



REBUILDING THE NUCLEAR ENERGY WORKFORCE

A UniStar Issue Brief

The world has changed and America’s perspective on energy has changed with it. Concerns about global climate change, air pollution, and public health have made fossil fuels less attractive, while nuclear energy has experienced a resurgence of support. America’s growing demand for energy will require construction of new, safe, and clean nuclear energy facilities.

New nuclear energy facilities will fuel demand for a whole new generation of skilled design engineers, construction specialists, and operating staff. We must take action now to ensure the nuclear energy industry is prepared to meet that demand. To be fully prepared to meet the nation’s energy demands, the nuclear

energy industry must continue to invest heavily in education, training, and workforce development. The country needs a renewed dedication to science, technology, engineering, and math (STEM) education on the parts of both industry and government. The higher skill levels and additional training required of workers in the nuclear industry is reflected in higher wages. According to 2008 data from the Bureau of Labor Statistics (BLS), nuclear technicians are paid an average of 13 percent more than technicians in chemistry, geology, petroleum, and environmental science and health profession; nuclear engineers are paid an average of 24 percent more than all other types of engineers except petroleum engineers; and nuclear reactor operators are paid an average of 34 percent more than operators in other types of utility plants.¹

Nuclear Energy Creates More Jobs than Other Sources of Electricity

Nuclear	500
Coal	220
Wind	90
Natural Gas	60
Solar	43/MW*

New nuclear energy jobs can be created in the near term to spur economic recovery, but critical steps must be taken now to move forward, including:

- Education reform efforts that stress accountability and reward teachers for keeping students in the STEM disciplines.
- New research into the demographic and educational challenges that underlie the deepest concerns about our workforce.
- An expanded partnership between the nuclear energy industry and the Department of Energy to stop the decline of nuclear engineering programs at colleges and universities.

“We will be there with you to help pursue the adoption of a diverse American energy portfolio that places a high priority on the re-emergence of nuclear power...We will bring the industry’s best training and customized skills development for a reliable, 21st century work force.”

– Mark Ayers, President, AFL-CIO Building and Construction Trades Department, May 15, 2008.

MEETING CURRENT NEEDS TO FUEL A REVIVAL

The reinvigoration of the nuclear energy industry will depend on the availability of qualified staff to replace the retiring workforce.

Because of the long pause in new construction of nuclear energy facilities in the U.S. — the last reactor to begin construction started in 1977 — there are real concerns that a capable workforce may not be in place to build the next generation of

Source: NEI, from Ventyx and U.S. Department of Energy

Jobs per 1,000 megawatts of generating capacity.

*Many estimates of solar job creation potential place it at about 10 construction and 33 maintenance jobs per MW; the scalability—how many additional jobs are added with additional MW—remains unclear.

clean-energy technologies in the numbers needed to meet the nation's increasing demand for electricity. UniStar Nuclear Energy and its partners are already working with organized labor to help address this concern. UniStar's planned Unit 3 at Constellation Energy's Calvert Cliffs site is the only new nuclear energy project in the country with a project labor agreement (PLA) in place. Under the Calvert Cliffs PLA, unions commit to increase their training programs in order to provide qualified, skilled craft workers to the Calvert Cliffs 3 project, and Bechtel, the project's constructor, commits to providing fair wages, fringe benefits, and good working conditions for all craft workers.²

The location of potential new nuclear energy facilities will mean renewed prosperity in many of the hardest-hit areas of the country—like South Carolina, Florida, Ohio and Tennessee—where some unemployment rates have reached more than 10 percent.³

With retraining, new jobs in nuclear construction, operations, and component manufacturing can replace jobs lost overseas in other manufacturing sectors and help offset the 14 percent decline in mining jobs projected by the BLS over the next eight years.⁴

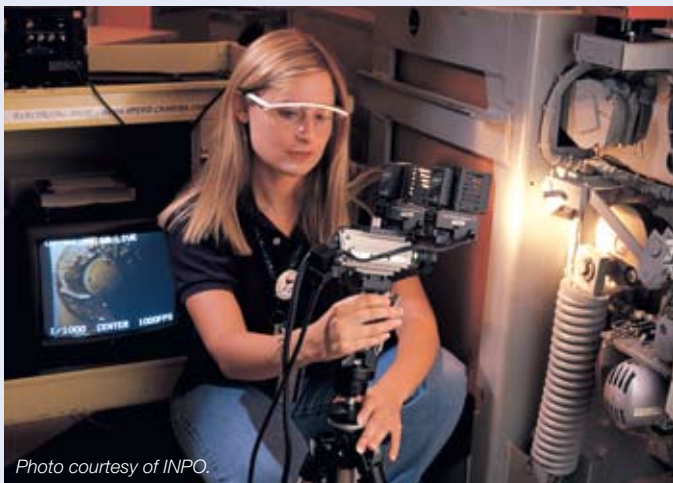


Photo courtesy of INPO.

