



Generation IV International Forum

François Gauché

GIF Policy Group Chairman

***International Workshop on advanced reactor systems and future energy market needs,
12 April 2017, OECD Conference Centre, Paris, France***

New Requirements to support a Sustainable Development

➔ Steady Progress:

- Economic competitiveness
- Safety and reliability

➔ Nuclear Power for centuries

- Resource saving
- HL Radwaste minimisation
- Non-proliferation

➔ New applications

Hydrogen, drinkable water, heat

➔ Industrial deployment ~2040

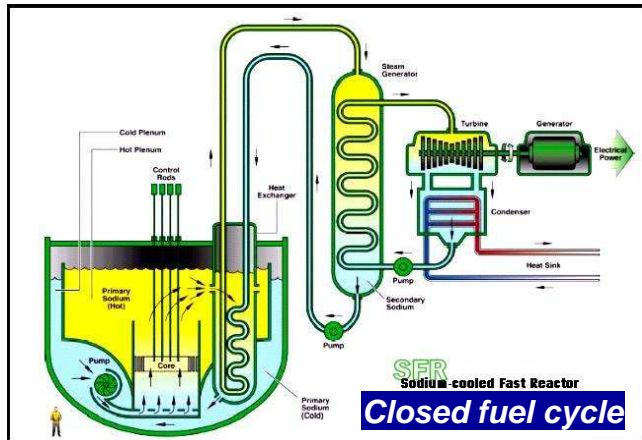
➔ Multilateral cooperation with 3 levels of agreements:

