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Nuclear Energy Agency

NEA
NUCLEAR ENERGY AGENCY

Trust and the Future of Nuclear Energy

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IEEJ 50th / APERC 20th Anniversary
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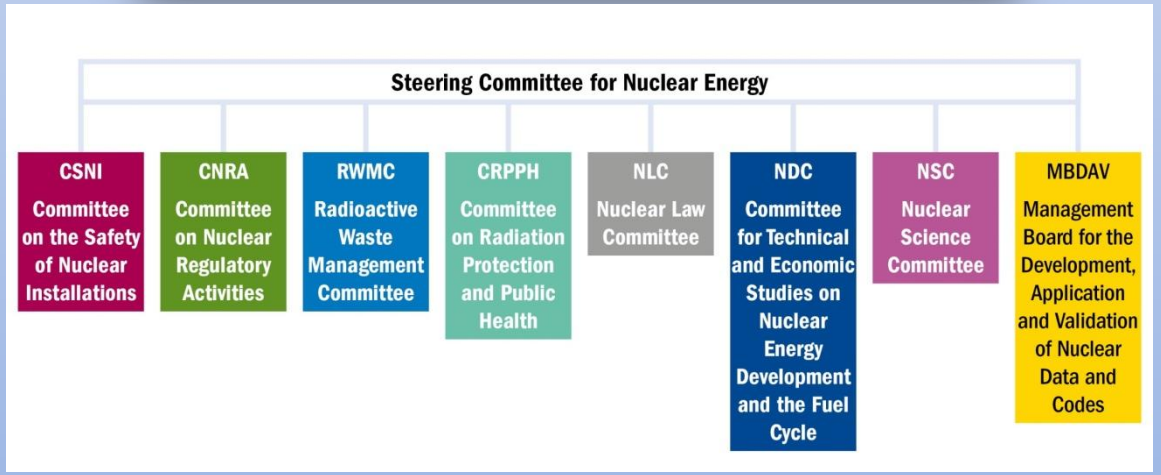
The NEA: 31 Countries Seeking Excellence in Nuclear Safety, Technology, and Policy

- 31 member countries + key partners (e.g., China)
- 7 committees and 75 working parties and expert groups
- The NEA Data Bank - providing nuclear data, code, and verification services
- 21 international joint projects (e.g., the Halden Reactor Project in Norway)



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

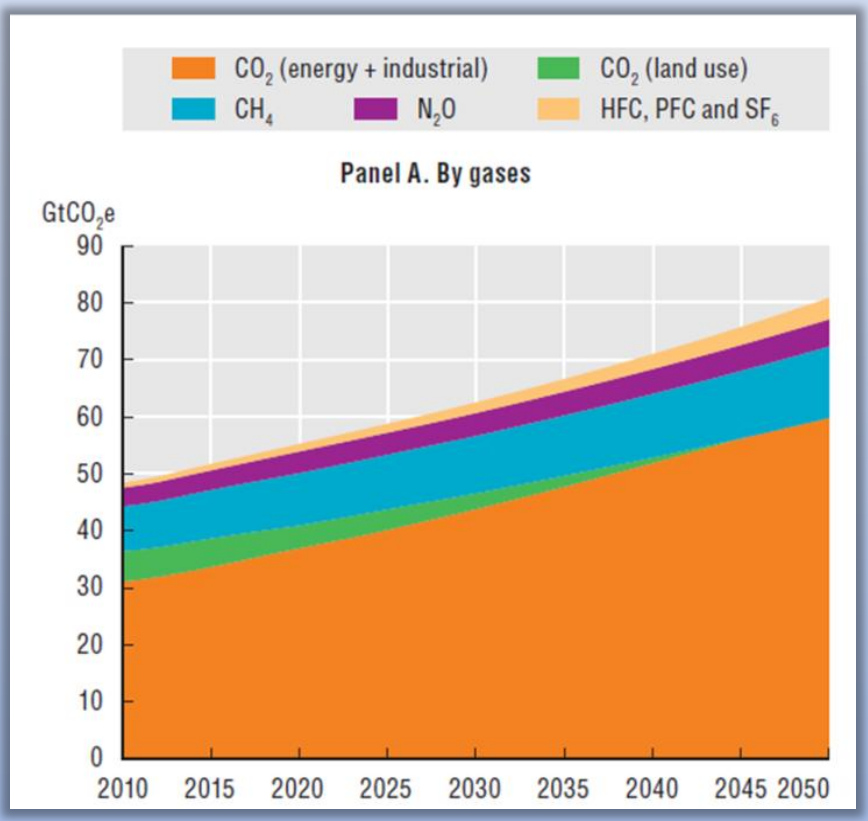
(Involving countries from within and beyond NEA membership)

