

The Global Realities of Energy

Overview

Coal has maintained its status as America's tireless energy workhorse by producing over 50 percent of our electricity at only one fourth the price of natural gas (NG). Thanks to coal-based generation, the U.S. has the most reliable electric power supply system in the world.

Other nations have seen the benefits that coal brings to the U.S., and there are now over 660,000 megawatts (MW) of new coal-based generation either under construction or planned around the world. China and India are rapidly moving to use their own coal resources to produce electricity, in addition to producing liquid fuels, synthetic natural gas (SNG) and chemicals. Using their domestic coal for a broader range of applications will enable China and India to reap substantial economic benefits by significantly reducing imports of oil and NG. This point was stressed in the Council's 2006 report regarding the opportunity for the U.S. to use domestic coal to bring significant benefits to consumers, generate high-quality employment, and improve energy security.

The Global Context of Energy Shows the Urgency of Sustainable Coal Use

Much of the world remains in the energy backwater. Over two billion people live on less than two dollars a day, over two

billion lack adequate access to electricity and another 1.6 billion have no electricity whatsoever. Improved access to energy is the only hope the most prominent victims of energy deprivation — women and children — have of lessening the burden of unrelenting toil in the dark. Indeed, as the Global Energy Network (2004) has pointed out:

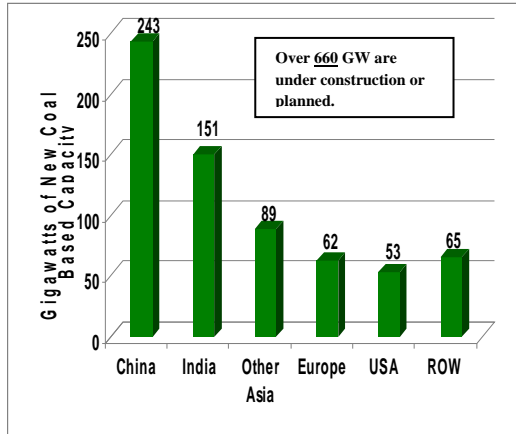
"Every single one of the United Nations' Millennium Development Goals requires access to electricity as a necessary prerequisite."

The **urgency of sustainable coal use** is increasingly apparent as policymakers grapple with the twin challenges of protecting the environment while meeting the energy needs of a growing and dynamic world.

The U.S. is projected to import 62 percent of its liquid fuels and 17 percent of its natural gas by 2015, so it has an unremitting vested interest in the unfolding of the global energy situation. The U.S. has a unique opportunity to assume a leadership role in simultaneously reducing both greenhouse gas (GHG) emissions and global poverty by making both established and emerging clean coal technologies available, deployable and affordable to developing nations. The world is inevitably turning to coal conversion to meet escalating energy demand. China and India have only 4 percent of the world's oil and natural gas, but 23 percent of the world's coal. With 2.5 billion people (37 percent of the

population), it should be no surprise that coal is the primary energy choice.

FIGURE 1. COAL-BASED GENERATION UNDER CONSTRUCTION OR PLANNED



(Platts, 2008)

Carbon Capture and Storage Will Open the Door Even Wider for Sustainable Use of Coal

Carbon Dioxide Capture and Storage (CCS) consists of new technologies to capture carbon dioxide (CO₂) from a fossil fuel utilization facility, compress the gaseous CO₂ into a dense fluid form, transport the CO₂ to a suitable storage site and inject the CO₂ into a geological formation where it will remain permanently sequestered. Captured CO₂ is already being used in limited areas as an injection fluid to recover crude oil from nearly depleted oil reservoirs.

CCS is a technically viable solution for capturing CO₂ emissions from coal-based power generation, coal-to-liquid production and SNG plants.

Long-term geologic storage of CO₂ is considered safe, and there is sufficient storage capacity in the U.S. for the quantities of CO₂ released by power generation and other applications. CCS technology is evolving to further improve capture capability, lower energy consumption, and reduce costs. As pointed out in prior Council reports, Research & Development programs, demonstration projects, and reasonable financial incentives should be implemented to spur commercial-scale demonstrations by 2015.

