

Energy Policy, Energy Security and National Security

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Good afternoon and thank you, Senator Brock, for that kind introduction. It's a great pleasure and privilege to join this distinguished group for this discussion of energy issues and the outlook for U.S. energy policy — but somewhat intimidating.

Bill Brock's invitation letter asked me to speak about energy security and national security. Most of what I know about the nexus between energy security and national security, I learned from many of you in this room. So I'll not go there, with your permission.

Suffice it to say (quickly) that I joined the Nuclear Energy Institute after 38 years of service in the United States Navy because I am convinced, first, that nuclear energy is essential to our nation's energy security and, second, that energy security is a keystone of our national security. As you all know, national security involves more than protection against external military threats. Positive national security includes public confidence in our nation's economic prospects ... confidence that we can sustain economic growth ... confidence that we can create jobs and promise our people a higher standard of living. National security does **not** include exporting over half-a-trillion dollars a year for the oil that drives a good part of our economy. And it does not include allowing ourselves to be vulnerable to people who do not accept our democratic principles and, worse, would like to destroy us.

So allow me to deviate slightly from my assigned homework and focus today on the electric power business and its relationship to energy security and thus to national security. It is not a pretty story. We have managed to dig ourselves into a deep hole in the United States when it comes to our electricity infrastructure.

About 45 percent of our generating capacity is more than 30 years old. Approximately 20 percent is more than 40 years old. We have roughly one million MW of electric generating capacity in the United States. About one-third of that million megawatts [315,000 MW] is coal-fired capacity. Nearly two-thirds of that coal capacity is 30 years old or older and about 50 percent of our coal plants are 40 years old or older.

Age is not always a precise indicator of a power plant's useful life. We expect to run today's nuclear plants for 60 years and possibly longer. But in the case of fossil-fired power plants, age is important. Older generating capacity is less efficient, generally not equipped with the latest environmental control technology and generally not economical to retrofit.

Continuing to operate that older, less efficient generating capacity, continuing to defer capital investment in newer, cleaner, more efficient generating technologies is frustrating our ability to achieve cleaner air and reduce carbon emissions, and will continue to do so.

We have deferred investment in new, more efficient, cleaner high-capital-cost nuclear and coal-fired baseload power plants – not to mention the transmission infrastructure necessary to move that power to market. As a result, America’s electric power industry is pushing a bow wave of capital investment in front of it.

How much? More than the book value of the entire U.S. electric system. More than 1.5 trillion dollars between now and 2025 or so for new generating capacity, new transmission and distribution, efficiency programs, and environmental controls. That does not include the inevitable costs of controls on carbon.

Given the length of time required to bring new nuclear plants into service, the environmental and regulatory uncertainty hanging over new coal-fired generating capacity, and the fact that carbon capture and storage has not been demonstrated at the scale necessary, it is virtually certain that U.S. electric sector dependence on natural gas will increase between now and 2020. Natural gas plants will become our default answer.

This fact has negative implications for U.S. energy security and the U.S. economy. Over the past 15 years, the electric power sector built approximately 290,000 MW of new gas-fired capacity because it could be built quickly, had low capital cost, and represented the lowest investment risk during a period of business uncertainty associated with the restructuring of the electric power industry. By comparison we added 10,000 MW of coal and nuclear during this time.

It is now clear, however, that this new gas-fired capacity has placed unsustainable demand on natural gas supply. It exposed consumers to recurring periods of price volatility— just this year, we've seen natural gas prices swing between \$7 per million BTU to \$13 and back again. And it does enormous damage to industries that depend on natural gas as feedstock and fuel. We've exported 118,000 jobs in the chemical industry since 2000.

About 40 percent of U.S. fertilizer manufacturing is shut down because of high gas prices. There are 120 major chemical facilities — one-billion-dollar-plus facilities — being built today around the world, but not one in the United States.

I cannot see how exporting our national wealth or **adding** dependence on imported natural gas in the electricity industry to our **existing** dependence on imported oil in the transportation industry is a step in the direction of greater security.

On top of this, it is clear that our nation **must** and **will** address climate change — partly because both parties and both candidates for President (and now most Americans) believe it is a major environmental imperative, but partly because climate change, no less than dependence on imported oil, has major implications for national security.

