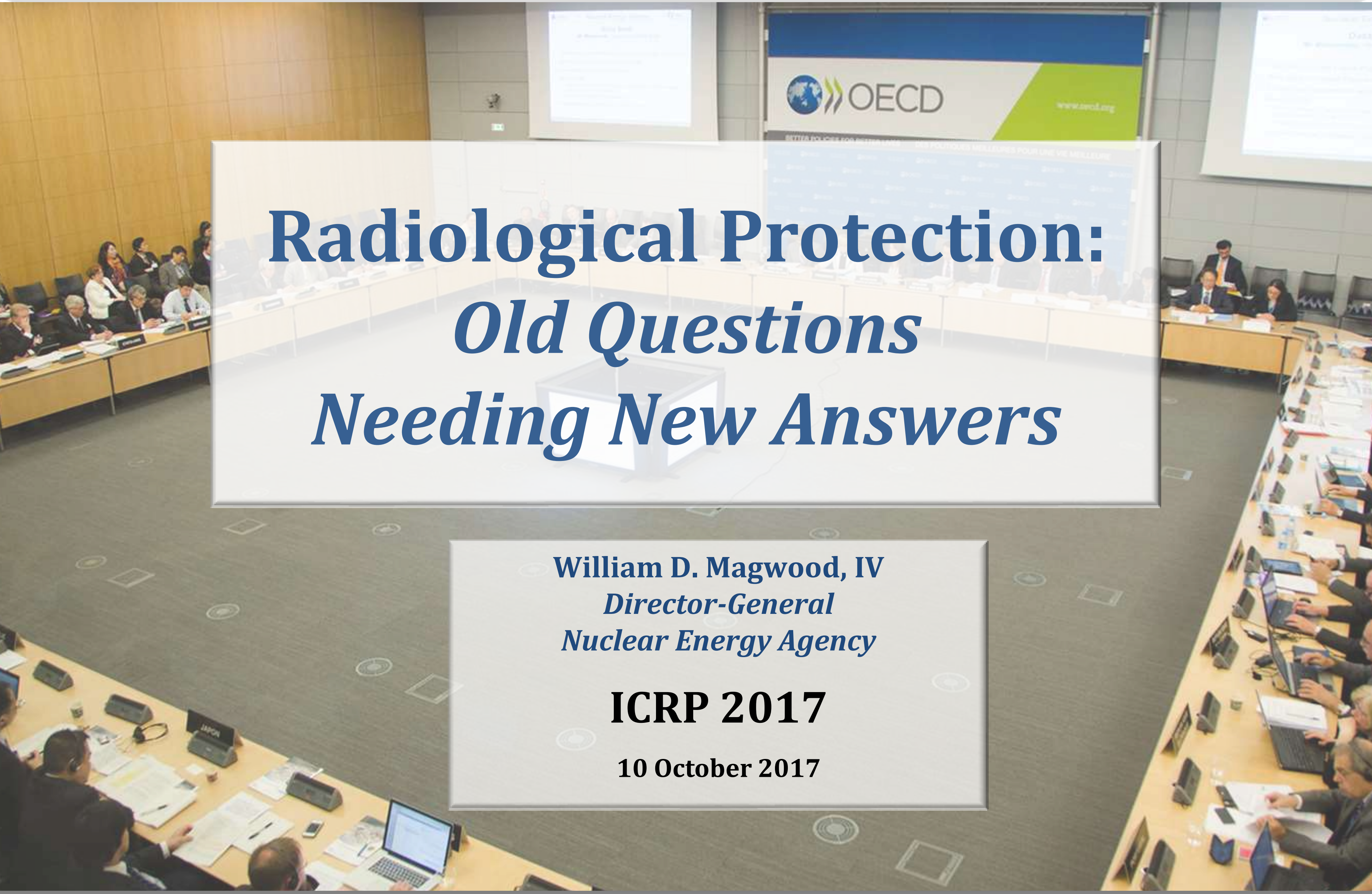

Radiological Protection: *Old Questions Needing New Answers*

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ICRP 2017

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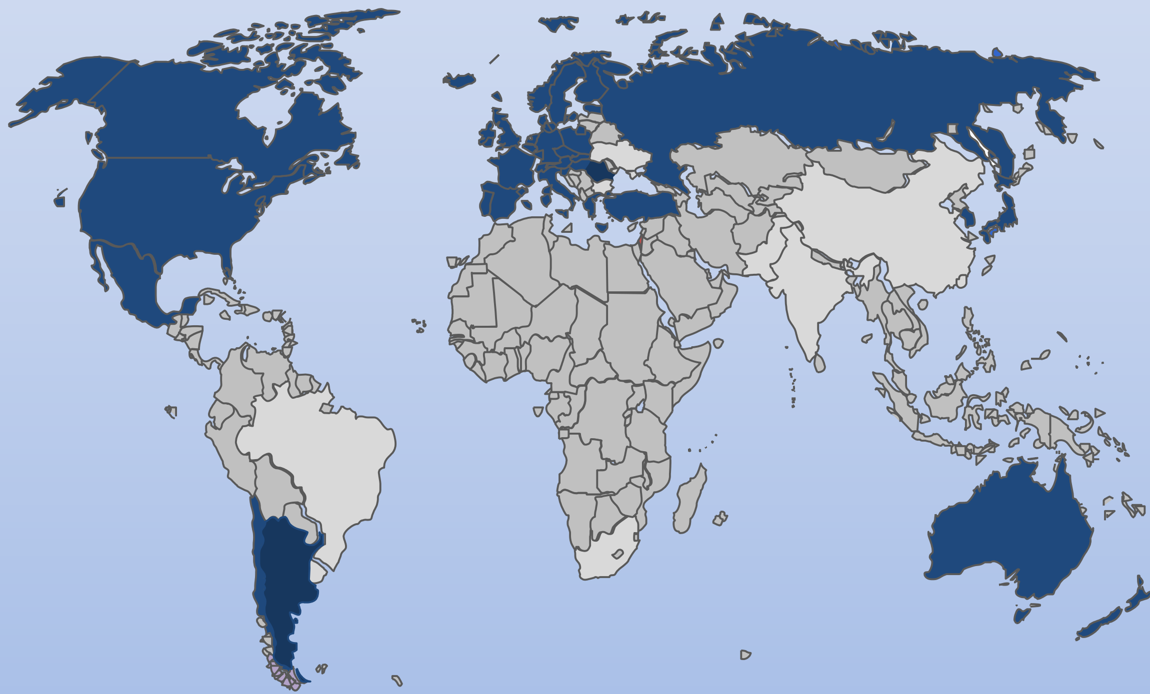
The NEA: 33 Countries Seeking Excellence in Nuclear Safety, Technology, and Policy

- 33 member countries + key partners (e.g., China)
- 7 standing committees and 86 working parties and expert groups
- The NEA Data Bank - providing nuclear data, code, and verification services
- 23 international joint projects (e.g., the Halden Reactor Project in Norway)

The NEA Serves as a Framework to Address Global Challenges

The Role of the NEA is to:

- Foster international co-operation to develop the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes.
- Develop authoritative assessments and forging common understandings on key issues as input to government decisions on nuclear technology policy
- Conduct multinational research into challenging scientific and technological issues.



