

## **Report from the Policy Director**

## May 27, 2020 GIF PG Tele Conference

## Nobuchika KAWASAKI (GIF PD)





## Generation IV major missions (2019-2021) GENTINGENERAL GENERAL GENERAL



GIF contributes Sustainable **Energy Supply by Gen IV** developers' mutual trust and co-operations.

#### **GIF missions:**

- Designs and R&Ds of 6 types of Gen IV reactors
- International standardization of Safety design and apply into Regulation
- Increased Flexibility on Nuclear system as Attractiveness in social Market
- Enhancement on R&D collaboration
- Appeal our results to the world



From the interview video to GIF chair (10mins interview)



## Designs and R&Ds of 6 types of Gen IV reactors

## **Technology Roadmap:**

issued at January 2014.

After that SFR SSC updated their System Research Plan (r3.2 revised 9 Oct 2019)

VHTR SSC is presently updating their System Research Plan (SRP).

MSR pSSC is preparing their System Research Plan, and upgrading to SSC.

#### **Action we need:**

- ➤ EG needs to evaluate System Research Plan whether they have adequate & definite development technical goals, necessary R&Ds to achieve these technical goals. (PG needs to decide action and make a request)
- > After evaluation of SRPs for SFR, VHTR, MSR. Need to update Roadmap.

Technology Roadmap Update for Generation IV Nuclear Energy Systems: Executive Summary of GIF outlook, Preparing the Future through Innovative Nuclear Technology: Outlook for Generation IV Technologies:



# International standardization of Safety design and apply into Regulation

## Regulatory Mission



#### Alice Caponiti (USA, DOE)

GIF PG Vice-Chair:

Alice Caponiti is the Director of Department of Energy's Office of Nuclear Energy Technologies, which provides strategic direction and execution of nuclear energy programs to improve research infrastructure and industry access to various fields.

The mission of the Vice-Chair on regulatory issues is to coordinate GIF's activities with various regulatory bodies to harmonize regulatory requirements. Dialogue between international R&D communities and regulatory communities can facilitate the development of collaborative approaches that

- identify and resolve key regulatory issues,
- identify and address the need of safety research, and
- further harmonize design, safety, and regulatory requirements.

The tasks of the Vice Chair include promoting Safety Design Criteria (SDC) and Safety Design Guideline (SDG) for GEN IV Systems and working on IAEA Safety Standards.

The Vice Chair also leads GIF's engagement with the OECD/NEA Working Group on the Safety of Advanced Reactors (WGSAR) and with appropriate IAEA departments.

#### **Regulatory Mission:**

- Identify need of safety research,
- further harmonizing design, safety, and regulatory requirements.

Risk & Safety Working Group

#### **RSWG** developed

- ➤ Integrated Safety Assessment Methodology (ISAM)
- White papers on ISAM implementation & safety systems

See: https://www.gen-4.org/gif/jcms/c\_9366/risk-safety

Proliferation Resistance & Physical Protection Working Group

#### PRPPWG developed

- ➤ Methodology used to evaluate and facilitate the introduction of PRPP through a case study at the earliest possible stage of design
- > PRPP white papers on the six GIF systems with SSCs.

See: https://www.gen-4.org/gif/jcms/c\_9365/pr-pp

Safety Design Criteria
Task Force

#### SDC TF developed

➤ Safety design criteria and guidelines for SFRs reviewed by IAEA, WGSAR, and international regulators.

See: https://www.gen-4.org/gif/jcms/c\_93020/safety-design-criteria



# International standardization of Safety design and apply into Regulation



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From the interview video to GIF chair

Presently this mission is under the charge of Vice Chair on Regulatory issues including post SDC-TF activity and with GIF-IAEA WSs, OECD/NEA WGSAR.



# International standardization of Safety design and apply into Regulation

#### **Action we need:**

- ➤ Synthesis RSWG safety activities (Basic safety approach, Risk Informed Performance-Based approach, White papers/ISAM, System safety assessments, SDC/SDG) and make a world safety standard (include to apply SMR?)
- = If this means collaborative activities between GIF and IAEA, Mr. Kubo's investigation and suggestion might help to synthesize.
- To communicate with GIF EMWG/outside related organizations to identify economic benefits of international regulatory collaboration (See GIF EMWG report/EMWG Status Report and Proposed Studies for Virtual EG/PG meetings ) (Future WGSAR, NRC related matters?)
- ➤ Also request for faster licensing process proposed in RDTF position paper (in TD synthesis report).



