

The insiders view



The Electric Power Research Institute (EPRI) is an independent nonprofit organization which conducts R&D relating to the generation, delivery and use of electricity for the benefit of the public. Mr Neil Wilmshurst, Vice President Nuclear, shared his insider's view about US and global nuclear power generation and the role of EPRI.

By Joanne McIntyre

EPRI was established by the US electricity industry in the 1970s," explains Mr Wilmshurst. "We're a collaborative R&D organization with an annual budget in excess of USD 350 million, primarily funded from our utility members. As a not-for-profit organization, our work has to be for the public good, and our core principles are objectivity and integrity. Although we are funded by the industry, we are a purely factual, science-based organization. We inform the debate by researching technologies, making projections based on economic modeling, looking at legislation which is or could be put in place and evaluating what impact it could have."

Today EPRI is an international organization, with around 15% of its total funding generated from non-US members. EPRI is divided into four sectors: Environment, Power Delivery and Utilization, Generation (excluding nuclear), and Nuclear. "In 2010 the nuclear division will have an R&D budget of about USD 140 million, nearly 40% of which will come from outside the US; this demonstrates our significant

level of engagement and activity in global nuclear activities."

US new build activities

"The American nuclear new build program is a reality, with site preparation work having started for four new reactors, two at the Southern Company's Vogtle facility and two at the South Carolina Electric & Gas Co.'s Virgil C Summer facility," continues Mr Wilmshurst. "However the speed at which the new build program advances will depend on two factors. Firstly, the loan guarantee program, which is vital as it allows investors to manage their exposure. The capital cost of a new plant is very significant compared to the market capitalization of most if not all of the nuclear companies in the US. I believe the president will request an increase in loan guarantee funding, which will stimulate more projects. Secondly, the speed of the US nuclear renaissance will depend on the success of the first wave of new plants coming on line on time and on budget. If they are completed as planned it will boost

The EPRI has adapted profilometry technology — commonly used in reverse-engineering applications—to the specific needs of the nuclear industry.

market confidence. Internationally there is a significant amount of construction in countries including Korea, China, Finland and France, and some development activity in the UK. Globally the new build activities are moving forward purposefully, but in the US we need to build confidence before the pace will increase."

At the moment nuclear generation makes up about 20% of electricity produced in the US. "One of the challenges in determining the future role of nuclear in the US is the regional nature of the electricity market. The EPRI Prism analysis examines what levels of CO2 reductions could be achieved through the development and deployment of various technologies, from renewables and energy efficiency to nuclear power and coal-fired generation with carbon capture and sequestration. For example, through increased deployment of new plants, nuclear power could maintain and



