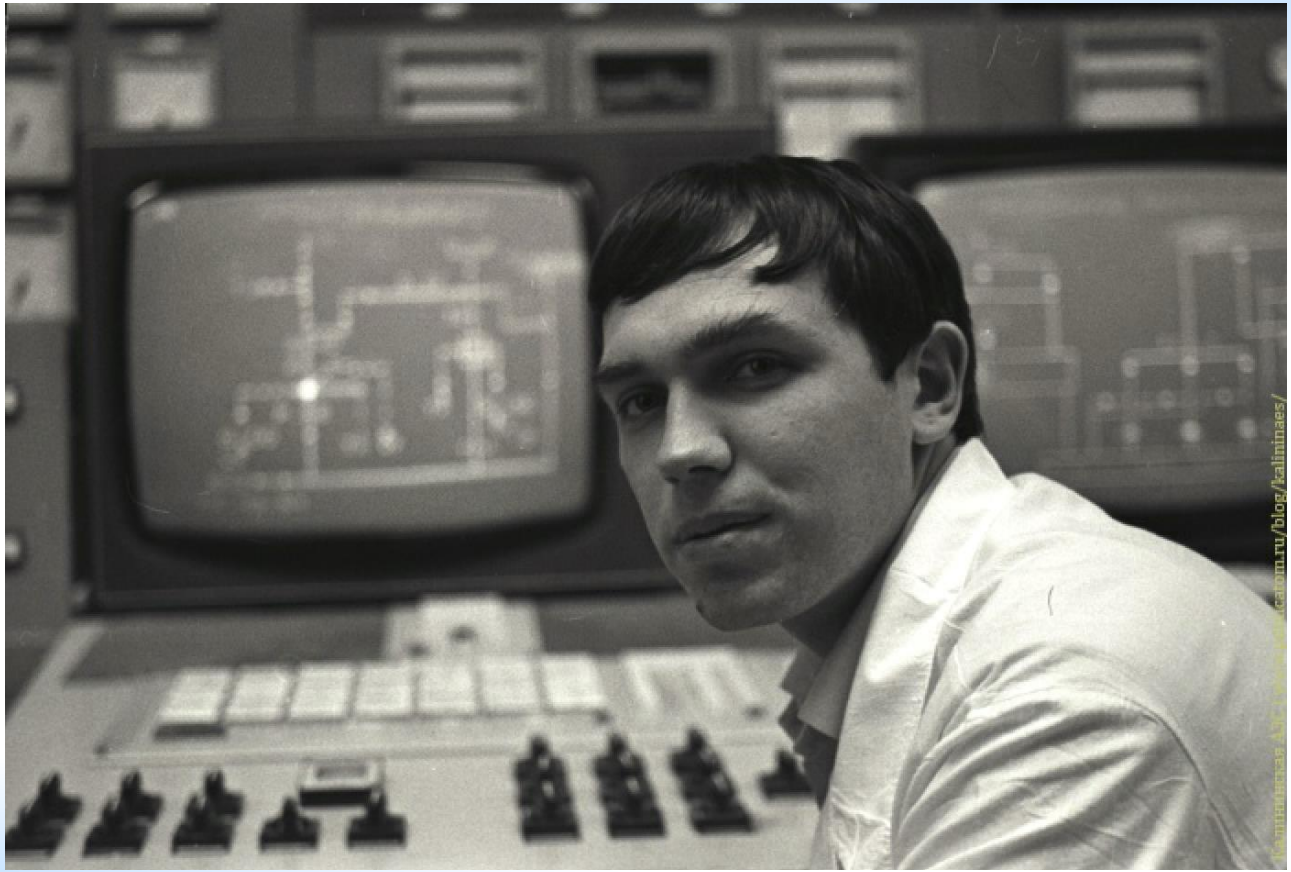
IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Activities of the Department of Nuclear Energy and the Future of Nuclear Power

Mikhail Chudakov
IAEA Deputy Director General
Head of the Department of Nuclear Energy