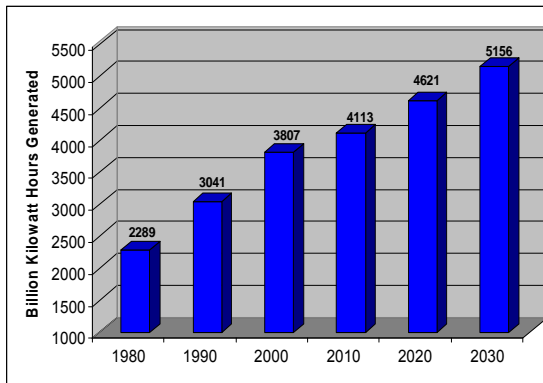
The U.S. Needs Additional Coal-Based Generation

The U.S. is a growing nation with increasing electricity requirements:

- The population is growing by about three million people per year and will exceed 365 million by 2030 — an increase of 75 million in only three decades.
- The overall economy is expanding, even through recessionary times: The GDP will rise from \$11 trillion in 2006 to over \$20 trillion in 2030 — an 82 percent increase.
- Advances in electro-technologies will place substantial demands upon the electricity infrastructure as increased precision and reliability become even more crucial to productivity.

The implications of these demographic, economic and technological trends for our nation's electric supply system are reflected in EIA's projections of electricity demand through 2030:

FIGURE 2. THE RISING TIDE OF ELECTRICITY DEMAND IN THE U.S.



(EIA, 2008)

The EIA has projected that at least 230,000 MW of new generation capacity will be needed by 2030 and that about 100,000 MW (43 percent) will be coal-based. Unfortunately, the National Electric Reliability Corporation (NERC) recently warned that the continuing short-term focus on the construction of new NG-based generation has increasingly adverse implications for reliability:

"short-term planning can't preclude long-range strategies for modernization and expansion... dependence on short term natural gas generation... overlooks the need to integrate other necessary sources."

The EIA has projected that about 75 percent of new natural gas supply will come from liquefied natural gas (LNG). If even more NG-based generation continues to be built to replace cancelled or delayed coal-based generation, the amount of LNG required in the next 20 years will be even greater than predicted. Hence, *de facto*, LNG would become the default fuel for generation and other uses. NERC has warned about such a situation:

"Importing LNG from abroad opens the U.S. fuel supply to the global market and all the economic and political risks associated with it"
(NERC, 2007)

Thus, for the first time in history, the reliability of the U.S. electricity supply system would be dependent upon decisions made in other countries. Europe, of course, has already gone down that path, with all the attendant risks to energy security and economic stability.

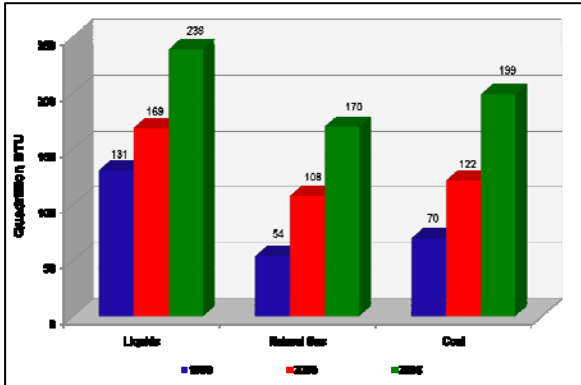
In order to meet the growing demand for electricity and the need for energy security, additional coal-based generation is essential. Coal is the only major energy source which can meet projected electricity demand in a timely, reliable, affordable, and increasingly clean manner.

The Global Scale of Demand for Energy is Beyond Our Experience

The changes that are taking place in regard to population growth and economic expansion are of a magnitude the world has never seen, dwarfing the Western world's industrial revolution. Consider these comparisons:

- For every child in France, there are 30 children in India
- China now has 600 million people living in cities, while Germany has 62 million
- The Middle East will increase its energy consumption more than 17 quads by 2030; Europe will increase by 8 quads

FIGURE 3. INCREMENTAL ENERGY CONSUMPTION IN NEXT 25 YEARS WILL BE MORE THAN 50 PERCENT GREATER THAN THE LAST 25 YEARS



Conclusions

Simply put, the sheer size of these economic, demographic, and social changes has no historical precedent. The world has never experienced an energy demand surge to compare with what we will face in the next 30 years.

It is impossible for the world to meet demand growth of this magnitude without coal conversion to electricity, liquid fuels, and SNG. Billions of people will be relying on coal to meet their needs and improve their quality of life.

As a public advisory committee to the Secretary of Energy initially chartered in 1984, The National Coal Council has compiled over 30 reports at the Secretary's request on numerous issues affecting coal and U.S. energy policy. The factual information in this paper, and the conclusions based thereon, are drawn from these studies and the documents used to compile them, all of which have been submitted to the Secretary of Energy.