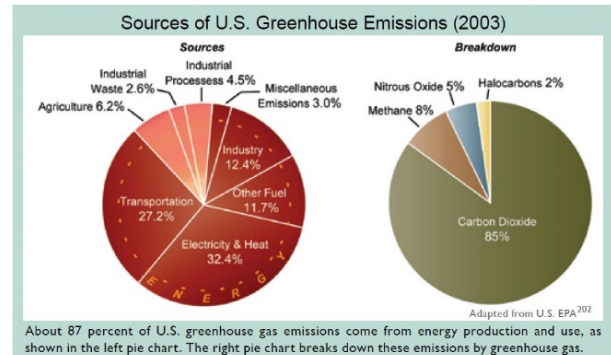


CLIMATE CHANGE IMPACT SUMMARY: ENERGY

Introduction

Energy production is responsible for 87% of the greenhouse gas emissions driving climate change. In this sense, energy is the central reason for climate change. In turn, climate change is expected to affect the nation's energy production capacity and demand.

The results of climate change -- including extreme weather, higher temperatures, changes in water availability, and sea level rise -- will all increase energy demand while at the same time making it more difficult to produce energy. However, yet to be determined are the effects of regulatory and policy efforts on energy production, and of future energy systems including renewables on energy use.

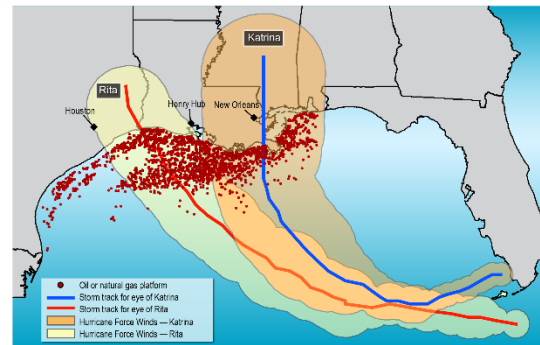


Key Findings

1. Extreme weather events will disrupt energy production and delivery.

- U.S energy resources move from one place to another by road, rail, and transmission lines. This movement is subject to interruptions from extreme weather events.
- Example: In 2005, oil and gas production and delivery facilities on the Gulf Coast were shut down for months after Hurricanes Katrina and Rita, affecting markets across the United States.

Paths of Hurricanes Katrina and Rita Relative to Oil and Gas Production Facilities

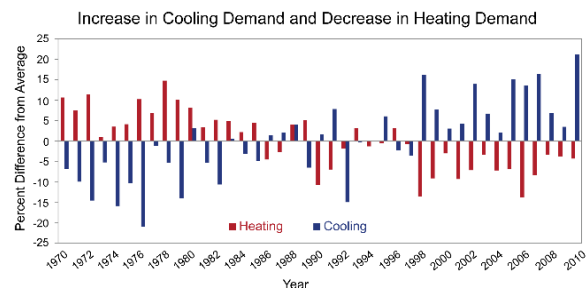


2. Extreme storm surges and long-term sea level rise will affect coastal production facilities and infrastructure.

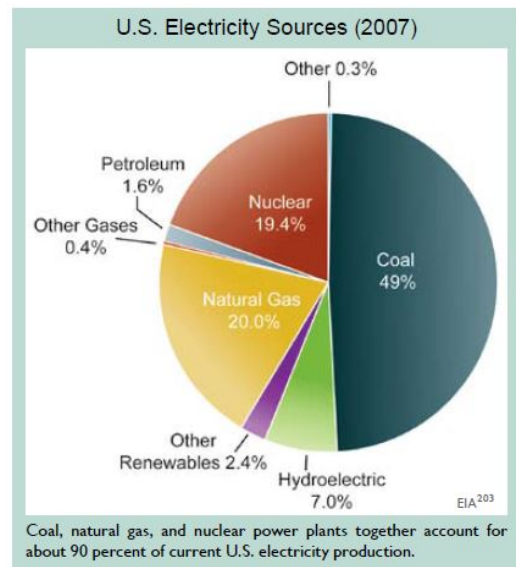
- Much of the U.S. energy power production infrastructure and transmission lines are in low-lying coastal areas.
- Particularly at risk are facilities along the Gulf Coast and the coast of California.
- These facilities are vulnerable to both short-term storm surges during hurricanes, and long-term sea level rise, projected at 1 to 4 feet by 2100.

3. Higher summer temperatures will increase use of electricity for cooling, while warmer winters will decrease demand for gas heating. Net electricity use is expected to increase.

- Higher U.S. temperatures over the past 20 years have resulted in decreased energy use for heating and increased use for cooling.



- This trend is expected to continue, with 64% more cooling days (> 65⁰F) and 14 more extreme hot days (> 95⁰F) in the Midwest.
 - Electricity demand is expected to increase because most cooling is done electrically. This will require more electricity generation and distribution facilities.
4. *Reduced availability of water will make production of many types of energy more difficult.*
- The production of energy from fossil fuels is inextricably linked to the availability of adequate and sustainable supplies of water.
 - Each kilowatt-hour of thermoelectric generation requires on average the withdrawal of 100 liters of water.
 - Droughts and reduced snowpack from climate change are expected to reduce the amount of water available. One-fourth of power generation facilities (240,000 megawatts) are in U.S. counties that face water shortages.
 - Increased temperatures of available water could also reduce the efficiency of power plant cooling technologies, leading to warm water discharge that can affect aquatic life.
5. *Energy systems of the future will be different from those of today, but in ways not yet known.*
- The U.S. energy system depends on a multitude of financial, regulatory, and technological variables. Energy supply portfolios of the future may look completely different from those today, depending on the economy, climate change legislation, and renewable energy.
 - Though solar, wind, hydropower, biofuels, and geothermal are currently small contributors to the U.S. energy supply, demand for them is growing with the opportunity to increase in the future.



Conclusion

Our current energy production system is the root cause of climate change, responsible for 87% of greenhouse gas emissions. Climate change both threatens energy supply and is likely to increase demand. The outlook for the U.S. energy system is uncertain due to unknowns in policy and technology. Climate change presents an opportunity, however, to develop an energy system more resilient and less vulnerable, as well as one that both mitigates and adapts to a warming world.

Citations

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