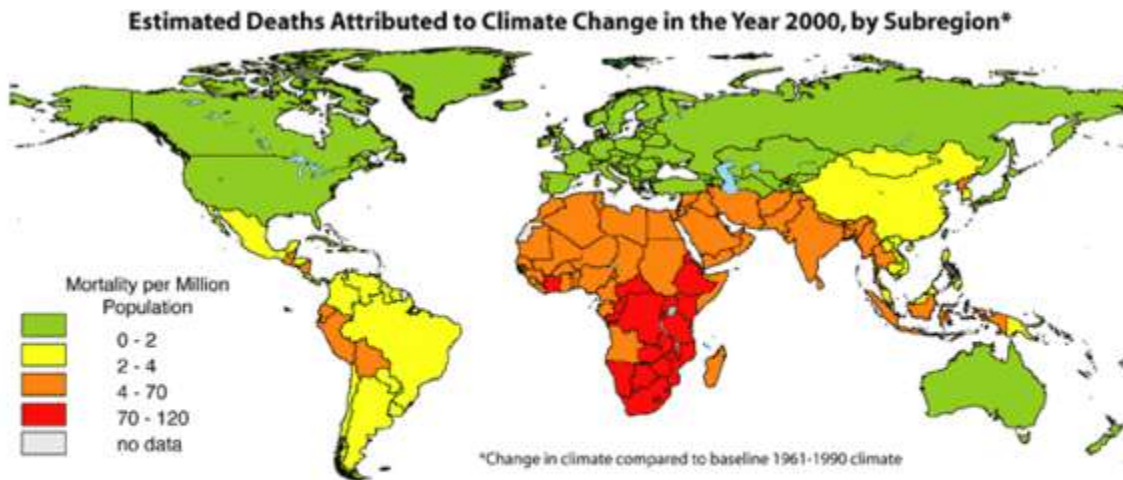


STATIONS RESOURCES

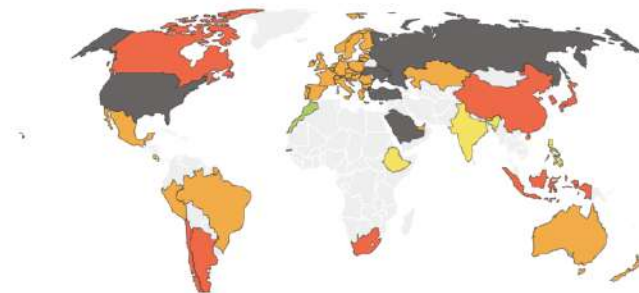
STATION 1.



Data Source:
McMichael JJ, Campbell-Lendrum D, Kovats RS, et al. Global Climate Change. In Comparative Quantification of Health Risks: Global and Regional Burden of Disease due to Selected Major Risk Factors. M. Ezzati, Lopez, AD, Rodgers A, Murray CJL. Geneva, World Health Organization, 2004

