IAEA
International Atomic Energy Agency
Atoms for Peace and Development

La situazione internazionale ed europea

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Giornata Annuale AIN
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ARTICLE II: OBJECTIVES

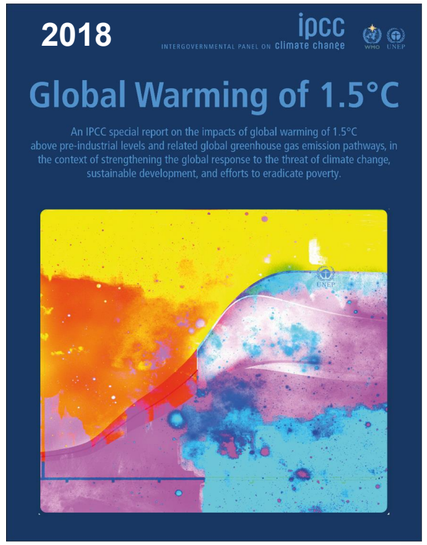
“The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. (...)”

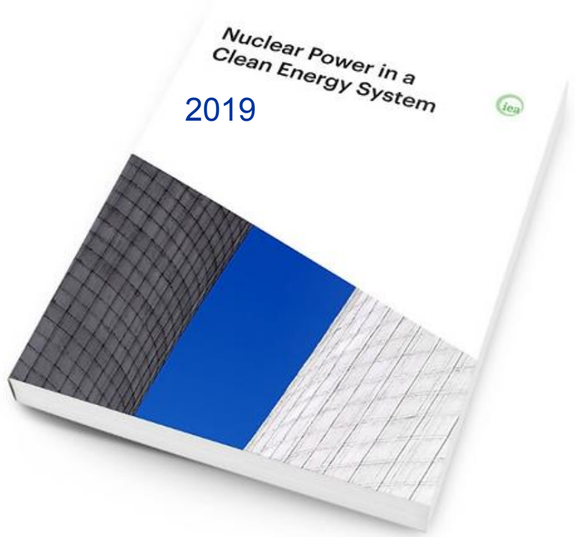
Grand Hotel, Vienna
1957- 1979

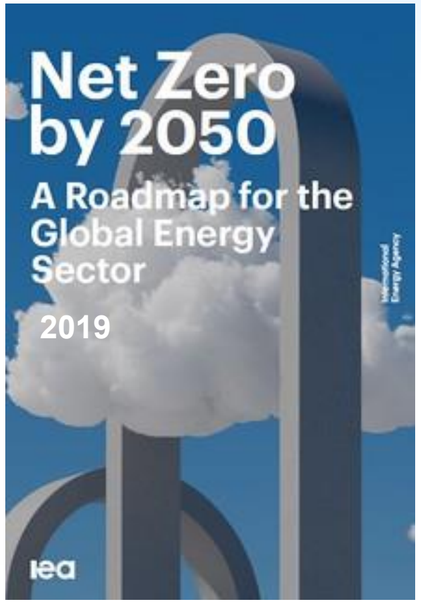
Rafael Mariano Grossi, Director General, IAEA

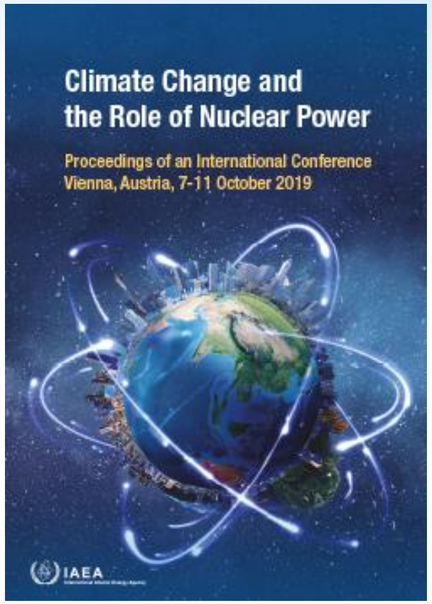
"Four years ago, nuclear power was struggling to gain a place at the table in major global conversations and events on energy and climate change. Today, nuclear power not only has a place at the table but is increasingly recognized as part of the solution."

