



THE UNISTAR FLEET MODEL: WE ARE PART OF THE SOLUTION

A UniStar Issue Brief

A TIMELY DECISION

The United States faces a shortfall of environmentally friendly, secure, affordable, and reliable electricity to supply Americans with the energy required for today's needs and for future growth. In 2004, Constellation Energy recognized this need and created an innovative business model to develop new nuclear energy facilities. Today, the foresight of that move is becoming increasingly clear. Fluctuating energy prices, international calls to restrict greenhouse-gas emissions, mandates for health-based air pollution reductions, and struggling economies at home and abroad all point to new nuclear energy as a common solution to diverse problems. New nuclear energy facilities offer the greatest hope of improving public health and slowing human contribution to climate change, while meeting the nation's need for energy independence, based on sources that are safe and sustainable.



A leading supplier of energy products and services to wholesale customers and retail, industrial and government markets in the U.S. Owner and operator of five U.S. reactors.



The largest nuclear operator in the world with 58 reactors and currently building an advanced nuclear energy facility, Flamanville 3, an EPR™ design, scheduled to come online in 2012.



A joint venture targeted on building a fleet of new nuclear reactors in the U.S. based on an advanced revolutionary design.

Model Objectives:

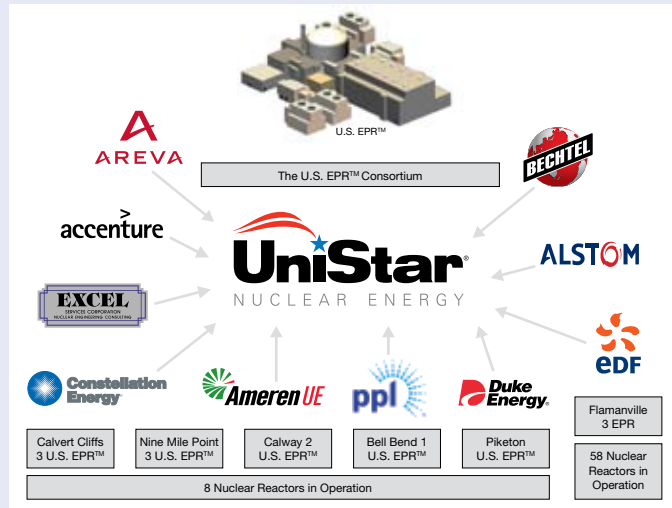
- Ensure the highest level of reactor safety, security and reliability
- Enhance U.S. energy security
- Improve ambient air quality
- Contribute to the long-term global climate change solution
- Construct and operate the most efficient nuclear energy fleet in North America

GETTING TO MARKET

In a natural extension of its years of experience of making its nuclear facilities safer, more efficient, and more reliable, Constellation Energy joined with EDF Group of France to create UniStar Nuclear Energy, a joint venture that provides the business foundation for the licensing and construction of a fleet of innovative nuclear energy facilities, to be built in the United States. UniStar benefits from the size, financial strength, and technological expertise of its parent companies.

The joint vision of Constellation and EDF Group is to build this advanced fleet of nuclear energy facilities using a new generation of even safer and more efficient reactors to take advantage of superior operating efficiencies, favorable economics, and clear regulatory benefits through multi-plant working groups focused on a single, specific design. The technology chosen by Constellation Energy for the standardized fleet is the AREVA U.S. EPR™ reactor, a robust, advanced nuclear technology currently under construction in Europe and Asia. Constellation Energy and EDF Group are committed to making UniStar a meaningful part of the solution for America's energy challenges.

UniStar Strategic Partners



UniStar has assembled a world-class team to implement its fleet model:

- **AREVA**—the owner of the EPR™ design and the world’s largest nuclear supplier, providing nuclear systems to more than 100 pressurized water reactors (PWRs).¹
- **Bechtel**—the largest nuclear construction company in the world, providing engineering and/or construction services to 85 of the current 104 operating U.S. nuclear facilities.²
- **Alstom**—the world’s largest producer of nuclear turbine systems.³
- **Accenture**—a global management-consulting, technology-services, and outsourcing company, that is developing the information technology platform called “Galaxy” to support the lifecycle knowledge management needs of the UniStar fleet.⁴
- **Excel Services Corporation**—engineering consultants with unique qualifications in Combined License (COL) application submittals, improved technical specifications (ITS), and inspections, tests, analyses and acceptance criteria (ITAAC).

- **U.S. EPR™ Owner Utilities**—In addition to planned U.S. EPR™ facilities adjacent to Constellation Energy’s Calvert Cliffs Nuclear Power Plant in Lusby, Md. and Nine Mile Point Nuclear Station in Scriba, N.Y., UniStar is working with other utilities interested in developing a U.S. EPR™ facility. PPL and Ameren have each selected the U.S. EPR™ technology for potential units at Bell Bend in Berwick, Pa. and Callaway in Fulton, Mo., respectively. Both are working with UniStar on obtaining licenses and other preparatory activities before making a decision to build. Other utilities in various stages of exploring additional generation capacity are in active discussions with UniStar regarding a range of services associated with new nuclear development.

The UniStar vision of a fleet of more than four U.S. EPR™ units integrated into an ownership team is clearly more than a dream; it is an achievable goal.

