



The Generation IV Forum: a Multinational Collaboration on Advanced Nuclear Energy Systems

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***Pacific Basin Nuclear Conference
Honolulu, 22 March 2004***

OVERVIEW

- ***GIF's accomplishments:***
 - *Vision and Charter*
 - *Generation IV Technology Roadmap*
- ***Path forward and future challenges:***
 - *Developing governance and legal framework*
 - *Working with others to realize the Vision*
 - *Some unique technology & policy challenges*
- ***Critical Success Factors for 2004 & beyond***

GEN vision

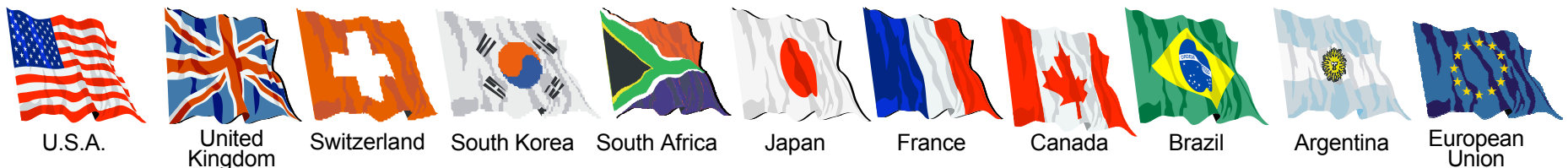
- ***GEN established Jan 2000 – 9 countries***
- ***Nuclear needed to meet future global energy needs***
- ***“Generation IV” nuclear energy systems must show significant advances in 4 Goal Areas:***
 - ***Economics***
 - ***Sustainability***
 - ***Safety & reliability***
 - ***Proliferation resistance & physical protection***
- ***To develop “Roadmap” for R&D collaboration for Gen. IV Systems deployable by 2030***

GIF Charter

Signed July 2001

- ***Set out Vision + Objective***
- ***Management framework: Policy & Experts Groups***
- ***Decisions by consensus – unanimity for new members***
- ***Work with other organizations, and share information openly where possible***
- ***No permanent offices or staff; meetings by rotation***

Current Membership:

