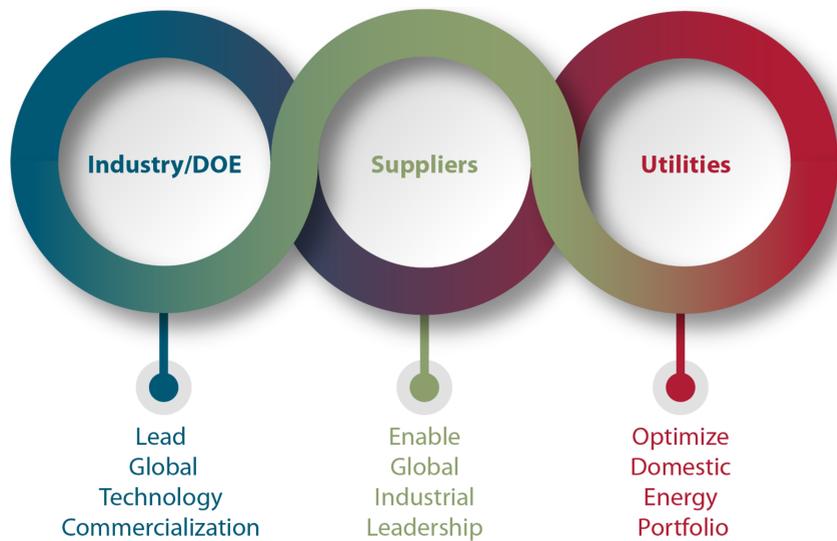


Molten Salt Reactors



DOE-NE has established the Gateway for Accelerated Innovation in Nuclear (GAIN) to provide the nuclear community with access to the technical, regulatory, and financial support necessary to move innovative nuclear energy technologies toward commercialization while ensuring the continued safe, reliable, and economic operation of the existing nuclear fleet.



Additional Molten Salt Reactor Resources:

bit.ly/GAIN-MSR

bit.ly/YouTube-MSR

bit.ly/ORNL-MSR

bit.ly/FluidFuelReactors

Contact GAIN:

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Developing safe, reliable sources of carbon-free energy will be the next decade's greatest challenge for power producers in the US. Several US-based companies are developing Molten Salt Reactors (MSRs), a type of advanced nuclear reactor, to help meet that energy challenge.

MSRs utilize low pressure, high temperature fluoride or chloride salts as liquid fuels and coolants. MSRs are different from most other advanced reactor concepts because of their ability to operate in a low pressure environment, as well as at higher temperatures and for longer durations than other reactor types. Developers of this reactor offer increased safety, reduced proliferation risk, passive safety system features, and short-lived waste.

MSRs could play a significant role in closing the nuclear fuel cycle, increasing fuel utilization, and reducing long-lived waste products.

Readily Apparent Safety

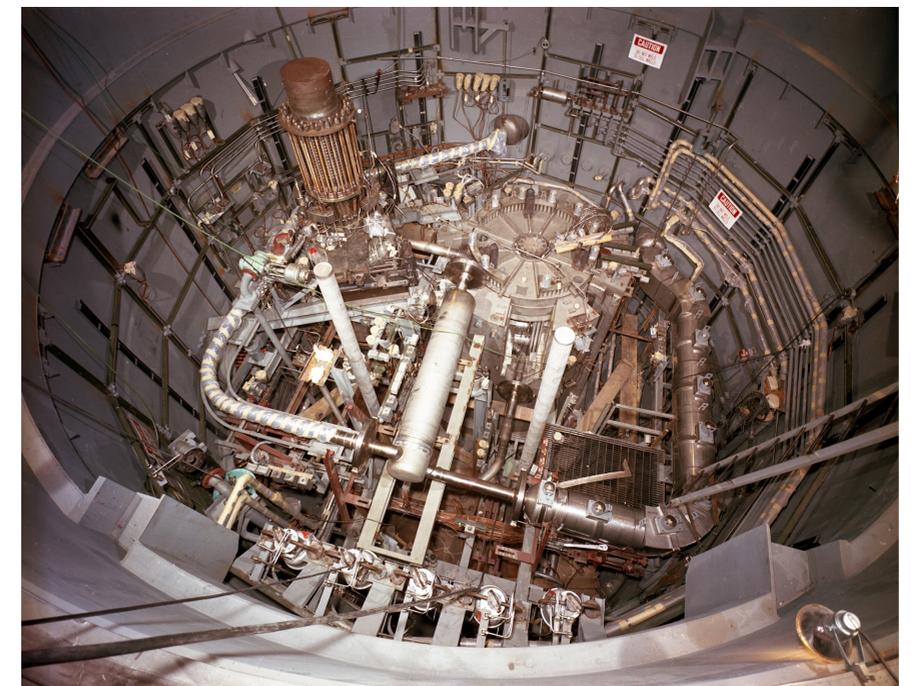
Due to the inherent characteristics of low pressure, chemically-inert coolants and liquid fuel systems, MSRs are easily coupled to passive safety systems that eliminate the need for many of the safety systems needed for other reactor types. MSRs can be designed to be "walk away" safe and operate with low pressure components and systems, which improve the economic performance and enhance the safety of the reactor.

High-Quality Energy

MSRs produce high temperature heat for efficient electricity production and for application in high temperature industrial applications, including the production of hydrogen. MSRs are attractive because of their potential to operate at higher, more efficient temperatures for extended operational cycles.