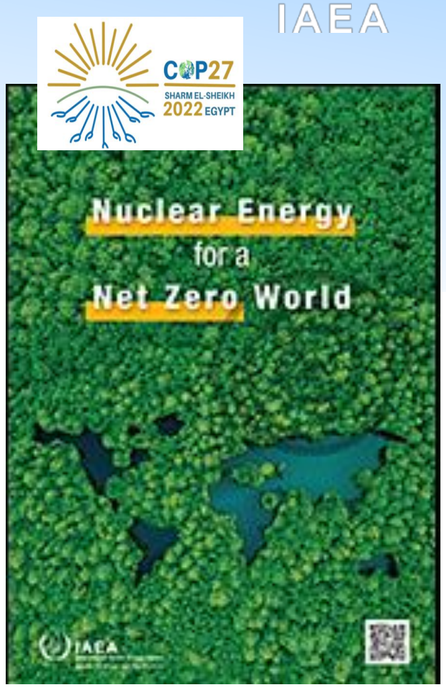
Nuclear Power And Climate Change

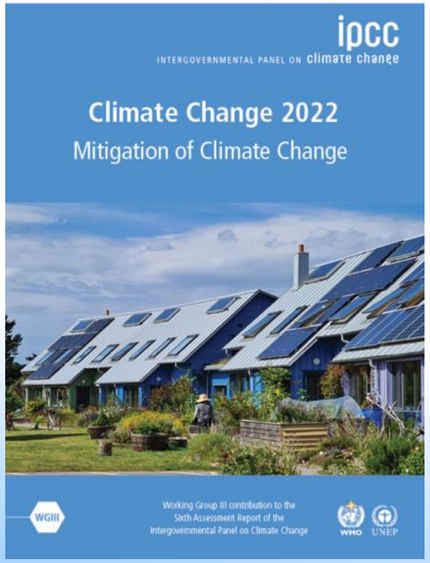


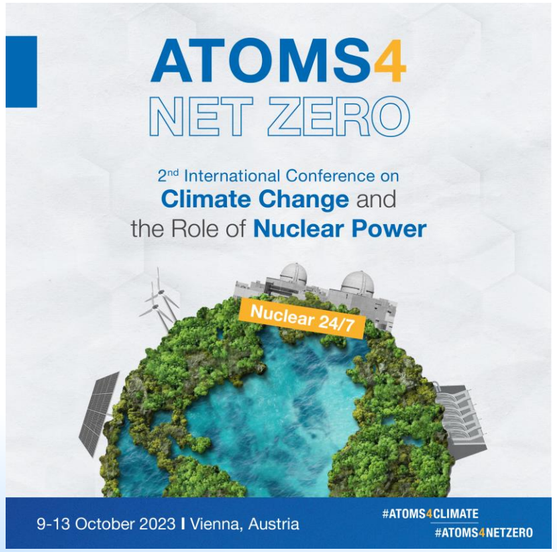


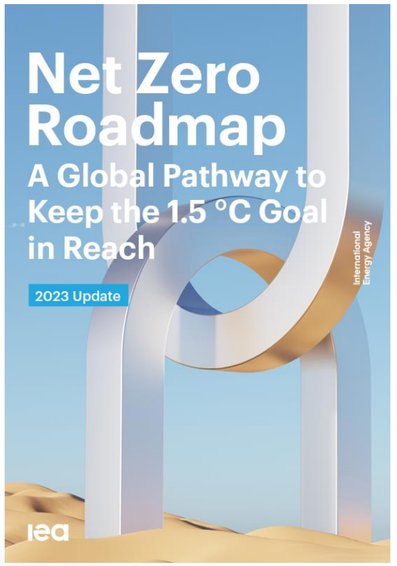


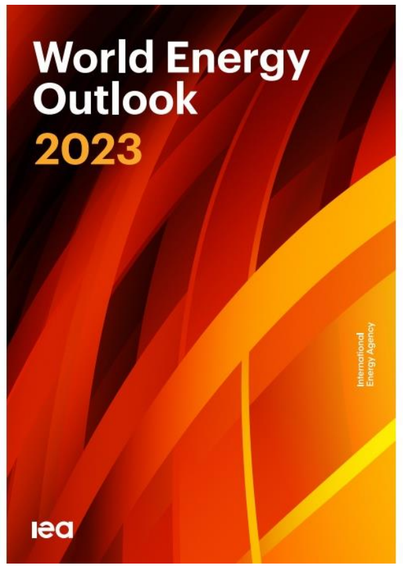












Nuclear Power @ COP28

Net Zero "Needs Nuclear Power," IAEA Says in Landmark Statement Backed by Dozens of Countries at COP28

140/2023

Dubai, United Arab Emirates

DEC
1
2023

Director General Rafael Mariano Gossi delivered the IAEA Statement on Nuclear Power at the 28th United Nations Climate Change Conference (COP28) in Dubai, 1 December 2023. (Photo: D Calma/IAEA)

The world needs nuclear power to fight climate change and action should be taken to expand the use of this clean energy source and help build "a low carbon bridge" to the future, the International Atomic Energy Agency (IAEA) said in a landmark statement supported by dozens of countries at COP28 today.

Announced by Director General Rafael Mariano Grossi at a high-profile event of the 28th United Nations Climate Change Conference (COP28) in Dubai, it was the first time such an IAEA statement was issued, its broad international backing underlining increased global interest in nuclear power to tackle the existential challenge of a rapidly warming planet.