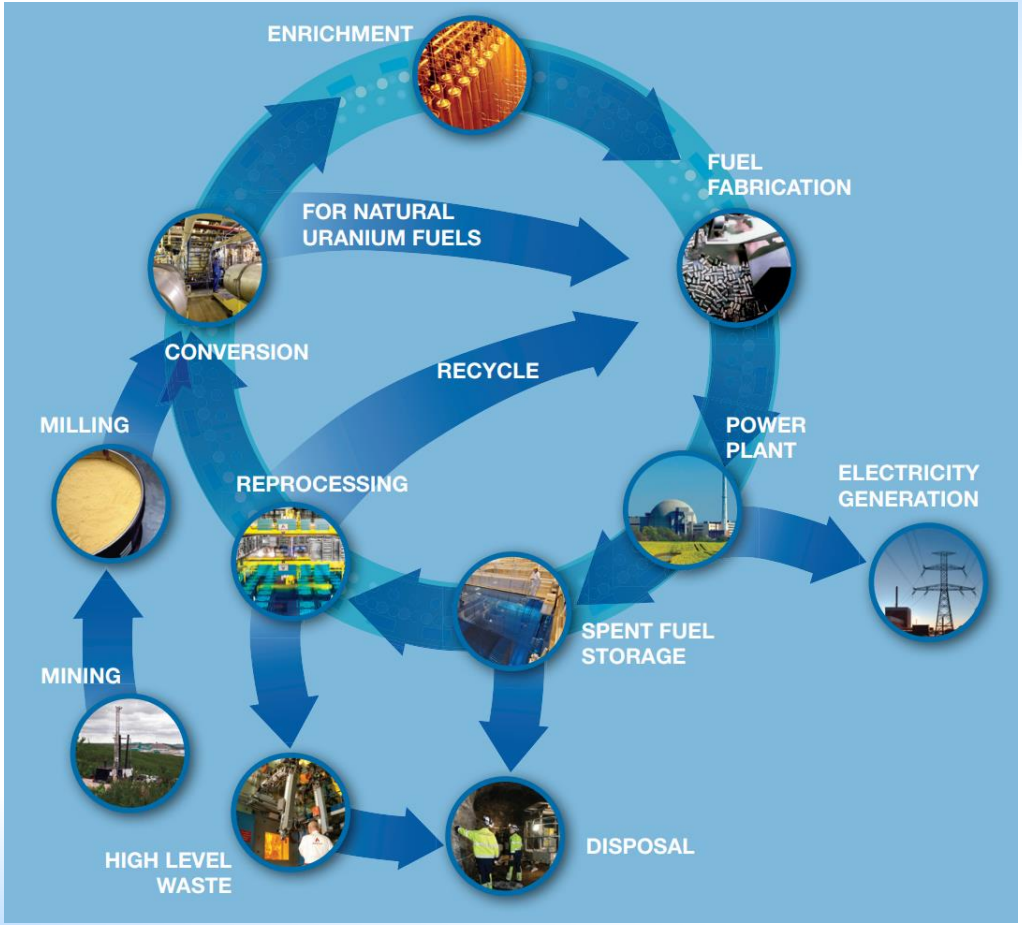
65 Years of Peaceful Nuclear Energy and Launch of the Obninsk NPP
June 2019