33 NEA Countries Operate nearly 90% of the World's Installed Nuclear Capacity

Major NEA Separately Funded Activities

NEA Serviced Organisations

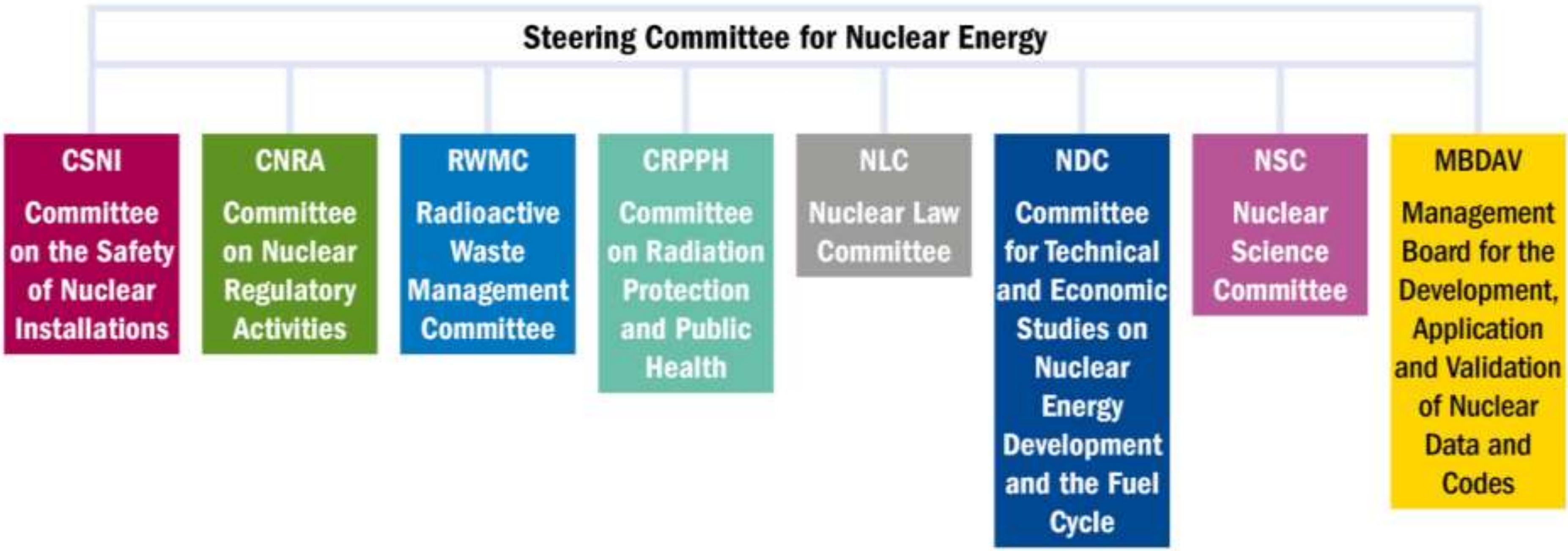
- **Generation IV International Forum (GIF)** with the goal to improve sustainability (including effective fuel utilisation and minimisation of waste), economics, safety and reliability, proliferation resistance and physical protection.
- **Multinational Design Evaluation Programme (MDEP)** initiative by national safety authorities to leverage their resources and knowledge for new reactor design reviews.
- **International Framework for Nuclear Energy Cooperation (IFNEC)** forum for international discussion on wide array of nuclear topics involving both developed and emerging economies.

21 Major Joint Projects

(Involving countries from within and beyond NEA membership)

