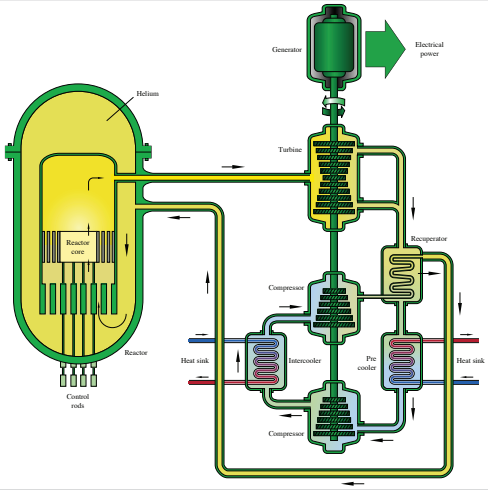
Small Modular Reactors



Small Modular Reactors (SMRs)[1] are considered to be nuclear reactors with power levels less than or equal to 300 MWe. Some of these reactors are designed to stand alone and some can be deployed as "modules", allowing add-on capacity after the initial module goes into operation. Like larger reactors, they use safe, proliferation-resistant technologies.

Generally speaking, SMRs have the following advantages:

- Use manufacturing capability currently available in the U.S.;
- Have lower capital cost with reduced debt profile;
- Require shorter construction time;
- Are deployable in markets in the U.S. and abroad that cannot accommodate or afford large reactors;
- Meet some mission requirements for government and military applications; and
- Provide electricity to remote populated areas such as in the northern latitudes.

In addition, SMRs can be used for the following specific low-carbon applications:

- Scalable electricity generation;
- Scalable industrial applications, such as:
- Electricity production for transportation,
- Synthetic fuel production for transportation (high-temperature reactor designs),
- Extraction of oil from tar sands (high-temperature reactor designs), and
- Production of fresh water by desalination; and
- Scalable back-end fuel cycle support.

The American Nuclear Society (ANS) has taken a leadership role[2] in addressing licensing issues for SMRs.

The licensing and eventual deployment of SMRs could lead to:

- Job creation,
- Potential opportunities to export SMRs as well as supporting technologies and services, and
- Opportunities to incorporate proliferation-resistant features into SMR designs and manufacturing.

The United States has built small reactors since the 1950s with many land-based and sea-based platforms. These efforts have advanced the safety and security of light water–cooled, gas-cooled, and liquid metal–cooled SMR technologies.

The American Nuclear Society recommends the following actions by the U.S. government:

- Expedite research on issues which must be addressed prior to commercial deployment of SMRs for flexible and scalable electricity generation applications,
- Enable timely adoption of SMR designs by assisting in the identification and resolution of generic SMR licensing issues as well as by establishing the most efficient and effective licensing

approaches through interactions with all stakeholders and the Nuclear Regulatory Commission,

- Encourage the development and deployment of multiple SMR designs as part of a balanced energy mix and expand their use beyond electricity generation,
- Participate in programs that demonstrate the feasibility of multiple SMR designs and approaches to reduce the time to market, and
- Encourage increased manufacturing/export technology capability in the United States for both domestic deployment and worldwide export within the "123 Agreement Framework"[3] in order to increase the use of nuclear energy as part of a balanced energy mix.

References

1. IAEA-TECDOC-1451, "Innovative small and medium sized reactors: Design features, safety approaches and R&D trends," May 2005.
2. "Interim Report of the ANS President's Special Committee on Small and Medium Sized Reactor (SMR) Generic Licensing Issues," July 2010.
3. Section 123 of the United States Atomic Energy Act of 1954, titled "Cooperation With Other Nations," establishes an agreement for cooperation as a prerequisite for nuclear deals between the United States and any other nation. Such an agreement is called a 123 Agreement.

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