36 years ago…



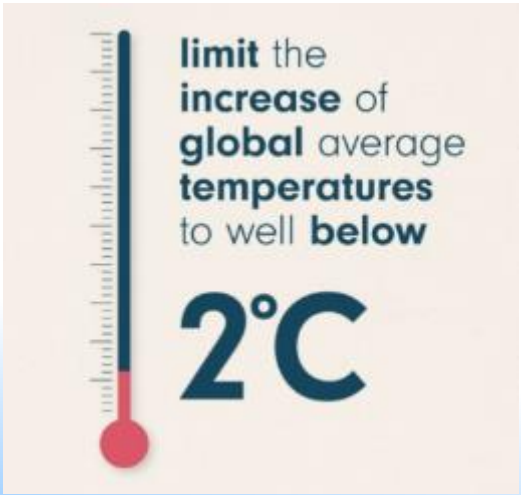
Russia's Nuclear industry

Nuclear fuel cycle



Energy access

SDGs & Paris Agreement



1.5°C Challenge

TODAY

70%

of electricity
comes from
burning fossil fuels

2050

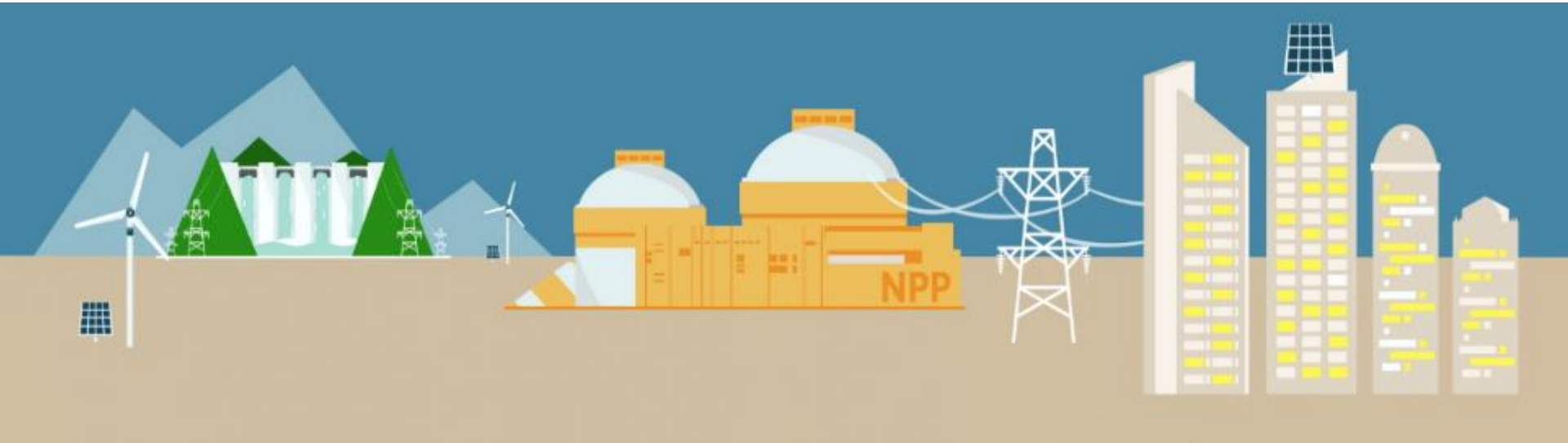
≈80%

of electricity
