



January 14, 2005

Generation IV International Forum

Remarks of Secretary of Energy Spencer Abraham National Press Club

It is a pleasure to be here today, to welcome the representatives of the Generation IV International Forum to their first Washington, D.C., meeting. Very early in my tenure as U.S. Secretary of Energy, I took part in the formation of the Generation IV initiative, and the signing of the organization's charter – which provided the framework for international cooperative research on advanced nuclear energy systems that are safe, reliable, economical and proliferation resistant... to help ensure that nuclear power has a vital and viable role in the world's energy future.

I last met with the Generation IV International Forum two years ago in Tokyo, Japan, and since that time, it has made tremendous progress. In fact, in its meeting this week, the Generation IV delegates completed negotiations on the world's first legally binding multilateral agreement for the development of advanced nuclear energy technologies. I look forward to seeing this groundbreaking agreement signed in the next few weeks. Congratulations to everyone who has helped make this historic achievement possible.

These early years of the 21st century mark a pivotal time for our world in terms of peace and security, economic growth, and protection of the environment for future generations. And at the center of each of these important issues is energy.

Energy is the lifeblood of our modern society. It drives the technologies that lift people out of poverty and enhance our quality of life – technologies that have led our progress through the industrial age and into the era of global telecommunications, medical marvels, instant information processing, and the exploration of space.

As technology advances and populations grow, the worldwide demand for energy increases at the same rapid pace. The International Energy Agency predicts that global demand for energy will rise by about 60 percent over the next 25 years, and that two-thirds of the increase will come from developing countries such as China and India. Economic expansion in these developing nations is already accelerating the need for additional energy to fuel their booming industrial and transportation sectors, and to electrify vast rural regions.

The IEA's energy outlook, issued this past October, envisions a 1.6 percent annual increase in the need for oil – to about 121 million barrels a day by the year 2030 from the current 82 million barrels a day. It also estimates a 1.5 percent increase every year in the demand for coal, and that the use of natural gas will double over the same period of time. Other energy organizations have similar predictions. The Department of Energy's Energy Information Administration sees world electricity demand increasing nearly 75 percent by 2025 and, during the same time, natural gas demand climbing by 67 percent.

As we look ahead to meeting this ever-greater demand, we face a dilemma. The same energy that has transformed our world in so many positive ways – and will help lift the fortunes of the developing world in the coming years -- also could have implications for the environment and, potentially, for future economic growth.

This is the case because the energy we use today comes mainly from fossil fuels – oil, coal and natural gas. While we have enough of these fossil fuels to last many decades into the future, they are becoming more expensive to find and produce and – particularly in the case of oil – they can be concentrated in politically unstable parts of the world. This makes the prospect of rising energy prices and greater price volatility a major concern in the years ahead.

And, as we know, fossil fuels – the way we use them now – cause pollution. This pollution includes sulfur dioxide, which leads to acid rain... nitrogen oxides, which form smog and ground-level ozone pollution... greenhouse gases... and other potentially harmful substances such as mercury.

The pollution problem is particularly evident in parts of the developing world. When you visit rapidly growing cities in these countries, you are surrounded by construction projects – new buildings, roads and other infrastructure. New factories and skyscrapers are popping up everywhere, the sidewalks are teeming with people, and the streets are choked with traffic. And as a result of all this growth and progress, the air is often thick with smog. You can see people walking around with masks over their faces to filter out the dirty air.

Unless we make significant changes in the way we produce and use energy, such as using more advanced technologies such as clean coal, these problems will intensify and – within the next few decades – could indeed pose serious issues. People will demand that their governments do something about the health and environmental problems – either real or perceived -- that could result. This, in turn, might prompt policy actions that constrain further development of energy supplies or expansion of infrastructure ... leading to the types of economic problems that could result from shortages of energy.

When President Bush took office in 2001, he saw this looming energy challenge as a top priority. One of his first actions as President was to put together a National Energy Policy addressing the long-term issues related to ensuring our nation's energy security well into the 21st century.

A central element of this policy was the plan for a diverse mix of energy sources for the 21st century economy, including traditional fuels like oil, natural gas and coal... along with hydropower and other renewables... and new sources like hydrogen. And, of course, a very important component of that diverse fuel mix is nuclear energy – which produces about 20 percent of America's electricity today.

While recent outlooks by the International Energy Agency, the Energy Information Administration and other organizations predict significant increases in the use of oil, coal and natural gas around the world over the next quarter century, they estimate only a very slight increase in the growth of nuclear power. They predict just a tiny up-tick in nuclear energy for the booming economies of Asia. They predict a decrease for nuclear energy in Europe. And they see no growth at all for nuclear power anywhere else – including the United States.