## Increased Flexibility on Nuclear system as Attractiveness in social Market

Outcomes/direction after GIF Workshop on the Flexibility of Gen IV Systems on 29 May 2019 at Vancouver, Canada:

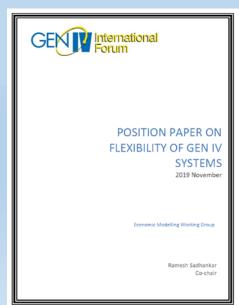
"POSITION PAPER ON FLEXIBILITY OF GEN IV SYSTEMS" is released on November 2019.

CEM NICE Future new initiative as Flexible Nuclear Campaign started. (Message about nuclear flexibility with example of GIF reactor systems and other national/organizational examples.)

http://www.cleanenergyministerial.org/initiative-clean-energy-ministerial/nuclear-innovation-clean-energy-future-nice-future

## **Action we need:**

- > To accelerate flexible campaign with CEM.
- Coordinate EMWG proposed studies with prioritization supported by EG. (See GIF EMWG report/EMWG Status Report and Proposed Studies for Virtual EG/PG meetings)





# Increased Flexibility on Nuclear system as Attractiveness in social Market

## Market Opportunities and Challenges Mission



#### Sylvestre Pivet (France, CEA)

GIF PG Vice-Chair:

Sylvestre Pivet is the director of the Innovation and Nuclear Support Division which manages the R&D programs led by the CEA in the field of civilian nuclear energy, covering fuel cycle, and advanced and operating reactors and simulation.

Decarbonization of hybrid energy systems is one of the important topics of Market Opportunities and Challenges. In the future, low-carbon or renewable energy systems will increase the global share in the overall energy mix and need to be complemented by energy storage and dispatchable energy technologies. **Decarbonized hybrid energy derived from Gen IV energy systems** can serve as both low-carbon sources of electricity and heat for industrial and other applications.

The Vice Chair addresses how Gen IV systems should deal with the need and challenge of future energy markets and support the development of innovative reactor concepts in cooperation with external GIF stakeholders, such as private sectors, policy makers, and investors, and various GIF bodies such as Systems Steering Committees, Economic Modelling Working Group, and Senior Industrial Advisory Panel.

## Market Opportunities and Challenges <u>Mission:</u>

Economic Modelling Working Group

EMWG developed

- ➤ Free cost evaluation software G4ECONS used to estimate six reactor systems economics
- Guidelines for estimating costs and identifying cost drivers of Gen IV designs

See: https://www.gen-4.org/gif/jcms/c\_9364/economics Including "Cost Estimating Guidelines" & "Impact of Increasing Share of Renewables" Senior Industry Advisory Panel

SIAP strategically reviews

- R&D progress and plans of individual systems from the industry perspective
- R&D progress and plans of cross-cutting activities (GIF working groups)
- system deployment and future nuclear energy fuel cycles
- international framework for nuclear safety standards and regulations.

The Vice Chair also coordinates activities of GIF and other multilateral initiatives of international organizations such as IAEA INPRO, NEA IFNEC, NEA NI2050. This coordination can contribute to further investigating and assessing costs and values of, the roles of private sectors for deploying, and to adjust the policy to develop, Gen IV systems.



## Mr. Sylvestre PIVET (France, CEA) GIF Vice-Chair

on Market opportunities and Challenges

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From the interview video to GIF chair

From the attached mission leaflet

Presently this mission is under the charge of Vice Chair on Market opportunities and Challenges.

## **Enhancement on R&D collaboration**



## **Enhancement of R&D**Collaborations Mission



#### Jong-Hyuk Baek (Republic of Korea, KAERI)

GIF PG Vice-Chair:

Jong-Hyuk Baek is a senior vice president (CTO, Chief Technology Officer) for Innovative Nuclear Reactor Systems at Korea Atomic Energy Research Institute.