> 40 Countries that have or are planning nuclear power

Nuclear Energy Summit
Brussels 20-21 March 2024

Nuclear Power Projections

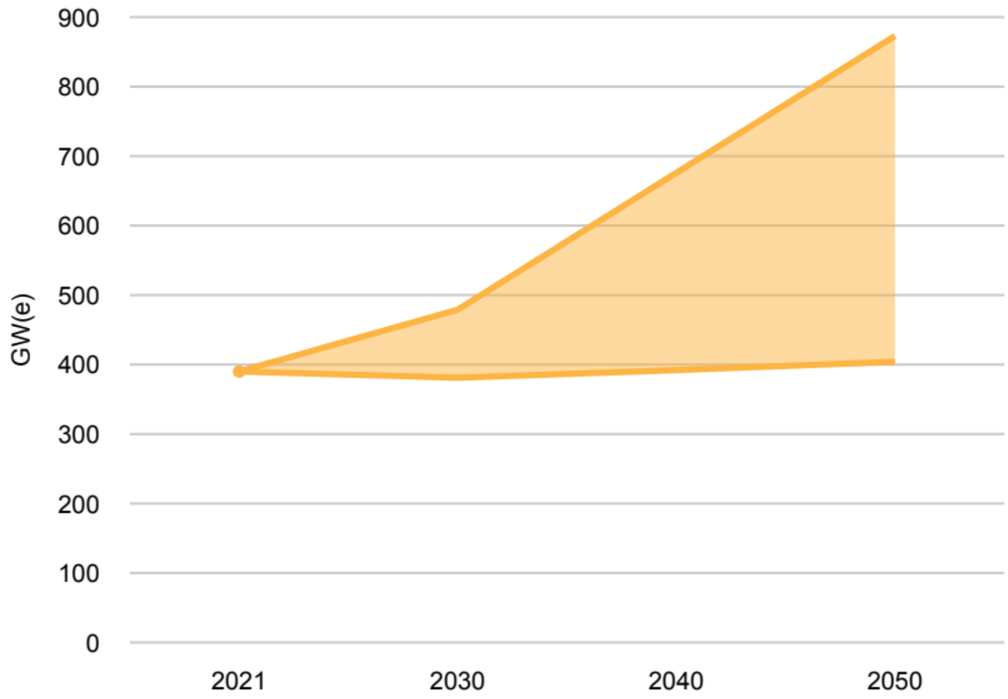
TABLE 4. WORLD TOTAL AND NUCLEAR ELECTRICAL PRODUCTION, TW·h

Electricity Production	2022	2030		2040		2050	
		Low	High	Low	High	Low	High
Total	27 672	33 275	33 275	41 508	41 508	50 071	50 071
Nuclear	2 545	3 143	3 601	3 518	5 385	3 901	7 158
Nuclear as % of Electricity Production	*9.2%*	*9.4%*	*10.8%*	*8.5%*	*13.0%*	*7.8%*	*14.3%*

Source: IAEA RDS-1 Ed. 2023

WORLD NUCLEAR CAPACITY ACTUAL, RETIREMENTS AND ADDITIONS GW(e)	LOW	HIGH
2022	371	371
Retirements	39	25
Additions	**71**	**116**
2030	403	462
Retirements	145	61
Additions	**200**	**489**
2050	**458**	**890**

FIGURE 6. WORLD NUCLEAR ELECTRICAL GENERATING CAPACITY



Nuclear Power Today |

as of November 2023

IAEA

1/4

low carbon electricity

Reactors

412 nuclear power reactors in 31 countries

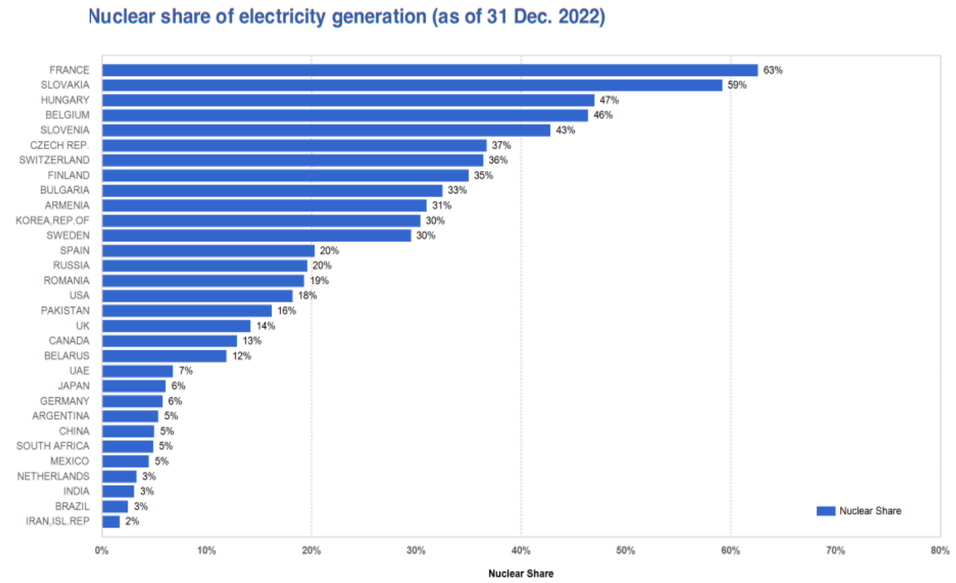
Capacity

~370 GW(e) capacity

Electricity

~10% world's electricity

Source: IAEA PRIS



Note: The nuclear share of electricity supplied in Taiwan, China was 9.1% of the total.

Nuclear Power Today

as of November 2023

IAEA

2022

NEW CONSTRUCTIONS CONNECTED TO THE GRID	
BARAKAH-3	(1345 MW(e), PWR, UAE) on 8 October
FUQING-6	(1000 MW(e), PWR, CHINA) on 1 January
HONGYANHE-6	(1061 MW(e), PWR, CHINA) on 2 May
KANUPP-3	(1014 MW(e), PWR, PAKISTAN) on 4 March
OLKILUOTO-3	(1600 MW(e), PWR, FINLAND) on 12 March
SHIN-HANUL-1	(1340 MW(e), PWR, KOREA,REP.OF) on 9 June
NEW CONSTRUCTION STARTED	
AKKUYU-4	(1114 MW(e), PWR, TÜRKIYE) on 21 July
EL DABAA-2	(1194 MW(e), PHWR, EGYPT) on 19 November
ELDABAA-1	(1194 MW(e), PWR, EGYPT) on 20 July
HAIYANG-3	(1161 MW(e), PWR, CHINA) on 7 July
LUFENG-5	(1116 MW(e), PWR, CHINA) on 8 September
SANMEN-3	(1163 MW(e), PWR, CHINA) on 28 June
TIANWAN-8	(1171 MW(e), PWR, CHINA) on 25 February
XUDABU-4	(1200 MW(e), PWR, CHINA) on 19 May