If none of America's new generation capacity is nuclear, its percentage of the U.S. electricity mix would drop from 20 percent to about 14 percent by 2025... and then down to 8 and to 5, and so on toward zero by the middle of this century. This is both astonishing and alarming, given the unique benefits that nuclear energy offers – benefits that no other major energy source available today can provide.

Foremost among these benefits is the fact that nuclear power emits none of the pollutants associated with the burning of fossil fuels. Indeed, nuclear plants in the eastern part of the United States have made it possible for many states to meet the requirements of the federal Clean Air Act. Since the mid-1970s, in fact, nuclear energy has enabled the United States to avoid emitting more than 80 million tons of sulfur dioxide and about 40 million tons of nitrogen oxides.

Also important is nuclear power's ability to supply electricity with no greenhouse gas emissions. About 440 nuclear reactors around the world produce electricity today, displacing about 2.5 billion tons of carbon dioxide every year that would have been emitted using coal-fired generation. That's an extremely significant number when you consider that coal-fired power generation around the world emits 5.8 billion tons of CO₂ per year.

Nuclear energy's benefits are even more pronounced when you consider its potential role in the developing world. There are 2 billion people in developing countries who currently have no electric service, but will strive to obtain it in coming decades. For that reason, it's estimated that electricity use in the developing

world will increase 125 percent by 2025. If that amount of new generation were supplied by coal, it could mean 5 billion tons of additional CO₂ emissions each year. If it were all supplied by an equal mixture of coal and natural gas, emissions would be about 3.4 billion tons. And even if all such new generation were gas-fired using the latest technologies, the carbon emissions would still be about 1.7 billion tons.

Because of its long-term potential to bring clean and cost-effective energy to the developing world, to help industrialized nations increase their energy security, and to help all nations deal with some of our most pressing environmental challenges, the advantages of nuclear power are strikingly clear.

Without nuclear energy – in fact, without a major increase in nuclear energy – we are much less likely to be able to affordably meet the world's growing demand for electricity. And we absolutely would not be able to produce all that electricity without accompanying increases in pollution and greenhouse gas emissions.

That's why President Bush's National Energy Policy recommends more nuclear energy in the United States – where no new commercial reactors have been ordered since the 1970s. As part of the President's plan, the Department of Energy has undertaken a number of initiatives to improve nuclear power's safety, cost-effectiveness and reliability to help ensure its future viability in this country and throughout the world.

One of the most important efforts, of course, is the Generation IV International Forum and its development of advanced nuclear technology for future decades, including plants that produce new products like hydrogen in addition to electricity. Large-scale hydrogen production, as envisioned in the Department of Energy's Generation IV program, would be instrumental in strengthening our nation's energy security if hydrogen-fueled vehicles someday replace the cars and trucks that currently run on gasoline.

Another key U.S. initiative is the Nuclear Power 2010 program, an effort to make sure our nation is ready to resume nuclear plant construction by the end of this decade. Nuclear Power 2010 involves the government and the private sector working closely together, and it includes demonstration of the Nuclear Regulatory Commission's "one-step" licensing process that will be crucial to increasing regulatory certainty and removing a major risk of investing in new nuclear power plants.

This work is well under way. The Energy Department is working with utilities and industrial companies nationwide to set the stage for new nuclear power plants to enter service in the United States. Already, we have three sites in the U.S. now undergoing review by the Nuclear Regulatory Commission to confirm that they are qualified places to build the next plants. And just two months ago, we selected two large industry consortia to proceed with the

regulatory steps that could lead to the first U.S. nuclear plants in more than 30 years.

But even the most ardent supporter of nuclear power understands that we must move forward in dealing with spent nuclear fuel. I was pleased to be Secretary of Energy when, after years of debate with no firm action, the United States moved ahead with a clear plan to deal with high-level nuclear waste. While some critics said that disposal of this waste is too hard or too controversial to be accomplished, we are well on our way toward fulfilling the government's obligation to the commercial nuclear power industry. Doing so will remove what has been a major impediment to the construction of new nuclear plants in this country. I am proud of our role in helping the United States deal effectively with high-level nuclear waste, and I believe we are on the right path – a path that is based on sound science and a path that I believe will successfully meet the regulatory tests ahead.