GIF has been concerned about the R&D collaboration among 6 Gen IV nuclear systems. The mission of the Vice-Chair is to enhance the R&D collaboration within GIF and external organizations. The Vice-Chair with the support of RD TF and AMME TF lead the GIF members to

- better understand the drivers, opportunities, and constrains in using large scale facilities for qualification purposes,
- examine various means for sharing such resources and R&D results to optimize joint research and shared results, and
- investigate other R&D topics (or crosscutting issues) related especially to research challenge or technical gaps to further boost the development of GEN-IV reactor systems.

The Vice-Chair points out that it is important to know what makes difficulty in collaborating with others and how we can find the practical solutions.

#### **Enhancement of R&D Collaboration**

#### Mission Focus

- ✓ <u>Strengthening R&D collaboration</u> within GIF
- ✓ Sharing <u>innovative technical</u> idea and issues among the GIF members
- ✓ Promoting <u>collaboration with outside</u> organizations and technology fields

R&D Infrastructure
Task Force

#### **RD TF** determines

- technological gaps to be filled,
- ➤ R&D infrastructure needed to fill the gaps, and
- promote the use of experimental facilities for collaborative R&D activities

Advanced Manufacturing /
Materials Engineering
Task Force

#### **AMME TF** identities

- ➤ the interest of both research institutions and nuclear companies in a crosscutting activities and
- collaboration ways to reduce the time and cost for deployment of Gen IV reactor systems

#### **Recent GIF activity**

- ✓ Generation –IV Systems' Experimental Infrastructure Needs
- ✓ GIF Workshops with Nuclear Industry including SMR vendors and supply chains:

Find out more information in : https://www.gen-4.org/gif/

Presently this mission is under the charge of Vice Chair on Enhancement of R&D Collaborations. He already started to develop white paper after related GIF workshops.



## **Enhancement on R&D collaboration**



Mr. Jong-Hyuk BAEK (Republic of Korea, KAERI) GIF Vice-Chair on Enhancement of R&D Collaborations

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#### **Action we need (Black letters are EG actions):**

- Conclude "GIF workshop on R&D Infrastructures needs and opportunities" and "GIF workshop on Advanced Manufacturing" with proposing next actions. (EG is discussing and TD started synthesis)
- Issue R&D Infrastructures position paper. (EG is reviewing)
- > To start AMME-TF (with expanded man-power) consistent with the present EG discussion. (might be connected with EMWG activities and qualification activities)
- > To issue R&D collaboration white paper included R&D TF and AMME TF activities.

## Appeal our results to the world



## What are our results/knowledge/message to share inside/outside GIF?

> Future Plan

From the views of outcomes

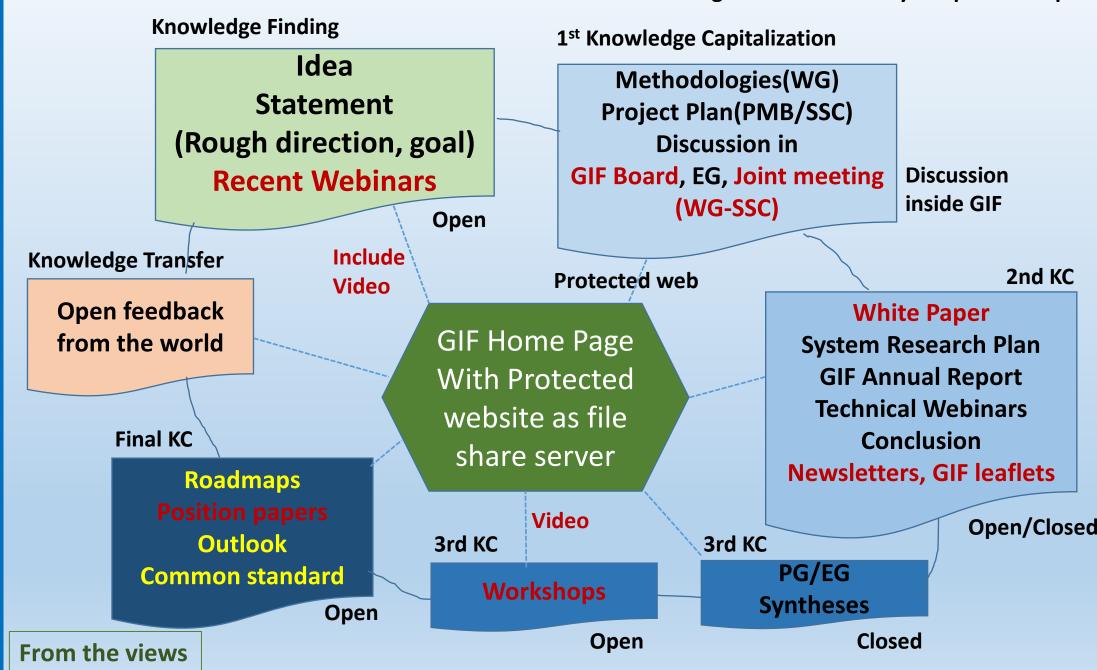
- = Roadmaps, Position Paper, (Open)
- = System Research Plan (Partially open, ex. Except budget sections)
- = Project Plan (GIF inside, only for project members)
- Present Status/Ongoing technology
  - = Outlook(Open), White Paper (GIF inside)
  - = Webinar(Open)

