

# Greenpeace founder makes the case for nuclear

*Patrick Moore, chairman and chief scientist of Greenspirit Strategies Ltd., based in Vancouver, British Columbia, Canada, presented the following testimony at an April 28, 2005, hearing before the Subcommittee on Energy and Resources of the U.S. House of Representatives' Committee on Government Reform. The topic of the hearing was "Nuclear Power Generation as an Approach to Meeting America's Energy Needs."*

### **Introduction**

Mr. Chairman and members of the Subcommittee, thank you for inviting me here today to testify about why nuclear energy is a vital component for America's energy future. First, let me say a few words about who I am and where I've come from.

### **Founding Greenpeace**

I was born and raised in the tiny fishing and logging village of Winter Harbour on the northwest tip of Vancouver Island, in the rainforest by the Pacific. I didn't realize what a blessed childhood I'd had, playing on the tidal flats by the salmon-spawning streams in the rainforest, until I was sent to boarding school in Vancouver at age 14.

I eventually attended the University of British Columbia studying the life sciences: biology, biochemistry, genetics, forestry; but it was when I discovered ecology that I realized that through science I could gain an insight into the mystery of the rainforest I had known as a child.

I became a born-again ecologist, and in the late 1960s, was soon transformed into a radical environmental activist.

I found myself in a church basement in Vancouver with a like-minded group of people, planning a protest campaign against U.S. hydrogen bomb testing in Alaska. We proved that a somewhat rag-tag looking group of activists could sail a leaky old halibut boat across the North Pacific Ocean and change the course of history.

President Nixon canceled the remaining hydrogen bomb tests in the series due to overwhelming public opposition, which we had helped to generate. In retrospect this was a major turning point in the global arms race.

This was the birth of Greenpeace.

### **Activism in action**

In 1975 we set sail deep-sea into the North Pacific against the Soviet Union's factory whaling fleets that were slaughtering the last of the sperm whales off California. We put ourselves in front of the harpoons in little rubber boats and made Walter Cronkite's evening news.

That really put Greenpeace on the map.

In 1979 the International Whaling Commission banned factory whaling in the North Pacific and soon it was banned in all the world's oceans.

### **From confrontation to consensus**

By the mid-1980s, Greenpeace had grown from that church basement into an organization with an income of over U.S.\$100 million per year, offices in 21 countries, and over 100 campaigns around the world, now tackling toxic waste, acid rain, uranium

mining, and drift net fishing, as well as the original issues.

We had won over a majority of the public in the industrialized democracies. Presidents and prime ministers were talking about the environment on a daily basis.

For me it was time to make a change. I had been against at least three or four things every day of my life for 15 years; I decided I'd like to be in favor of something for a change.

I made the transition from the politics of confrontation to the politics of trying to build a consensus for environmental reform.

After all, when a majority of people decide they agree with you it is probably time to stop hitting them over the head and sit down and talk to them about finding solutions to our environmental problems.

### **Sustainable development**

The term "sustainable development" was adopted to describe the challenge of taking the new environmental values we had popularized, and incorporating them into the traditional social and economic values that have always governed public policy and our daily behavior.

We cannot simply switch to basing all our actions on purely environmental values.

Every day 6 billion people wake up with real needs for food, energy, and materials. The challenge for sustainability is to continue to provide for those needs, maybe even provide more for people in the developing countries, while at the same time reducing our negative impact on the environment. These two goals are not mutually exclusive as many activists claim today.

But any changes made must also be socially acceptable and technically and economically feasible. It is not always easy to balance environmental, social, and economic priorities.

Compromise and cooperation with the involvement of government, industry, academia, and the environmental movement are required to achieve sustainability.

It is this effort to find consensus among competing interests that has occupied my time for the past 20 years.

### **Environmental extremism**

Not all my former colleagues saw things that way. They rejected consensus politics and sustainable development in favor of continued confrontation and ever-increasing extremism. They ushered in an era of zero tolerance and left-wing politics. Some of the features of this environmental extremism are:

Environmental extremists tend to be anti-human. Humans are characterized as a cancer on the Earth. To quote eco-extremist Herb Hammond, "Of all the components of the ecosystem, humans are the only ones we know to be completely optional." Isn't that a lovely thought? It isn't even true.

They are anti-science and technology. Science is invoked to justify positions that have nothing to do with science. Unfounded opinion is accepted over demonstrated fact. You don't need to look any farther than the zero-tolerance policies against genetically enhanced food crops and nuclear energy to see that this is true.

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They are anti-business. All large corporations are depicted as inherently driven by greed and corruption. Profits are definitely not politically correct. The liberal democratic market-based model is rejected even though no viable alternative is proposed to provide for the material needs of 6 billion people. As expressed by the Native Forest Network, "It is necessary to adopt a global phaseout strategy of consumer-based industrial capitalism."

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I think they mean civilization.