- **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.)

COP 21 and Energy Production

- UN-sponsored meeting at the end of 2015 concluded with 195 countries agreeing to develop approaches to limit global warming to below 2°C.
- Energy represents 60% of global CO_2 emissions - ¾ of global electric power production today is based on fossil fuel.
- Nuclear is the second largest low-carbon power source globally (after hydro).

GHG emissions – baseline scenario:



Source: OECD Environmental Outlook 2050

2015 NEA/IEA Technology Roadmap

Contents and Approaches

- **Provides an overview of global nuclear energy today.**
- **Identifies key technological milestones and innovations that can support significant growth in nuclear energy.**
- **Identifies potential barriers to expanded nuclear development.**
- **Provides recommendations to policy-makers on how to reach milestones & address barriers.**
- **Case studies developed with experts to support recommendations.**

2015 NEA/IEA Technology Roadmap

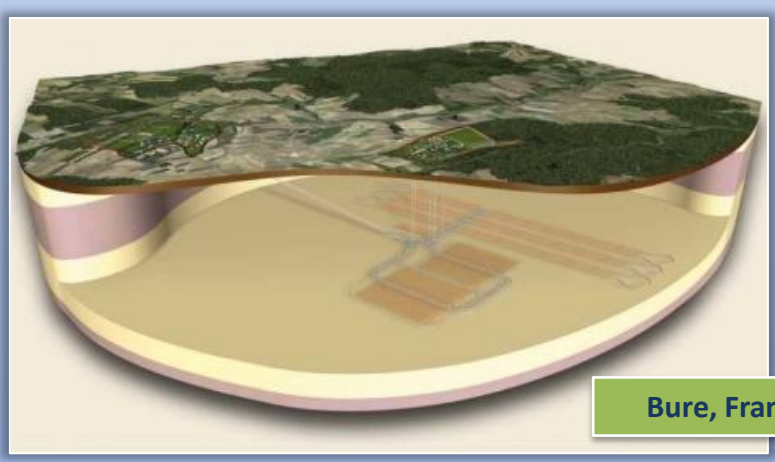
What Are the Barriers to Large Global Expansion?