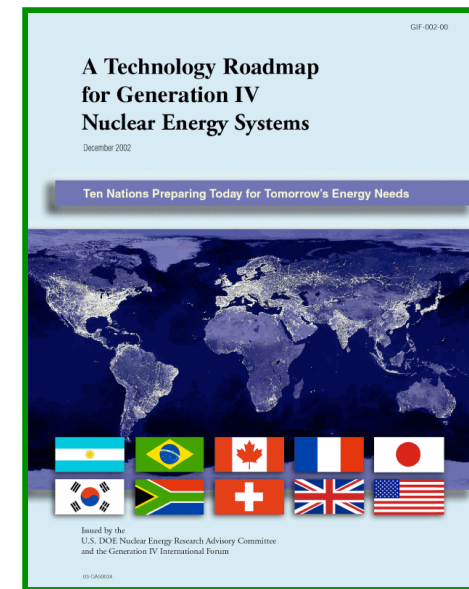


Generation IV Roadmap: process

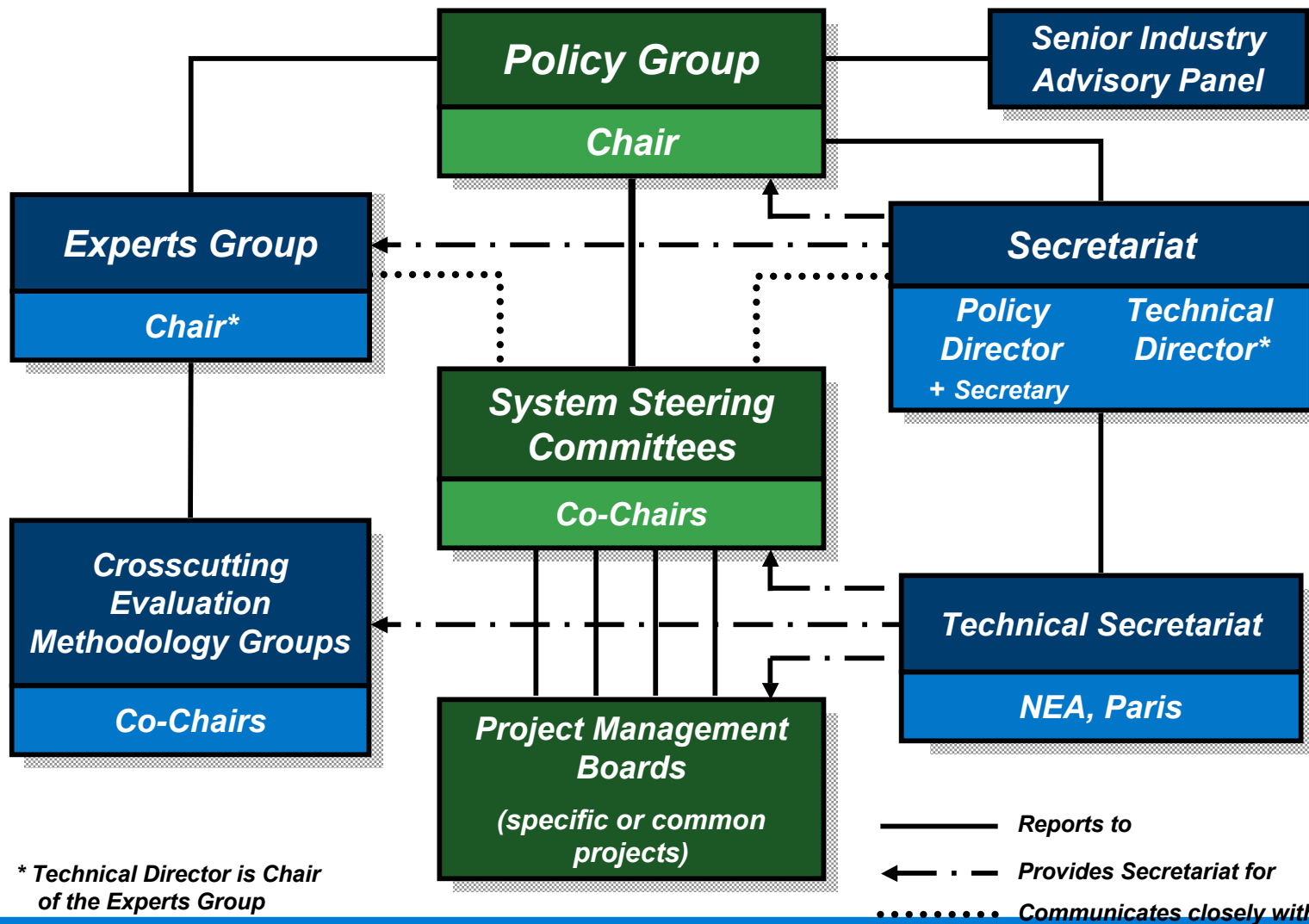
- ***Task: select 6-8 most promising concepts from 100+ proposed internationally, and outline R&D needs***
- ***Process:***
 - ***100+ GIF experts in 4 Technical Working Groups, Cross-cut Groups & Methodology Groups***
 - ***IAEA & other expert inputs***
 - ***For each Goal Area, sub-goals & metrics developed to evaluate systems***
 - ***Overseen by integration team + GIF Experts Group***
 - ***Final selection by GIF Policy Group, taking account of different missions: electricity, hydrogen etc***

“Technology Roadmap for Generation IV Nuclear Energy Systems”

- **6 Gen IV Systems selected:**
 - *Gas-Cooled Fast RS (GFR)*
 - *Lead-Cooled Fast RS (LFR)*
 - *Molten Salt RS (MSR)*
 - *Sodium-Cooled Fast RS (SFR)*
 - *Supercritical-Water-Cooled RS (SCWR)*
 - *Very-High-Temperature RS (VHTR)*
- **Summarized R&D priorities - foundation for planning**
- **Also identified 16 Near-Term Designs: potential R&D synergies with Gen. IV?**



GIF Governance Structure [near-final]



GEN Governance (1): Systems Committees & Project Boards

- ***Systems Steering Committees (SSCs):***
 - *GEN Members interested in a particular System*
 - *Define & guide R&D program for the System*
 - *Ensure integration of specific Projects*
 - *Evaluation and quality assurance*
 - *already formed for VHTR, SCWR, SFR & GFR*
- ***Project Management Boards (PMBs):***
 - *R & D organizations from GEN Member countries*
 - *manage projects contributing to one or more System*

GEN Governance (2): legal agreements

SSCs & PMBs will sign legal agreements:

- ***Needed for R&D costing \$600m-\$1,000m per System***
- ***Templates being prepared by USDOE***

Systems Agreement template: provisions include:

