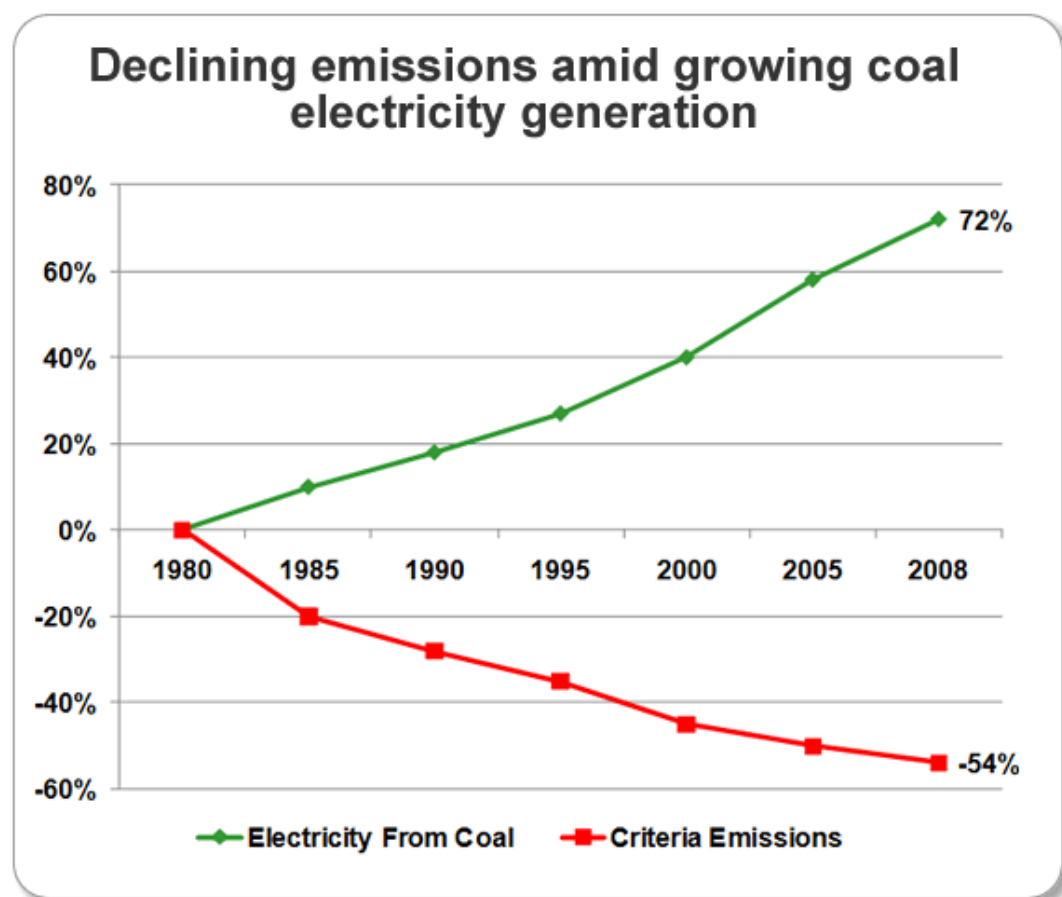


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“Carbon capture and storage technologies hold enormous potential to reduce our GHG emissions as we power our economy with domestically produced and secure energy.” -- President Barack Obama [4]

- References:**
- [1] [http://www.congressional.energy.gov/documents/5-19-09_Final_Testimony_\(Chu\).pdf](http://www.congressional.energy.gov/documents/5-19-09_Final_Testimony_(Chu).pdf)
 - [2] Data based on EIA files: <http://www.eia.doe.gov/>
 - [3] <http://www.nrc.gov/reactors/new-reactors/new-licensing-files/expected-new-rx-applications.pdf>
 - [4] http://www.barackobama.com/pdf/factsheet_energy_speech_080308.pdf

About Frank Clemente, Ph.D.

Dr. Clemente is a Professor at Penn State University where he specializes in research on the socioeconomic aspects of energy policy. His work has appeared in *World Oil*, *Public Utilities Fortnightly*, *Oil and Gas Journal* and a variety of other energy related media. *The materials presented here are solely the responsibility of the author and do not represent Pennsylvania State University in any manner.*



Week of February 8, 2010

What 50% Really Means: The Scale of Coal's Contribution to our Electricity Supply