**Technical details = GIF Deliverables (GIF inside, only for project members)** 

- Message/News/Leaflets (Open, New genre!)
  - = Statement(including video), GIF newsletters, GIF leaflets, Webinar Guidebook
- Common Method/Standard/Handbook/Database
  - = GIF methodologies (Safety, Economics, PRPP, etc.) (Basically open/GIF inside)
  - = (GIF)-IAEA safety standards (Open & Common standards with outside organizations)
  - = Handbook/Database (For present GIF inside)
- > Common Characteristics
  - = Flexibility, Gen IV safety, R&D facilities for Gen IV safety (Severe accident etc.)
    Innovation to accelerate Gen IV character (Safety, Economics, Flexibility, PRPP)
  - → Statement/Conclusion/White paper through joint meeting/workshop/ad hoc iTF

## (My?) Knowledge Management: KF/KC/KT GEWINTERNATIONAL

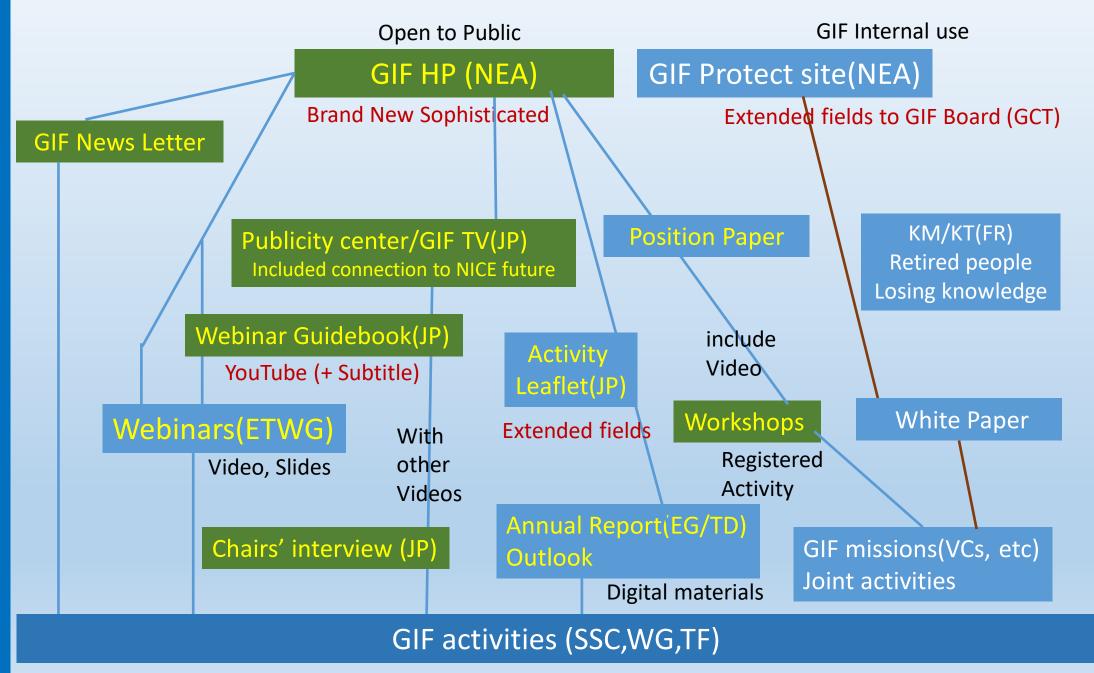
Image: Off course many warps and loops



**Knowledge Transfer= To keep open activities/ cross cutting activities** 

of process

## From the point of Capitalization (My image)



## **Trials of Knowledge Capitalization**



## **GIF TV**



GIF contributes Sustainable Energy Supply by Gen IV developers' mutual trust and co-operations.

#### GIF missions:

- Designs and R&Ds of 6 types of Gen IV reactors
- International standardization of Safety design and apply into Regulation
- Increased Flexibility on Nuclear system as Attractiveness in social Market
- · Enhancement on R&D collaboration
- · Appeal our results to the world



## **GIF TV (Presently)**

- Interview of GIF Chair
- ➤ GIF Webinars
- GIF workshop on R&D Infrastructures needs and opportunities
- GIF workshop on Advanced Manufacturing
- > CEM Nice future Webinars



#### GIF TV

チャンネル登録者数1人

Generation IV International Forum (GIF) introduces you messages from GIF and also introduce related videos which have the same objectives of GIF. GIF is a co-operative international endeavor to carry out the research and development (R&D) needed to establish the feasibility and performance capabilities of the next generation nuclear energy systems.

GIF contributes Sustainable Energy Supply by Gen IV developers' mutual trust and co-operations. Developing;

- · Designs and R&Ds of 6 types of Gen IV reactors,