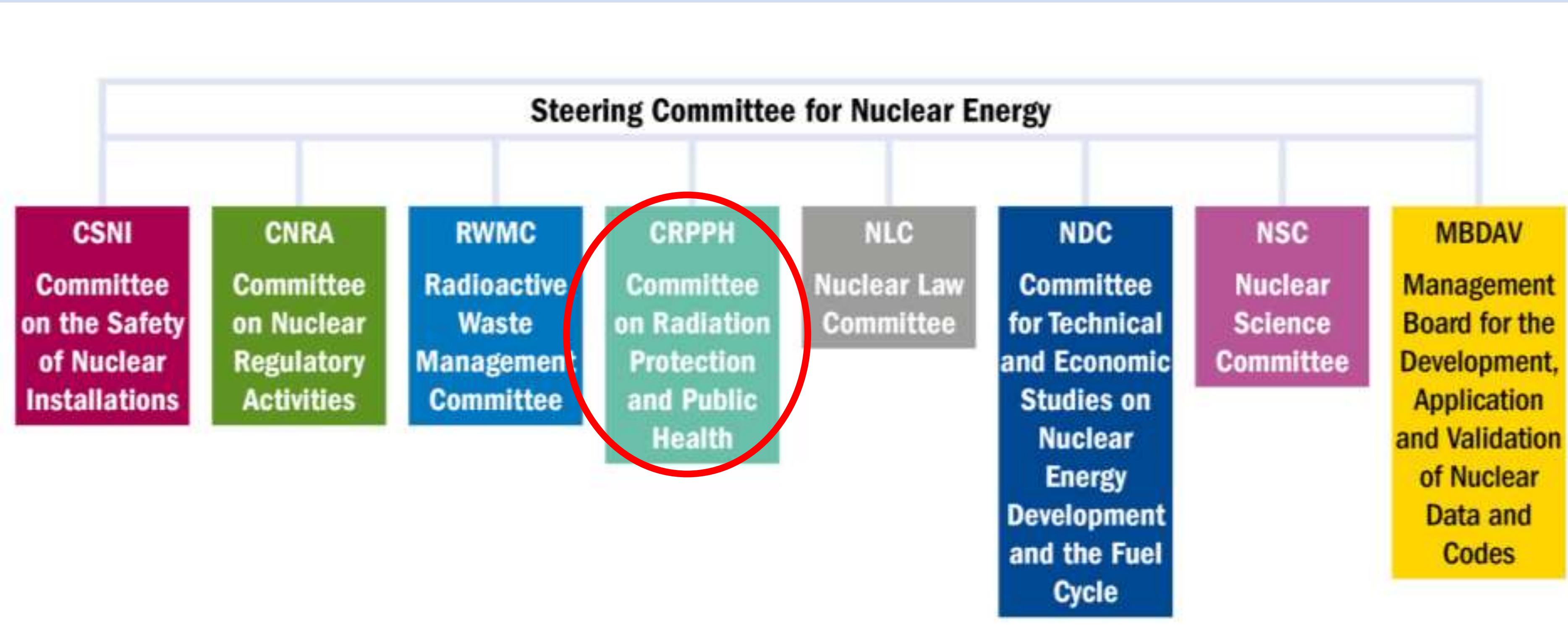
- **Nuclear safety research** and experimental data (e.g., thermal-hydraulics, fuel behaviour, severe accidents).
- **Nuclear safety databases** (e.g., fire, common-cause failures).
- **Nuclear science** (e.g., thermodynamics of advanced fuels).
- **Radioactive waste management** (e.g., thermochemical database).
- **Radiological protection** (e.g., occupational exposure).
- **Halden Reactor Project** (fuels and materials, human factors research, etc.)

NEA Standing Technical Committees



The NEA's committees bring together top governmental officials and technical specialists from NEA member countries and strategic partners to solve difficult problems, establish best practices and to promote international collaboration.

NEA Standing Technical Committees



The CRPPH provides leadership and analysis regarding key issues regarding Radiological Protection. It is well-placed to lead a new look at persisting technical and policy issues associated with radiological protection

Committee on Radiation Protection and Public Health (CRPPH)

Chair: Mr Mike Boyd, USA
Lead Staff: Dr Ted Lazo

Joint Undertakings

Information System on Occupational Exposure (ISOE)

- Collect and analyse occupational exposure data from NPPs,
- Share exposure management experience

Working Group on Data Analysis (WGDA)

- Analyse ISOE data for trends

Working Group on Radiological Protection Aspects of Decommissioning Activities at Nuclear Power Plants (WGDECOM)

- Occupational exposure management experience and good practice for units in decommissioning

Working Party on Nuclear Emergency Matters (WPNEM)

Develop and implement CRPPH programmes in emergency management

International Nuclear Emergency Exercises (INEX-5)

Develop, implement and analyse INEX exercises

Expert Group on Lessons Learnt from Non-Nuclear Events (EGNE)

Draw experience from chemical and natural disaster

Expert Group on the Implications of Recommendations (EGIR)

- Regulatory input to draft ICRP and IAEA documents

Expert Group on Exclusion from Paris Convention (EGPC)

- Development of RP criteria for exclusion from the Convention

Expert Group on the Radiological Protection Aspects of the Fukushima Accident (EGRPF)

- CRPPH Programmes on Fukushima

Expert Group on Legacy Management (EGLM)

- Develop practical recommendations for regulators

Activities Under Development

International Radiological Protection School (IRPS)

- **Sharing Social Media Experience**
- **Evacuation Decisions**
- **Building Human capital in RP**