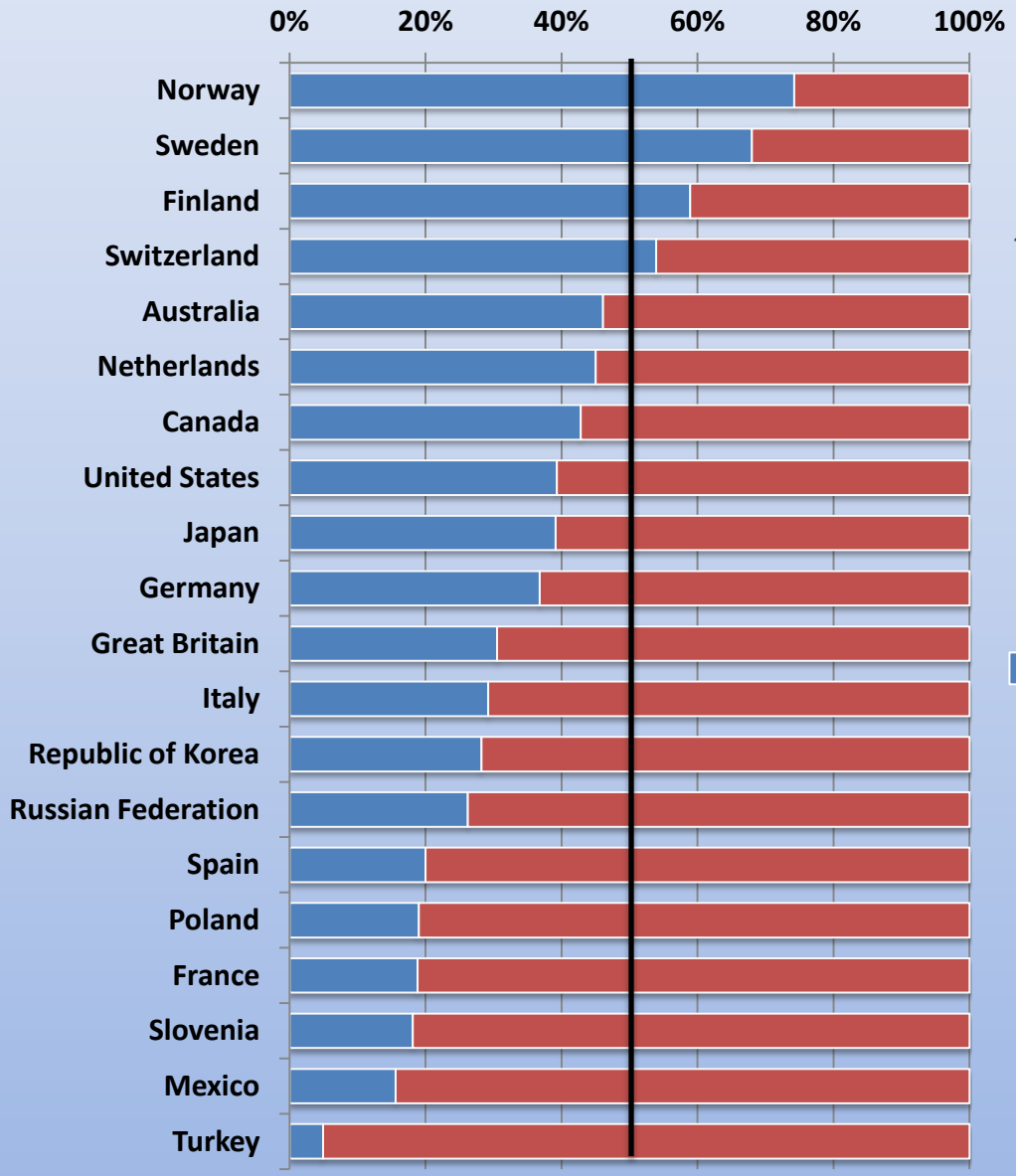
- **Distortions and failures in electricity markets that impact financial competitiveness of baseload plants**
- **Persistent questions about long-term operation of current plants and constructability of Gen III/Gen III+ plants**
- **Unanswered questions about technology, cost, and regulatory issues regarding SMRs, Gen IV reactors, and other advanced technologies**
- **In some countries, public acceptance concerns about safety in the aftermath of the Fukushima accident**
- **Continuing international concerns about non-proliferation associated with expanded use of civilian nuclear power**
- **Ongoing challenges in many countries regarding long-term high level waste storage and disposal**

Global Leaders in HLW Disposition

Waste type	Country	Location	Formation	Status	Projected Start of Operations
HLW/SF	Finland	Eurajoki	Crystalline rock	Licence pending	2020
HLW/SF	Sweden	Forsmark	Crystalline rock	Licence pending	2025
HLW/SF	Switzerland	3 potential sites	Opalinus clay	Siting regions identified	~2040
LILW-LL & HLW/SF	France	Region of Bure (URL)	Callovo-Oxfordian Clay	Siting region identified	2025


Forsmark, Sweden


Bure, France



The Trust Factor: *An Element of National Policy in NEA Member Countries*

Respondents agreeing that "most people can be trusted"

Source: Data from the fifth World Values Survey (2005 – 2008)
www.worldvaluessurvey.org