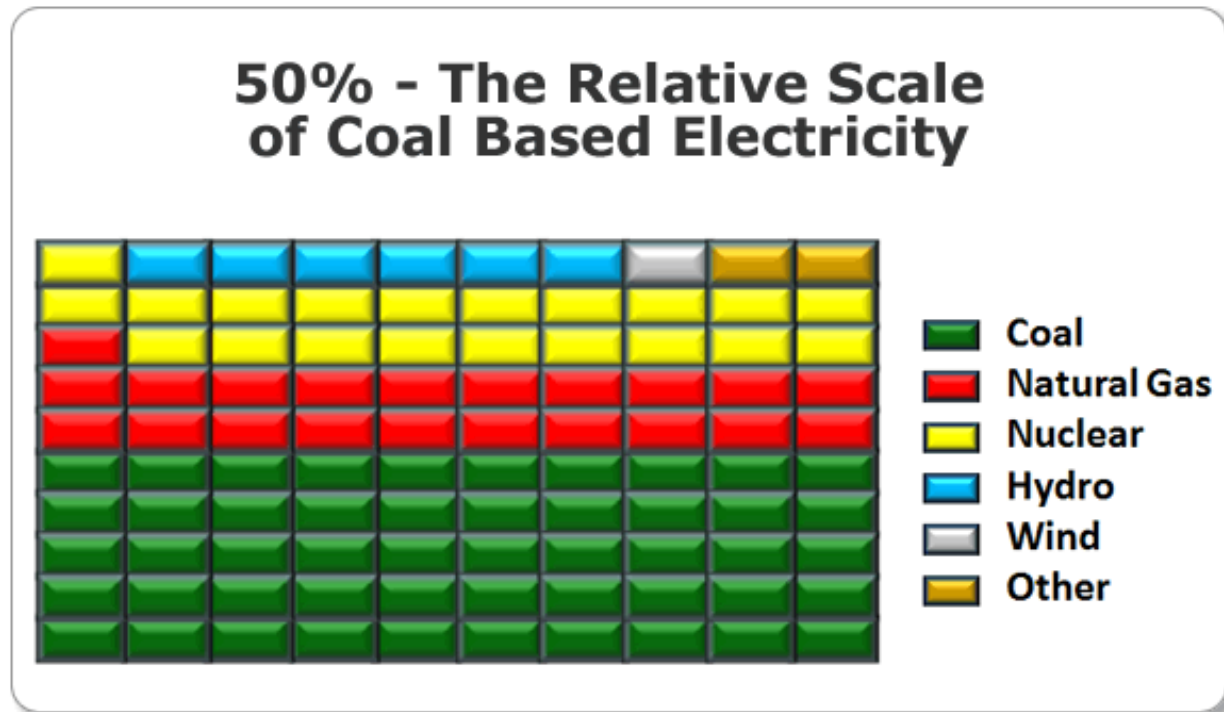
“Prosperity depends upon reliable, affordable access to energy. Coal ... is likely to be a major and growing source of electricity generation for the foreseeable future.... We must make it our goal to advance carbon capture and storage technology to the point where widespread, affordable deployment can begin in 8 to 10 years.”

-- Steven Chu, Secretary of Energy [1]

For decades coal-based electricity has constituted half of the fuel for Americans now to consume over 4,100 billion kWh of electricity at prices which have declined in the past 30 years in real terms. [2]

The 600 coal power plants distributed across the country are the cornerstone of the most reliable electric power system in the world.

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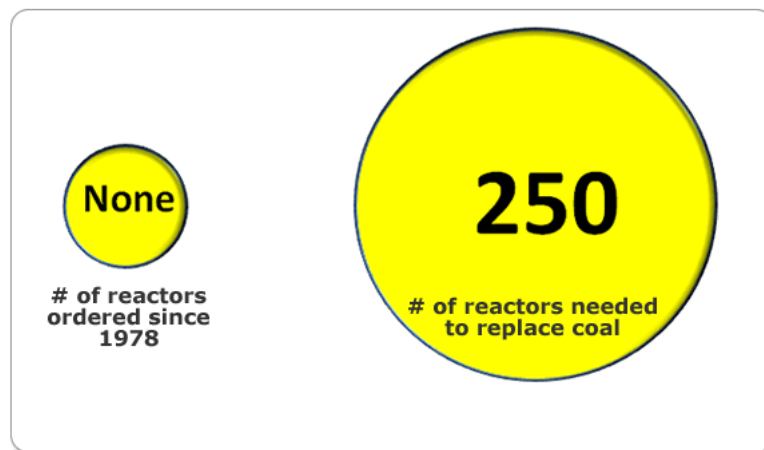
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Given its abundance, accessibility, cost, versatility and established infrastructure, coal is essentially irreplaceable as a baseload fuel in the United States. If utilities did not have access to coal they would be unable to meet the needs of our electricity dependent modern society and maintain our quality of life.

Nuclear's Contribution Will Be Severely Limited

The leading alternative is nuclear power -- an excellent baseload fuel. However, the nuclear industry is only a shadow of its former self. The escalating cost of nuclear plants, coupled with the lengthy time delays to bring a facility online, severely limit the magnitude of the contribution nuclear power can make over the next several decades.