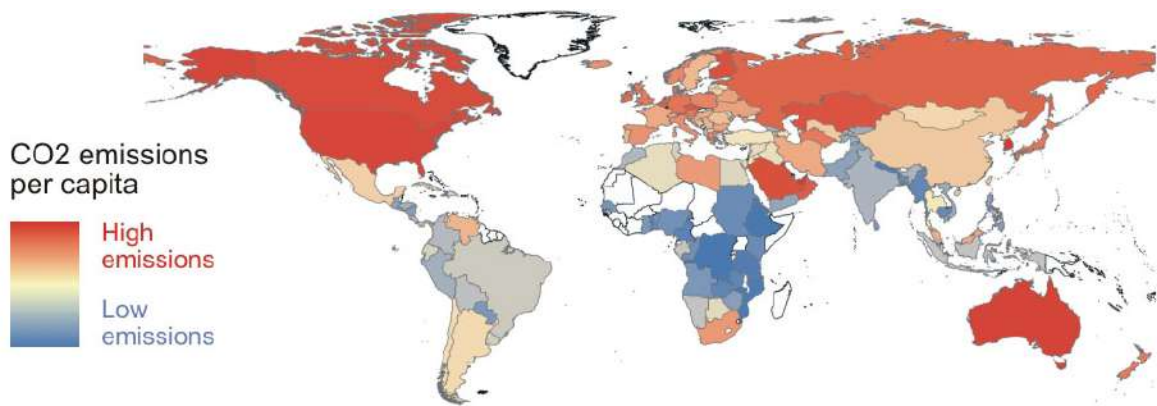


Maps produced by the Center for Sustainability and the Global Environment (SAGE)

