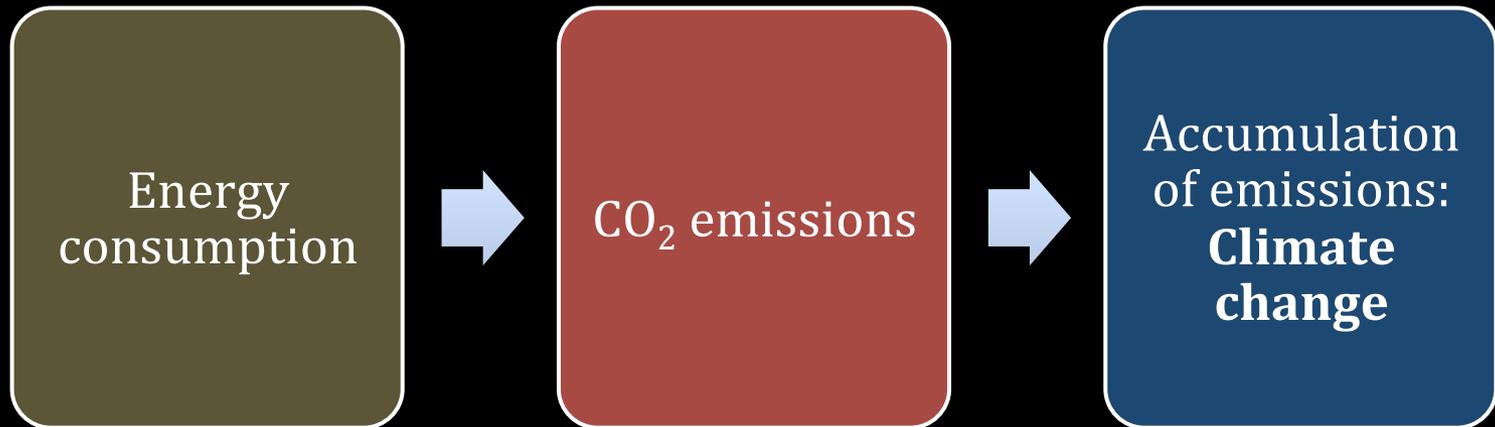


International Perspectives to Energy, Emissions, and Global Warming

Which countries are the biggest consumers of energy?

**More industrialized countries have
(1) used more energy and
(2) require more energy
to sustain their economy**



Which countries are the biggest exporters of fuel?

Biggest exporters of oil globally



Biggest exporters of gas globally



Biggest reserves of uranium globally



**Biggest exporter of
crude oil to the U.S.?**



**Biggest exporter of
natural gas to the U.S.?**



Why did countries take different energy paths?