This blinding flash of the obvious became clear to me when I participated in a year-long exercise sponsored by the CNA Corporation. CNA organized a Military Advisory Board — a group of a dozen retired 3- and 4-star flag and general officers from all services – to evaluate the national security implications of climate change. You would recognize many of the names on the board —

- Gordon Sullivan, former Army Chief of Staff
- Tony Zinni, former Commander in Chief, Central Command
- Joe Prueher, former Commander in Chief, Pacific Command, and former Ambassador to China
- Dick Truly, former astronaut and NASA Administrator, and others.

We received detailed briefings over many months from the U.S. intelligence community, climate scientists, business leaders, and others.

As we developed our report — which was published in 2007 and called *National Security and the Threat of Climate Change* — we came to recognize that we could not make a useful contribution to the ongoing debate over climate science and, in fact, attempting to do so would diminish our message.

But we did conclude that we could make a useful contribution by proposing a new way of thinking about climate change, and by focusing attention on the national security impacts of climate change, which could be staggering.

We concluded that, even if catastrophic climate change is a **low**-probability event, the consequences are so staggering that America's national security demands that we must take steps now to reduce the growth rate in CO₂ emissions.

We documented and validated the **direct** potential consequences: Extreme weather events, drought, flooding, sea-level rise, increased spread of disease. Economic and environmental conditions in already fragile areas will further erode as food production declines. Water becomes increasingly scarce. Large populations migrate and immigrate in search of essential resources and basic needs.

But we also found dangerous **indirect** potential consequences. Climate change could seriously exacerbate already marginal living standards in many Asian, African and Middle Eastern nations, causing widespread political instability and the likelihood of failed states.

Weakened and failing governments provide a breeding ground for internal conflict, genocide, extremism, radical ideologies, terrorism, dictatorships — all profound threats to our democratic principles and our market economy.

All this has nothing but negative implications for America's national security. We would be drawn more and more frequently into situations, either alone or with our allies, to help provide stability before conditions worsen and are exploited by extremists. We would be called upon to undertake stability and reconstruction efforts once a conflict has begun.

As Tony Zinni said: [QUOTE] “We will pay for this one way or another. We can pay to reduce greenhouse gas emissions today, and we’ll have to take an economic hit of some kind. Or we will pay the price later in military terms. And that will involve human lives. There will be a human toll.” [UNQUOTE] Add to this the sure fact that we have precious few troops to devote to **additional** stabilization and reconstruction missions, and you might agree that this litany of energy and environmental challenges sounds formidable — almost insurmountable.

However, I am convinced that, if we get after the root causes, the challenges we face are not insurmountable. In fact, they represent a huge opportunity – to **rebuild** our energy infrastructure, **generate** hundreds of thousands of new jobs, **stimulate** economic growth and the creation of national wealth all while addressing the conundrum of meeting increasing electricity demand and reducing carbon emissions.

But to capitalize on this opportunity, we must acknowledge two fundamental realities.

First, we must do what we have never done successfully in this country — develop an integrated, bipartisan policy to address energy policy and environmental policy, and abandon the fiction that these are two separate issues that can be managed separately.

And second, we must recognize that the tools available to accomplish the work ahead of us — tools that we inherited from the 20th century – are simply not adequate for rebuilding and de-carbonizing America’s energy infrastructure. We must create new, 21st century tools and capabilities tailored to a 21st century challenge.

We all know that a portfolio of technologies and energy sources is essential to address U.S. environmental imperatives and to provide adequate supply of electricity. Although each technology has its own challenges, the largest single challenge across all technologies is financing. Sufficient financing is an essential requirement to conduct research, development and demonstration of the technologies in the portfolio, and to enable large-scale deployment of the new technologies when they have been developed and demonstrated. We must create new financing platforms.

The Electric Power Research Institute has estimated that the United States must increase investment in energy research, development and demonstration by \$1.4 billion annually between now and 2030 to develop and demonstrate the technology portfolio necessary to bring electric sector carbon emissions back to 1990 levels.

We will never achieve this level of investment using 20th century tools — taxpayer dollars funneled through the Department of Energy matched by industry funding.

Financing deployment of new, more efficient, low- and zero-carbon technologies also requires creation of a new financing platform. The electric sector faces staggering investment requirements — at least \$1.5 trillion between today and about 2025 on new generating capacity, transmission and distribution and environmental controls and that does not include the cost of reducing carbon emissions. This is more than the book value of today's electric infrastructure.

New baseload power plants are capital-intensive — in 2008 dollars, \$3-4 billion in the case of coal-fired power plants, \$6-8 billion for new nuclear plants, which (by the way) are twice as large. The U.S. electric power sector consists of many relatively small companies, which do not have the size, financing capability or financial strength to finance power projects of this scale on their own, in the numbers required. These projects require financing support — loan guarantees and tax incentives from the federal government or assurance of investment recovery from state governments, or both.