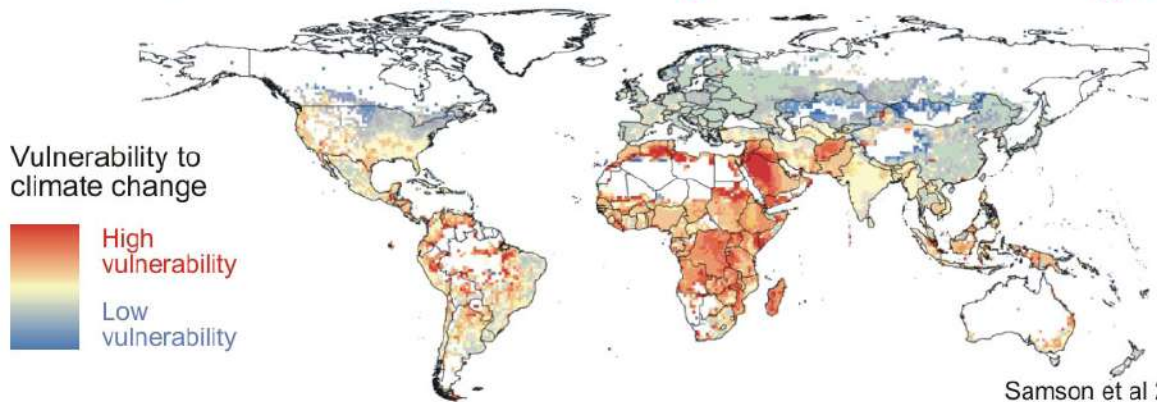


LAST UPDATE: April 2018



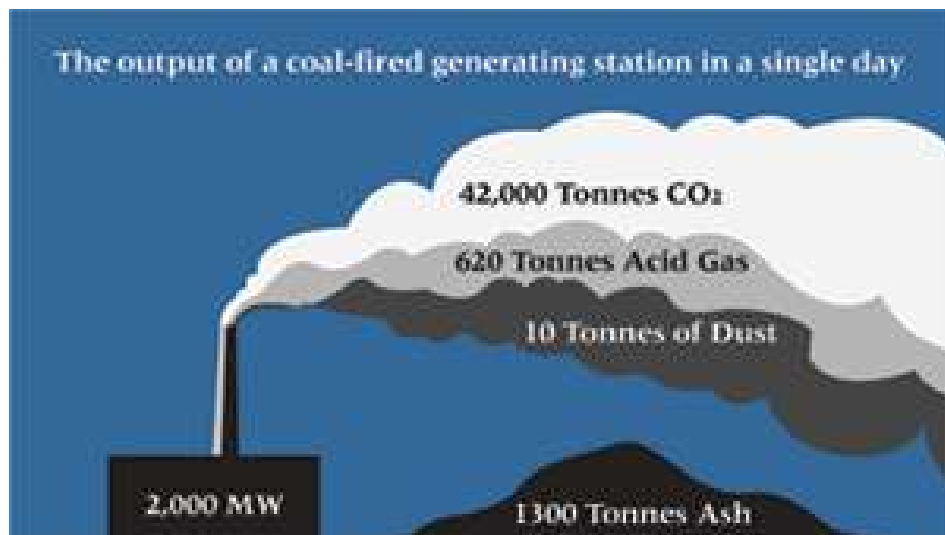
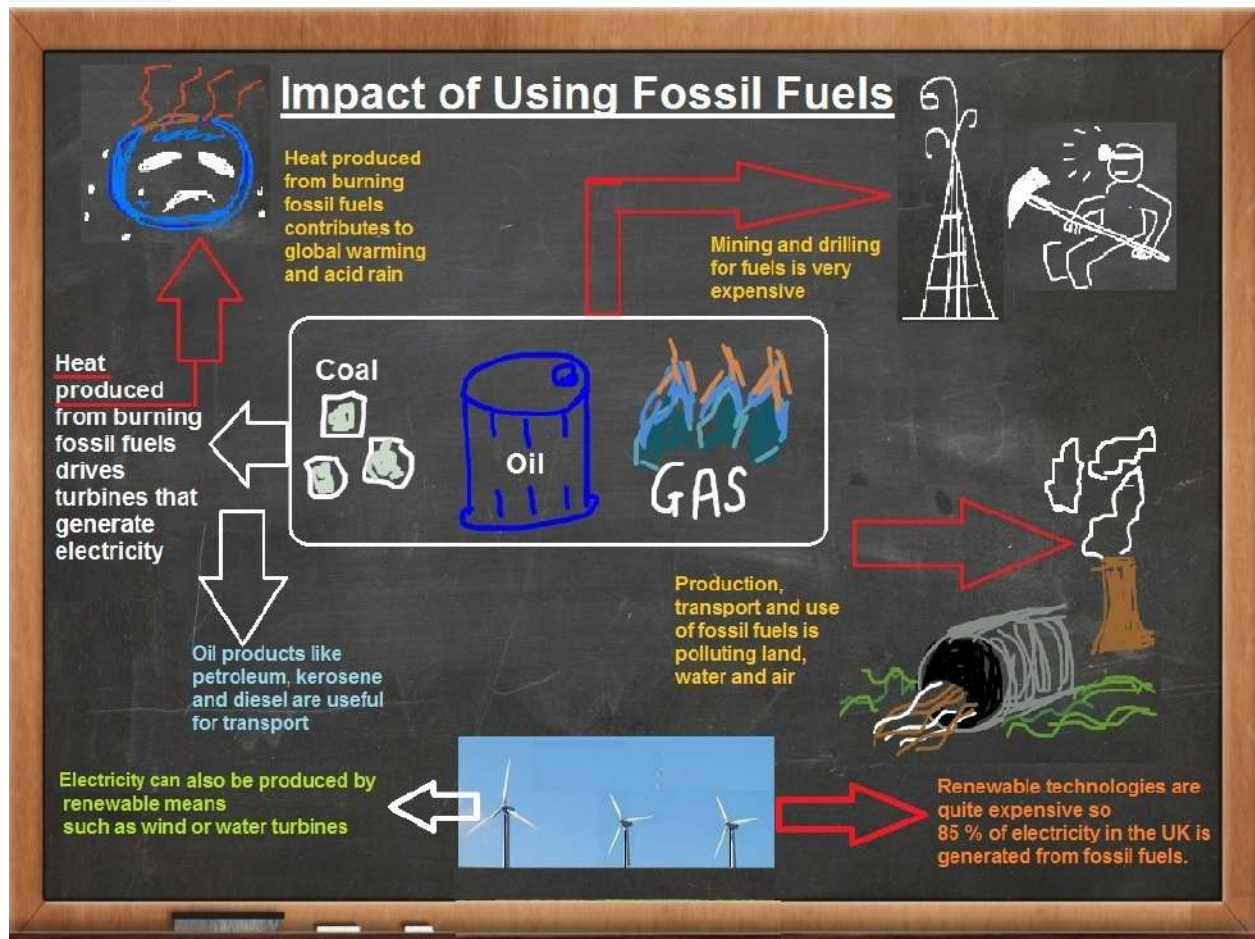


Those who contribute the least greenhouse gases
will be most impacted by climate change