Safety and Science

- There has been considerable research regarding the health risks from ionising radiation
- But at low levels of exposure (less than 50 mSv), the scientific evidence is inconclusive
- How much regulation is "enough" is a judgement, and uncertainty regarding the risks below 50 mSv makes this more difficult

This makes regulatory policymaking an inexact science

Radiological Safety Policy

- **Radiological protection policy around the world generally adopts the LNT philosophy**
  - LNT postulates that any exposure carries risk
  - Radiological protection evolves toward minimizing exposures with some consideration of social, economic, and beneficial use taken into account
- **Is the resulting approach:**
  - Not prudent enough?
  - Appropriately balanced?
  - Unnecessarily conservative?

Examples of Policy Questions Impacted By Scientific Uncertainty

- **How should occupational and public doses be regulated?**
- **How should risks from medical exposure be controlled?**
- **How different are the risks to children?**
- **How should radioactive waste disposal be regulated?**
- **How should emergency response be regulated?**
- **How should decommissioning standards be set?**
- **How should post-accident recovery be regulated?**

Low Doses: Some Risk or No Risk?

- **What we know about low doses:**
  - Less than 100 mSv = no observed increase in risk
  - Multiple animal studies – no discernible risk
  - Dose response varies from organ to organ

- **What we don't know:**
  - How radiation initiates cancer
  - The difference between chronic exposure and from acute exposure
  - What "bio-markers" might exist for radiation-induced cancer
  - Whether there is a threshold below which there is no risk of radiation-induced cancer

It is essential to continue and accelerate scientific research to increase our knowledge

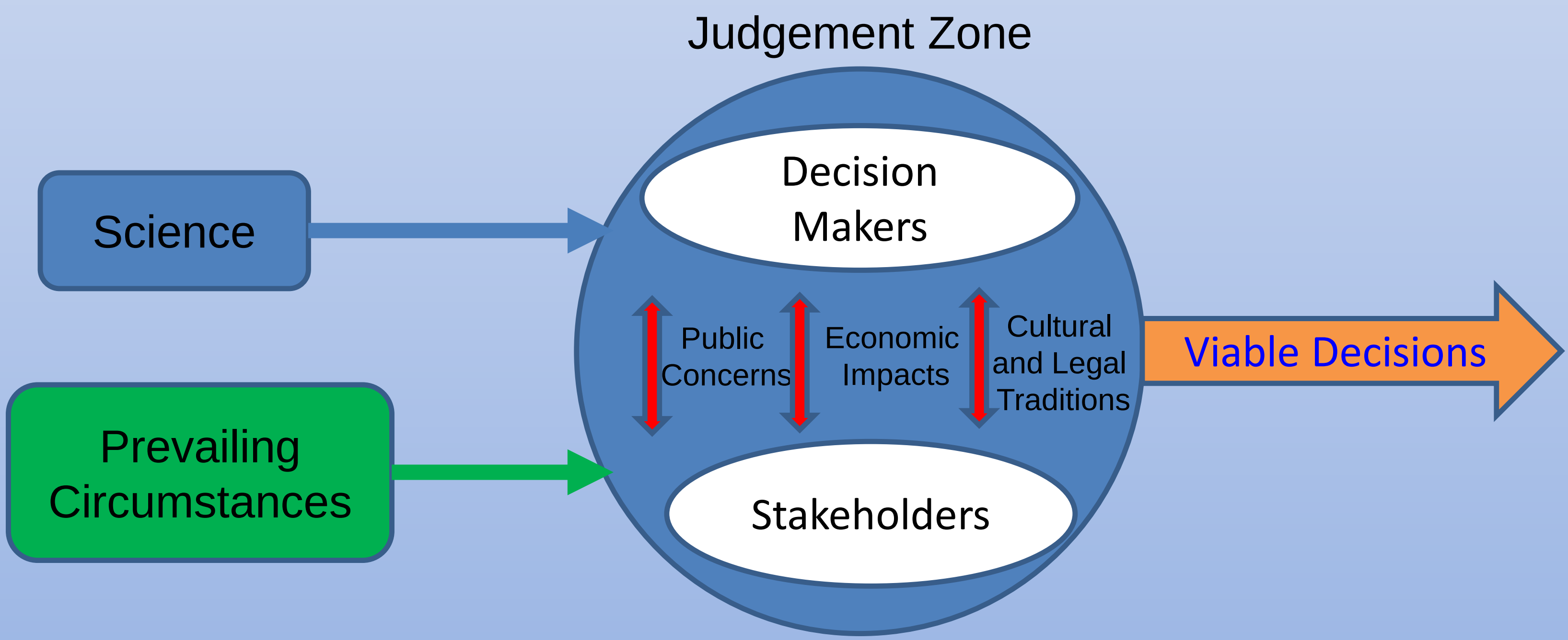
Until the Science is Definitive, A Multi-Disciplinary Approach is Needed