2023

NEW CONSTRUCTIONS CONNECTED TO THE GRID	
BELARUSIAN-2	(1110 MW(e), PWR, BELARUS) on 13 May
FANGCHENGGANG-3	(1000 MW(e), PWR, CHINA) on 10 January
MOCHOVCE-3	(440 MW(e), PWR, SLOVAKIA) on 31 January
VOGTLE-3	(1117 MW(e), PWR, USA) on 31 March
RESTART AFTER SUSPENDED OPERATION	
TAKAHAMA-1	(780 MW(e), PWR, JAPAN) on 2 August
TAKAHAMA-2	(780 MW(e), PWR, JAPAN) on 20 September
NEW CONSTRUCTION STARTED	
ELDABAA-3	(1194 MW(e), PWR, EGYPT) on 3 May
HAIYANG-4	(1161 MW(e), PWR, CHINA) on 22 April
LUFENG-6	(1116 MW(e), PWR, CHINA) on 26 August
SANMEN-4	(1163 MW(e), PWR, CHINA) on 22 March

Source: IAEA PRIS

Nuclear Power Today

as of November 2023

IAEA

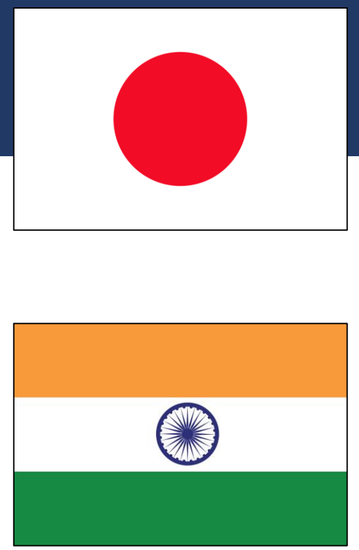
Construction

58 currently under construction

~60 GW(e) generating capacity

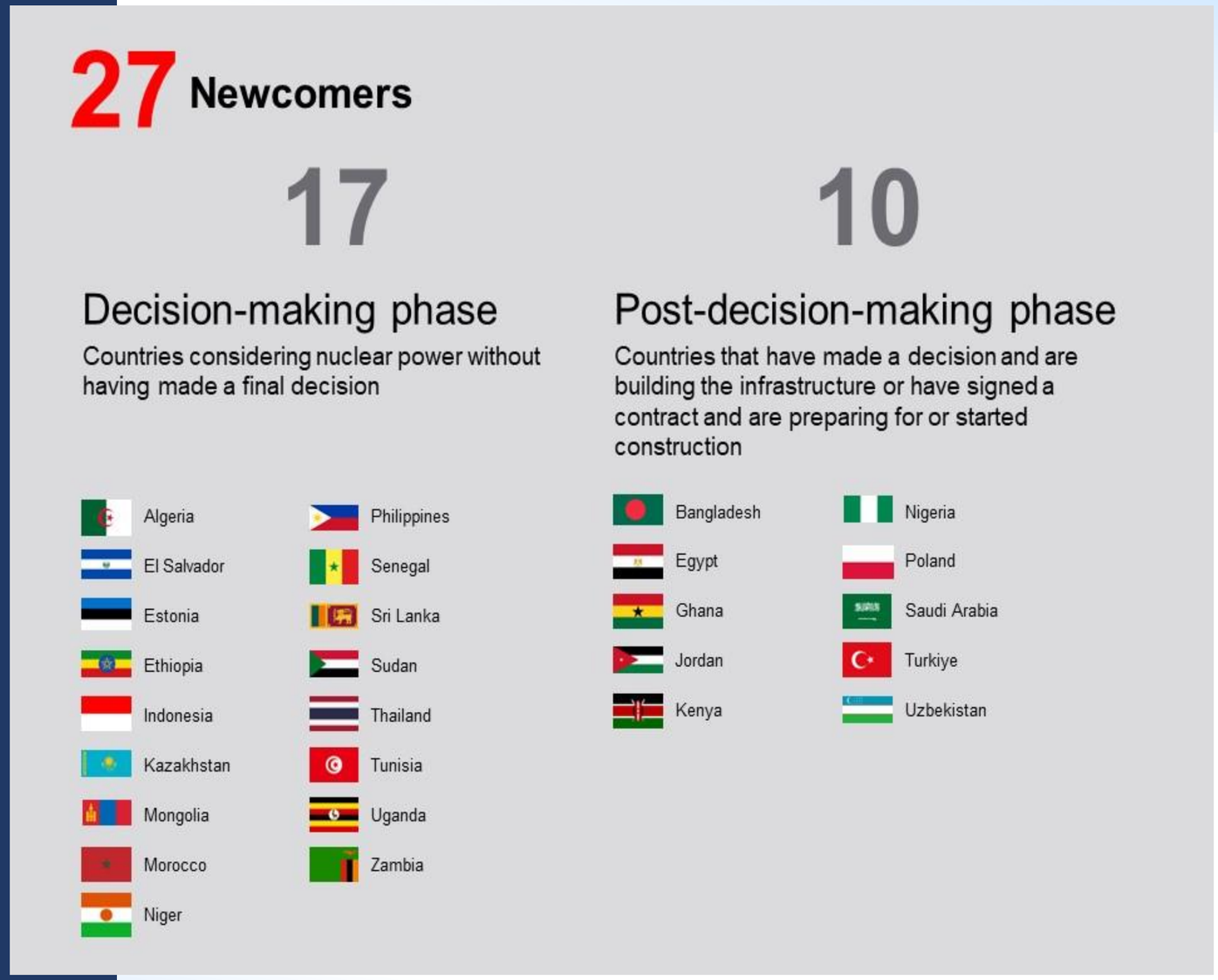
Suspension

25 reactors in suspended operation



Nuclear NEWCOMERS

Several additional countries have recently expressed in interest in nuclear power, particularly, small modular reactors.



By 2035

the number of operating countries may increase by about **30%** with **10-12** new countries operating NPPs

SMRs

- The interest in Small Modular Reactors (SMRs) is increasing, and significant industrial and regulatory efforts are ongoing to facilitate their development and early deployment.
- There are 80+ SMR designs under development and deployment at different stages in 18 Member States.
- In 2023, at least 20 Member States had active national programmes on SMR aiming for deployment by 2035, many of them carried out in international collaboration.
- The key driving forces of SMR development are fulfilling the need for flexible power generation for a wider range of users and applications, replacing ageing fossil-fired units, enhancing safety performance, and offering better economic affordability.
- Currently, there are two SMRs in operation: the **Akademik Lomonosov** (70 MWe) in the Russian Federation and the **HTR-PM** (200 MWe) in China; and one SMR, the **HTTR** (30 MWth) in Japan, being used as a test reactor generating heat only.
- Three SMRs have started construction: the **CAREM-25** (30 MWe) in Argentina, the **ACP-100** (125 MWe) in China and the **BREST-OD-300** (300 MWe) in the Russian Federation
- Several others are ready to start construction or licensed or in advance stage of the licensing process

