

The Nuclear Energy Renaissance

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Around the globe, policy makers seeking to meet the world's surging energy demand with a low-carbon, baseload power supply are taking a new look at nuclear energy. After nearly 20 years, there is once again great interest in the power of the atom.

America needs cleaner energy that is reliable, abundant, and immediately available. But there aren't many choices that fit the bill now, *today*. Perhaps that's why both public and political support for nuclear energy is the strongest it's ever been.

So, what are the variables that changed the equation? First, global warming: Since the turn of the century, scientists and political leaders have come to a consensus in the belief that climate change is quite simply the biggest challenge facing humanity. Industry insiders see nuclear as an important weapon in the fight against warming.

"If this nation is truly serious about controlling global warming, nuclear power must maintain its 20 percent share of U.S. power generation," says J.M. Bernhard Jr., Chairman, President and CEO of The Shaw Group Inc., the \$7 billion energy, environmental and infrastructure engineering and construction firm based in Baton Rouge, LA. "That will require the construction of 45 to 50 new nuclear plants by 2030, while maintaining the current fleet."

Second, energy supply has become a concern as geopolitics has left its mark on the psyche of energy consumers around the world. And third, energy demand is ever on the rise. The Energy Information Agency predicts a 30% increase in electricity use by the year 2030. The United States uses about 15 times more energy per person than does the typical developing country.

America is not alone in rethinking nuclear. Countries looking in atomic power include the United Kingdom, Italy, Finland, France and the Czech Republic. China and India are extremely serious about nuclear, and Russia, home to huge resources of oil and

natural gas, is also very active. Whether large or small, resource rich or resource wanting, countries taking a new look at nuclear are doing so for essentially the same reasons: global warming, energy independence and energy security.

Climate of Change

Public opinion is pushing forward the notion that nuclear should have a role to play in the generation of electricity, alongside other low carbon technologies. According to a recent Gallup poll, a record high 59% of Americans surveyed favor nuclear. When asked by the Nuclear Energy Institute (NEI) about their support for

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(Gallup Poll)

new nuclear power plants, 69% agreed that the U.S. should build more nuclear power plants in the future. In fact, a majority associated nuclear energy with energy independence & security, reliability, efficiency, clean air and affordability.

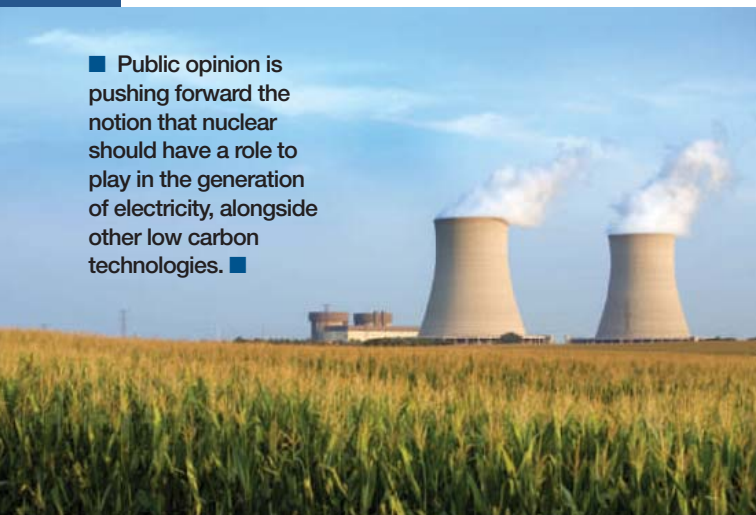
One of Nuclear's most respected advocates is Dr. Phillip Finck of the Idaho National Laboratory. With a doctorate in nuclear engineering from MIT and an MBA from the University of Chicago, Dr. Finck is uniquely qualified to grasp the political, technical and commercial implications of a national return to nuclear energy. "My vision and belief is that nuclear is one of the key tools we can use to help us with both the climate and energy independence issues," he says. "Think of it: With one solution, we lessen the amount of CO2 per unit of energy produced with the potential of replacing some of the energy we import. And, we also have another superb clean baseload power option at our disposal. To be able to replace dirty baseload with clean baseload is a tremendous advantage."

When asked about how renewable energy options might fit into the mix, Dr. Finck welcomes power options based on natural resources, while keeping in mind drawbacks. "Wind and solar have a natural intermittency that affect their use as part of the grid structure; they are more difficult to use as baseload power, but I believe strongly that we should use what we can. I see great advantages to using wind and solar in the mix. But the backbone of the system could easily be, and should be, nuclear."

The Powerful History of Nuclear

Throughout human history, heat has been the primary method for enjoying the benefits of energy. We've either used heat directly to warm our food, our shelter, or ourselves, or we've employed it in the creation of a secondary item, like electricity. Humans

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and clean air,

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The nuclear energy renaissance has already created thousands of new jobs. By providing reliable and affordable electricity, nuclear energy will help keep American business competitive, and will power future worldwide job growth.

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The Westinghouse AP1000™ nuclear power plant is the most advanced of its kind currently available in the global marketplace. Four AP1000s are now under construction in China, and the AP1000 is the announced technology of choice for no less than 14 new plants planned for the United States.

Today, nuclear energy provides 16 percent of total global electricity generation and 20 percent in the United States. Additionally, nuclear energy accounts for more than 70 percent of the carbon-free electricity in the United States.

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have learned how to extract the power of tiny amounts of nuclear material to create electricity, but that process is new; very new when we think of how long humans have been harnessing the benefits of energy.