Elements of Public Trust: *The Case of Nuclear Power*

The Operation of Nuclear Power Plants in any country relies on public trust in the following areas:

- Presence of a strong, independent regulator
- Confidence in the fairness of decision-making processes
- Confidence in the overall system of checks and balances
- Confidence that the use of nuclear energy is part of a global consensus

Photo: The Japan Times

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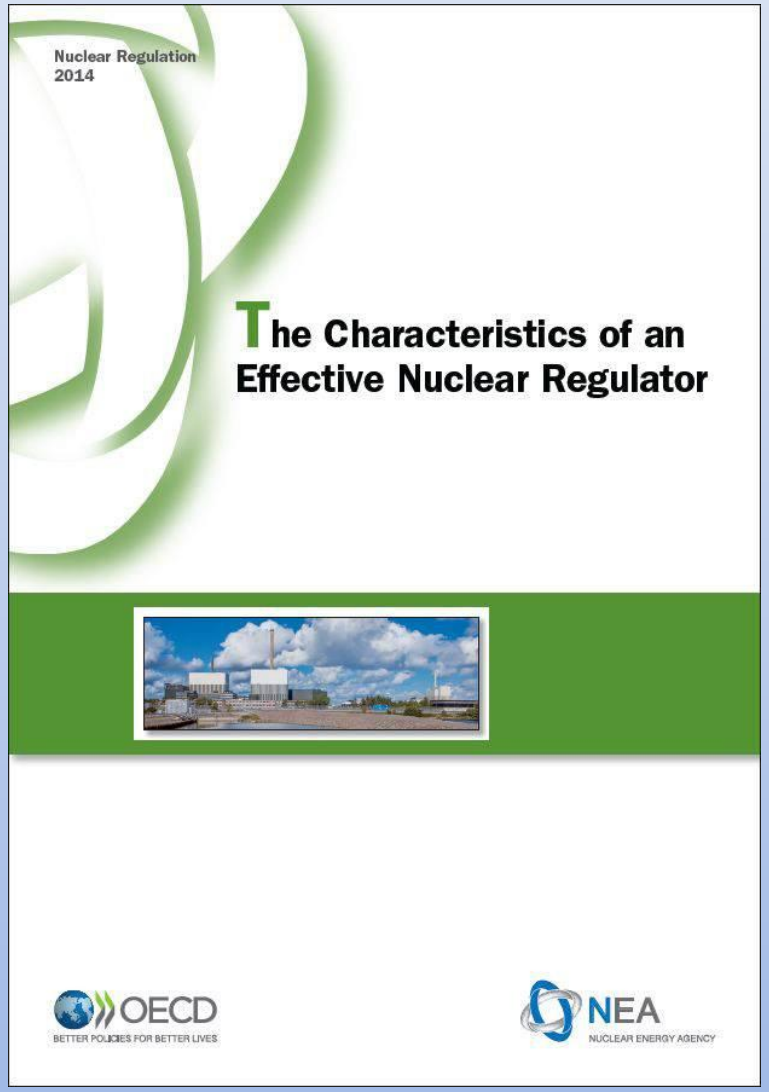

The Characteristics of an Effective Nuclear Regulator

NEA Regulatory Guidance Booklets
Volume 16, 2014, NEA/CNRA/R(2014)3

Elements of Public Trust:
A Strong, Independent Regulator

Progress of Japan's NRA

- Commission-led agency established after 3/11; highly credible individuals appointed
- Quickly issued new nuclear power plant regulations and requirements
- Established a reputation for independence

Issues to be Addressed

- Needs additional skilled staff—recruitment not easy after 3/11
- Responding to IAEA IRRS comments regarding inspection practices
- Is there a better balance between independence and engagement?