Samson et al 2011

STATION 2



Environmental impacts

- burning fossil fuels releases CO_2 which adds to global warming
- Releases gases that contribute to the formation of acid rain
- Gathering wood for fuel can cause deforestation and destroys habitats
- Mining for coal causes air and water pollution. Open cast mining removes large areas of land which destroys more habitats
- Transporting oil either by pipeline or tanker can lead to leaks, Oils spills kills birds and fish and damages the marine ecosystem

STATION 3

FOSSIL FUELS AS AN ENERGY SOURCE

Presently, fossil fuels account for about 88% of the commercial energy sources used (not counting energy supplied directly by the sun and traditional biomass sources not traded in commerce). This situation hasn't changed much over the last 50 years (Table 1) and could persist for 50 more. Considering the environmental problems associated with the increasing use of fossil fuels, why are they so popular?

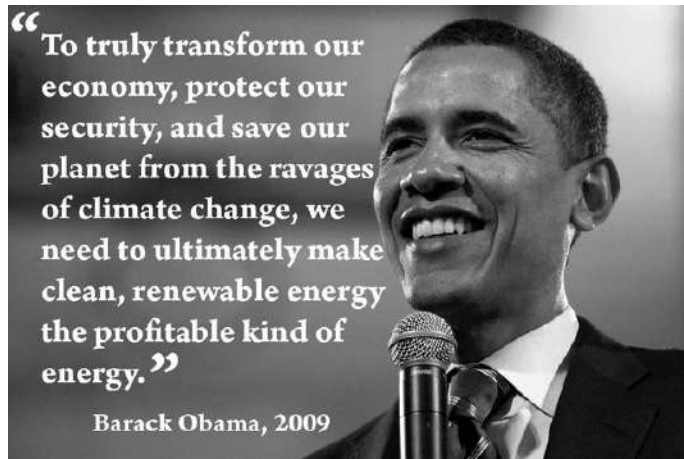
Fossil fuels are relatively marvelous energy sources. The variety of fossil fuels plus the technology mankind has developed to produce and convert them to useful purposes is a marvelous combination. As a result, fossil fuels are available everywhere, and some are easy to transport. Technical advances have led not only to discoveries and production from the most inhospitable (tough to live) places but also to more complete resource recovery. Although fossil fuels are depletable, the estimated resources are still very large. The undiscovered resources of oil and gas are judgmental estimates of those resources thought to be geologically possible and technically recoverable within a reasonable price range. For coal, ultimately recoverable geological resources is an estimate based on the assumption that 50% Of the total coal resources-in-place can be recovered using current mining techniques as well as advanced techniques yet to be developed.

Fossil fuels are attractive not only because they are available and relatively inexpensive but also because we have learned to use them so effectively. The relatively simple technology of controlled combustion provides energy for both small- and large-scale applications. Almost exclusively, liquids refined from petroleum power the world's transportation systems (greater than 97% in the United States) because these fuels have such a high energy density, because they are so portable, and because of the development of the internal combustion engine and the modern jet engine.

