

Coupling Integral Molten Salt Reactor Technology with Hybrid Nuclear/Renewable Energy Systems

26 January 2018 – ME Lecture Hall – 1300

With Mr. John Kutsch

V.P. Conceptual Development, Thorium Energy Alliance / Terrestrial Energy USA, Loyola University of Chicago



Mr. John Kutsch

Abstract:

The Integral Molten Salt Reactor (IMSR) represents a clean energy alternative to fossil fuel combustion for industrial heat and provision, which is compact, efficient, and cost-competitive with fossil fuels. The IMSR is a Gen 4 reactor and a successor of the very effective Molten Salt Reactor Experiment work of Oak Ridge National Lab.

Terrestrial Energy USA is now working with Idaho National Laboratory to couple the IMSR to advanced industrial systems. Several systems have been designed and proposed. These can serve energy-intensive industries with stable heat and power for clean H₂, O₂ production, and by extension ammonia and methanol production. Desalination is also a very significant market sector for the IMSR heat and power.

IMSR has the potential to be a truly transformative energy technology, and when coupled to advanced industrial systems, IMSR enables new, truly transformative clean industries. The IMSR demonstrates that power generation systems designed explicitly for electricity generation are no longer a necessary constraint. Nuclear energy can provide new opportunities for variable renewable energy systems by allowing them to contribute to a common reservoir of thermal battery storage without stressing the grid system. The IMSR enables the idealized deep decarbonization desperately sought after by climate-conscious industrialists, such as Google.org.

In the Google.org experiment, the conclusion was finally drawn that carbon-free electricity was an exceedingly small fraction, compared to the behemoth fossil fuel power for transportation and industrial processes. The IMSR provides a new deployable system for low-cost carbon-free process heat energy, which can be used to produce a broad array of energy services, including electric power; hydrogen as an input for industrial chemicals production; steel, cement, and other primary materials; or synthetic fuels for the transportation sector. All of this can be achieved cost-competitively with fossil fuels, and at the lowest life cycle emissions rating of any power source.

Abridged Biography:

Mr. John Kutsch is the Executive Director for the Thorium Energy Alliance. He has spent 23 years developing materials, mechanisms, and products for industrial, energy, and medical clients. He is noted for leading the Technical Design of all the variations on the Integral Molten Salt Reactor (IMSR), from 25, 250, 600, 80, 400 and all variations of each. He is also a Design Engineer who runs Whole World LLC, an engineering consultancy in Harvard, Illinois. Whole World specializes in energy engineering and utility integration with successful projects in Run-of-river hydroelectricity, Dye-activated solar cell development, organic Light Emitting Diode research, Waste-to-energy system design, Landfill Gas Collection and Energy Generation, Optimizing Ethanol Production, Up-Rating of existing small scale generation facilities, and with many project services for mechanical and production engineering provided to the National Renewable Energy Lab.

He provides his clients with world class innovation and engineering project management. He is an expert in CAD and Project Life Cycle Management. Other areas of expertise are in Fabrication, Materials Selection, Prototype Production, Casting, Forming, Rapid prototyping and computer visualization of a CAD models, stress analysis, Quality Function Deployment and performance modeling to ensure client receives the design they envisioned. He never forgets that someone's life, livelihood and investment depends on every project.

Mr. Kutsch became a founding member of the Thorium Energy Alliance, a 501(c)3 organization, in 2006 after spending several years researching thorium applications and reactors for an industrial client. Within four years of the Thorium Energy Alliance founding, eight conferences with international participation have been organized. He has recently given commentary in support of uranium 233 preservation, Rare Earth Refining and Thorium Energy Research to the Blue Ribbon Commission on the Future of Nuclear Energy. He has also made scores of trips to Federal and State Legislatures promoting changes in federal policy regarding uses and storage of thorium and rare earth elements.