- ***High-level Objectives – “to develop System X”***
- ***System Research Plan: – to define & integrate Projects***
- ***Management***
- ***Forms of cooperation – sharing information, personnel, facilities***
- ***IPR, including background information***
- ***Funding – self-funding, in-kind and/or common fund***
- ***Miscellaneous – amendments, liability, disputes etc***

GIF Governance (3): Policy Group

- ***By Charter, most senior decision-making body in GIF***
- ***All GIF Members, representing Governments***
- ***Chair (US) & 2 V/Chairs (France & Japan)***
- ***Will give guidance/decide on:***
 - ***Governance and agreements***
 - ***Any applications by non-Members to join GIF, or participate in R&D***
 - ***R&D strategy, priorities & methodology***
 - ***Engaging with regulators, industry, etc***
 - ***Communications strategies***

GIF Governance (4): Experts Group & Methodology WGs

Experts Group:

- ***All GIF Members; US Chair***
- ***Expert advice to Policy Group on:***
 - ***R&D strategy, priorities and methodology***
 - ***Evaluation of System Research Plans***

Methodology WGs:

- ***2 WGs so far: on Economic Modeling, and Proliferation Resistance & Physical Protection***
- ***report to Experts Group, work closely with Systems Committees and Project Boards***

Methodology WGs (1): Economic Modeling

- ***Members: GIF Member experts + OECD Nuclear Energy Agency***
- ***Purpose: to develop a standard integrated model for evaluating performance of Gen.IV systems:***
 - ***Capital/production cost***
 - ***Nuclear fuel cycle***
 - ***Alternate energy products (hydrogen)***
 - ***Plant scale model: monolithic v. modular plants***
- ***Work schedule: phased 2003-06 models***

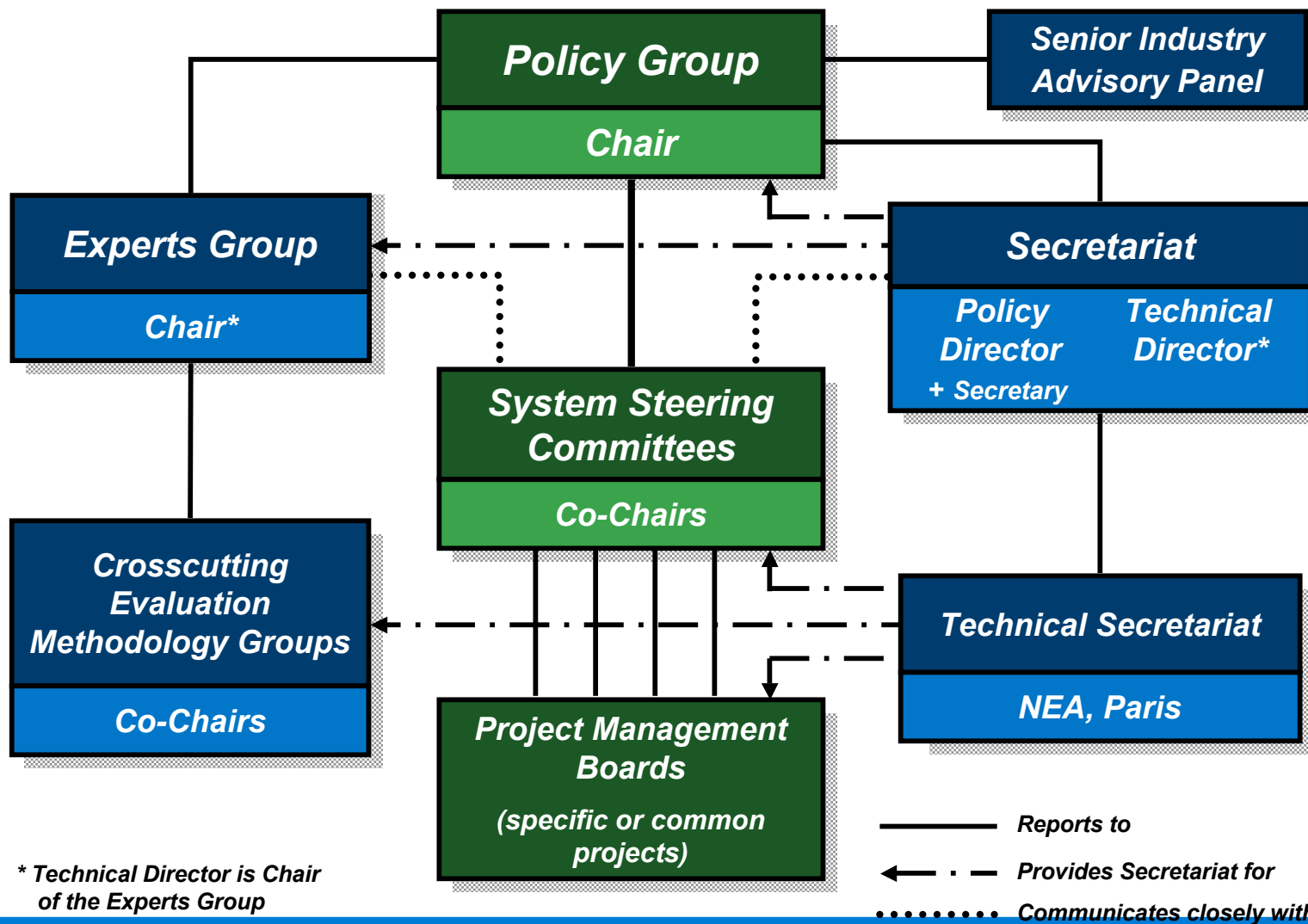
Methodology WGs (2): Proliferation Resistance & Physical Protection