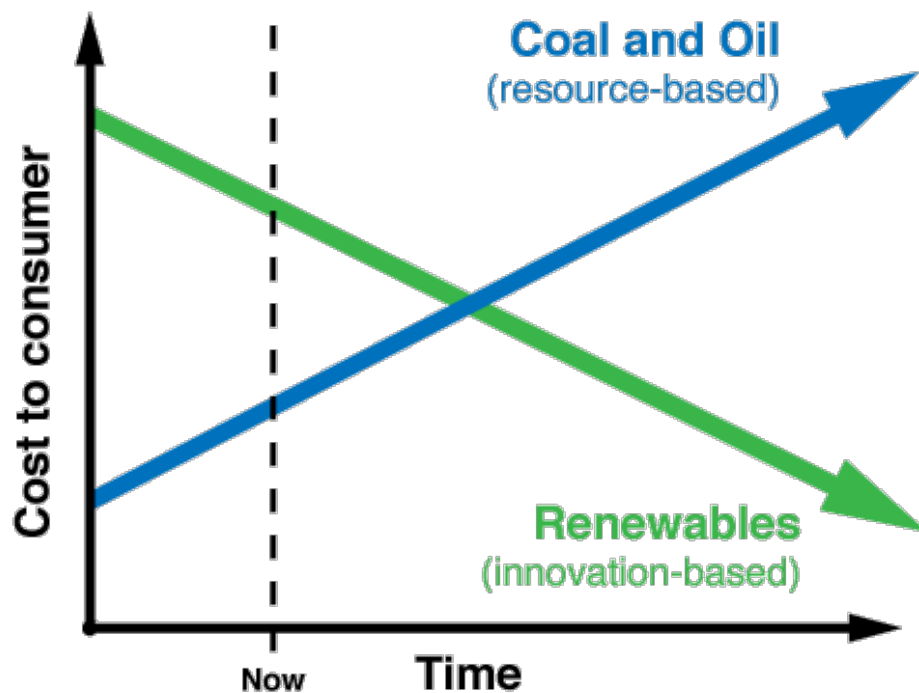
The top 3 producers of fossil fuels – China, America and Russia – are also the top 3 consumers of fossil fuels. Unsurprisingly, they are almost all developed economies: Japan, Germany, South Korea, Brazil, United Kingdom and Italy.

STATION 6

“But even as we push to get serious about confronting climate change, we should not try to solve the problem on the backs of the poor. For one thing, poor countries represent a small part of the carbon-emissions problem. And they desperately need cheap sources of energy now to fuel the economic growth that lifts families out of poverty. They can’t afford today’s expensive clean energy solutions, and we can’t expect them to wait for the technology to get cheaper.”



STATION 5



Fuel Type	Advantages	Disadvantages
Coal	<ul style="list-style-type: none"> Inexpensive fuel Abundant supply near existing resources Low cost resource Reliable, semi-flexible operation 	<ul style="list-style-type: none"> Produces highest level of emissions, including carbon dioxide Relatively water intensive
Nuclear	<ul style="list-style-type: none"> Produces no emissions Low-cost resource Reliable, fixed operation 	<ul style="list-style-type: none"> High up-front capital cost Produces radioactive waste, for which long-term storage and disposal is not resolved Uses reclaimed water
Natural Gas	<ul style="list-style-type: none"> Cleaner burning than coal, including half of the carbon emissions Abundant supply in New Mexico (local production as well as access to interstate pipelines) Reliable, fully-flexible operation Flexible design options from base load to peaking plant types 	<ul style="list-style-type: none"> Still produces emissions, including carbon Volatile in price Can achieve low water intensities at a price
Wind	<ul style="list-style-type: none"> No emissions or water use NM ranks 10th in the nation for wind energy production potential (Source: AWEA) No fuel cost 	<ul style="list-style-type: none"> Intermittent in nature High up-front capital costs for equipment and transmission Requires fossil-fueled backup Wind power is often not available when customers use the most electricity.
Solar	<ul style="list-style-type: none"> No emissions or water use NM ranks second in the nation for solar energy production potential No fuel cost While solar energy production peak does not precisely match the peak daily hours for energy consumption, generation is during daylight hours, when usage is high 	<ul style="list-style-type: none"> Intermittent in nature Prices have been declining, but still have high up-front capital costs for equipment Requires large land area; 8-10 acres/MW for PV Requires fossil-fueled backup Other solar technologies such as solar thermal hold promise, but have not demonstrated cost-competitiveness with solar PV for electric utility needs
Geothermal	<ul style="list-style-type: none"> No air emissions High capacity factor generation 	<ul style="list-style-type: none"> High up-front capital costs Water intensive Favorable sites may not be available in all areas of the country or New Mexico
Solar Thermal	<ul style="list-style-type: none"> No Emissions Less operational variation than wind or solar PV No fuel cost 	<ul style="list-style-type: none"> Intermittent in nature Water intensive High up-front capital costs