- · International standardization of Safety design and apply into Regulation,
- · Increased Flexibility on Nuclear system as Attractiveness in social market,
- Enhancement on R&D collaboration,
- · Appeal our results to the world (Knowledge Management/Knowledge Capitalization).

#### List of GIF TV channels:

- \* GIF Chairs' interviews:
- ... Interview of GIF Chair
- .... https://youtu.be/npzhTGdWqH0
- \* GIF Webinars Guide Page:
- . . GIF Webinar Series
- .... https://www.youtube.com/playlist?list...
- \* GIF Videos:
- . . GIF International Workshops with Nuclear Industry including SMR vendors and supply chain SMEs: Workshop on R&D Infrastructures needs and opportunities
- .... https://www.gen-4.org/gif/jcms/c\_1158...
- . . CEM NICE Future initiative webinars (GIF supports this initiatives)
- .... https://www.nice-future.org/webinars

. . . .

## **Interview of GIF Chair**





## 10 mins interview

All mission/project leaders can post their interview videos!

Japanese shooting team is ready to help you!

#### **GIF PG Chair interview:**

Mr. Hideki KAMIDE (JAEA, Japan) told the objectives, missions, and future of Generation IV International Forum (GIF).

Q1 Objectives of the Generation IV International Forum

Q2 How do you lead this Forum?

Q3 GIF future?

He emphasized that GIF systems can contribute as Sustainable Energy Supply by Gen IV developers' mutual trust and co-operations. He also introduces GIF special 4 missions in his interview:

- International standardization of Safety design and apply into Regulation
- Increased Flexibility on Nuclear system as Attractiveness in social Market
- Enhancement on R&D collaboration
- Appeal our results to the world

https://youtu.be/GOjnUMYOEWI

## **Contents of interview**





Interview to the Chair of Generation IV International Forum.

> Mr. Hideki Kamide GIF 2019-2021 Chair

#### **Title including Bio**



#### **Interview**

#### **Technical Secretariat**

The OECD Nuclear Energy Agency has been supporting the activities of the Generation IV International Forum since 2005. It provides technical secretariat services; archiving records and documents, as well as maintaining the Forum's internal and external websites. The NEA Technical Secretariat consists of 15 staff members on both a full-time and part-time basis.