- ***Members: GIF Member experts + IAEA***
- ***Purpose: to develop and demonstrate methodology for evaluating Gen. IV systems with respect to:***
 - ***Proliferation resistance: prevent diversion of materials***
 - ***Physical protection: prevent sabotage or theft***
- ***To the extent possible, methodology should be quantitative & standardized***
- ***Work schedule: draft methodology complete by 2004***

GIF Secretariat

- ***US-based Secretariat: supporting Chair of PG***
 - *Policy Director (Washington) – Ms Helen Leiser*
 - *Technical Director (Idaho) – Dr Ralph Bennett, also Chairs Experts Group*
- ***Paris-based technical secretariat [proposed]:***
 - *OECD's NEA to provide expert support for work of Systems Committees, Project Boards etc*
 - *GIF members to contribute funds + cost-free experts*

GIF Governance Structure [near-final]



Working with others (1): Senior Industry Advisory Panel

- ***Being formed now to advise GIF on strategic issues, particularly:***
 - ***Regulatory, commercial, technical***
 - ***Overview of R&D progress and plans***
- ***Up to 12 senior nuclear industry representatives***
- ***GIF teleconference soon with Panel Members***
- ***Meet with Policy Group once a year***

Working with others (2): safety regulators

Goals:

- ***support Gen IV Goal of enhanced inherent safety***
- ***shared understanding on safety performance goals, early in R & D planning***
- ***encourage internationally-consistent regulatory approaches***

Policy Group discussions with:

- ***senior regulators from Canada, UK, US (Sept '03)***
- ***IAEA on their Innovative Reactors project (Jan '04)***

GIF Safety Working Group to be formed

Working with others (3): non-GIF countries & IAEA

Less developed countries (LDCs):

- ***Policy Group have agreed arrangements for LDCs to access GIF technology if “sponsored” by a GIF Member***

IAEA & its Innovative Reactors Project (INPRO):

- ***INPRO should complement, not duplicate, GIF***
- ***GIF have peer-reviewed INPRO methodology; joint review of sustainability criteria suggested***
- ***IAEA contributing to GIF methodology: proliferation-resistance, safety & reliability***

Some non-GIF countries may seek to participate in GIF R&D

Working with others (4): Developing a Communications Plan

- ***Public interest likely to grow as GIF R&D gets under way***
- ***Communications planning must cater for:***
 - ***Variety of groups & individuals requiring information***
 - ***Differences of national policy & perspectives***
- ***GIF Policy Group - actions in train:***
 - ***Establishing network of “communications liaisons”***
 - ***Developing public Website***
 - ***Review communications goals later in year***

Conclusion: GIF project presents some unique challenges

- ***Complex technology + many Systems & inter-actions***
- ***Some methodology still in development***
- ***Political & funding sensitivity for Governments***
- ***Tensions between public policy & commercial “lift-off”***
- ***Uniquely stringent regulatory frameworks***
- ***International differences in regulation, codes & standards***
- ***Need consensus (in Policy Group) among 11 Members***
- ***Public acceptance crucial***

Critical Success Factors: 2004 & beyond

- ***Agreements signed for Systems and key Projects***
- ***Quality Research Plans in place***
- ***Dialogue with industry & regulatory community***
- ***Methodology work advanced & being integrated***
- ***GIF technical secretariat, & Website, up and running***
- ***Industry committed to continually improving its performance, reputation and communications***