- ✓ *Intergovernmental*
- ✓ *Systems (x 6)*
- ✓ *11 R&D Projects*

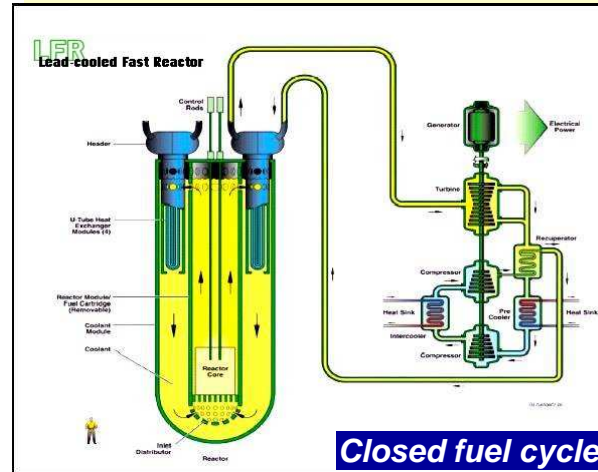


Six GIF Systems for R&D

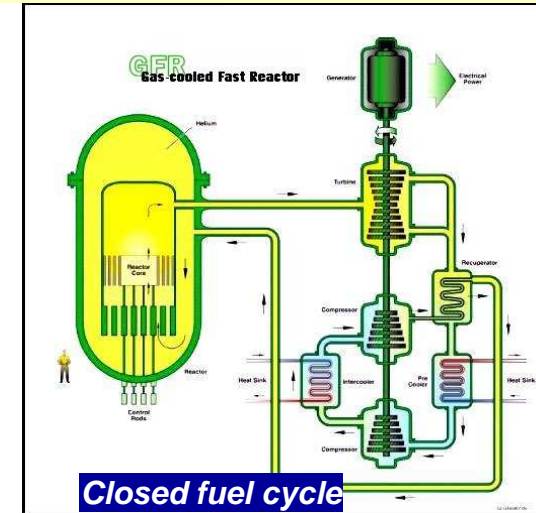
GIF Selection of six Nuclear Systems



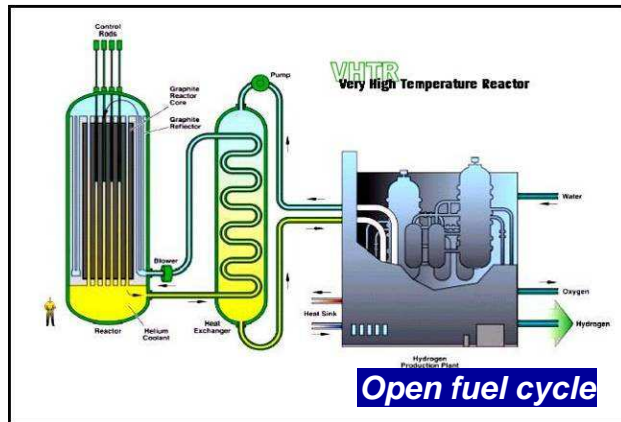
Sodium Fast Reactor



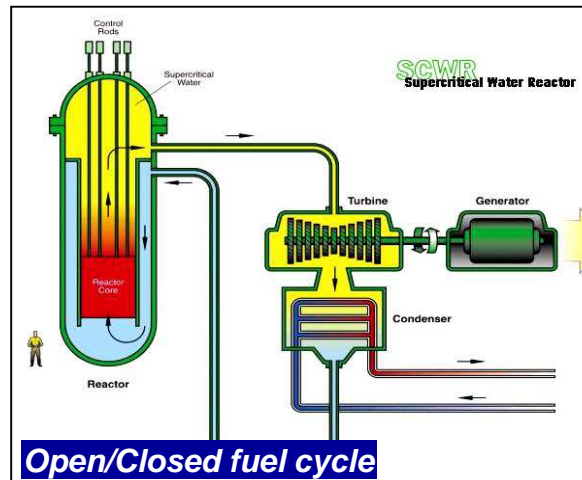
Lead Fast Reactor



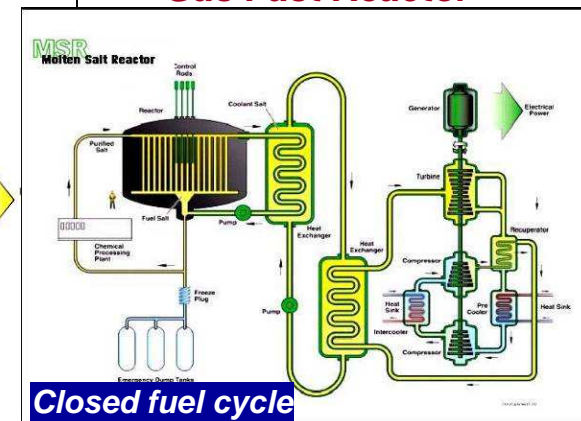
Gas Fast Reactor



Very High Temperature Reactor



Super Critical Water Reactor



Molten Salt Reactor

Recognition of the major potential of fast neutron systems with closed fuel cycle

GIF is a platform supporting innovation in nuclear power...

❑ **...To prepare the future**

- Meeting our **energy and climate change challenges** will require the mobilization of all technologies
- Gen-IV systems can secure nuclear future beyond the 21st century by removing the **Uranium resource constraint**

❑ **...To improve the performance of nuclear power**

- The four “goals” of GIF: improved **economics, safety, PR&PP & environmental** performances

❑ **...To support the competitiveness and public acceptance of nuclear power in the mix**

- In the coming decades, the introduction of Gen-IV reactors in the nuclear fleet can **improve the overall economics of nuclear power** (in particular with closed fuel cycles)
- Open nuclear to **new applications**, supporting the **decarbonation of other industrial sectors** (H₂, heat)