SUPPORTING THE SKILLS OF TOMORROW

Jobs in the nuclear energy industry require a high degree of skill, training, and education. Our educational system must do a better job of encouraging young people from an early age to develop the math and science skills they will need in these careers. STEM education is essential for both nuclear engineering and skilled labor careers, but students must be encouraged to acquire these skills through a combination of new education programs and industry-sponsored career opportunities.

A 2008 study by Tapping America's Potential (TAP), a coalition representing a diverse group of high-tech and industrial employers, estimates that by 2015, the country will need roughly 400,000 students graduating per year with STEM degrees to meet the total high-tech workforce demand. In 2006, the number of STEM graduates was 225,660—just a little more than half the number needed to meet the nation's needs a few short years from now.⁵

Some in the nuclear energy industry have stepped into this gap to provide training for the existing workforce, providing the specialized training that workers at all levels need to succeed in nuclear energy jobs. The Building and Construction Trades Department of the AFL-CIO, for example, established training centers and new apprenticeship programs to support nuclear energy careers.⁶

However, the simple fact is that the nuclear energy industry faces a serious workforce shortage in the near future. In that respect, the industry is no different from many "high-tech" sectors of the U.S. economy. A decline in the number of engineers and other science professionals is hindering opportunities for growth and sapping American vitality across the entire energy industry, as well as many others.⁷

In addition to the general need for more science professionals, as cited in reports by the Center for Energy Workforce Development, the nuclear energy industry in particular is facing a worrisome demographic shift. Large sections of the nuclear energy facility workforce are preparing to retire. The 2009 Nuclear Energy Institute (NEI) Work Force Report states that

A New Generation of High-Tech Workers

UniStar Nuclear Energy understands that an interest in science and technology must start at an early age if our students are to follow advanced scientific careers. Through our American parent company Constellation Energy, UniStar provides high school students interested in science with job training and high-paying jobs. We also are working with the College of Southern Maryland on developing nuclear training programs for craft workers. This support from UniStar and other companies in the nuclear energy industry must continue throughout undergraduate and graduate programs.

That's why UniStar is proud of the work we have done in conjunction with our corporate partners at AREVA.

AREVA in Lynchburg, Va., partnered with Central Virginia Community College's Nuclear Technology Institute. The AREVA program hires students to work at the Lynchburg facility while earning their A.A.S. Degree in Nuclear Support Technologies. In addition to providing valuable work experience, the program also offers students a high-quality, good-paying job after graduation. Nuclear energy companies across the United States are developing similar programs to interest students in science and technology education and to help meet the nuclear industry's rapidly expanding workforce demands.

approximately 35 percent of the current nuclear utility work force will be eligible to retire in the next five years. The report finds that "general attrition"—the natural occurrence of people changing jobs—will reduce the workforce by an additional 11 percent.⁸ This 46 percent gap in the nuclear energy workforce is equal to about 25,000 vacant jobs, just in the current nuclear generation.

The statistics for licensed reactor operators are not much better. "27 percent of the work force may be eligible to retire within the next five years, and an additional 13 percent is expected to leave due to other reasons."⁹

"Nuclear energy investments would help restore U.S. competitiveness, grow our manufacturing sector, create new American jobs and address the challenges of energy independence and climate change."

—Rep. Zach Wamp (R-TN), February 13, 2009, op-ed in the *Chattanooga*.