Someday, it may be possible for science to find new ways to deal with nuclear waste, and another Department of Energy program, the Advanced Fuel Cycle Initiative, is working with experts in countries such as France and Japan to find it. This effort has the goal of developing proliferation-resistant fuel treatments and transmutation technologies that will enable a transition from the current once-through nuclear fuel cycle to a sustainable, closed fuel cycle for the future. Developing these technologies will reduce the cost of geologic fuel disposal, help the future spent fuel repository operate more effectively, and support many of the new systems being developed under the Generation IV program.

While we in the United States have been working to address the impediments to nuclear construction in our own nation, a number of other countries have been moving aggressively forward with significant nuclear energy programs.

A few nations, most notably France, already derive the majority of their electricity from nuclear plants. Nuclear power is also a major contributor to the electricity needs of Japan, Sweden, South Korea and several other nations. Finland has recently begun adding new nuclear capacity – the first new reactor construction in Western Europe in 15 years – which will boost nuclear power's share of Finland's electricity production to 35 percent.

The largest nuclear programs are under way in the developing nations, where China has become the world's second-largest generator of electricity from all sources. And, with electricity demand expected to double within 20 years, China also has become the fastest-growing market in the world for nuclear power generation equipment. China has eight nuclear plants now under construction and plans to build at least eight more reactors by early in the next decade.

By the year 2020, China plans to boost its nuclear electric generating capacity to 36,000 megawatts – up substantially from the 7,000 megawatts of nuclear capacity it has today. That would mean building nearly 30 new reactors over the next 15 years, which puts China squarely at the forefront of nuclear power development in the world. The chairman of China's Atomic Energy Authority (Zhang Huazhu) said recently that “nuclear energy will become one of the pillars of the power structure” in his country, especially in the fast-growing coastal areas.

As China, Finland and these other countries clearly recognize, the case for nuclear energy is compelling. And their governments' decisions to pursue nuclear power programs are validated by a number of recent studies – all of which emphasize the importance of nuclear energy.

- A study by University of Chicago Department of Economics cites the impediment that high financing costs poses for nuclear construction in the United States, but it concludes that nuclear power plants can become cost-competitive with electricity produced by coal and natural gas --once the extra costs associated with building the first plants are absorbed. The study further notes that nuclear energy would become even more competitive with fossil fuels as emission restrictions are imposed on the generating sector.
- Another independent study, by the Massachusetts Institute of Technology, focuses on nuclear power's benefits in helping control the growth of greenhouse gas emissions, and calls for government support in conducting research on next-generation reactors -- such as we are pursuing in Generation IV. This study also envisions increasing the world's nuclear energy capacity to 1,000 reactors by 2050.
- A third study, released this past August by Princeton University, advocates doubling the world's current nuclear power capacity as a way to help combat greenhouse emissions growth.

These studies confirm the advantages of nuclear power, including its potential role in helping achieve the President's goal of reducing America's greenhouse-gas intensity. So the question arises: If nuclear power makes sense for China, France, Finland and all these other countries, why isn't it also moving forward in the United States?

The primary reasons, as we all know, are cost considerations and political opposition. And these two factors are closely related. While high costs in the early phases of new nuclear construction will result from implementing first-time designs and construction processes, the greater cost constraint is uncertainty -- particularly regulatory uncertainty. This uncertainty stems from the belief that political opposition to nuclear energy could bring about costly rule changes and/or actions which significantly delay projects in such a fashion as to make project costs unacceptable. Thus, for nuclear

power to move ahead in America, these issues must be addressed.

Political opposition to nuclear power in the United States and other countries may represent a minority viewpoint, but it is deep-seated and intense. And, importantly, nuclear opponents have successfully persuaded large numbers of Americans of the validity of their concerns, especially as to the safety of nuclear power. Despite the industry's excellent overall safety record, too many people still think nuclear plants are extremely dangerous and unreliable.

The fact is, though, that U.S. nuclear plants are safer today than they have ever been, and their safety performance continues to improve. Back in 1980, the Nuclear Regulatory Commission reported more than 200 "unusual events" – the term used to describe incidents, even minor things like unlocked doors, that could have safety implications – each year at U.S. nuclear power plants. Today, there are only about 20 such incidents per year – a reduction of 90 percent. And today's nuclear plants have far fewer incidents of safety violations or employee injuries than other types of power plants or industrial facilities.

Furthermore, the new designs for nuclear reactors rely on natural forces such as gravity, rather than the performance of mechanical devices, to safeguard plants from accidents. In addition, these new designs also make nuclear plants more economical to build and operate.