Load Following and Integration

By employing MSRs in an energy mix, a power producer is able to provide reliable energy to its customers while integrating with variable resources. Flexible load following capabilities of MSRs enable integration with intermittent renewable energy sources; moreover, the high-grade heat produced by MSRs make thermal energy storage or integration with industrial processes possible and attractive during low electricity demand intervals.



A top view of the Molten Salt Reactor Experiment (MSRE) at Oak Ridge National Laboratory.

Molten Salt Reactors

COST EFFICIENCY

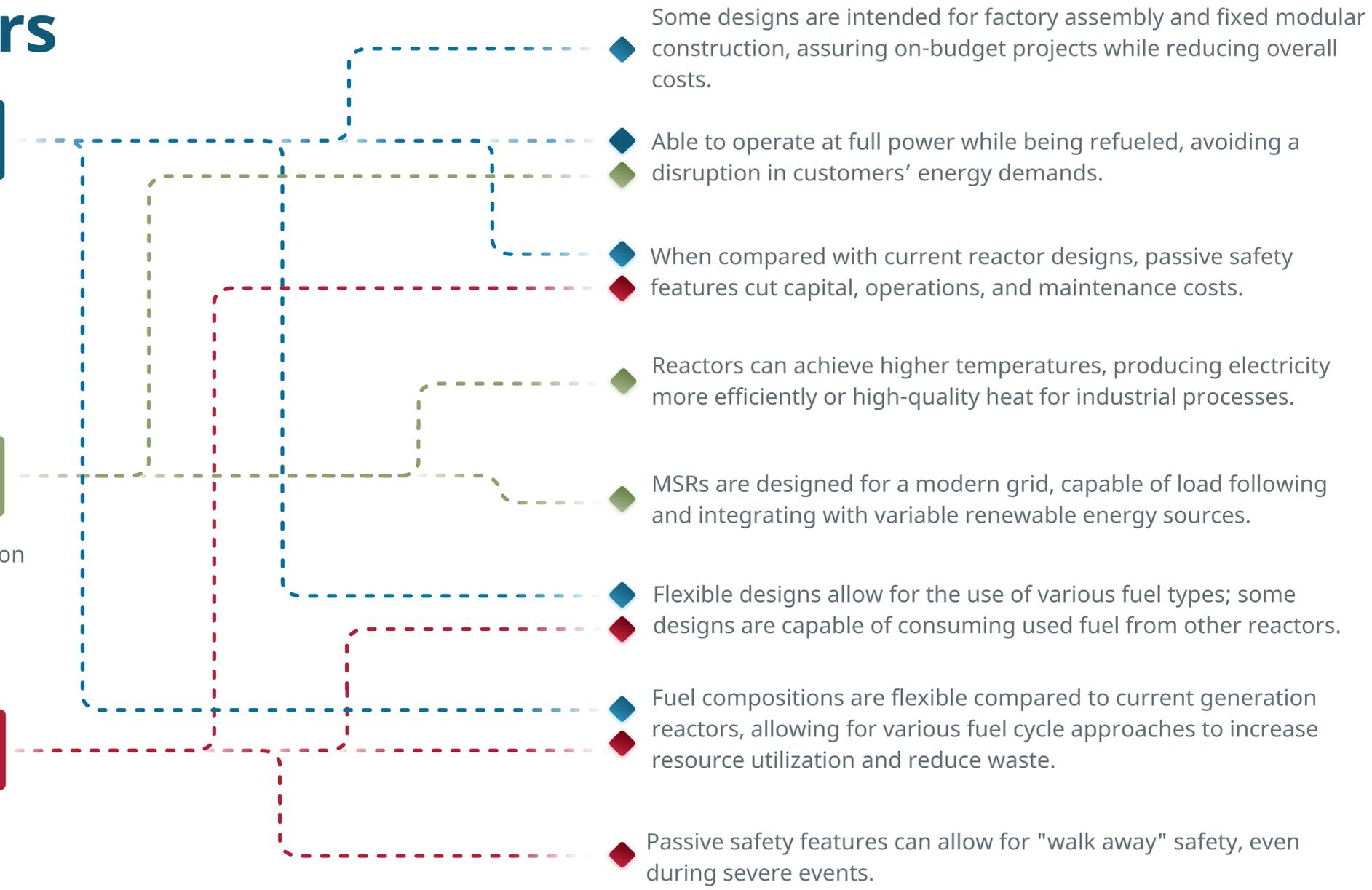
As utilities evolve to meet the challenges of a modernizing grid, advanced nuclear reactor technologies seek to provide economically viable solutions through simplified designs and reduced operational costs.

INTEGRATION & RELIABILITY

Flagging load growth and the rise of distributed generation sources are driving advanced nuclear developers to provide flexible, always on power to end users.

SAFETY & WASTE

The possibility of Fukushima-like events is eliminated by the inherent physics of the reactor through a failsafe design; fuel waste concerns are substantially reduced.



	Thermal Output (per unit)	Electrical Output (per unit)	Total Plant Footprint	Primary System Water Requirements	Industrial Heat & Steam	Load Following
< 50 MWe Micro Systems	< 150 MWt	< 50 MWe	Fast Food Restaurant	None		
50 - 300 MWe Small Systems	150 - 1000 MWt	50 - 300 MWe	Parking Garage	None		
> 300 MWe Large Systems	> 1000 MWt	300 - 1500 MWe	Industrial Factory	None		