And they are just plain anti-civilization. In the final analysis, eco-extremists have a naive vision of returning to a utopian Garden of Eden, which never actually existed, conveniently forgetting that just 100 years ago people lived to an average age of 35, and there were not enough doctors or dentists to go around. In their Brave New World there will be no more chemicals, no more airplanes, and certainly no more nuclear plants.

### **The case for nuclear energy**

What does environmental extremism have to do with nuclear energy?

I believe the majority of environmental activists, including those at Greenpeace, have now become so blinded by their extremist policies that they fail to consider the enormous and obvious benefits of harnessing nuclear power to meet and secure America's growing energy needs.

These benefits far outweigh the risks.

There is now a great deal of scientific evidence showing nuclear power to be an environmentally sound and safe choice.

### **The current situation**

Today nuclear energy supplies 20 percent of U.S. electrical energy.

Yet demand for electricity continues to rise and in the coming decades may increase by 50 percent over current levels.

If nothing is done to revitalize the U.S. nuclear industry, the industry's contribution to meeting U.S. energy demands could drop from 20 percent to 9 percent.

What sources of energy would make up the difference?

It is virtually certain that the only technically feasible path is an even greater reliance on fossil fuels.

### **Fossil fuels**

In a "business as usual" scenario, a significant reduction in greenhouse gas emissions (GHG) seems unlikely given our continued heavy reliance on fossil fuels. An investment in nuclear energy would go a long way to reducing this reliance and could actually result in reduced CO<sub>2</sub> emissions from power generation.

According to the Clean Air Council, annual power plant emissions are responsible for 36 percent of carbon dioxide (CO<sub>2</sub>), 64 percent of sulfur dioxide (SO<sub>2</sub>), 26 percent of nitrogen oxides (NOX), and 33 percent of mercury emissions (Hg).

These four pollutants cause significant environmental impact, including acid rain, smog, respiratory illness, [and] mercury contamination, and are the major contributors to GHG emissions.

Among power plants, old coal-fired plants produce the majority of these pollutants. By contrast, nuclear power plants produce an insignificant quantity of these pollutants.

According to the Clean Air Council, while 58 percent of power plant boilers in operation in the U.S. are fueled by coal, they contribute 93 percent of NOX, 96 percent of SO<sub>2</sub>, 88 percent of CO<sub>2</sub>, and 99 percent of the mercury emitted by the entire power industry.

### **Prominent environmentalists see nuclear energy as solution**

Prominent environmental figures like Stewart Brand, founder of the *Whole Earth Catalog*, Gaia theorist James Lovelock, and Hugh Montefiore, former Friends of the Earth leader, have now all stated their strong support for nuclear energy as a practical means of reducing greenhouse gas emissions while meeting the world's increasing energy demands.

I too place myself squarely in that category.

U.K. environmentalist James Lovelock, who posited the Gaia theory that the Earth operates as a giant, self-regulating super-organism, now sees nuclear energy as key to our planet's future health. "Civilization is in imminent danger," he warns, "and has to use nuclear—the one safe, available energy source—or suffer the pain soon to be inflicted by our outraged planet."

While I may not be quite so strident as my friend James Lovelock, it is clear that whatever risk there is from increased CO<sub>2</sub> levels in the atmosphere—and there may be considerable risk—can be offset by an emphasis on nuclear energy.

In a recent edition of the Massachusetts Institute of Technology's *Technology Review*, Stewart Brand writes that nuclear energy's problems can be overcome, and that:

The industry is mature, with a half-century of experience and ever improved engineering behind it. Problematic early reactors like the ones at Three Mile Island and Chernobyl can be supplanted by new, smaller-scale meltdown-proof reactors like the ones that use the pebble-bed design. Nuclear power plants are very high yield, with low-cost fuel. Finally, they offer the best avenue to a "hydrogen economy," combining high energy and high heat in one place for optimal hydrogen generation.

### **Nuclear energy: A proven alternative**

Indeed, nuclear power is already a proven alternative to fossil fuels.

The United States relies on nuclear power for some 20 percent of its electricity production, and produces nearly one-third of global nuclear energy.

Despite its current limited supply, nuclear energy now provides the vast majority (76.2 percent) of the U.S.'s emission-free generation. (Others include hydroelectric, geothermal, wind, biomass, and solar.)

In 2002, the use of nuclear energy helped the U.S. avoid the release of 189.5 million tons of carbon into the air, if this electricity had been produced by coal.

In fact, the electric sector's carbon emissions would have been 29 percent higher without nuclear power.

And while hydro, geothermal, and wind energy all form an important part of reducing our reliance on fossil fuels, without nuclear energy that reliance will likely not diminish. In 2002, carbon emissions avoided by nuclear power were 1.7 times larger than those avoided by all renewables combined.

But let me make it clear at this point that I believe there should also be a much greater emphasis on renewable energy production. I believe the two most important renewable energy technologies are wind energy, which has great potential, and ground-source heat pumps, known as geothermal or GeoExchange. Solar

panels will not be cost-effective for mass application until their cost is reduced by 5–10 times. I would not be inclined to support an energy policy that focused exclusively on nuclear but would rather insist that an equal emphasis be placed on renewables, even though it is not possible, given present technologies, that renewables could produce the same quantity of power as nuclear plants.