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Elements of Public Trust: *Confidence in the fairness of the decision-making process*

Public Confidence in decision-making regarding nuclear issues requires three major elements:

1) **Transparency**

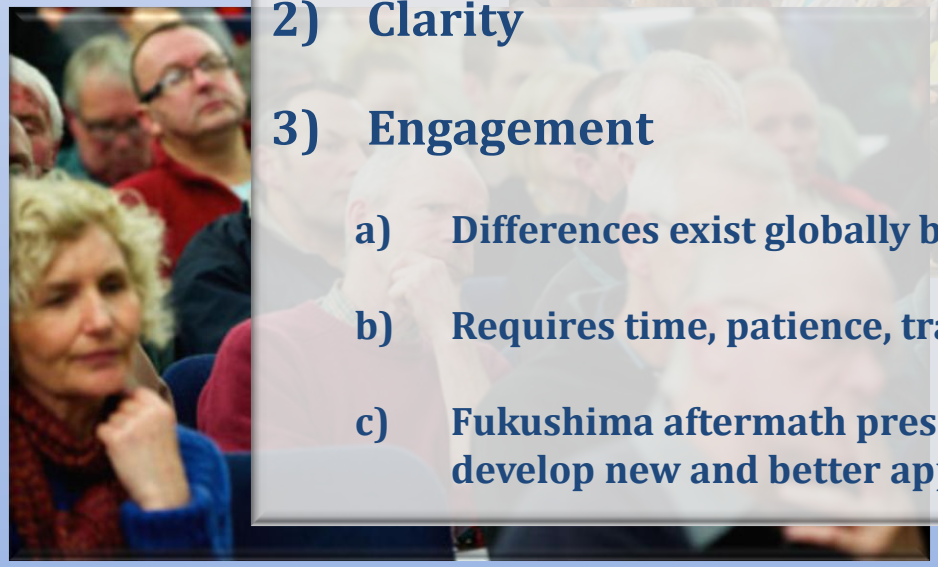
2) **Clarity**

3) **Engagement**

   a) **Differences exist globally based on policy, law, and culture**

   b) **Requires time, patience, training, and resources**

   c) **Fukushima aftermath presents an important opportunity to develop new and better approaches in Japan**



Fukushima Stakeholder Dialogues
A Good Model for Engagement

NEA supported 12 dialogue sessions organised by ICRP between 2011 and 2015, with stakeholders from affected areas of Fukushima Prefecture

- Addressed many stakeholder concerns regarding radiological safety
- Reflected desire of residents to regain control of their lives and to return to normality
- Important message from those who evacuated and have not returned: “We may return, but only if the site is safe.”

Lessons from the Stakeholder Dialogues

- **Mutual trust** is a necessary and central component of successful stakeholder engagement.
- Successful stakeholder engagement provides information and support to enable stakeholders to make **informed decisions** and develop a positive vision of their future.
- It is essential to clearly establish the **validity of all individual decisions** (i.e., whether to stay in an affected area or to relocate).
- Must plan for **long-term technical support to stakeholders**--not just short-term responses. Recognize that this can be very resource intensive.

Elements of Public Trust: *Confidence in the Overall System*

Trust in the Regulator is essential, but this must be bolstered by:

- A clear, fair process for the public to intervene and raise issues
- A coherent and consistent approach for review of decisions made by the regulator
- Integration of regulation with the overall system of administration and law

Photo: US NRC

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Elements of Public Trust: *Confidence in the Overall System*

The Role of the Courts

- In some countries, judicial challenges are first addressed by the relevant administrative agency; in many others, this is not required
- Some countries apply clear standards of standing in cases, including the use of geographic components
- An area deserving study – are conclusions reached by expert agencies on technical matters often reversed by courts?

Items to Consider

- Each nation has different legal traditions and standards based on long history and cultural norms.
- In the case of nuclear power, the courts play a vital role in:
  - enabling public issues to be considered (thus engendering public trust); and
  - establishing an environment that creates regulatory stability
- The evolving balance between these objectives will be a matter of great importance in many countries, including Japan.

