How it works

The IMSR plant uses demonstrated molten salt reactor technology with patented enhancements for commercial-scale thermal and electrical energy generation

How it works

1

The IMSR Plant uses molten salt fission technology. This is high-temperature fission technology, classified as Generation IV fission technology class under international treaty.

"Generation IV designs will use fuel more efficiently, reduce waste production, be economically competitive, and meet stringent standards of safety and proliferation resistance…" according to the Generation IV International Forum charter signed in 2001 by US, Canada, UK, and others.

The IMSR plant.

2

Molten salt fission technology uses a molten salt as coolant and fuel. Conventional fission technology uses a water coolant circulating through a highly pressurized system to cool solid fuel elements, which are the signature technology features of current nuclear power plants.

A nuclear reactor requires a high-performance coolant for safe and efficient commercial operation. Molten salts are such coolants. They have exceptional thermal stability, making them superior reactor coolants compared to water. This permits safe high-temperature and low-pressure reactor operation, which is crucial for heat supply to the industry, to reduce the cost of nuclear energy, and transform the efficiency of nuclear electric power generation.

3

When a molten salt coolant and molten salt fuel are used in combination, the reactor has the potential to incorporate the powerful virtues of passive and inherent reactor safety as well. This is important to safety, social license, and commercial performance as well.

The IMSR improves upon earlier molten salt reactor designs by incorporating key innovations that create a reactor suitable for commercial industrial use and ready for near-term deployment. The IMSR cogeneration plant design incorporates many aspects of molten salt reactor operation researched, demonstrated and prototyped by test reactors at the Oak Ridge National Laboratory.

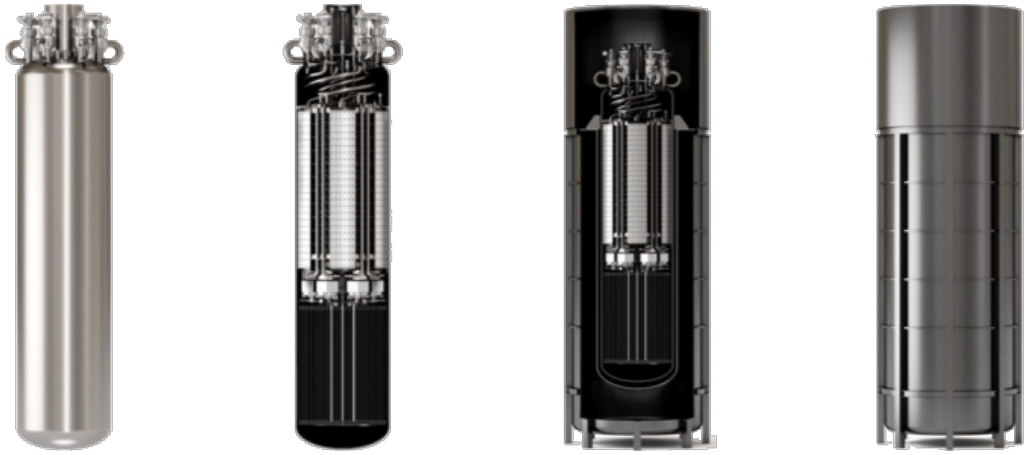
4

Operating at 44% thermal efficiency (net), an IMSR cogeneration plant can generate 392 megawatts of electricity from 884 megawatt of thermal reactor power. Heat at 700°C is generated from two thermal-spectrum, graphite-moderated, molten-fluoride-salt reactors (IMSR).

These reactors use today's standard nuclear fuel – comprising standard-assay low-enriched uranium (less than 5 percent U-235) – critical for near-term commercial deployment of IMSR plants.

44%

The Replaceable IMSR Core-unit



The key challenge | **The IMSR Core-unit** | **High safety, high energy**

The key challenge to molten salt reactor commercialization has been graphite's known lifetime limitations in a reactor core. Commercial reactors require high-energy densities in the reactor core to be economic, but such high-power densities significantly reduce the graphite moderator's

lifespan. Replacing the graphite moderator on a regular basis would add undesirable complexity and cost in a commercial setting.

Learn more about Terrestrial Energy

Terrestrial Energy is an industry-leading technology company committed to delivering reliable, emission-free, and cost-competitive nuclear energy with a transformative advanced reactor, the Integral Molten Salt Reactor (IMSR).

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