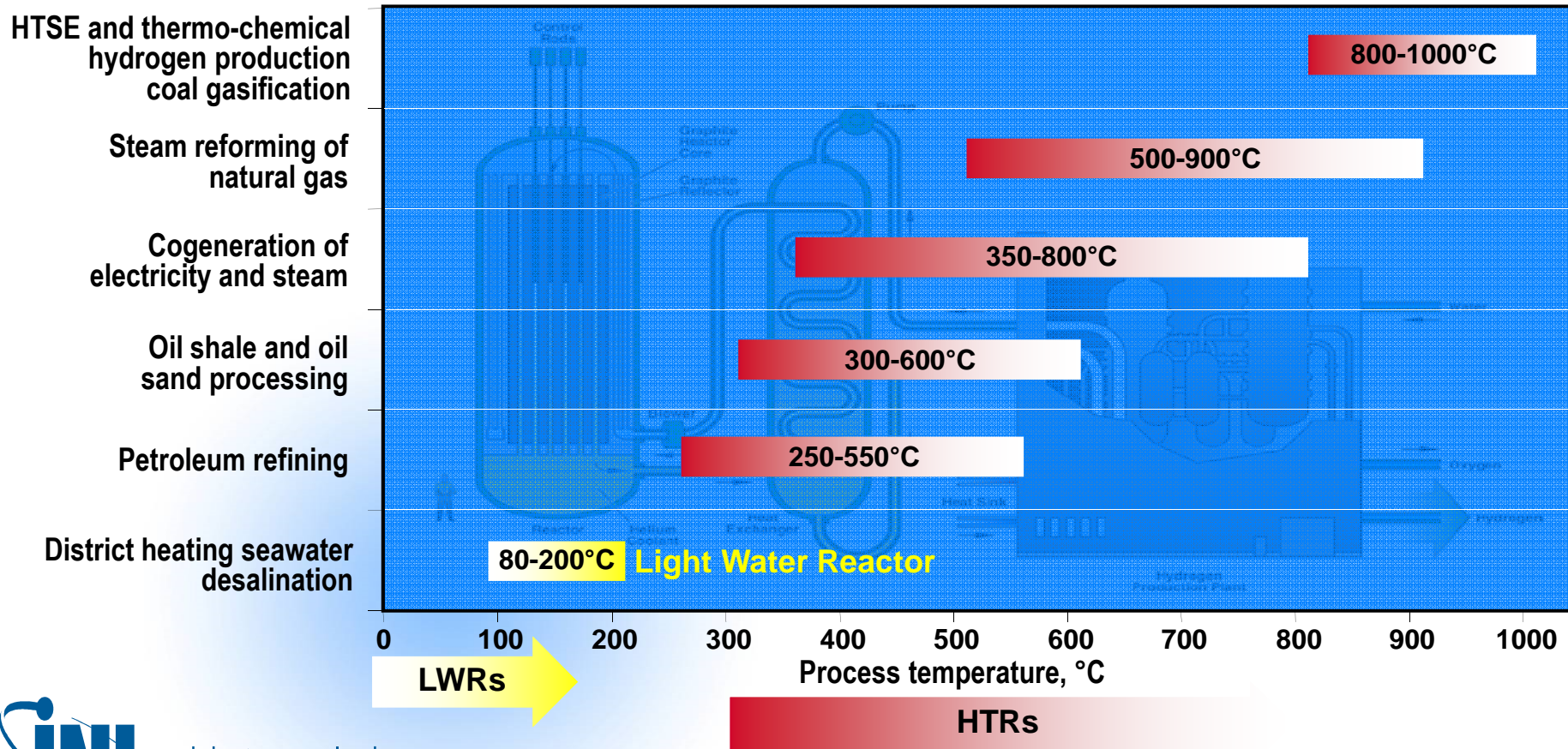
Recent GIF initiatives to foster innovation

- ❑ GIF has built a strong international scientific community focusing on 6 distinct systems... that is **increasingly mobilized around crosscutting issues, e.g.: material, power conversation systems, modelling issues, ATF, passive safety, etc.**
- ❑ A strategic review has been launched to investigate how GIF systems will be integrated in future energy systems in order to fully **take into account at the R&D stage long term market issues**
- ❑ GIF offers both a framework and tools (SDC/SDG) to facilitate an early **engagement between reactor vendors and regulators on licensing issues**
- ❑ GIF is looking at how to **consolidate the needs for key research infrastructures**
- ❑ GIF is engaged with the new generation through **new education and training activities (webinars)**

Thank you for your attention!

Potential of High Temperature Reactors




Efficiency Gains could be Possible in the Future with High Temperature Reactors



There is a role for existing LWRs, advanced LWRs, and small reactors...

Membership and Systems Development

(year of Charter signed)

	 Canada (2001)	 China (2006)	 France (2001)	 Japan (2001)	 Korea (2001)	 Russia (2006)	 RSA (2001)	 Swiss (2002)	 USA (2001)	 EU (2003)
SFR		•	•	•	•	•			•	•
VHTR		•	•	•	•			•	•	•
LFR*				•	•	•				•
SCWR	•	•		•		•				•
GFR			•	•						•
MSR*			•			•		•	•	•

*All activities, except LFR and MSR (based on MoU), are carried out based on a **system arrangement**.