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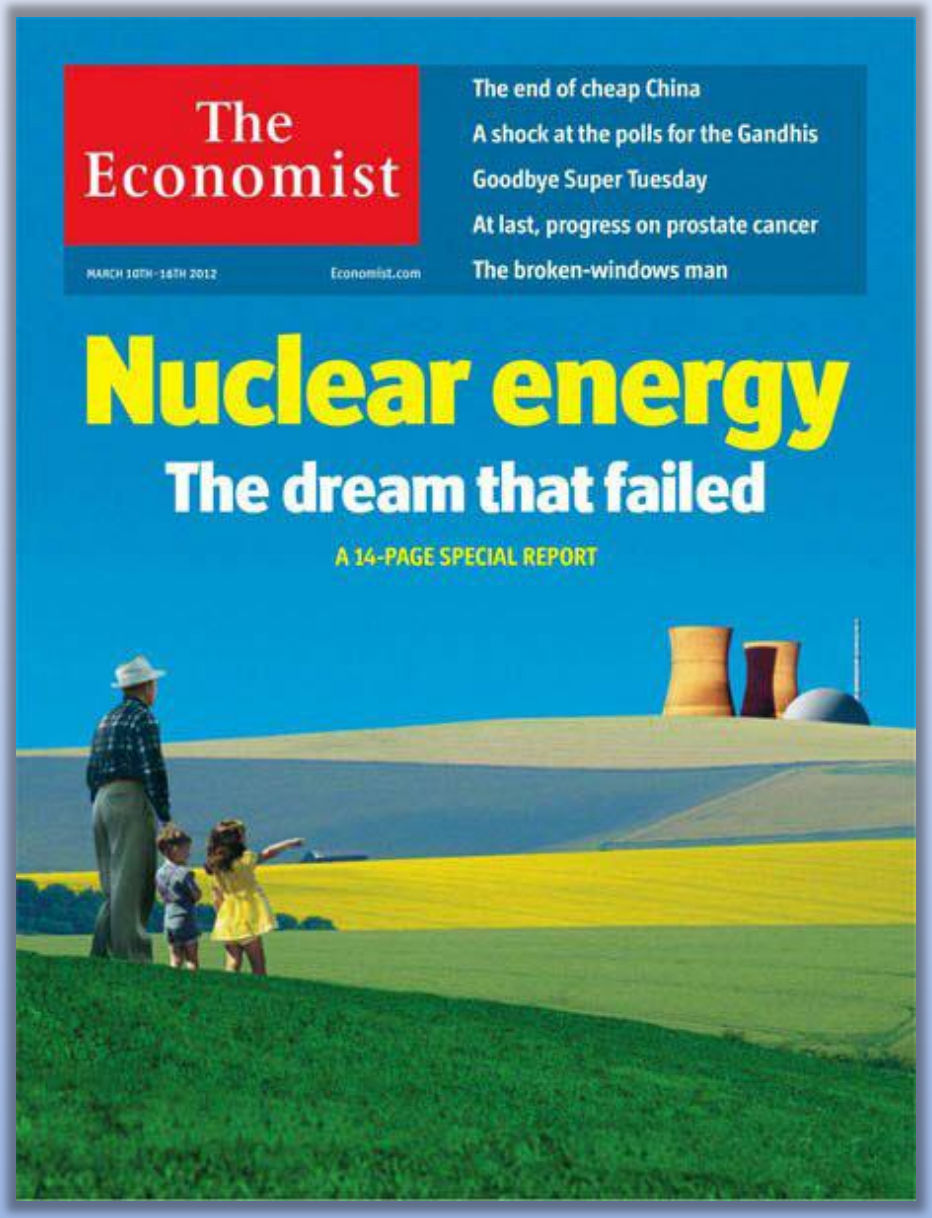


Elements of Public Trust: *The Global Consensus*

The public in any country should have confidence that:

- Their country is not an outlier "going it alone" in using nuclear power
- There is a system and practice of international review and cooperation
- Nuclear power is seen broadly as part of the global energy future