Congress created the Atomic Energy Commission in 1946. The goal in the 1950s was to show that nuclear was the future of energy, and that it could create electricity for commercial use while building an American industry. The first U.S. commercial generating plant powered by nuclear energy was built by Westinghouse Electric in Shippingport, PA in 1957. In fact, 40% of all the nuclear power plants operating in the world were either built by Westinghouse or licensees using Westinghouse designs. Today, America is home to nearly 25% of the 440-plus nuclear plants that operate in 31 countries. According to the Department of Energy, nuclear accounts for 12% of our generating capacity and 20% of our daily electricity.

The Employment of Logic

One item is often forgotten when calculating the benefits associated with a strong U.S. nuclear industry: jobs. In the midst of the greatest economic crisis in three generations, few industries can equal the economic benefits of a resurgent nuclear energy industry. According to the NEI, the average nuclear plant employs 1,600 people during construction. Plants often help create economic activity that generates 550 additional jobs locally, and produce about \$430 million annually for goods, services and labor, through subsequent spending by the plant and its employees. Nuclear plants provide state and local tax

Web Sites to Watch

Idaho National Laboratory
www.inl.gov

Platts
www.platts.com

The Shaw Group, Inc.
www.shawgrp.com

Westinghouse
www.westinghousenuclear.com

revenue of more than \$20 million, along with annual federal tax payments of \$75 million.

By renewing its nuclear industry, the U.S. also protects its position as both a technological and commercial power. "This is a high-tech industry," says Dr. Finck of the Idaho National Laboratory. "A nuclear reactor costs several billion dollars, which means that with plants currently being talked about, this could be a several trillion dollar worldwide market."

Activity in the space supports Dr. Finck's assertion. Westinghouse, for one, has hired over 4,000 people globally in the last four years. The company is building four plants in China, and has been identified as technology provider for at least 14 new plants in the U.S., including six for which the company has signed contracts. Westinghouse also sees business growing in the



Building Excellence—Leading the Way in the Nuclear Renaissance

As a member of the AP1000™ Consortium and part-owner of Westinghouse Electric Co., Shaw's Power Group is a leader in providing clean, safe, Generation III+ nuclear power technology. With contracts for six new units in the U.S. and four units underway in China, Shaw is committed to providing efficient, effective solutions to the world's power needs.

For fully integrated nuclear power solutions, choose excellence. Choose Shaw.

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AP1000 Rendering

20%

of daily U.S. electricity comes from nuclear plants.

operating plant arena, which includes service, maintenance, and refueling, in the U.S. and around the world.

Westinghouse President and CEO Aris S. Candris says his company has had inquiries from no less than 40 countries regarding potential construction of new plants, driven

in large part by the excitement over new plant designs that are even safer and more economical than the already well-performing operating fleet.

“The nuclear energy renaissance is clearly a reality,” he says. “We are seeing support for nuclear energy throughout the world, and are particularly pleased that so many bright and enthusiastic young people now see nuclear power as both a growth and a green industry.”

Planet Ready, Shovel Ready

If national goals are indeed about reducing our carbon footprint while increasing energy independence and creating jobs, few can argue with the advantages presented by advocates of nuclear energy. In the United States, Westinghouse and its partner The Shaw Group are building the infrastructure to provide the Westinghouse AP1000™ nuclear power plants around the world. The AP1000, with a generating capacity of 1,100 megawatts, employs naturally occurring safety systems such as gravity, natural circulation and condensation to further enhance the safety pedigree.

Plus, the plant requires fewer pumps and motors, and less piping and wiring than traditional plants, reducing both construction and maintenance costs.

Mr. Bernhard of The Shaw Group is bullish on what Nuclear can contribute to the nation. “A nuclear renaissance will create an industry-driven jobs program unrivaled since the great infrastructure projects of FDR’s Works Progress Administration. But unlike those Depression-era programs, the nuclear renaissance will be paid for with private capital and built by private citizens.”

As pressure increases on the American energy ecosystem to deliver more power with less carbon, few choices are readily available. Ironically, the strongest contender is one that’s been touted as the most future-forward for over half a century. Only time will tell how fast America, and the world, will choose to go back to the future of energy.

Written by Henry Gentenaar



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America's Nuclear Energy Laboratory



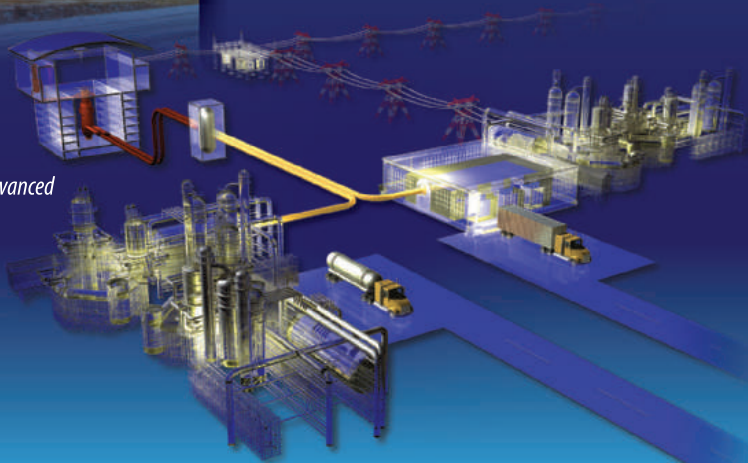
Yesterday – Generation of the world's first usable electricity from nuclear power at Idaho's EBR-I



Today – Operation of the Advanced Test Reactor National Scientific User Facility

Tomorrow – Development and deployment of advanced nuclear energy systems and hybrid energy islands

A 60-year legacy of leadership in nuclear energy research, development, demonstration and deployment



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