Australia
(2016)

Australia signed the Charter on 22 June 2016.



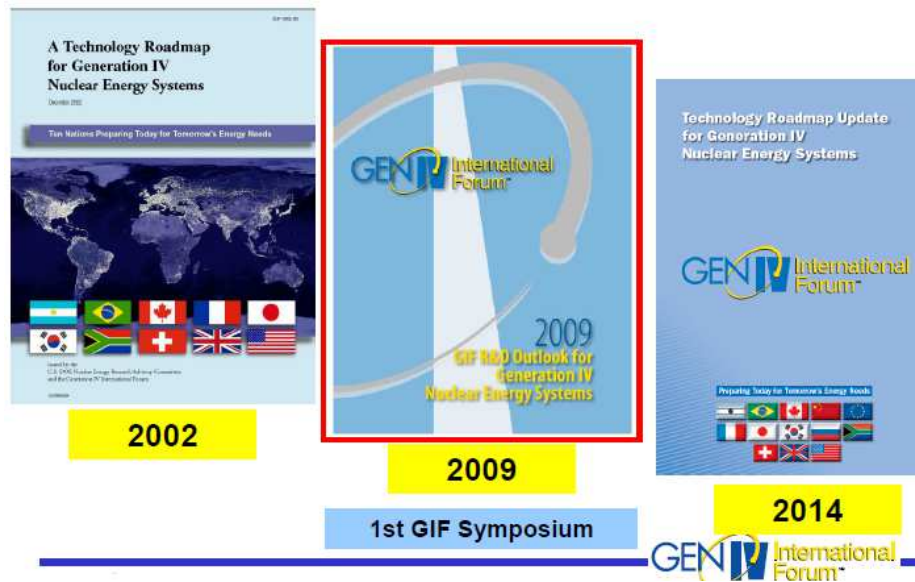
Argentina
(2001)

Brazil
(2001)

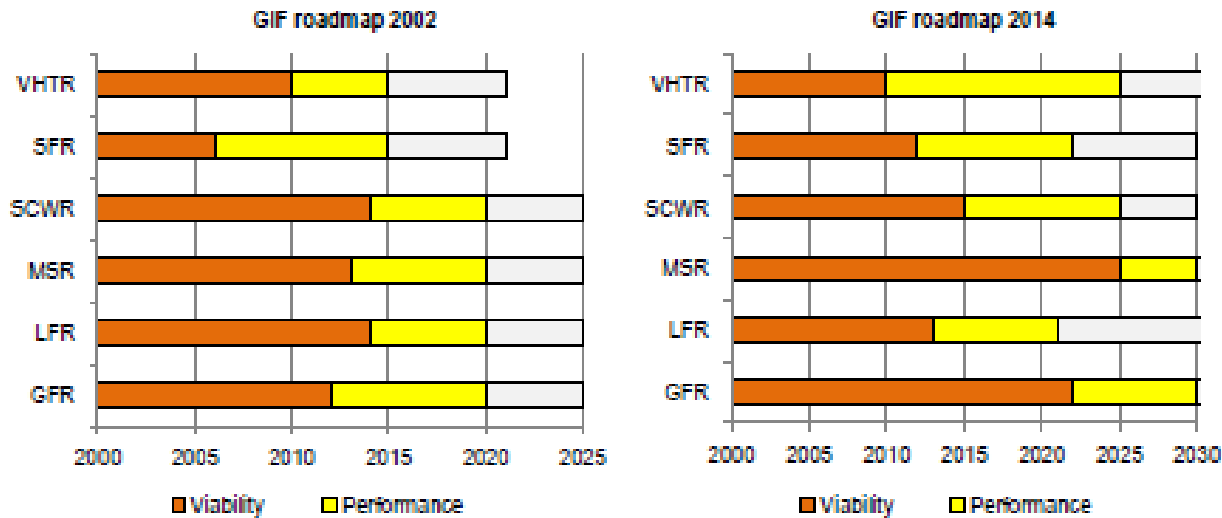
UK
(2001)

are also members as non-active member.