The loan guarantee program authorized by the 2005 Energy Policy Act was an important step in the right direction and implementation of the program is a continuing challenge, partly because the Department of Energy is not well-suited to operate a project finance operation and partly because of tinkering by both the House Appropriations Committee and the Administration. The existing loan guarantee program — with an artificially-capped \$38.5 billion in loan guarantee authority — does not represent a sufficient response to the 1.5 trillion dollar investment necessary to rebuild America's critical electric power infrastructure.

Earlier this year, Senator Pete Domenici proposed creation of a Clean Energy Bank, a government corporation modeled on the Export-Import Bank and the Overseas Private Investment Corporation, to ensure that capital flows to critical infrastructure deployment in the electric sector. Senator Jeff Bingaman has also proposed creation of a federal institution to finance deployment of so-called "breakthrough" energy technologies, to accelerate the time between technology demonstration and widespread deployment. Both concepts have merit.

Too aggressive? Consider this: The Export-Import Bank has \$100 billion of loan guarantee authority to support American companies doing business overseas. The federal government manages a successful loan guarantee portfolio of approximately \$1.1 trillion which, on balance, returns more to the Treasury than it costs the taxpayer. We use loan guarantee programs to support shipbuilding, steelmaking, student loans, affordable housing, construction of critical transportation infrastructure, and for many other purposes.

Please don't tell me that America's electric infrastructure is any less important. It's true that the U.S. electric industry represents only three to four percent of U.S. GDP. But the other 96 to 97 percent of our \$14-trillion-a-year economy depends on that three or four percent.

Before I close, I would be remiss if I did not say a few words about nuclear energy. I trust many of you will acknowledge this simple fact: There is no credible strategy to address both climate change and increasing electricity demand unless nuclear power is part of the portfolio.

That is not personal opinion. It is fact, and we have an overwhelming body of evidence to support it.

In the 2008 *World Energy Outlook*, perhaps the pre-eminent global forecast, the International Energy Agency analyzed what must be done to stabilize the concentration of CO₂ in the atmosphere at 450 parts per million (ppm) — the level judged necessary by the Intergovernmental Panel on Climate Change to avoid irreversible damage. In that scenario, world nuclear generating capacity more than doubles — from 368 gigawatts today to 833 gigawatts in 2030.

Even with this ambitious growth, the additional nuclear capacity does not shoulder the entire carbon reduction load: end-use energy efficiency, improved efficiency of coal-fired power plants, and major gains in CO₂ capture and storage are also necessary.

Closer to home, analyses of the various legislative proposals that have come before Congress all show that nuclear plant construction must accelerate in a carbon-constrained world. In EIA's analysis of the Lieberman-Warner legislation, the model forecasts more new nuclear capacity than could realistically be built during the forecast period. And in those modeling runs where nuclear energy expansion is constrained, carbon emissions and carbon prices are higher, electric sector consumption of natural gas soars, electricity and gas prices are higher, and GDP losses are greater.

There are many more independent studies like these. They may differ in detail and degree, but not in direction. All point unmistakably toward nuclear power as a strategic part of the portfolio of technologies required to reduce carbon emissions.

As we look forward to 2009, the challenge for the new Congress and the new Administration is to create an integrated energy and environmental policy agenda that can attract broad-based bipartisan support and will, in a single stroke, address three major imperatives:

First, demonstrate and deploy the low- and zero-carbon technologies necessary to reduce electric sector carbon emissions and ensure reliable supplies of electricity.

Second, create jobs through construction of new electric infrastructure and rebuild the U.S. manufacturing base for power plant equipment and components.

And third, generate economic wealth and U.S. GDP growth.

National policy to reduce carbon emissions must obviously include targets and timetables for carbon reduction, but such policy must also facilitate the development and rapid deployment of the portfolio of technologies necessary to achieve those targets and timetables. Climate change legislation is unrealistic, and will fail to achieve its targets and timetables, if it fails to address the major financing challenges facing the electric power sector as it seeks to develop and deploy the low-carbon and zero-carbon technologies necessary to reduce greenhouse gas emissions.

The necessary financing tools and techniques do not currently exist. We must create them. Meeting these investment needs will require a partnership between the private sector and the public sector, combining all the financing capabilities and tools available to the private sector, the federal government and state governments.

I deeply believe that the well-being of my six grandchildren, and yours in this room, depends on these actions.

Thank you.