Photo: Westinghouse Electric Company

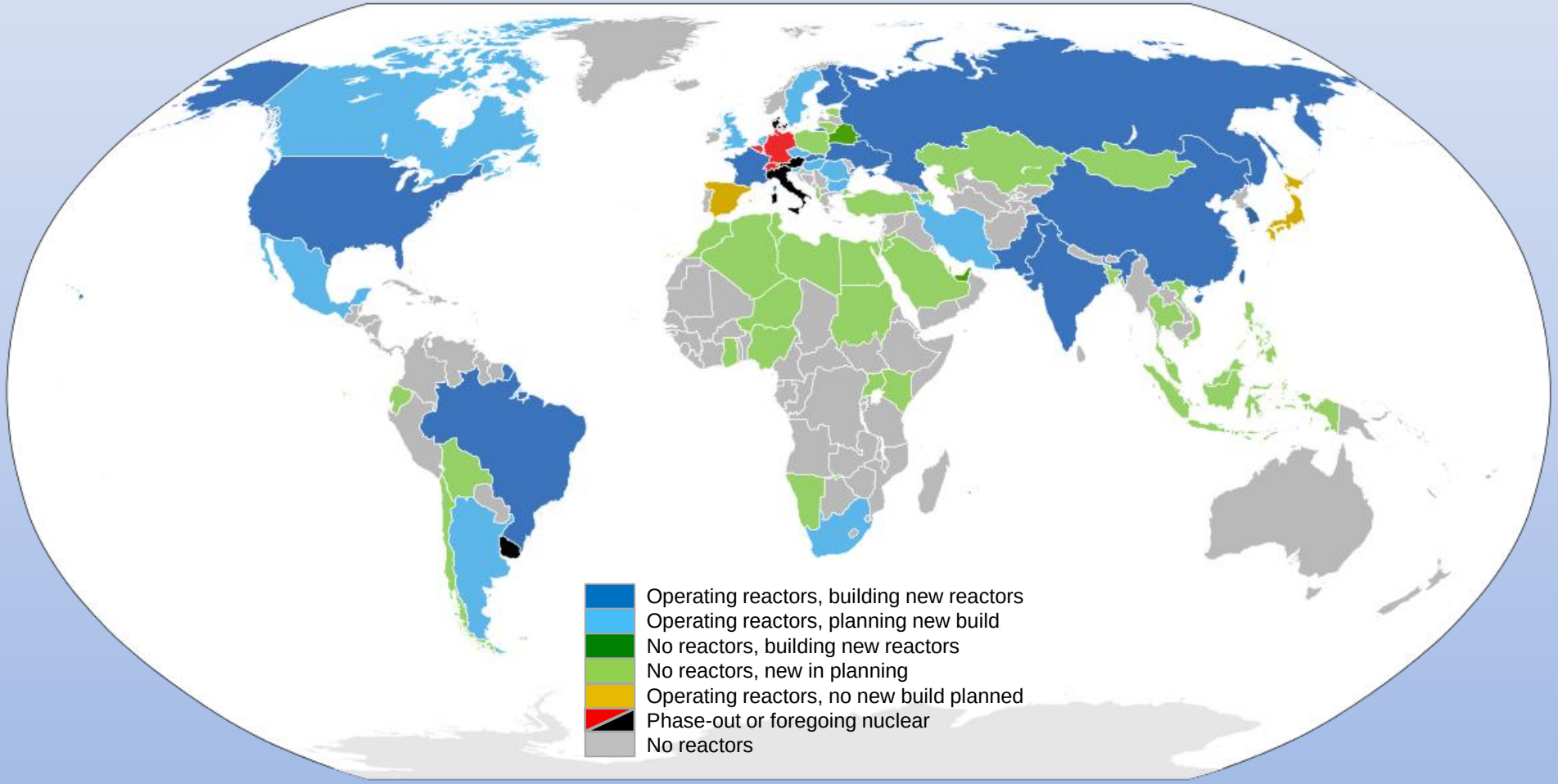
Nuclear Power Plants under Construction

(June 2015)

Location	No. of units	Net capacity (MW)
Argentina	1	25
Belarus	2	2 218
Brazil	1	1 245
China	24	23 738
Finland	1	1 600
France	1	1 630
India	6	3 907
Japan	2	1 325
Korea	4	5 360
Pakistan	2	630
Russia	9	7 371
Slovak Republic	2	880
Ukraine	2	1 900
United Arab Emirates	3	4 035
United States	5	5 633
***Other:* Chinese Taipei**	2	2 600
TOTAL:	**67**	**64 097**