The Nuclear Industry Would Be Overwhelmed



The Nuclear Regulatory Commission received only three applications in 2009 and, at the present time, reports only two expected applications in 2010 and has none identified for 2011. [3]

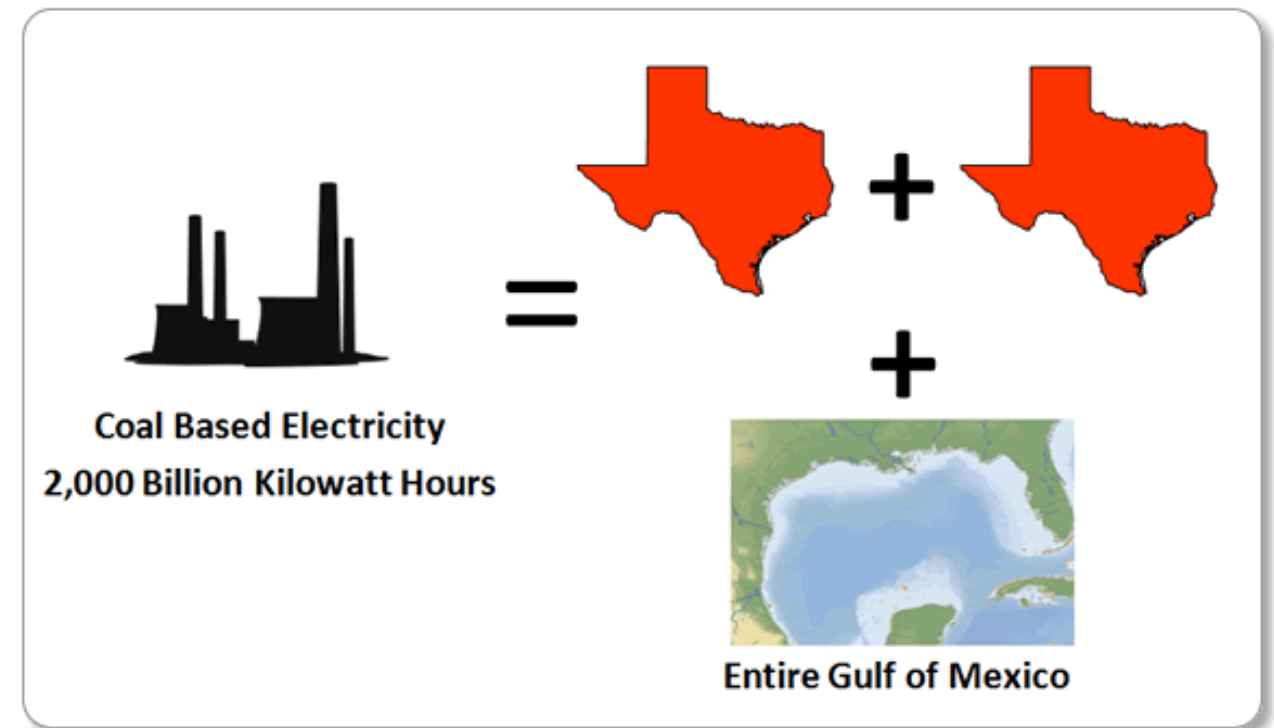
Natural Gas Is Risky As Baseload Power

Given these constraints, utilities would turn to natural gas to meet growing electricity demand. But natural gas is risky as baseload power for three reasons:

1. The growth in natural gas generation is the primary reason electric rates increased 50% over the past decade. Further, the new demand for gas from power plants created a conflict with families and businesses for fuel -- elevating and destabilizing prices for all consumer groups.
2. There is not enough natural gas to meet expected demand. The Energy Information Agency projects gas supply will decline 4 percent by 2020. Based on its analysis, increasing shale gas production will not be enough to offset declining

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Gas Production Needed To Replace Coal in the U.S.



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conventional production and reduced pipelined gas from Canada.

3. If domestic supply is not available, we will be forced to import Liquefied Natural Gas (LNG) from foreign countries. Unfortunately, Russia, Iran and Venezuela have 45 percent of the world's gas.

15 Trillion Cubic Feet of Gas is Needed to Replace Coal

Clean Coal Technologies Work

Secretary Chu has called for the continuing evolution of clean coal technologies into the area of carbon capture and storage. Success in developing and implementing emission control technologies has been a hallmark of our electric power system for decades now. The United States has made huge strides forward in significantly reducing criteria emissions -- particulate matter, sulfur dioxide, carbon monoxide, lead, ozone and nitrogen oxides -- while substantially increasing coal-based generation in meeting the electricity needs of an expanding population in the context of a growing economy.