Let's take five examples

 **United States**

 **China**

 **Brazil**

 **Iceland**

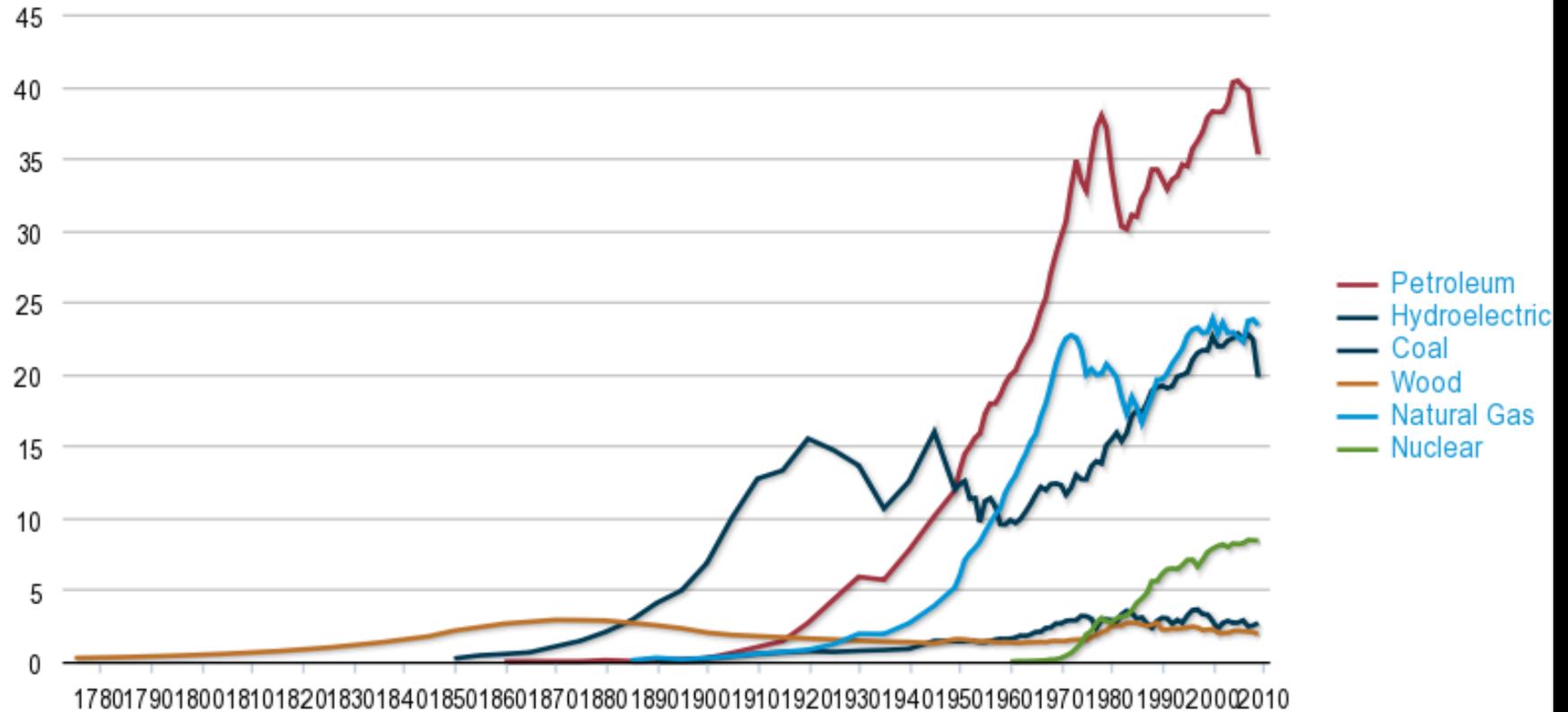
 **France**



United States

History of energy consumption in the United States, 1775-2009

quadrillion Btu

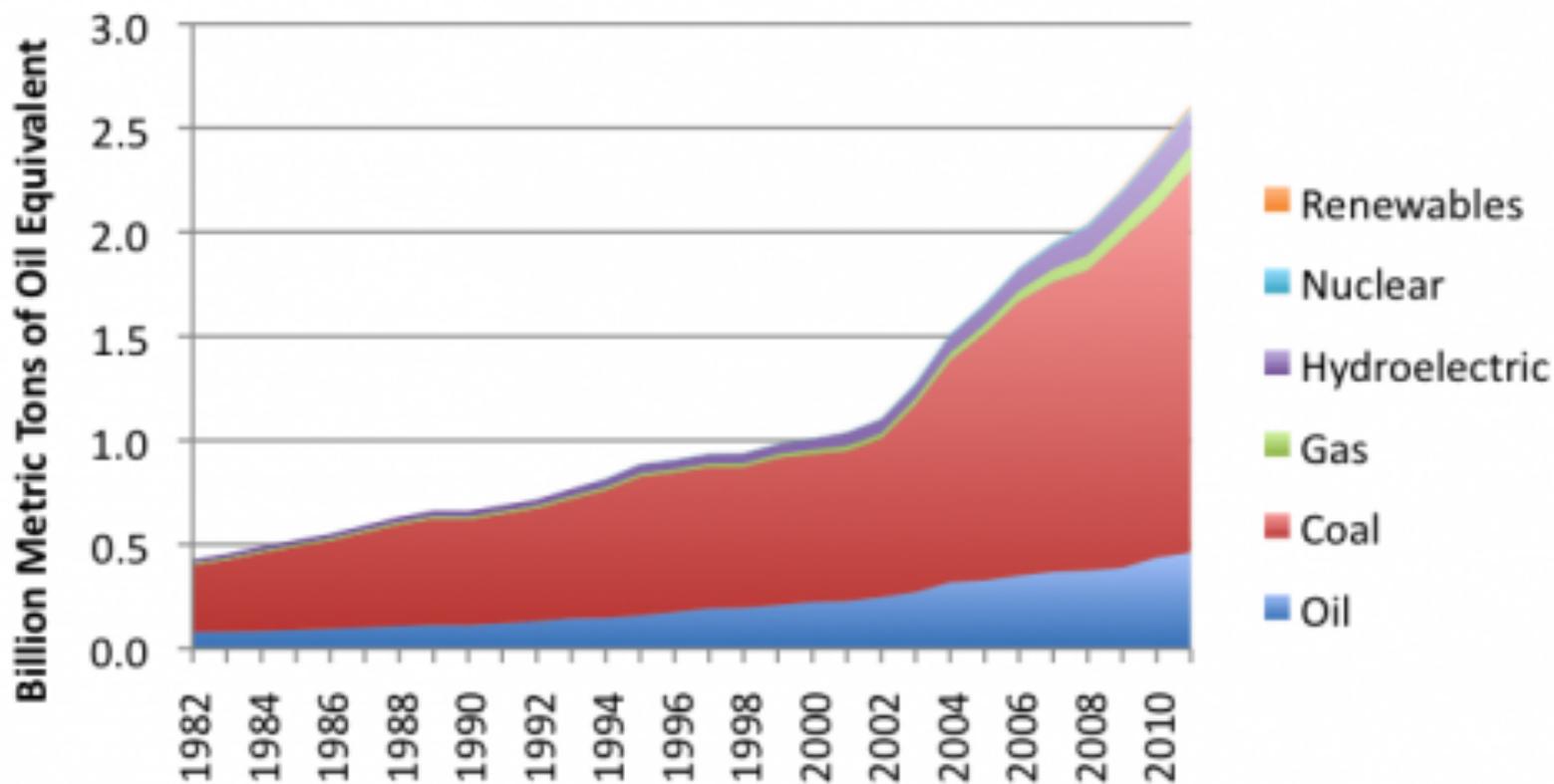