- **Determining the appropriate level of risk from a radiological activity is both a scientific and a societal process**
- **Decision-makers and RP experts must be conscious of stakeholder concerns**
- **Technical judgement must be informed—but not determined—by social norms and expectations**
- **Public consultation must be an integral part of decision-making**

Radiological protection and social science must be applied in concert to determine the appropriate responses to each risk

What Have We Learned Over the Years?

- **Prevailing circumstances frame stakeholder concerns**
- **RP decisions must reflect the realities of the situation**
- **Optimisation is central to robust and viable RP decisions**
- **Stakeholder involvement is central to optimisation**



Public Involvement in Nuclear Activities: *An Ongoing Challenge for all Countries*

- In January 2017, NEA hosted over 140 senior government officials from 26 countries to discuss how to involve public stakeholders in nuclear decisions in a 3 day workshop.

- The participants represented every aspect of civilian nuclear technology.
- They engaged in intensive “roundtable” dialogue sessions to conduct in-depth discussions of the issues and to compare experiences.

Main Findings from the NEA Workshop

- **There is no one-approach-fits-all** : The stakeholder involvement process needs to be adapted to country-specific context.
- **Officials must take the time to engage and debate**.
- **Time is not the enemy,** but an ally to reach a solution that is stable over time and built on trust.
- Stakeholder involvement should start by **listening to concerns**, then addressing these. Officials must use plain language.
- **Younger generations must be included** early in the process to ensure a sustainable dialogue with the public.
- **Stakeholder involvement is "not a vote".** One informed comment weighs more than many uninformed comments.

Fukushima Stakeholder Dialogues
A Good Model for Engagement

NEA supported 16 dialogue sessions organised by ICRP between 2011 and 2017, with stakeholders from affected areas of Fukushima Prefecture

- Addressed many stakeholder concerns regarding radiological protection and social disruption
- Included input from RP technical experts and social scientists, jointly addressing stakeholder concerns
- Affected individuals participating in the Dialogues developed more positive images of their future

Building Trust in Decisionmaking:
NEA Forum on Stakeholder Confidence (FSC)

- **Established in 2000 to analyse and support stakeholder interaction and public participation in decision-making**
- **10 “national workshops” conducted thus far – most recently in 2016 in Berne, Switzerland**
- **Issued Publications such as “*Local Communities’ Expectations and Demands on Monitoring and the Preservation of Records, Knowledge and Memory of a Deep Geologic Repository*”**
- **Emphasises transparency, stepwise decision-making, and an open partnership approach between all interested parties**


2012 Country Workshop, Czech Republic


2016 Country Workshop, Switzerland

Things to Consider

1) **ICRP says that the measure of "collective dose", in person-Sv, cannot be used to proactively predict a number of expected deaths in an exposed population—*So why do we continue to report potential impacts in terms of "latent cancer fatalities"?***

2) **ICRP should provide the RP community with guidance as to how social science and stakeholder engagement may be applied to achieve optimisation.**

3) **Since Stakeholder Involvement is essential to radiological protection decisions, what can we do to improve our ability to communicate radiological risk to the public?**

4) **How can the RP community press successfully for greater investment in scientific research to reduce uncertainties?**

Thank you for your attention

More information @ www.oecd-nea.org

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