GE Scientists Working to Make Nuclear Power a More Attractive Carbon Free Energy Alternative

- *Developing an innovative inspection technique called RADMASS (Resonance Absorption Densitometry for Materials Assay Security Safeguard), to help enable affordable ways to reprocess fuel with advanced nuclear reactor concepts*
- *Awarded $4.5 million project through the Advanced Research Projects Agency for Energy's (ARPA-E) Optimizing Nuclear Waste and Advanced Reactor Disposal Systems (ONWARDS) program to develop and demonstrate RADMASS*
- *Project part of a comprehensive effort through ONWARDS to recycle fuel and make nuclear a more attractive carbon-free energy solution*

NISKAYUNA, NY – March 15, 2022 – Working to make nuclear power an even more attractive carbon-free energy solution, a team of scientists at GE Research have been awarded $4.5 million through ARPA-E's ONWARDS program to develop a new inspection technique that would encourage the recycling of fuel for advanced nuclear reactor concepts coming online.

Today, nuclear power comprises nearly 20%, or 1/5 of the entire US energy footprint and is the nation's largest carbon free energy source. With the introduction of advanced nuclear reactor concepts, ARPA-E's ONWARDS program is supporting new developments like RADMASS that would significantly reduce the cost of recycling fuel with these new designs.

Dr. Andrew K. Hoffman, a Materials Research Scientist at GE Research and principal investigator on this project, says new technologies like RADMASS would mean onwards and upwards for nuclear energy as a carbon-free energy alternative. "One of the most exciting factors about the advanced nuclear reactor concepts coming online is the opportunity to optimize how the industry can recycle fuel in the future. Through ARPA-E's ONWARDS program, GE Research and others will develop new solutions that make the re-processing of fuel a much more attractive and viable process for energy producers."

Today, spent nuclear fuel is safely stored at various storage sites in the US. Up until now, the technologies have not existed to cost-effectively recycle it. One of the challenges is in the probing or inspection of the fuel itself, which GE's RADMASS technology is being designed to address. RADMASS is a non-destructive evaluation (NDE) technique that will be able to accurately measure and characterize this material for reprocessing.

RADMASS Team photo
Caption: The RADMASS team will have access to state-of-the-art materials characterization and X-ray imaging equipment on GE's Research campus in Niskayuna, NY to develop its new inspection technique in support of fuel recycling. Pictured (from left to right): Bogdan Neculaes, Principal Scientist, and Uwe Wiedmann, Senior Scientist, who specialize in radiation physics and system design; and the project's PI, Andrew Hoffman, a materials scientist.

The end objective of GE's ARPA-E project will be to demonstrate a proof of concept with its RADMASS technology in a non-radiation environment. The GE team will use photonics and nuclear modeling and simulation to show proof of concept for the ability of RADMASS to operate in a high radiation environment such as a nuclear fuel reprocessing hot cell (radiation containment chamber) facility.

"As the nation looks to aggressively address climate change and realize a zero-carbon future, nuclear can play a critical role in meeting our future clean energy goals," Hoffman said. "With new advanced reactor concepts creating more recycling opportunities, we need to seize the moment in making nuclear an even more attractive, carbon-free energy alternative."

About GE Research

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