Source: U.S. Energy Information Administration - Annual Energy Review 2009



China

China's Energy Consumption by Source





Brazil

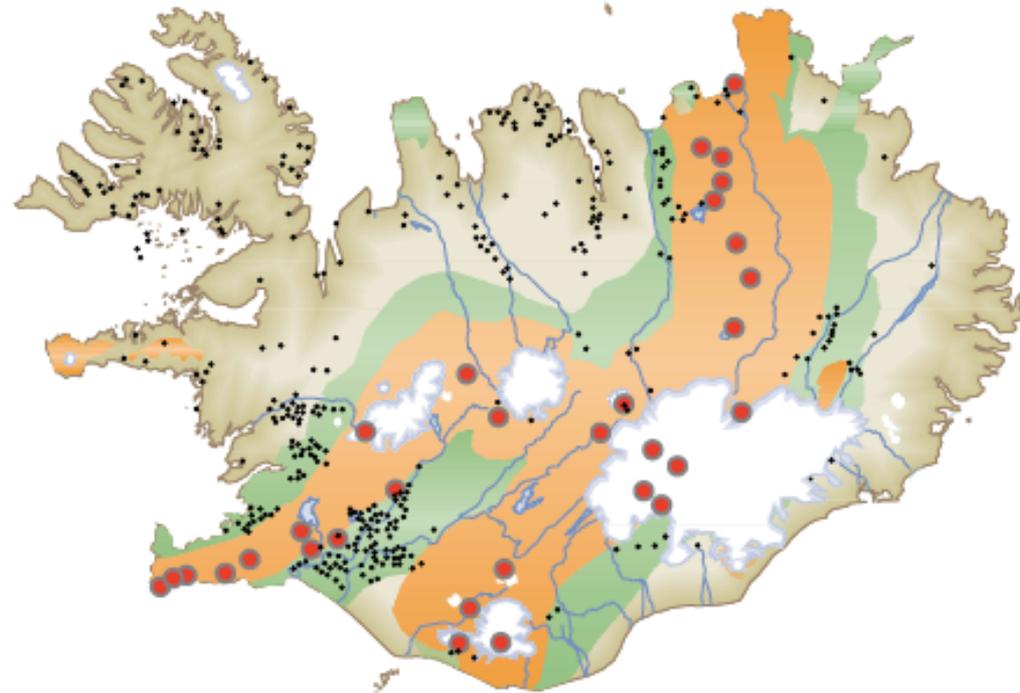


Figure courtesy of Wikipedia



Iceland

Geothermal



- High temperature field