Non-electric **Applications**

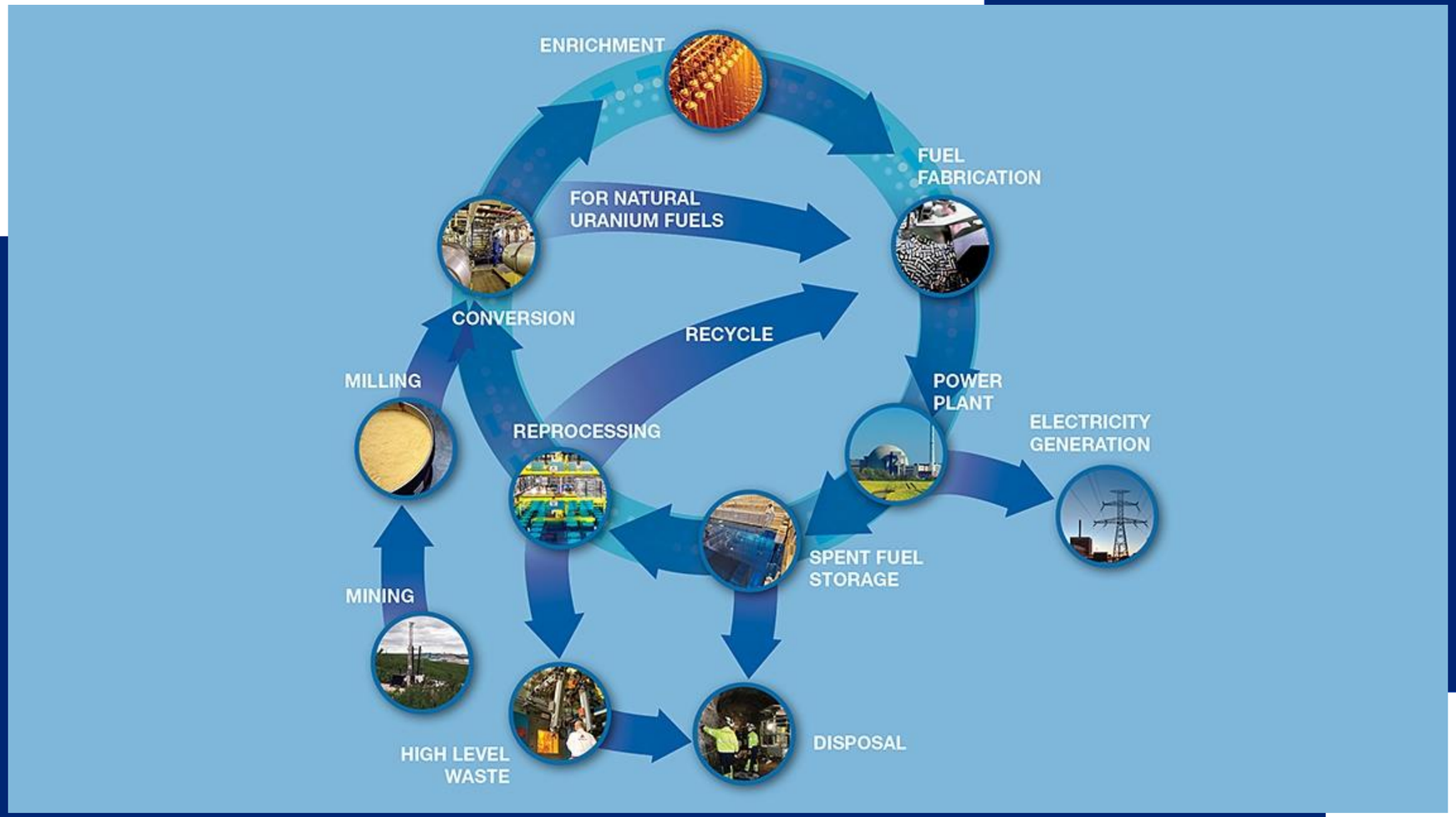
Hydrogen production

District & process heat

Seawater desalination

Synthetic fuels & chemicals

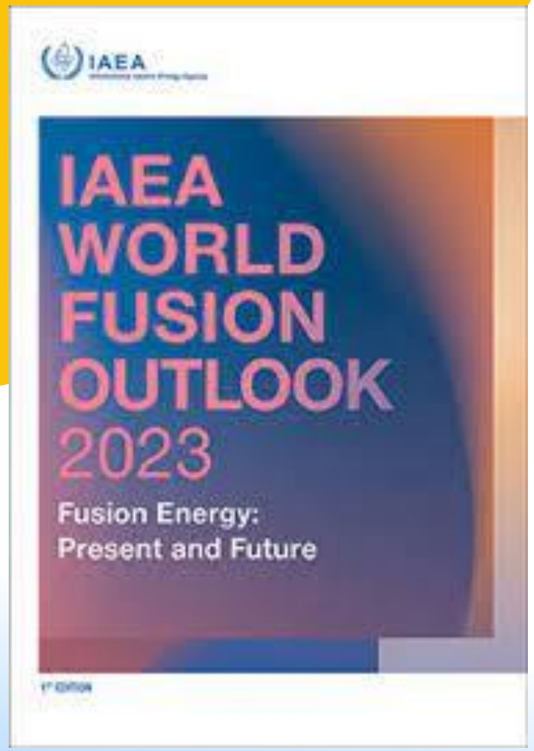
Nuclear Fuel Cycle



Fusion Activities

Forums

- Fusion Energy Conference
- Workshops on the DEMO project
- Technical Meetings

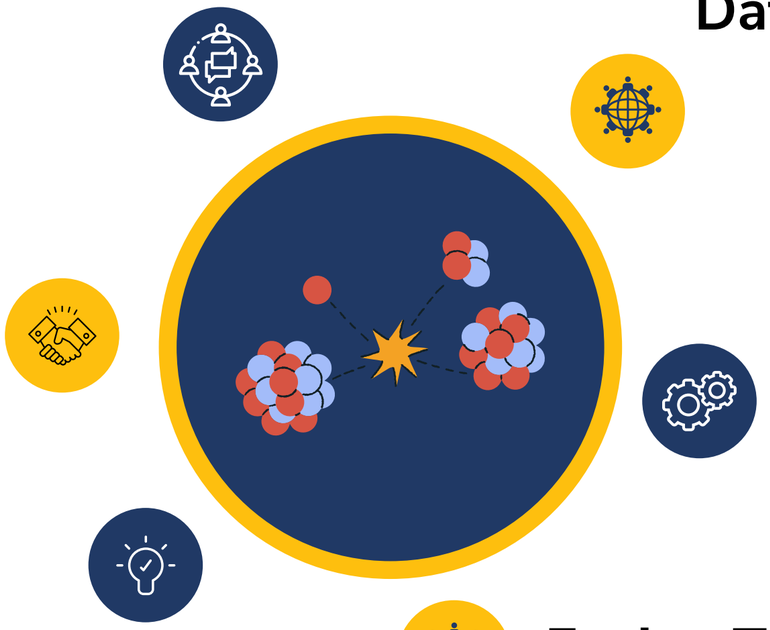


Databases

- Maintain databases for fusion community

Publications

- Fusion Journal
- Fusion Physics Book
- TECDOCs



Education and Training

- Supports education and training activities on fusion

Networks

- Create networks of institutions and scientists

Fusion Technology Development

- Fission to fusion synergies
- Legal and institutional INPRO study
- Regulatory aspects

IAEA at a glance

178 Member States

(as of September 2023)

