

GIF Industry Forum: Innovators' Panel

Background Information

Date & Venue: Thursday October 6 at 8:00-9:45, Room Halton, Delta Hotel, Toronto, Canada.

Objectives: The objectives of this session were for the panelists to share experiences on advancing concept beyond the academic phase, to reflect on their experience with Gen IV/SMR systems, to share their career paths, to discuss the challenges they faced in moving a concept forward, and to highlight the rewards of working in the advanced nuclear field.

Participants:

- Robert Petroski (TerraPower)
- Sang-II Lee (Hyundai Engineering)
- Marcy Sanderson (X-energy)
- Dominick Claudio (NuScale Power)
- Cal Doucette (ARC Energy)

Each speaker made a short presentation, providing experience-based insights for the early career attendees on how innovation can lead to breakthrough opportunities in the nuclear field. This was followed by a panel discussion moderated by John Kelly.

Key messages of the presentations

Opening remarks:

Panelists were asked to provide personal experiences on what has taken them to take the design beyond original idea, what else they saw whether successes, do they still believe it is a good idea to if they had to start all over again, and what would they do differently. John introduced the 5 panelists from 5 different companies and gave the floor for presentations.

Sang II Lee: Hyundai Engineering has been developing the high temperature gas cooled reactor since 2012, and is developing a multi-purpose high temperature reactor suitable for power production and process heat applications including the production of hydrogen. Hyundai Engineering is working towards the deployment of a gas-cooled micro reactor in 2026. His career path began as a researcher before moving to Hyundai Engineering in 2010.

Robert Petroski: TerraPower's Sodium reactor concept was selected as one of two winners of advanced reactor demonstration projects (ARDP), and has a project to build the first reactor in Wyoming. Challenges with advanced nuclear are the diversity of designs, and delivery and qualification which are long and challenging. The fulfillment of working toward an important mission and intellectual challenge of a new technology are rewarding.

March Sanderson: X-energy is the other reactor concept which was selected by DOE's ARDP program to deliver a four-unit Xe-100. She also introduced her career path from NASA, AECL and then X-energy. SMR companies are doing their best to turn a concept into a deployment, and X-energy has been very proactive in bringing in people with project experience in design as well as construction experience to work on final designs.

Cal Doucette: Advanced Reactor Concept (ARC) is basically a sodium-cooled fast reactor based on EBR-II platform, and the ARC Energy company was formed by people who worked for EBR-II project. He used to work at the AECL, and with the potential for SMR market, joined ARC as a senior design engineer. ARC is in the middle of licensing phase, and a major problem he sees in this industry is marketing to end users.

Dominick Claudio: NuScale was incorporated in 2007 to develop a small modular LWR. They teamed up with other companies and investors to support the commercialization of the NuScale design. Over 40% of the employees are under the age of 40 and they want to make an impact in this important time for the ecosystem. A career in the SMR field is highly recommended. After receiving their design certificate in 2020, NuScale is now working towards developing the Class 3 cost estimate by the end of this year to be able to satisfy market demands.

Outcomes of the panel discussion

Minimum size of human resources: Approximately 500 people or so are needed to take a design through preliminary and detailed design and, apparently, there are not many companies with the financial capabilities to do this. It can also be accomplished with a core group and subcontracts with other companies with expertise from around the world.

Reach-out efforts for public acceptance: Concerning the need to convince people to choose an innovative reactor in competition with wind or solar power in the context of carbon neutrality, NuScale held 200 meetings with UAMPS project to gain public acceptance believing that their message itself as well as its frequency of communication were both are important. Transparency and education on Gen IV technology was also emphasized.

Challenges faced with for developers: A major challenge could be the licensing process. Part of the challenge is educating regulators, pre-engagement with the regulator, and the continuous process of learning all of which are very time consuming. A major frustration that Gen IV/SMR companies are experiencing is dealing with outside engineering firms since it is very hard to find people who can work on the project all the way through the design process.

Challenges with deployment: Concerning the Quality Assurance program, more effort is needed in increasing the awareness that a large percentage of supply chain is not in place. Continuous efforts in talking to community colleges and indigenous people and holding suppliers' events were also highlighted. It is important to engage with interested and qualified counterparts early in the process and to build a vision on how advanced nuclear technology can benefit the eco-system.