- Low temperature field

Bedrock

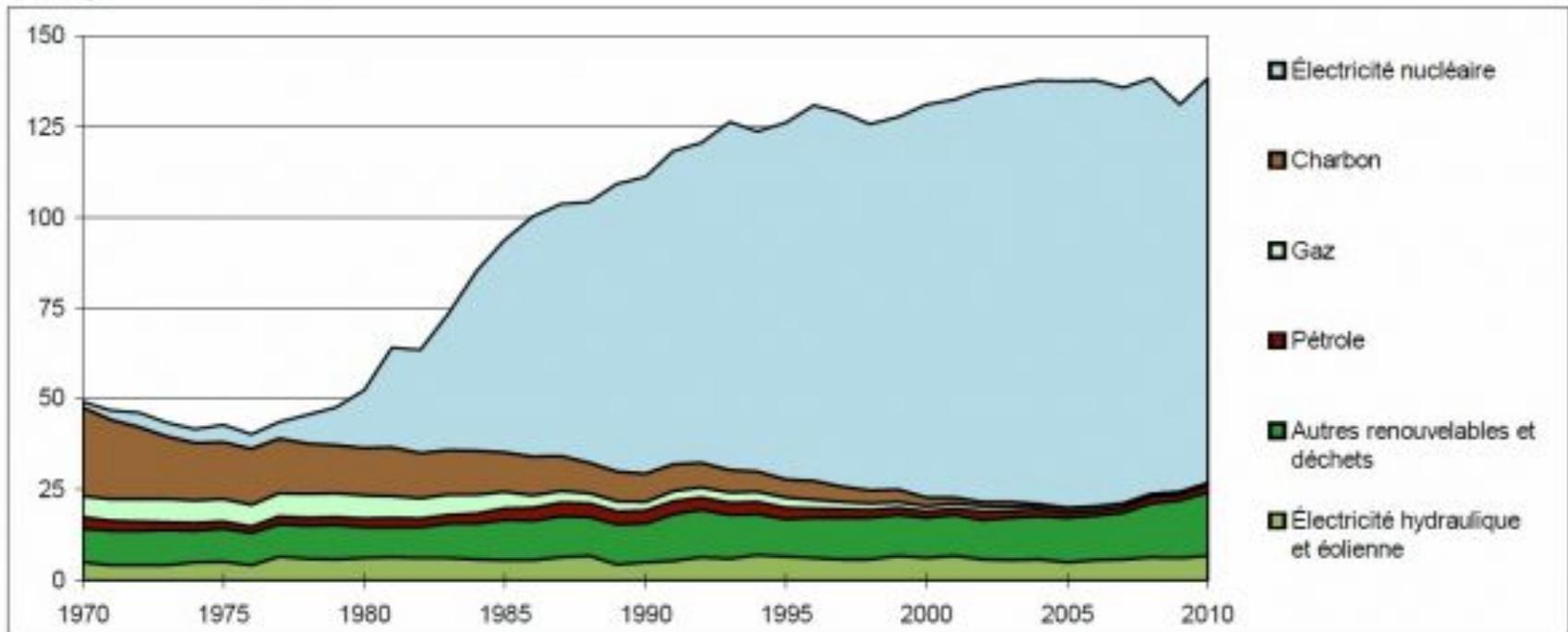
- < 0.8 m. years
- 0.8 - 3.3 m. years
- 3.3 - 15 m. years



France Nuclear

Production d'énergie primaire

En Mtep



Source : SOeS, bilan de l'énergie 2010

Why did countries go different energy paths?