Screen shot of TD/TS Monthly meeting with G. Rodriguez (TD. Top-right) and P. Terrason (CEA, Bottom-right)

Top: S. Anglade-Constantin, S. Chang Middle: S. Bilbao Y Leon, S. Okajima, M. Demeshko Bottom: M. Berthelemy, A. Vaya Soler

NEA Technical Secretariat not appearing in the photo C. Besnier, M. Bossant, S. Cornet, E. Lacroix, E. Leguillon, N. Soppera, X. Vasquez-Maignan, D. Zavani

## **Team** members

#### Off course three Vice chairs appear

# (PMB)

**Figures/Charts** 

#### What can be possible through international collaboration?

ior Industry Advisory Panel

Technical Secretaria

- GIF's goal is to promote international collaboration toward the commercialization of Gen IV reactors which serve as sustainable energy sources.
- Since the Fukushima Daiichi nuclear power plant accident, nuclear energy has been facing challenges: How can understanding from public be gained? How can its marketability be better with renewable power sources?
- Gen IV reactors will be sustainable energy sources for centuries by overcoming these challenges.
- · Making the best of country-level collaboration provided by GIF enables faster reactor developments to accelerate R&D that can solve the challenges. To have global standards that enhance reactor safety, and to show the significance and feasibility of Gen IV reactors to stakeholders including governments and private sectors.

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#### Summary

#### Message

Action: Contact to Japanese shooting team (PD), if you would like to make it! 6

## Other types of message video





Say hello under the lockdown

Japanese GIF team made a Greeting film to our GIF friends.

Any kind of methods are acceptable.

Thanks China for your masks.





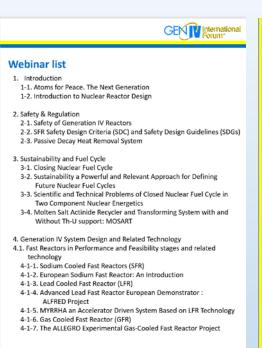
Action: Click the below link.

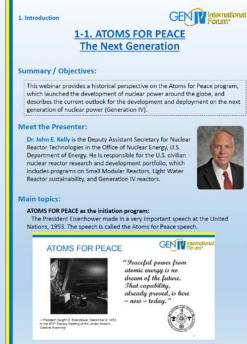
## Webinar-GuideBook

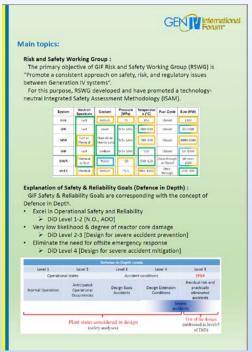




https://www.gen-4.org/gif/jcms/c\_82831/webinars







Japanese Special webinar team is making Webinar Guidebook. 4 pages introduction for each webinar. (Meeting attachment pdf)

Complete until GIF 20th anniversary!



## **GIF** leaflets





Presently transforming to fit web style.

Complete until GIF 20<sup>th</sup> anniversary!

**GIF Position Paper** 



**GIF Mission Leaflet** 

**GIF Overall Leaflet** 

GIF Webinars Leaflet

Presently expanding them to fit 5 important field.

## **Summary of Appeal our results**



- > GIF TV
  - Channel setting is finished. Continue to post, when new videos appear. <a href="https://www.youtube.com/channel/UCUUBIUGLAISeUU5msbHFmxw">https://www.youtube.com/channel/UCUUBIUGLAISeUU5msbHFmxw</a>
- ➤ GIF Chairs' interviews (including Corona Greeting video)
  Kamide-san complete his interview. Who challenge the next?
  If you can accept we connect the contents into GIF HP.

  <a href="https://youtu.be/GOjnUMYOEWI">https://youtu.be/GOjnUMYOEWI</a>
  <a href="https://youtu.be/tjHap0ZxBel">https://youtu.be/tjHap0ZxBel</a>
- Webinar-GuideBook (attachment 1) 70% complete! Finish before 50<sup>th</sup> anniversary. After ETWG/EG reviews, version 1 will be released.
- ➢ GIF leaflets (attachment 2,3)
  A position paper, a webinar leaflet, two mission leaflets.
  Convert into web style and connected into GIF HP.
  Also will be distributed in PG-50!