THE UNISTAR FLEET MODEL

The nuclear industry in the United States today has a disturbing historical parallel to the U.S. automotive industry. In a world where lean manufacturing, continuous improvement, and error proofing are often thought of as Japanese innovations in manufacturing, few Americans know that all of these techniques and more actually originated in the United States a hundred years ago at the Ford Motor Company. As the United States auto industry moved away from the principles, squandered our technological lead, and failed to evolve for changing markets, foreign industries refined the methods and took advantage of the opportunities we had created. As a result, today, we find our auto industry sorely tested by international competition. Similarly, while the United States initially created the commercial nuclear energy industry, we voluntarily have yielded the world stage in nuclear energy development to Europe and Asia by our decades’ long hiatus from new builds. As the U.S. suspended new nuclear construction, the rest of the world has constructed more than 300 nuclear energy facilities. As our manufacturing facilities closed their doors, foreign firms filled the gap and are now the

only sources of key nuclear construction components. Today, we need a new idea to revitalize the industry. The UniStar fleet model is that new idea.

UniStar is the lead company in this strategic model for building a fleet of nuclear energy facilities. It provides the organizational infrastructure for developing a fleet of standardized U.S. EPR™ units. It also commits to the first U.S. EPR™ project and funds the initial work.

As other utilities commit to the U.S. EPR™ technology and the fleet model, each will share in the generic costs for the fleet development and support functions. These project owners then also have a voice and vote in decisions that affect the fleet.

In 2008, four Combined License (COL) applications were submitted to the U. S. Nuclear Regulatory Commission (NRC) for construction and operating licenses for four U.S. EPR™ units, as part of UniStar's proposed fleet. The applicants' facilities are:

- Calvert Cliffs Unit 3, in Lusby, Md. (the U.S. EPR™ reference plant and the first project that would be constructed)
- Nine Mile Point Unit 3, in Scriba, N.Y.
- Bell Bend Unit 1, in Berwick, Pa.
- Callaway Unit 2, in Fulton, Mo.

The central concept of UniStar's fleet model is one of sharing. To expedite regulatory processes, minimize construction time, and control costs, all U.S. EPR™ projects share common designs. Deviations from the standard design occur only when there are valid site-specific requirements. By developing methods, software, and procedures that apply to all facilities within the fleet, individual project owners share investment costs and fleet benefits. A common design and common methods can be parlayed into greater purchasing power by joint purchasing of spare parts and supplies, a strategy that reduces operational costs. The benefits of continuous improvement in construction methods and operational procedures are realized by all facilities through the sharing of ideas and lessons learned from the first wave of U.S. EPR™ projects. In short, we will not "reinvent the wheel"; we will pool resources to multiply our knowledge base and increase our joint negotiating power.

The fleet model offers owner/developers of U.S. EPR™ facilities membership in an assemblage of companies that actively cooperate to provide all of the members lower financial risk, lower costs, and greater certainty of success in moving forward to advanced, stable nuclear energy.

SAMPLE COST EFFICIENCIES OF UNISTAR'S FLEET MODEL

- UniStar has committed to purchasing at least four turbine-generator systems from Alstom, creating savings for each UniStar partner by buying multiple units.
- A significant percentage of UniStar's COL application to the NRC is generic, saving time, effort, and money in the submittal process for subsequent COLs.
- Additional savings accrue to project owners through shared generic development costs and lessons learned from the development of EDF Group's Flamanville 3 facility in France, as well as other preceding EPR™ projects.
- Total expected savings for each participating U. S. EPR™ owner is estimated to exceed \$1 billion.

The Fleet Advantage = Sharing

Owners of U.S. EPR™ Units will:

- Share generic costs
- Share risks
- Share lessons learned
- Share negotiating and buying power
- Share in a critical spares inventory
- Share procedures and techniques
- Share IT and training resources

And most importantly,

- Share people and ideas

THE U.S. EPR™ TECHNOLOGY

At the center of UniStar's strategy for a fleet of new nuclear generating facilities is AREVA's EPR™ technology. This choice was based on design features that give the EPR™ design clear advantages over competing technologies. In fact, the EPR™ design is the only technology that offers the benefit of continuous evolution of design, construction, and operating experience at existing facilities in France, Germany, China, and other countries.⁵

EDF Group's Flamanville 3 unit, currently under construction in France, provides the design basis for the U.S. EPR™ fleet that will be built in the United States. And, while the U.S. EPR™ technology incorporates a few design modifications to meet codes and standards specific to the U.S., the superior safety and efficiency features of the EPR™ design remain the same:

- an evolutionary design based on proven PWR technologies
- a proven design that will be built at least four times before the first U.S. unit is constructed
- superior safety features in the post-9/11 world
- superior lifecycle cost performance
- 60-year design life
- high availability and capacity factors
- a design focus on environmental protection
- low water usage
- more efficient use of uranium fuel
- lower worker and public radiation exposures

Safety Features

Based on the experience gained from the first wave of nuclear generating facilities built in the United States and spurred by an awareness that safety of the facilities is always in the forefront of the public's consciousness, the U.S. EPR™ systems have been designed in an environment absolutely committed to safety.⁶ The robust design is unequalled and includes features that anticipated new regulatory requirements that were not considered in competing reactor designs.



The EPR™ design is committed to safety. The technology meets or exceeds every safety requirement by the Nuclear Regulatory Commission (NRC).

Environmental Protection Features

Our ongoing commitment to protecting the environment is evidenced by our inclusion of a hybrid cooling tower, and selection of technology that will minimize water usage. This design at Calvert Cliffs 3 will decrease consumption of water from the Chesapeake Bay by 98 percent compared to the current operating units. We examine every decision for its environmental impact to our community and beyond.



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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