Generation IV International Forum (GIF)

Four generations of nuclear power plants are typically identified: the early prototype reactors of the 1950s as the first generation; the commercial power reactors developed in the 1970s, which still represent the vast majority of the 436 operating plants in 2010, as the second generation; reactors such as the ABWR, the AP1000 or the EPR, derived from Generation II concepts and recently built or under construction, as the third generation; and finally the fourth generation under development.

The Generation IV International Forum (GIF) was launched in 2000 as a co-operative international endeavour seeking to develop the research necessary to test the feasibility and performance of fourth generation nuclear systems, and to make them available for industrial deployment by 2030. The goals of fourth generation plants are to improve sustainability (including effective fuel utilisation and minimisation of waste), economics (competitiveness with respect to other energy sources), safety and reliability (for example, no need for offsite emergency response), and proliferation resistance and physical protection.

After a thorough review of roughly 100 concepts in 2002, GIF members selected six systems for further R&D: the gas-cooled fast reactor (GFR), the lead-cooled fast reactor (LFR), the molten salt reactor (MSR), the sodium-cooled fast reactor (SFR), the supercritical-water-cooled reactor (SCWR) and the very-high-temperature reactor (VHTR). These systems are described in the Technology Roadmap for Generation IV Nuclear Energy Systems, available on the GIF public website (www.gen-4.org/).
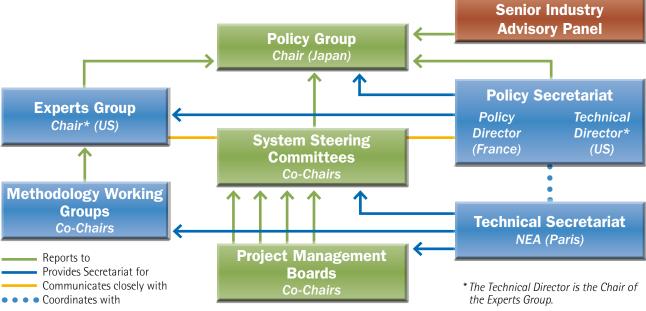
Membership in the GIF requires the signature of two major documents: the Charter of the Generation IV International Forum and the intergovernmental Framework Agreement for International Collaboration on Research and Development of Generation IV Nuclear Energy Systems. In 2009, the GIF had ten active members, i.e. the members who have signed the Charter and signed, ratified or acceded to the Framework Agreement, and are effectively contributing to GIF work through participation in the System Steering Committees (SSC) and associated Project Management Board (PMB) of at least one of the six systems selected, or through the design of a plant or base studies (e.g. materials) in support of such a design. These members are Canada, China, Euratom, France, Japan, the Republic of Korea, the Republic of South Africa, the Russian Federation, Switzerland and the United States.

The GIF is led by the Policy Group (PG), to which all members can nominate up to two representatives. In 2003, the PG asked the NEA to provide Technical Secretariat support to the six SSCs and their associated PMBs, which are in charge of the systems development, and to the three Methodology Working Groups (MWG) on Economic Modelling, Risk and Safety, and Proliferation Resistance and Physical Protection. The NEA Steering Committee acknowledged that this role is consistent with the NEA mission, and requested that it be kept informed regularly of the corresponding ongoing activities.

In addition to supporting the SSCs, PMBs and MWGs, the NEA is hosting and managing the two GIF websites. The most important is the one restricted to GIF members, which gathers all GIF information (including meeting minutes and technical contributions to the GIF). The other is open to the public. The NEA is also providing support for the preparation and management of legal documents regarding GIF activities (such as the System or Project Arrangements), including the signature process and archiving. In 2009, Technical Secretariat support was provided for approximately 50 meetings as well as the organisation of the first GIF Symposium, held in Paris and embedded in the Global 2009 conference. This symposium provided an opportunity to widely communicate the achievements and goals for the different systems; those interested may consult the symposium proceedings on the GIF public website.

The NEA is fully compensated for its support to GIF activities through voluntary, financial and in-kind contributions made by individual GIF members.

* The Technical Director is the Chair of the Experts Group.

Technical Secretariat