will need to be
low carbon

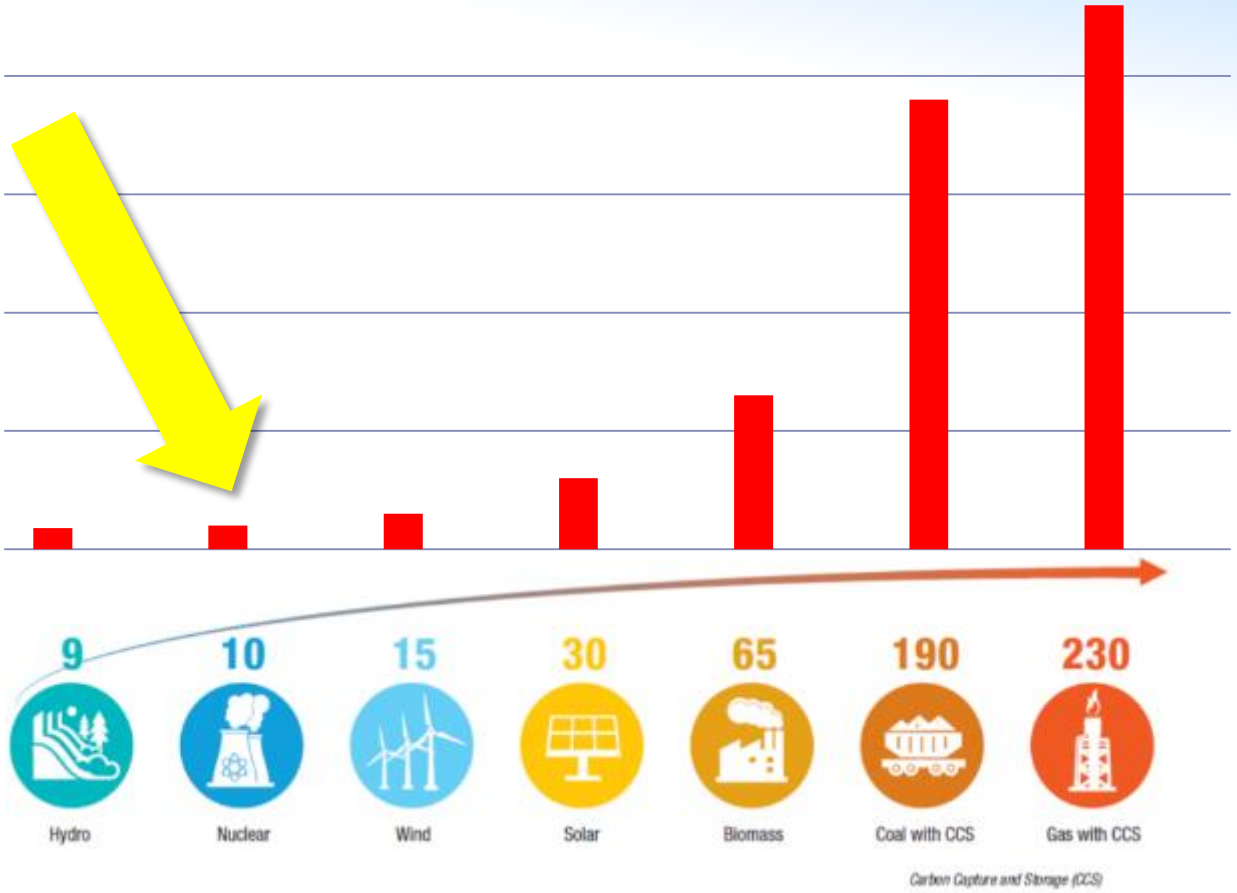
Low carbon mix

"…without significant progress on using the full potential of nuclear power, it will be difficult for the world to secure sufficient energy to achieve sustainable development and to mitigate climate change."

