GIF Industry Forum: EMWG Session: economic challenges and opportunities for Gen IV reactors (TS01)

Background Information

Date & Venue: Monday October 3 at 15:00-17:00, Room Mississauga, Delta Hotel, Toronto, Canada.

Objectives: The objective of this session is to bring together representatives of the GIF EMWG, nuclear reactor vendors and potential energy investors/users to discuss the economic challenges and opportunities facing advanced reactors today, requirements of future users/investors, and how advanced reactor developers plan to overcome these challenges. This workshop will focus on issues common to all applications which may significantly impact the economic viability of the reactor; including financing, project costs, cost of regulation, supply chain readiness, and the transition from research to field-ready production units. At the end of the session, it is expected that areas for cooperation on cost estimation/modelling between GIF, Private Industry and Potential Users will be identified, allowing future detailed exchanges that may inform the EMWG on future updates to the GIF Cost Estimating Guidance and G4ECONS cost model.

Participants:

- Megan Moore (CNL, Canada)
- Fiona Reilly, (FiRe Energy, UK)
- Lisa Raitt (CIBC, Canada)
- Marcio Paes-Barreto (Wyoming Energy Authority, US)
- Christian Rabiti (USNC)
- Grant Cherkas (Westinghouse, Canada)

Megan Moore delivered a short presentation to inform the audience of the GIF EMWG and its current initiatives. This was followed by a panel discussion moderated by Fiona Reilly.

Key messages of the presentations

EMWG Update: The EMWG provide a methodology for the assessment of Generation IV systems against two-economic goals: life cycle cost advantage over other energy sources & financial risk comparable to other energy projects. The EMWG also tackles topics such as flexibility, and integration with renewable sources, acknowledging a shift from economic assessment for individual system levels to the integration of Generation IV systems into grids with other resources. Major initiatives of the EMWG include updating the Cost Estimating Guidelines, the development and update of the G4ECONS Cost Model, the development of Advanced Nuclear Technologies cost reduction strategies and maintaining the publication of a report on Nuclear Energy as an ESG Investable Asset Class.

Outcomes of the panel discussion

The role of the private sector in nuclear financing: although from a politician standpoint nuclear is seen as a solution to Net Zero, the centre of gravity for nuclear has shifted from governments to the private sector. This may be due, in part, to a constant lack of government funding. The underlying concern of many governments is to find ways to get the private sector involved in the development and deployment of nuclear energy technologies, while providing the market framework for the market to thrive.

The risk analysis of banks for making investments as a barrier for nuclear deployment: the biggest concerns of banks with regards to nuclear are the risks of going overtime and over budget. In particular, banks require the operation and continued generation of revenue not to be impeded by supply chain issues as is currently the case in nuclear new build. Besides, risks in the Supply Chain are not only related to materials and components but also to the workforce, with increasing difficulties in finding qualified and skilled labor. Governments are usually willing to take higher risks than banks.

Considerations on transportable reactor designs: micro and small modular reactor designs revolutionize the delivery of nuclear power and solve some key challenges: they allow for a rapid scaling to meet the demand (an entire plant can be delivered in a handful of truckload size containers), minimize decommissioning efforts and allow deployment in remote areas with no spent fuel or waste storage on site. However, uncertainties on transportable NPPs include regulatory, legal and institutional issues across international borders: for instance, the supplier of a transportable NPP would need to make a commitment to the host state regulator, to enable access to the design details and safety case approved by the national regulator of the supplier country.

Considerations on the licencing and regulatory side: Licensing goes along with more certainty on the technology, so less risk for the financiers. However, one of the main challenges in the nuclear regulatory area is the need to educate the regulators on the technology. Regulators and industry players need to work together with the purpose of regulating, licensing and approving new reactor designs. Regulators also need to work together across borders to minimize the risks and change the overarching international regulations. But bringing the whole community on board and getting governments to agree is the most difficult part.

Considerations on Micro and Small Modular reactors: From an investment banking point of view, there is a lot of excitement around micro reactors as they take away many uncertainties and lower the risks. However, to decarbonize the economy by 2050 there is a need for a massive scale of deployment that cannot be solely fulfilled by SMRs and Micro reactors. Applications of micro and small modular reactors extend beyond power generation (process heat for refineries, petro chemistry and metallurgy...). Hence the importance for technology providers to be focusing on the markets that they can best sell to.

Conclusion: Participants acknowledged that *"there is nice wind in the sails for nuclear",* especially when it comes to nuclear isotopes, nuclear hydrogen or micro and small modular reactors. However, there is a strong need to develop a better understanding of the risks associated with both small and large-scale nuclear projects that act as barriers to investment. It is the industry's role to make sure that nuclear projects are set-up well. To de-risk the licensing of new reactor technologies, industry and regulators need to work together, within and beyond international borders.

Actions and next steps

- Analyze industry and financiers' expectations with regards to risk-assessment of nuclear projects and identify areas where these could fit in the existing work carried out by the EMWG.
- Elaborate a path forward to foster engagement with industry and the finance community.
- Further develop cost reduction strategies and update the cost estimating guidelines.