GIF strategic deliverables

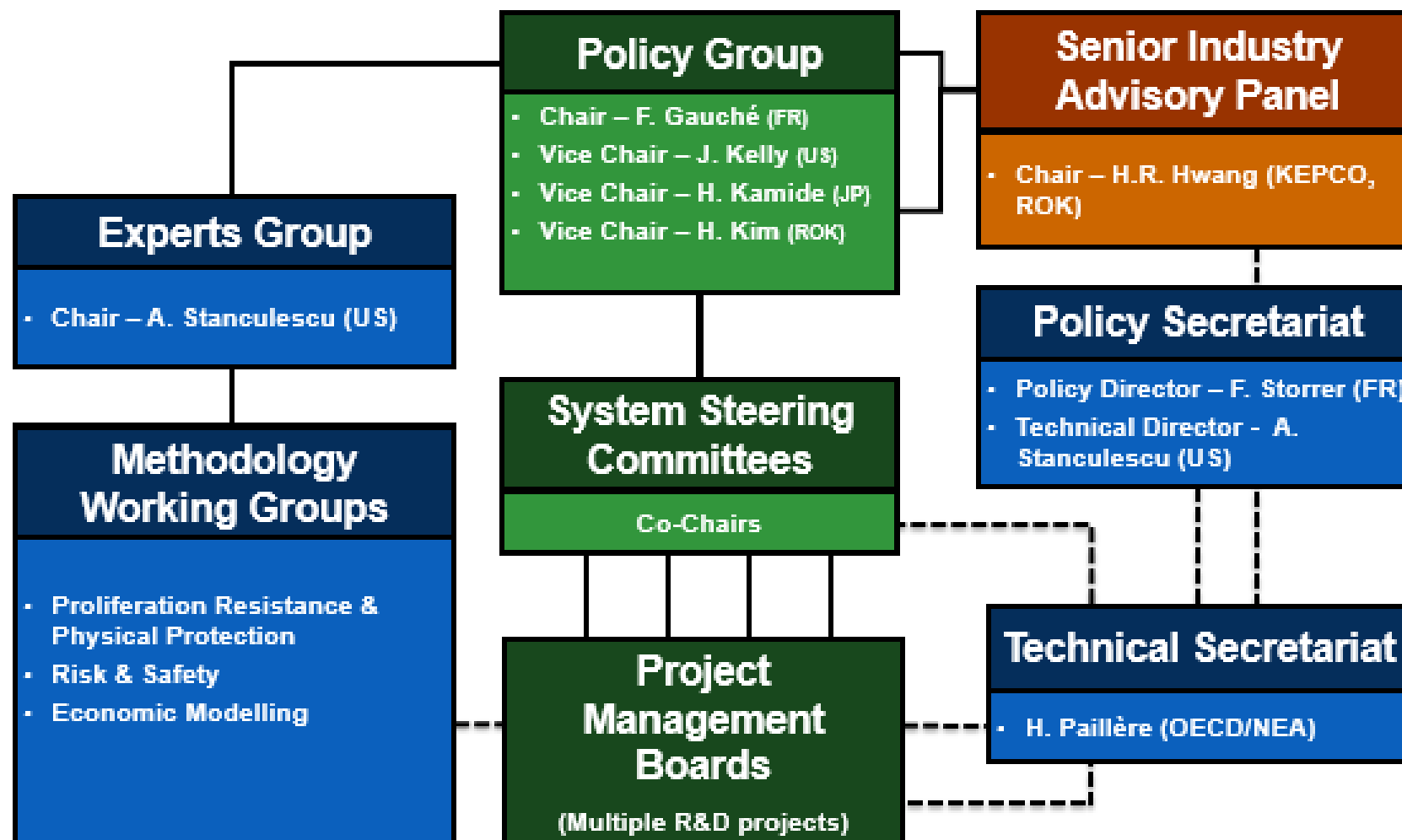


October 2018:
4th GIF symposium,
Paris, France



GIF structure and Governance

Current PG Chair's mandate: 2015 - 2018



Task Force: E&T, SDC/SDG for SFR, and possibly on Sustainability

Key positions (Who's who on GIF website)



Francois Gauché was elected Chair of the GIF Policy Group in April 2016 and will serve a three-year mandate. He is the Director of the Nuclear Energy Division at the French Alternative Energies and Atomic Energy Commission (CEA), previously serving as Head of the CEA programme on 4th Generation Reactors and the ASTRID programme from 2010-2015.