HQ in Vienna

Laboratories in Seibersdorf, Monaco and Vienna

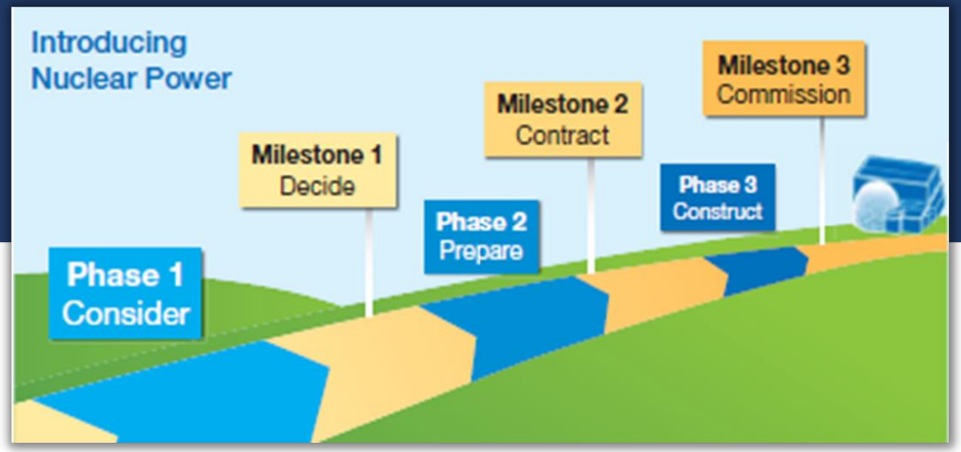
Regional offices in Toronto and Tokyo

Liaison offices in New York and Geneva

2,500+ staff from

over 100 countries

IAEA
MILESTONES APPROACH



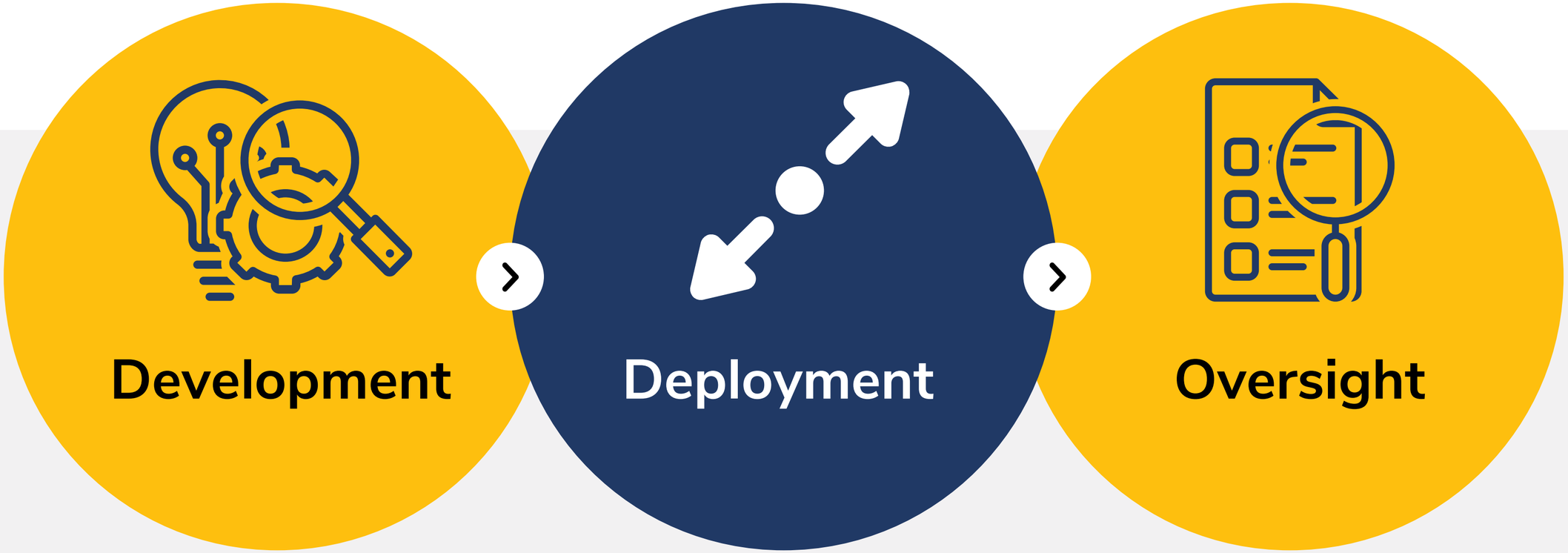
3 Phases
(Consider – Prepare – Construct)