In addition to safety, nuclear energy's critics often cite environmental concerns. But let's look at the environmental impact of not having nuclear energy. Without nuclear energy, the vast amounts of electricity the world will need in the future will be produced largely by coal and other fossil fuels. The increases in pollution and greenhouse gas emissions from this additional generation capacity would be huge, easily surpassing any hoped-for reductions under the Kyoto Protocol.

Indeed, I think it interesting that the strongest backers of Kyoto and of reducing greenhouse gas emissions -- who oppose coal as well as other fossil fuels -- are often the same people who also oppose nuclear power.

These critics usually point to renewable energy as the better alternative. Renewable sources are important, and our Administration is actively promoting the expansion and further development of energy sources like solar and wind power as part of a diverse energy portfolio. But current renewable technology alone cannot produce the vast quantities of electricity needed to meet the growing energy demand. Of all the forms of emission-free energy available today, only nuclear power can deliver large blocks of dispatchable electricity regardless of the weather, time of day or geographic location.

As the demand for energy rises around the world – and the desire to meet various pollution and greenhouse gas targets continues growing – the advantages of nuclear power are more pronounced than ever before. Without nuclear energy, countries will most likely have to choose between having enough electricity to maintain strong economic growth or cutting back on power production to control emissions. I think we can expect that the nations of the world are not prepared to lower their standards of living in order to keep emissions down.

That's why I believe it is essential that those who are concerned about pollution and the buildup of greenhouse gases join the discussion about nuclear power. Shouldn't nuclear energy's ability to meet our growing electricity needs, without producing nitrogen oxides, sulfur dioxide, mercury or CO₂, make it a key part of the debate? Doesn't it make sense for all sides to address nuclear energy's issues and challenges?

And just as the opponents of nuclear power need to consider nuclear power in the context of the broader world energy and environmental picture, so too must nuclear energy's supporters begin re-thinking their role in the debate. For too long now, some of those who should be among nuclear power's most vocal proponents have been putting qualifications and conditions on their support.

Many of nuclear energy's supporters have been focusing elsewhere during the past years, and I have heard some of them say they're ready to become more-engaged advocates – but “if only.” If only the cost issues could be dealt with... if only the waste disposal questions could be answered... if only there were more regulatory certainty... if only the public fears could be overcome.

I believe the time for action has arrived. Today, it is time to stop saying “if only.” Today, it's time for nuclear power advocates to much more fully engage in this debate and aggressively build the case for nuclear power as well as to comprehensively address the public's concerns.

In short, it's time for rational people on all sides of the nuclear debate to come together and attempt to find an acceptable way to ensure that the advantages of nuclear energy are part of our energy and environmental solutions.

All sides in the debate need to address the fundamental questions and issues that are critical to laying the foundation for nuclear energy's future – questions and issues concerning safety, cost, regulatory certainty, and siting.

These questions include:

- What needs to be done to adequately address issues of safety and security at nuclear power facilities – to make the

public comfortable and confident with nuclear energy?

- How do we deal with the cost issues of nuclear plant construction, particularly the high costs of the first few new units—which will be the first nuclear plants built in this country since the early 1970s?
- What must we do to bring about the regulatory certainty needed to attract sufficient investment capital into the nuclear energy sector?
- What is the best way to spur the evolution from today's light water reactor technology to Generation IV systems?
- And how do we make sure that the nations of the world – particularly the developing countries – have access to the enormous benefits of the latest, safest, cleanest, most secure and most cost-effective nuclear energy technologies?

I know that taking on all these issues is a tall order. But the economic and environmental challenges the world faces in the coming years demand that this dialogue take place, and that these issues be addressed by all interested parties.

When the age of nuclear power dawned more than 50 years ago, the world had great hopes for the peaceful and constructive use of this amazing new source of energy. Since that time, we have seen the enormous contributions that nuclear science has made to our lives, including medical imaging devices and wondrous new treatments for cancer and other diseases, and advances that have revolutionized industrial processes and enhanced our understanding of matter and the universe.

As we enter the second half of the first nuclear century, I am reminded of President Dwight Eisenhower's call in 1953 to use "the miraculous inventiveness of man" to harness nuclear energy "to serve the peaceful pursuits of mankind."

In his famous "Atoms for Peace" speech, Eisenhower foresaw nuclear energy's ability to "serve the needs of agriculture, medicine and other peaceful activities," and he said that "a special purpose would be to provide abundant electrical energy in the power-starved areas of the world." We have a historic opportunity today to help transform that early vision into reality.

Working together, we can advance the development of new nuclear technologies, we can overcome the political opposition -- and even convert some opponents into supporters -- and we can usher in a new age of energy and economic security... that enhances the quality of life for people around the world.