Chair (FR)



John E. Kelly is one of the three Vice-Chairs of the GIF Policy Group. He will support the GIF Chair in the area of regulatory issues. Prior to taking on this role, he served as the GIF Chair from 2013 to 2015. During that time, the Framework Agreement was extended, and significant progress was made in developing safety approaches for Generation IV systems and interacting with regulators. Kelly is Chief Technology Officer for Nuclear Reactor Technologies at the U.S. Department of Energy's Office of Nuclear Energy.

**Vice Chair (US) /
Regulatory issues**



Hideki Kamide became a GIF Vice Chair in 2015, succeeding Kazumi Aoto in this role. He is the Director General of Advanced Fast Reactor Cycle System R&D Centre at the Japan Atomic Energy Agency. As GIF Vice Chair, he will support the activities of the Policy group in the area of market issues.

**Vice Chair (JP) /
Market issues**



Hark Rho Kim was elected as the 3rd Vice Chair of the GIF Policy Group in April 2016. He is Senior Vice President at the Korea Atomic Energy Research Institute, and has been a member of the Policy Group since 2014. As GIF Vice Chair, he will support the activities of the Policy Group in the area of external collaborations.

**Vice Chair (KR)/
GIF external cooperation &
research infrastructures**



Alexander Stanculescu became the GIF Technical Director in October 2015, succeeding Dohee Hahn in this role. He recently held the position of Director of the Nuclear Systems Design and Analysis Division at the Idaho National Laboratory (INL). As GIF Technical Director, he provides technical advice to the Policy Group and serves as Chair of the Experts Group.

Technical Director (US)



François Storrer became the GIF Policy Director on 1 January 2016. He supports the GIF Chair mainly in the legal and communication fields, as well as the management of Policy Group activities. Storrer is a Senior Research Scientist at CEA. Prior to his role at the CEA, he held the position of Technical Advisor on nuclear R&D and policy issues in the French Ministry for Energy, Sustainable Development and Ecology.

**Policy Director and Chief of
Staff for the Chairman (FR)**

Innovation: GIF Technology Goals

❑ Sustainability

- Secure long term fuel supply
- Minimize waste and long term stewardship burden

❑ Safety & Reliability (RSWG/ SDC&SDG TF)

- Excel in safety and reliability
- Keep very low likelihood and degree of core damage
- Eliminate need for offsite emergency response

❑ Economics (EMWG)

- Maintain life cycle cost competitiveness over other energy sources
- Reduce financial risk comparable to other energy projects

❑ Proliferation Resistance & Physical Protection (PRPP)

- Prevent unattractive materials diversion pathway
- Enhance physical protection against terrorism

❑ Vice Chair missions to foster innovation in the development of GEN-IV systems addressing:

1) Market issues, 2) Regulatory issues, 3) External GIF cooperation, with support from the Senior Industrial Advisory Committee (SIAP)

3 years program as approved by the PG (1)

- ❑ **Renew the industry involvement in R&D projects**
- ❑ **Promote a more continuous work of the SIAP**
- ❑ **Launch an initiative on market issues identifying drivers, opportunities and constraints**
- ❑ **Further investigate the requirements of safety authorities, with the help of the SIAP and RSWG, and define more precisely what a technological demonstration phase could be (system integration and assessment)**
- ❑ **Identify needs for research infrastructures (qualification of components and systems) and promote networking of facilities**
- ❑ **Further promote the international review of the SFR SDC and SDG, and extend this type of exercise for other GEN-IV concepts.**

3 years program as approved by the PG (2)

- ❑ **Share *best practices in project planning with the help of SSC chairs and exchange on feed-back experience from each reactor project and technological demonstrator launched in PG member countries.***

- ❑ **Keep an eye - with the help of the Technical Director and the Expert Group - on possible *emerging and promising new concepts that are not yet charted in the technology roadmap.***

- ❑ **Think about *cross-cutting R&D issues among systems to look for possible synergies such as between VHTR and GFR concepts with improved safety level and performance.***