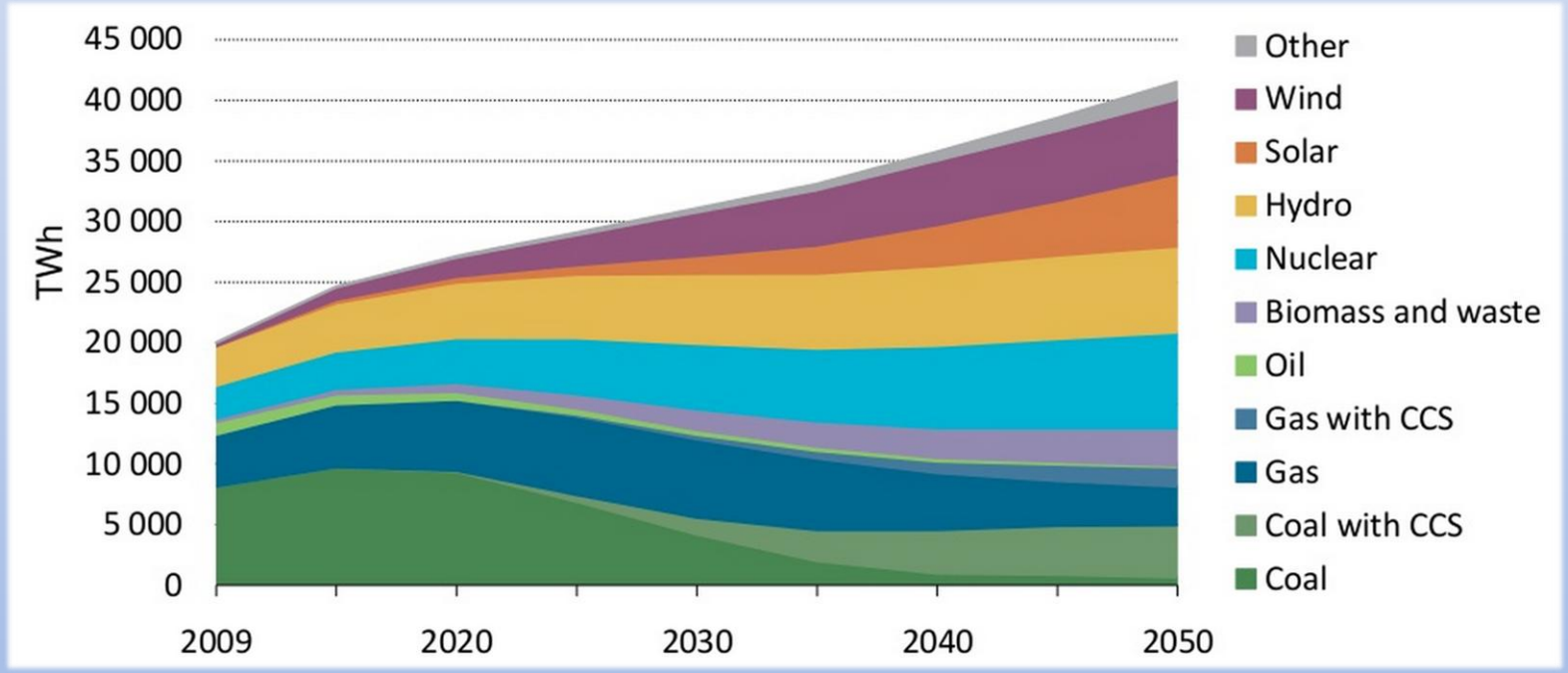
Source: IAEA PRIS

Global View of Nuclear Power Today



Source data: World Nuclear Association Update 2015

IEA 2°C Scenario:
Nuclear is Required to Provide the Largest Contribution to Global Electricity in 2050



Source: IEA

Thank you for your attention

More information @ www.oecd-nea.org

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