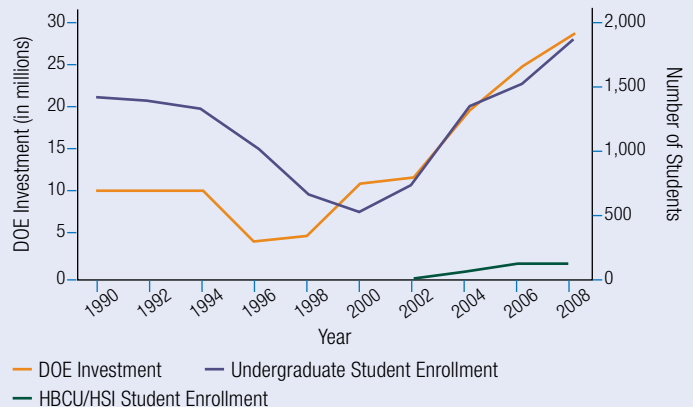
GOVERNMENT SUPPORT ENCOURAGES STUDENT PARTICIPATION

As Department of Energy (DOE) investment in university programs—full reactor programs, more than just scholarships—dropped off, so did enrollment.¹⁰ For fiscal year 2008, budgetary control of the program was passed from DOE to the Nuclear Regulatory Commission (NRC).

And the problem may be even more dramatic than it appears. These projected shortfalls do not account for the likelihood of at least one—and probably several—new nuclear energy facilities being constructed in the next decade. Moving forward with these facilities will require even more architects, engineers and technicians.

The decades-long hiatus in construction of new nuclear energy facilities has contributed to this workforce decline, of course. As the marketplace became less interested in nuclear energy, fewer students entered the discipline, reducing enrollment and forcing the closure of university and skills-based programs. Reversing this trend will require building confidence among individuals in the target demographic that the nuclear renaissance is real and long term.

Trends in Enrollment



Source: APS Education Study

WASHINGTON MUST TAKE A STAND

The nuclear energy industry can only go so far in making critical workforce investments without a clear signal from the Federal government.

Spurred by both industry and political considerations, President Obama and Secretary of Energy Steven Chu have begun the task of promoting green and high-tech jobs in the U.S. In August 2008, while still the director of the Lawrence Berkeley National Laboratory, Dr. Chu and other National Laboratory Directors signed a statement calling for a federal commitment. “For example, the government should establish and fund a nuclear energy workforce development program at universities and colleges to meet the expected [workforce] need.”¹¹

As the American Nuclear Society stated, “America’s university-based [nuclear science and engineering] programs cannot continue to be leaders in the field without an active [NRC]

To meet our nation’s climate change goals, the U.S. must build 100 new nuclear energy facilities in the next twenty years. This investment in America’s future would create more than 150,000 new, long-term, construction jobs and nearly seven times as many manufacturing, supply chain, retail, and service jobs in the wider economy.¹³ The new facilities would add nearly 44,000 permanent jobs and generate \$43 billion in income in their respective local communities. These new facilities would also pay \$2 billion per year in state and local taxes and \$7.5 billion per year in federal taxes. Between 1970 and 1990, the U.S. built 95 reactors; we can do it again.¹⁴

university program.” Both the total number of nuclear engineering programs and the enrollment in those programs has fallen precipitously since the 1980s.¹²

THE TIME IS NOW

Increasing the use of nuclear energy—building new facilities and expanding or relicensing existing ones—will maintain or create tens of thousands of high-paying jobs for American workers. But two key ingredients for a true nuclear energy renaissance are missing.

First, the federal government must demonstrate a long term commitment to a resurgent nuclear energy industry. This means expanding the NRC university program, funding and issuing loan guarantees, and other concrete actions. If we want people to stake their education and career choices on nuclear expansion, they deserve a clear signal that the government supports the industry with more than just words.

Second, companies must commit to a continued investment in their own workforces, through research to understand the labor-supply environment, through training, and through partnerships with organized labor.

Ultimately, the government and industry must act together to both provide career opportunities and also ensure that a trained workforce will be available to fill the demand.



If you want to look closer at the research behind the information in this publication, please visit our web site at www.unistarnuclear.com. There you will find an annotated version of this Issue Brief with links to the original research and other data behind this publication as well as all of the other publications in the Issue Briefs series.

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This UniStar Issue Brief is a publication of UniStar Nuclear Energy, a joint venture of Constellation Energy and EDF Group. It is one in a series of Issue Briefs presenting information and interpretation on important issues surrounding the growth of electrical generation in the United States. UniStar and its partners are working to meet future energy needs with a new generation of nuclear generating facilities, the most effective combination of clean, reliable, and environmentally-friendly electrical production. We have confidence that an informed public armed with the facts behind our energy options will support increasing the role of nuclear generation for meeting the nation's future electricity demand. The Issue Briefs series is just one part of UniStar's efforts to keep the public fully informed. ©2009 UniStar Nuclear Energy. All rights reserved.

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