

News briefs

Update on the Generation IV International Forum

Generation IV nuclear energy systems are expected to offer significant improvements over existing systems in the areas of economics; safety and reliability; proliferation resistance and physical protection; and sustainability. The GIF Technology Roadmap evaluated over 100 system concepts, identified six with the greatest promise and outlined the R&D necessary to bring them to commercialisation in the 2030 time frame. The Generation IV International Forum (GIF) members are collaborating on the R&D needed to develop generation IV nuclear energy systems, beyond what is currently being undertaken by industry.

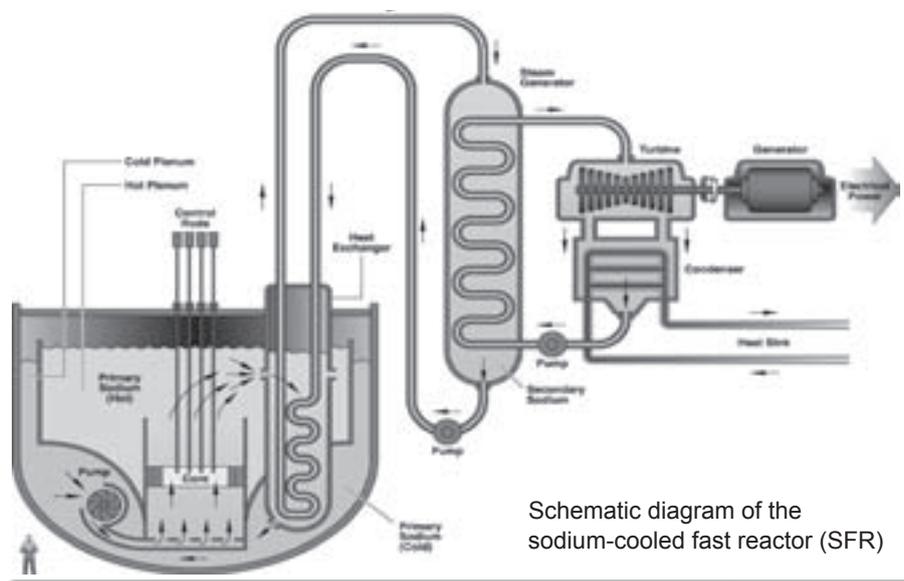
GIF members include the initial signatories to the GIF Charter – Argentina, Brazil, Canada, France, Japan, Korea, South Africa, the United Kingdom and the United States – as well as Switzerland (which signed the Charter in 2002), Euratom (2003), China (2006) and the Russian Federation (2006). Among the founding members, four have not signed or ratified the GIF Framework Agreement,

which officially places them on “non-active” member status.¹

The Forum has created a legal framework for its co-operation, as well as an organisational framework for co-ordinating and managing the work. System steering committees have been put in place to implement the R&D for each of the six reactor concepts, as set out in the system research plans (SRPs). Within each SRP, project arrangements, overseen by project management boards, are established with well-defined deliverables, milestones and a timetable.

2007 update

The Forum’s most notable achievement in 2007 was the signing of the first GIF project arrangement in March. It was signed by five GIF members (Euratom, France, Japan, Korea and the United States) and concerns advanced fuel for the sodium-cooled fast reactor system (SFR). Additional progress made in advancing the six chosen concepts during 2007 follows below.



Gas-cooled fast reactor system (GFR)

Negotiations advanced during 2007 to put in place GFR research projects on the integration, design and safety of GFR systems, as well as the fast neutron fuel, core materials and fuel cycle processes specific to the GFR system. The aim is to have an experimental technology demonstration reactor in place by 2020.

Lead-cooled fast reactor system (LFR)

The LFR system research plan, which sets out the research required on the system design, fuel and lead technology and materials, was updated in the course of 2007. The LFR plan incorporates two tracks of development leading to a single joint demonstration facility by 2018. Separate designs for a small, transportable LFR with a long core life and a moderate-sized power plant will be investigated in the demonstration facility.

Molten salt reactor system (MSR)

A draft system research plan for the MSR was updated during 2007. As part of the overall roadmap for the system's development, a scoping and screening phase will continue until 2011. At that point, confirmation of the potential of salt (selection, properties and compatibility with other materials) will have been established. The selection of reference designs will be made by 2018, when the project will move into its performance phase.

Sodium-cooled fast reactor system (SFR)

In addition to the project arrangement signed on advanced fuel in March, two others have since been signed in the areas of component design and balance-of-plant (CD&BOP) and the global actinide cycle international demonstration (GACID). The CD&BOP project aims to develop key components and devices of the plant system and to investigate safe and effective power conversion concepts. The GACID project sets out to demonstrate on a significant scale that fast neutron reactors can manage the whole actinide inventory.

Supercritical-water-cooled reactor system (SCWR)

A draft SCWR system research plan was completed in 2007. Project management boards have been established in the following areas: thermal-hydraulics and safety; materials and chemistry;

GNEP and GIF:

Distinguishing features and dynamics

The Global Nuclear Energy Partnership (GNEP) is an international framework which aims to expand nuclear power worldwide while managing radioactive waste and reducing proliferation risks. The GNEP statement of principles recognises the GIF as a vehicle for multilateral R&D collaboration. The GNEP stated aim is to complement, not replace, existing co-operative mechanisms such as the GIF.

The GIF is focused on a future generation of nuclear energy systems, addressing both fuel cycles and reactor technologies. The GNEP is, in a sense, both more narrowly focused on nuclear energy systems that consume transuranic elements from recycled spent fuel, as well as more broadly focused on its objectives to enhance nuclear safeguards, establish international fuel services and promote nuclear energy in developing countries and regions. The GNEP plans to use the existing arrangements established within the GIF to carry out any R&D work in common. GIF members have indicated that they welcome the opportunity to carry out R&D on advanced nuclear energy systems in co-operation with the GNEP.

and design and integration. Negotiations to put in place project arrangements for all these areas advanced significantly during 2007.

Very high temperature reactor system (VHTR)

A system research plan was put in place for the VHTR in 2007. Currently, project arrangements to study the following areas are in the final stages of negotiation: the development and validation of materials to be used in the VHTR system; associated fuels and fuel cycle issues; and the use of the VHTR system to produce hydrogen. The overall aim of these research efforts is to define the system's baseline concepts by 2010 and to optimise their design and operating features by 2015.

The NEA acts as the Technical Secretariat of the Generation IV International Forum. More information about the GIF is available at: www.gen-4.org. ■

Note

1. Current non-active members include Argentina, Brazil, South Africa and the United Kingdom. The latter intends to participate in the GIF activities through Euratom.