3 Milestones
(Decide – Contract – Commission)

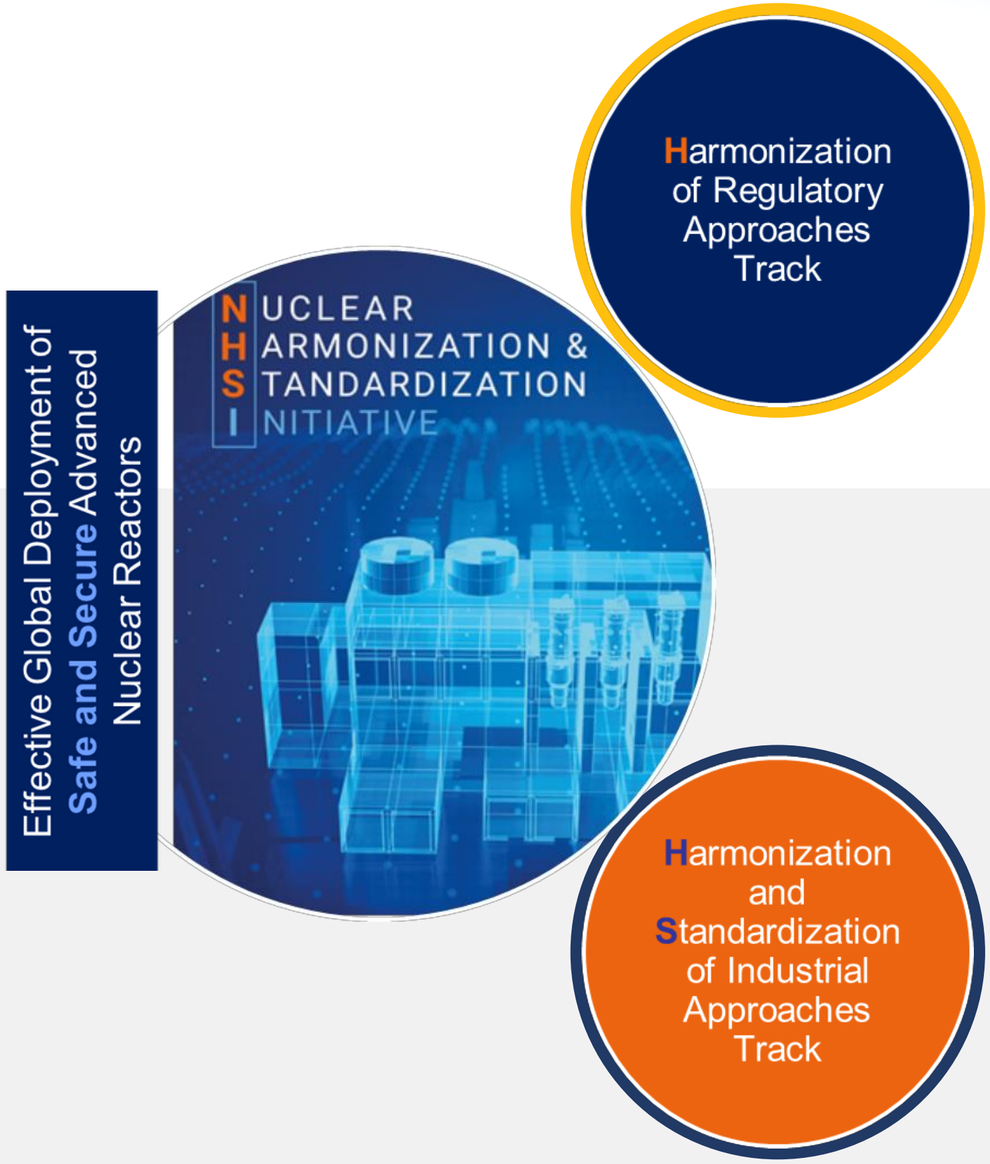
19

Infrastructure Issues

IAEA Platform on SMRs
and their Applications



Nuclear Harmonization and Standardization Initiative



- **WG1:** Framework for information exchange
- **WG2:** International pre-licensing regulatory reviews
- **WG3:** Leveraging other regulatory reviews

- **TG1:** Harmonization of high-level user requirements
- **TG2:** Common Approaches to Codes and Standards
- **TG3:** Experimental Testing and Validation for Design and Safety Analysis Computer Codes
- **TG4:** Acceleration of nuclear infrastructure implementation for SMR

Regulators

Governments

Technology Holders

Operators and other end-users

International Organizations and Associations

Stakeholder Engagement

IAEA Strategic Support

Publications

Training Courses, workshops

Technical meetings

Expert missions

Webinars

e-Learning

Nuclear Communicator’s Toolbox

Scientific visits

IAEA MARIE SKLODOWSKA-CURIE FELLOWSHIP PROGRAMME

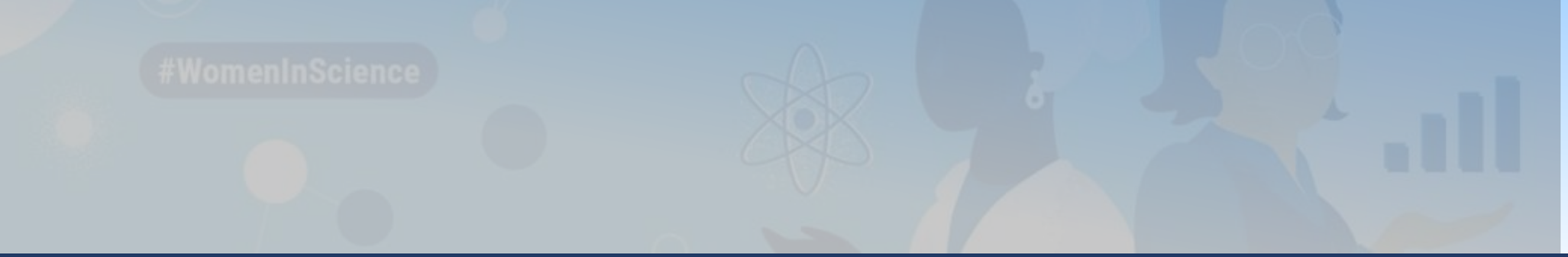
Up to 200 scholarships for women studying towards Master's programmes in:

Nuclear Energy
Nuclear Science & Applications
Nuclear Safety & Security
Non-proliferation
Nuclear Law

Selected since 2020
560 from > 110 countries

Application Deadline
September

MSCFP@iaea.org
www.iaea.org/MSCFP



IAEA LISE MEITNER PROGRAMME

Boosting career development for women professionals in the nuclear field

- 2 – 4 weeks, possibly longer
- First two visits in the USA in June and October 2023
- 10 to 15 professionals per cohort
- Visits to various facilities, onsite lectures and discussions with interactive training

Next LMP visit

Republic of Korea, March 2024

Application deadline:

September

LMP@iaea.org

www.iaea.org/LMP

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Thank you!