

News briefs

The Generation IV International Forum enters a new phase

The Generation IV International Forum (GIF) is a major international initiative aimed at developing the next generation of nuclear energy systems. It was launched by the US Department of Energy in January 2000 and formally chartered in 2001. The GIF reached an important milestone on 28 February 2005 when five of its members (Canada, France, Japan, the United Kingdom and the United States) signed the Framework Agreement for International Collaboration on Research and Development of Generation IV Nuclear Energy Systems, which sets out the steps to be taken to encourage the participation of R&D institutes and industry organisations in the GIF, while defining the necessary implementing provisions, such as the apportioning of intellectual property rights of the developed systems.

The framework agreement entered into force immediately following the signing ceremony held at the French Embassy in Washington, DC. On 13 April 2005, Switzerland announced its intention to accede to the agreement as well, and the other GIF members are expected to accede over the coming months. During this transition period, all members will continue to participate in GIF activities. The current GIF members are: Argentina, Brazil, Canada, Euratom, France, Japan, the

Republic of Korea, the Republic of South Africa, Switzerland, the United Kingdom and the United States.

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's 2002 Generation IV Technology Roadmap evaluated over 100 system concepts, identifying six with the greatest promise and setting out the research and development necessary to bring them to commercialisation within the 2030 time frame. The six concepts selected were:

- **Gas-cooled fast reactor system (GFR)**

The GFR features a fast-neutron-spectrum, helium-cooled reactor and a closed fuel cycle. The key challenges associated with this system concern the development of new fuels and materials operating at 850°C, the core design and the helium turbine.

- **Lead-cooled fast reactor system (LFR)**

The LFR features a fast-spectrum lead or lead/bismuth eutectic liquid metal-cooled reactor and a closed fuel cycle. Its key challenges concern the lead or lead-alloy handling and the development of the neces-

sary fuels and materials in the range of 550/800°C.

- **Molten salt reactor system (MSR)**

The MSR uses a circulating molten salt fuel mixture with an epithermal-spectrum reactor and a full actinide recycling fuel cycle. The molten salt chemistry and handling, and the development of materials and the fuel cycle are the main challenges for this system, which is intended to operate at 700/800°C.

- **Sodium-cooled fast reactor system (SFR)**

The SFR system features a fast-spectrum, sodium-cooled reactor and a closed fuel cycle. Reducing the capital cost and improving passive safety, especially under transient conditions, are the major challenges for this system, which already benefit from considerable technological experience.

- **Supercritical-water-cooled reactor system (SCWR)**

The SCWR system is a high-temperature, high-pressure, water-cooled reactor that operates above the thermodynamic critical point of water (374°C and 22.1 MPa, or 705°F and 3208 psia). Material corrosion and water chemistry in the range of 500/550°C, along with the development of materials, are the key challenges for this system.

- **Very high temperature reactor system (VHTR)**

The VHTR is a graphite-moderated, helium-cooled reactor with a once-through uranium fuel cycle. Also designed for hydrogen production and process heat application, this system's aim of operating above 1000°C presents significant challenges in terms of fuel and materials development, as well as safety under transient conditions.

As detailed in its charter and subsequent policy statements, the GIF is led by a policy group. The policy group is

responsible for the overall framework, policy formation and interactions with third parties. An expert group advises the policy group on R&D strategy, priorities and methodology and evaluates the research plans for each of the Generation IV systems. The GIF policy group meets two to three times a year to review past activities, provide guidance to the expert group and systems steering committees (one per system under development), and determine the programme's future direction. The GIF policy group is currently chaired by the United States, with vice-chairs from France and Japan.

At its January 2005 meeting, the GIF policy group confirmed arrangements under which the OECD Nuclear Energy Agency will provide Technical Secretariat support to the GIF, including the funding of this activity by GIF members through voluntary contributions. The NEA is able to offer long-standing experience with international working groups, neutrality, long-term continuity and a comprehensive approach to both the organisation and substance of the GIF R&D activities. ■

More information about the GIF is available at www.gen4.org.

Nuclear power for the 21st century

An international conference on Nuclear Power for the 21st Century was held in Paris on 21-22 March 2005. Organised by the International Atomic Energy Agency (IAEA) in cooperation with the OECD and the NEA, the conference was hosted by the French government. The aim of the conference was to analyse the potential contribution of nuclear energy to meeting the world's energy needs in an economic manner, while respecting social and environmental concerns. The conference was attended by ministers, high-ranking officials and experts from 74 countries and 10 international organisations.

The conference¹ on Nuclear Power for the 21st Century came at a very important time, with the twin demands of ensuring the security of energy supply and meeting the challenge of climate change pressing on all governments. It is in this context that a number of NEA member countries have been re-examining the potential role of nuclear energy in their national energy mix.

What emerged from the two days of ministerial interventions and roundtables with invited experts was a widely

held opinion that nuclear energy can, under the right conditions, be part of a response to the challenge of meeting expanding energy demand, and ensuring the security of energy supply while addressing climate change. But nuclear energy is not necessarily a solution for everyone, and some countries have made clear, including through nuclear phase-out policies, that nuclear is not their preferred option. In his keynote address to the opening session, Mohamed ElBaradei, IAEA Director-General acknowledged "...each

country and region faces a different set of variables when choosing its energy strategy, and energy decisions cannot be made on a 'one-size-fits-all' basis." Patrick Devedjian, French Minister Delegate for Industry highlighted, *inter alia*, the multifaceted nature of energy policy, which requires consideration of a number of factors including economic, social and environmental concerns.

Climate change

OECD Secretary-General Donald Johnston highlighted, as did many of the ministers