Resources

Technology

Security

Geopolitics

Energy  **Emissions**

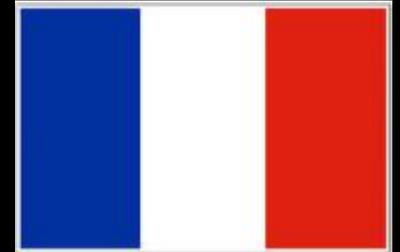
We will now play a game

Relation between energy & emissions

- 5 Groups: each one will be responsible for a country
- You will receive one card with some information about each country
- Calculate: energy consumption per capita, Electricity Consumption per capita, emission per unit of energy, CO₂ per capita, CO₂ per GDP
- Guess the position that your country is ranked in among the five countries.
- Compare these results to global annual emissions and global cumulative emissions

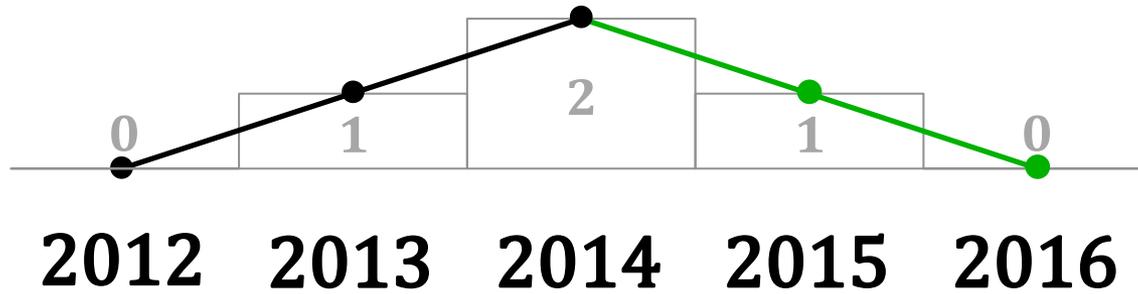
Country	
Energy Consumption (TWh)	
CO2 emissions (Mt of CO2)	
Total Primary Energy Supply (Mtoe)	
Population (million)	
GDP (billion 2000 USD)	

Indicators	Calculation	Rank
TPES/Population (toe/capita)		
Electricity Consumption / Population (kWh/capita)		
CO2/TPES (t CO2/toe)		
CO2/Population (t CO2/capita)		
CO2/GDP (kg CO2/2000 USD)		



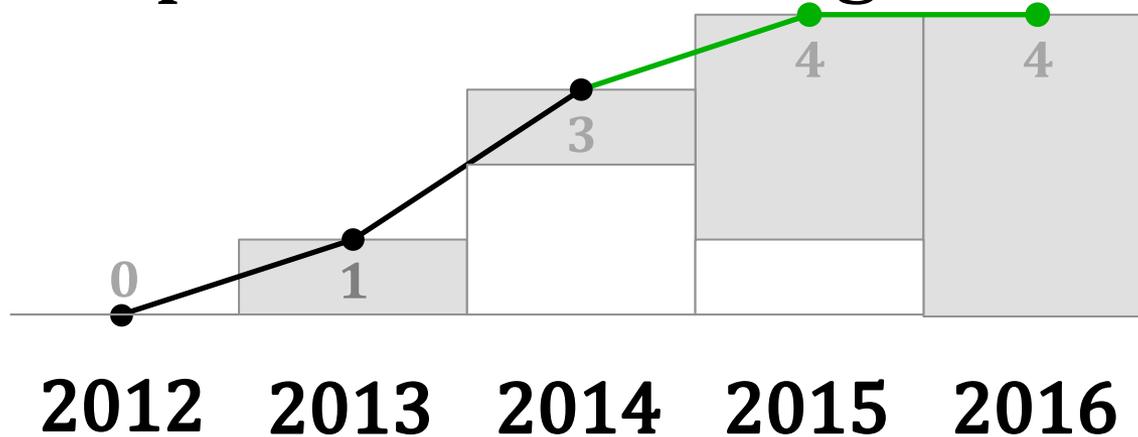
Cumulative vs. Annual emissions

A country with decreasing emissions



Yearly

could be responsible for a large concentration



Total

PICTURE SOURCES

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