### **The impact of additional nuclear energy generation**

Nuclear energy has already made a sizeable contribution to the reduction of GHG emissions in the U.S.

But more must be done and nuclear energy is pointing the way.

A revitalized American nuclear energy industry, producing an additional 10 000 MW from power plant upgrades, plant restarts, and productivity gains, could assist the electric sector to avoid the emission of 22 million metric tons of carbon per year by 2012 according to the Nuclear Energy Institute—that's 21 percent of the President's GHG intensity reduction goal.

A doubling of nuclear energy production would make it possible to significantly reduce total GHG emissions nationwide.

While current investment in America's nuclear energy industry languishes, development of commercial plants in other parts of the world is gathering momentum.

In order to create a better environmental and energy-secure future, the U.S. must once again renew its leadership in this area.

### **Safety**

As Stewart Brand and other forward-thinking environmentalists and scientists have made clear, technology has now progressed to the point where the activist fear-mongering about the safety of nuclear energy bears no resemblance to reality.

The Chernobyl and Three Mile Island reactors, often raised as examples of nuclear catastrophe by activists, were very different from today's rigorously safe nuclear energy technology. Chernobyl was actually an accident waiting to happen—bad design, shoddy construction, poor maintenance, and unprofessional operation all combined to cause the only terrible accident in reactor history. In my view, the Chernobyl accident was the exception that proves the rule that nuclear reactors are generally safe. Three Mile Island was actually a success story in that the radiation from the partially melted core was contained by the

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concrete containment structure; it did the job it was designed to do.

Today, approximately one-third of the cost of a nuclear reactor is dedicated to safety systems and infrastructure.

The Chernobyl reactor, for example, was not outfitted with the fully automated, multiple levels of safety and redundancy required for North American reactors.

As we speak there are over 100 nuclear reactors in the U.S. and

over 400 worldwide that are producing electricity every day without serious incident.

### **Nuclear waste**

The fact that reactors produce nuclear waste is often used to support opposition to them. First, there is no technical obstacle to keeping nuclear waste from entering the environment at harmful levels. Second, this is already being accomplished at hundreds of nuclear power sites around the world. It is simply an issue of secure containment and maintenance. Most important, the spent fuel from reactors still has over 95 percent of its potential energy contained within it. Therefore, spent fuel should not be disposed of, it should be stored securely so that in the future we can use this energy productively.

### **Nuclear proliferation**

Nuclear reactors produce plutonium that can be extracted and manufactured into nuclear weapons. This is unfortunate but is not in itself justification for eliminating nuclear energy. It appears that the main technologies that have resulted in combat deaths in recent years are machetes, rifles, and car bombs. No one would seriously suggest banning machetes, guns, cars, or the fertilizer and diesel that explosives are made from. Nuclear proliferation must be addressed as a separate policy issue from the production of nuclear energy.

### **Other benefits from nuclear energy**

Besides reductions in GHG emissions and the shift away from our reliance on fossil fuels, nuclear energy offers two important additional and environmentally friendly benefits.

First, nuclear power offers an important and practical pathway to the proposed “hydrogen economy.” Unfortunately, there are no hydrogen mines where we can source this element directly. It must be manufactured, from fossil fuels, biomass, or by splitting water into hydrogen and oxygen. Splitting water is the only nongreenhouse gas-emitting approach to manufacturing hydrogen.

Hydrogen, as a fuel, offers the promise of clean, green energy for our automobiles and transportation fleets.

Automobile manufacturers continue to improve hydrogen fuel cells, and the technology may, in the not-too-distant future, become feasible for mass application.

By using electricity, or by using heat directly from nuclear reactors to produce hydrogen, it may be possible to move from fossil fuels for transport energy to using clean hydrogen, thus virtually eliminating smog caused by autos, trucks, and trains.

A hydrogen fuel cell-powered transport fleet would not only virtually eliminate CO<sub>2</sub> emissions, but would eliminate the energy security problem posed by reliance on oil from overseas.

Second, around the world, nuclear energy could be used to solve another growing crisis: the increasing shortage of fresh water available for human consumption and crop irrigation.

By using nuclear energy, seawater could be desalinated to satisfy the ever-growing demand for fresh water without the CO<sub>2</sub> emissions caused by fossil fuel-powered plants.

### **Conclusion**

I want to conclude by emphasizing that nuclear energy—combined with the use of renewable energy sources like wind, geothermal, and hydro—remains the only practical, safe, and environmentally friendly means of reducing greenhouse gas emissions and addressing energy security.

If the U.S. is to meet its ever-increasing demands for energy, while reducing the threat of climate change and reliance on overseas oil, then the American nuclear industry must be revitalized and permitted to grow.

The time for common sense and scientifically sound leadership on the nuclear energy issue is now.

Thank you.

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