#### **Action:**

Accept Knowledge Management activity supported by ETWG.

To hold Face to Face ETWG and consolidate related activities and make synergy!



# Important meeting schedule (PG/EG, GIF symposium, GIF-IAEA, CEM Nice future)

PG-47/EG-41 in spring 2019 at Vancouver with GIF Flexibility WS (EMWG/SIAP-SSCs), SMR round table, CEM10 NICE future

PG-48/EG-42 in fall 2019 at Weihai
= ANESS (China – GIF interface WS), LFR pSSC signature

GIF WS on R&D Infrastructures needs and opportunities
GIF WS on Advanced Manufacturing in Feb 2020
= Industry –(Regulatory) – GIF interface in AMME, R&D collab.

PG-49/EG-43 in spring 2020, Virtual meeting



## Future important meeting schedule

## **GIF-IAEA** interface tele meeting in 8 July

=one 3 hour virtual meeting to discuss key points, starting 11:00GMT or later.

=Collaborations for Reactors, Safety, Market, R&D collab., PRPP, ET(KM/KT)

between GIF and IAEA

**Main participants:** 

IAEA, PG chair, VCs, TD, TS, PD, SSC/WG/TF chairs

https://www.gen-4.org/gif/jcms/c\_9493/external-collaborators

Find and strengthen collaboration with IAEA by direct presentations from each SSC/WG/TF level. (Because maximum 3hrs)



## Future important meeting schedule

PG-50/EG-44 on 19-23 October, 2020, at Amboise, France

**Original plan** 

- = Joint WG-SSC (PRPP, RSWG),
- = Ceremony for accession (as same as LFR pSSC at China)
- = 20 years anniversary, 50<sup>th</sup> PG

Possibility/Necessity of Hybrid meeting style (Face to Face + Virtual meeting)

**Option A: Face to Face meeting (+ Virtual meeting)** 

Option B: In case of 2<sup>nd</sup> wave of corona, another Virtual meeting

**Option C: Others** 

## **Action:**

We realized awfulness of virus and at the same time effectiveness of innovative tele technology and importance of face to face comunication. Need opinion/feedbacks from members about meeting style. We will gather opinion/feedbacks in June.



## **Example of detail for PG-50/EG-44**

- > Day 1 Oct 19 EG only
- ▶ Day 2 Oct 20 EG + PG --> SSC, TF, WG updates presentations
- ➤ Day 3 Oct 21 PG only
- ➤ Day 4 Oct 22 Tour of Clos Lucé (Leonardo da Vinci's house) and gala dinner to celebrate the 20th anniversary of GIF
- > SIAP and EMWG meetings will be also held need to communicate with TS
- > PRPPWG is considering to have meetings in Amboise. Yet to be confirmed.
- ➤ We asked all SSCs, TFs, WGs to let the secretariat know if anyone wanted to co-locate an in-person meeting in Amboise, since most groups have missed many in-person meetings this year. No responses have been received so far.
- And with Gilles's exiting ideas!

## Future important meeting schedule



```
World Nuclear Exhibition (WNE): Another 20 years anniversary event 8-10 December, 2020, at Paris-Nord Villepinte, France Objectives: Publicity, Communication with outside GIF Expected participants: NEA(TSs), PD, TD, PG VC(s), PG chair https://www.world-nuclear-exhibition.com/en-gb.html
```

PG-51/EG-45 in spring 2021, Sydney (Need to reflect feedbacks)
accompanied SIAP and EMWG meetings (and AMME workshop?)
17-21 May, 2021, at Sydney, Australia
= We never miss to visit Sydney!

Proposed future PG/EGs:
PG-52/EG-46 in fall 2021 = EU (Need to reflect feedbacks)
= we need to start preparation.

(PG-53/EG-47 in spring 2022 = Switzerland?)
=decision with Amboise's feedbacks

GIF Symposium: not to conflict with FR21, so in 2022 or after = need of candidate host for GIF Symposium