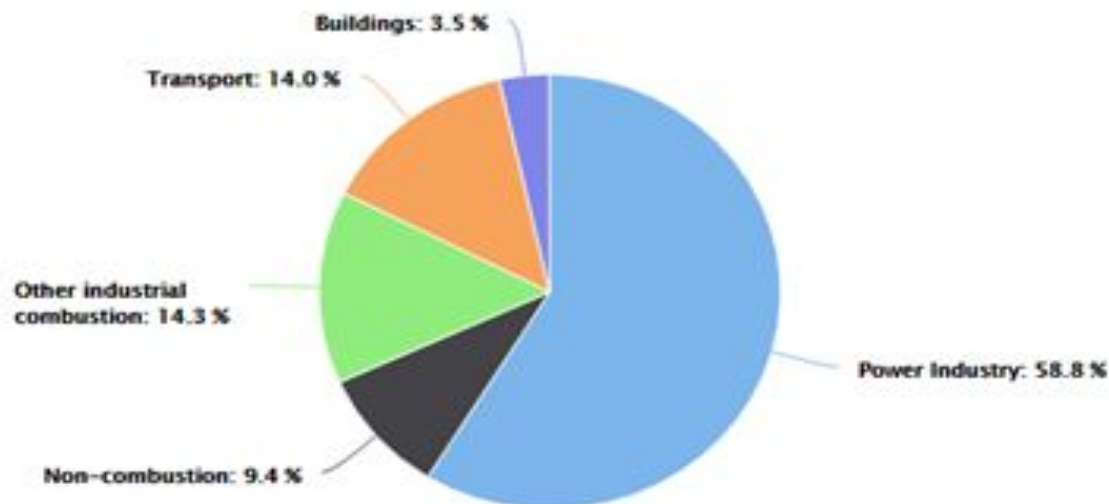
Burning fossil fuels is one of the largest sources of CO₂, a greenhouse gas associated with global warming and climate change.

North Macedonia CO2 Emissions (2016)

Fossil CO2 Emissions <small>(2016)</small>	Yearly Change	Global Share	Tons per capita
8,896,732 tons	+1.62%	0.02%	4.28

North Macedonia CO2 emissions by Year (tons)

Fossil CO₂ Emissions (by Sector)



Greenhouse gases are associated with global warming and climate change.

- Fossil CO2 emissions in the Republic of North Macedonia were **8,896,732** tons in 2016.
- CO2 emissions increased by 1.62% over the previous year, representing an increase by **142,010** tons over 2015, when CO2 emissions were **8,754,722** tons.
- **CO2 emissions per capita** in the Republic of North Macedonia are equivalent to **4.28** tons per person (based on a [population of 2,080,743 in 2016](#)), an increase by **0.07** over the figure of 4.21 CO2 tons per person registered in 2015; this represents a change of **1.6%** in CO2 emissions per capita.

Sources of Carbon Dioxide

- The major sources of CO₂ emissions are electricity generation and transportation.
- Worldwide about 50,000 power plants produce CO₂.
- Burning coal and hydrocarbons are the largest sources of CO₂ emissions.

Byproducts of Coal Burning

Carbon and other elements combine with oxygen and are moved from the geosphere to the atmosphere.

- **Carbon dioxide** (a greenhouse gas, causes global warming).
- **Sulfur dioxide** (causes acid rain).
- **Nitrogen oxide** (causes smog).
- **Carbon monoxide** (poisonous gas, contributes to global warming).
- **Small particles of toxic heavy metals.**

Which fossil fuels have the *highest* CO₂ emissions?

Fossil fuel	Weight of CO ₂ (pounds) emitted per million BTU of energy
Lignite	215.4 lb
Sub-bituminous coal	214.3 lb
Bituminous coal	205.7 lb
Anthracite coal	228.6 lb
Diesel fuel and heating oil	161.3
Gasoline	157.2
Propane	139.0
Natural gas (methane)	117.0

Which fossil fuels have the *lowest* CO₂ emissions?

Fossil fuel	Weight of CO ₂ (pounds) emitted per million BTU of energy
Lignite	215.4 lb
Sub-bituminous coal	214.3 lb
Bituminous coal	205.7 lb
Anthracite coal	228.6 lb
Diesel fuel and heating oil	161.3
Gasoline	157.2
Propane	139.0
Natural gas (methane)	117.0

Energy Use and Carbon Dioxide Emissions in the United States

Fossil fuel	Energy used (%)	Carbon dioxide emissions (%)
Petroleum	35%	42%
Natural Gas	28%	27%
Coal	18%	32%

- Which fossil fuel produces the *highest* percentage of CO₂ emissions?
- Which fossil fuel produces the *lowest* percentage of CO₂ emissions?

Climate Change Mitigation Targets and Plans

Macedonia's INDC communicates its target to reduce carbon dioxide emissions from fossil fuel combustion by 30% by 2030, compared to the business as usual scenario, through mitigation measures in energy supply, buildings, and transport.

Energy supply mitigation measures include reduction of distribution losses, establishment of renewable energy power plants (hydro, solar, wind, biogas, and biomass cogeneration), shifting to central heating in Bitola, installation of solar thermal collectors, and increasing the share of biofuels to 5% of the energy mix.

Review Questions

1. What is the primary greenhouse gas emitted in North Macedonia through human activities?
2. What are the major sources of CO₂ emitted in the country, by economic sector ?
3. What are the major byproducts of the burning of coal?
4. Which fossil fuel has the *highest* CO₂ emissions?

Review Questions

5. Which fossil fuel has the *lowest* CO₂ emissions?
6. Which fossil fuel is the largest contributor to CO₂ emissions?
7. What could we do to reduce CO₂ emissions?