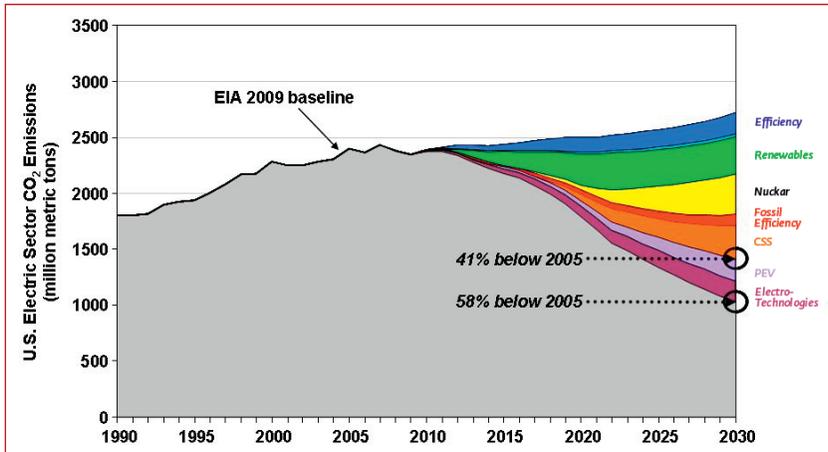


Figure 1. EPRI Prism analysis

expand its role as a non-CO2 emitting generation resource (see Figure 1). We recognize, however, that the political and geographical constraints can vary widely between regions. We're in the process of refining the Prism analysis to explore regional differences in resource availability, regulations, rate structures, etc. One likely finding from such a regional analysis is that the deployment of new nuclear plants in the US may be concentrated in the Southeast." As an independent organization, the EPRI is not directly involved in the design and production of components for nuclear plants, although it does utilize its skill sets to support the safe, reliable deployment of new plants. "When new plants come on line the expectation is that they will be reliable, have capacity factors in excess of 90% and they will have short outages. We help the vendors collectively to understand what lessons have been learned from current plants so they can build that knowledge into their equipment, processes and procedures and help new plants succeed from day one. We channel our wealth of collective experience in the industry to the vendors to help them learn the lessons of the past thirty years."

Challenges for a nuclear future

"I believe standardization is the key to the future for nuclear power generation," continues Mr Wilmshurst. "Consider France, whose nuclear fleet has a limited number of designs, allowing them to leverage the commonalities and the economies of scale. The US faces the challenge of a significant spread of reactor types. In response to this, we see our members coming together to jointly discuss issues and learn from each other, whether they are deploying Westinghouse, Mitsubishi, Hitachi-GE,

Toshiba, or Areva plants. In the future I can see the US nuclear industry limiting the number of designs, with closer ties between the owners and operators of those plants to leverage their experience and their capabilities."

The sector has learned a lot in the 30 years since the Three Mile Island incident, says Mr Wilmshurst. "Today the US nuclear industry is one of the most open industries in the world. With leadership from the Institute of Nuclear Power Operations (INPO), the whole collegiate atmosphere of the industry means that safety predominating over and above commercial interests is a core value in the nuclear industry."

"The most significant challenge facing the energy industry in general is aging infrastructure and the need to replace it with environmentally responsible assets. A significant level of investment is required in generation and distribution assets. However, the nuclear industry specifically is fortunate in that its

ongoing focus on safety and the drive for improvements in safety, reliability and capacity factors means infrastructure is in very good condition. Plants have undergone significant investments and upgrades, so the challenge is continuing to maximize those assets and understand the ability to extend the life span of the original 40 years to 60 years and beyond. EPRI and the Department of Energy are cooperating to identify and evaluate the technical issues that could impact decisions for extending the life of the existing nuclear fleet to 80 years. EPRI's Long-Term Operations Project and the DOE's Light Water Reactor Sustainability Program conduct complementary research in a number of areas, from concrete and materials degradation to new fuel cladding concepts to advanced monitoring and control technologies. Considering that nuclear is the predominant means of low-carbon generation worldwide and certainly in the US, that's a big deal. Allowing these assets to run longer, understanding the challenges and managing them is one of our main research focus points both in the US and with our global members."

"The continued safe and reliable operation of the existing fleet is also the foundation for the new fleet to be built both in terms of public support and for the financial viability of the utilities who want to build. The most important challenge for the industry and for my team at EPRI is ensuring the current fleet continues to operate with the same levels of safety and reliability, while maximizing those assets by safely running them for as long as possible."



Born in the UK, Neil Wilmshurst began his career in the Royal Navy as a Submarine Engineer. In 1992 he joined the maintenance and engineering

team at British Energy's (BE) Sizewell B nuclear plant in Suffolk. When BE entered the AmerGen joint venture with PECO Energy in 1998, Neil was part of the due diligence team which researched the purchase of nuclear plants in the US. His team participated in the purchase of Three Mile Island Unit 1, which has one of the highest capacity factors in the world. In 2003 he joined EPRI, which brings together scientists, engineers, and experts from academia and industry to help address challenges in the electricity industry. EPRI's members represent more than 90% of the electricity generated and delivered in the US, and international participation extends to 40 countries.