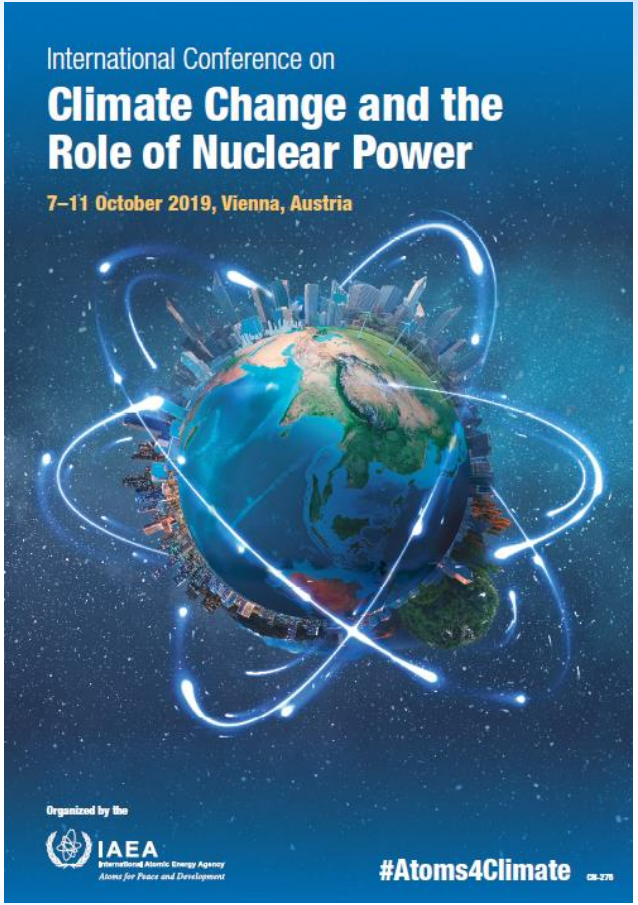
Yukiya Amano, IAEA Director General



Life cycle GHG emissions



Climate Change & Nuclear Power



NP Reactors

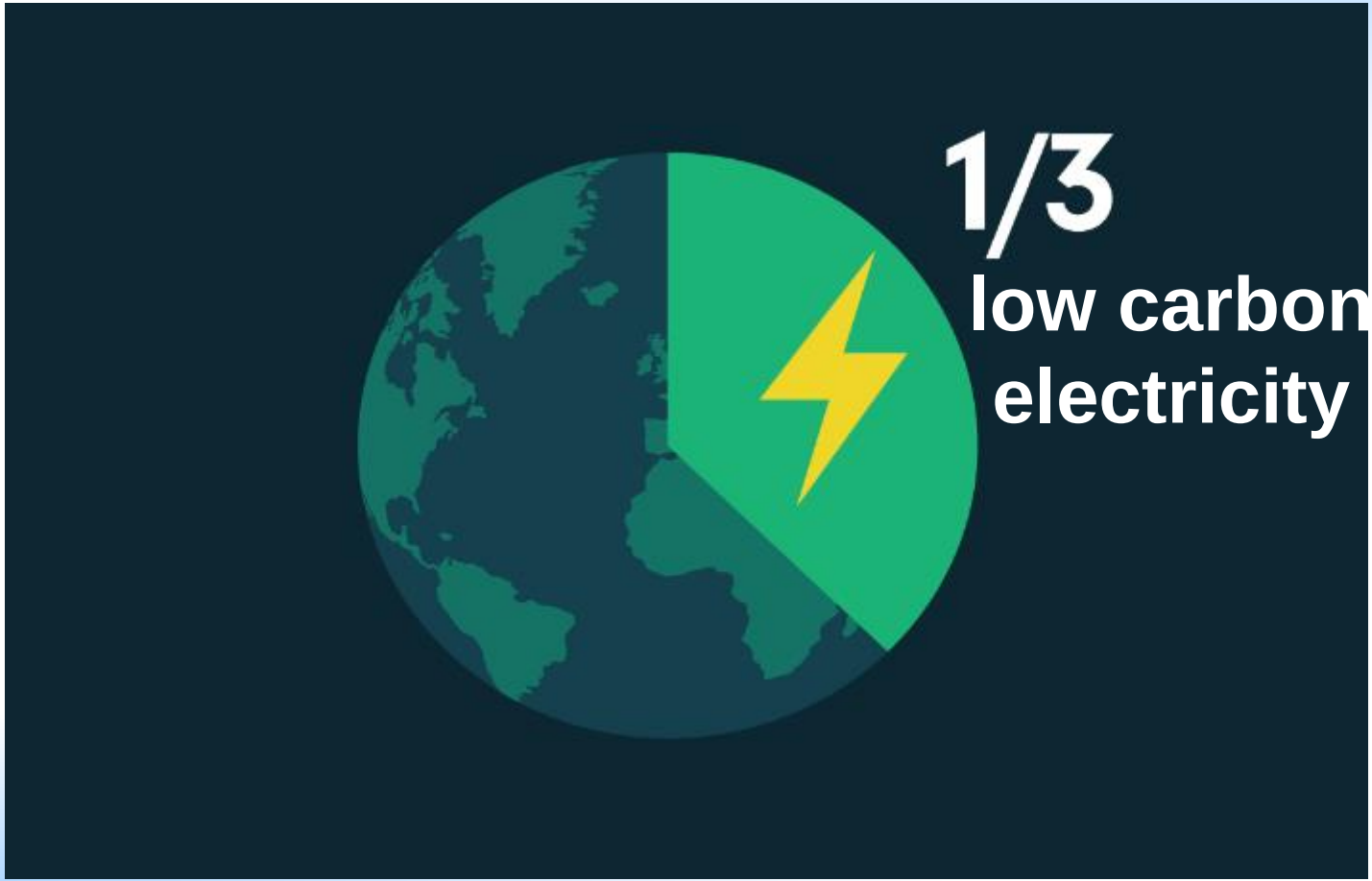
(24 June 2019)

449 in operation

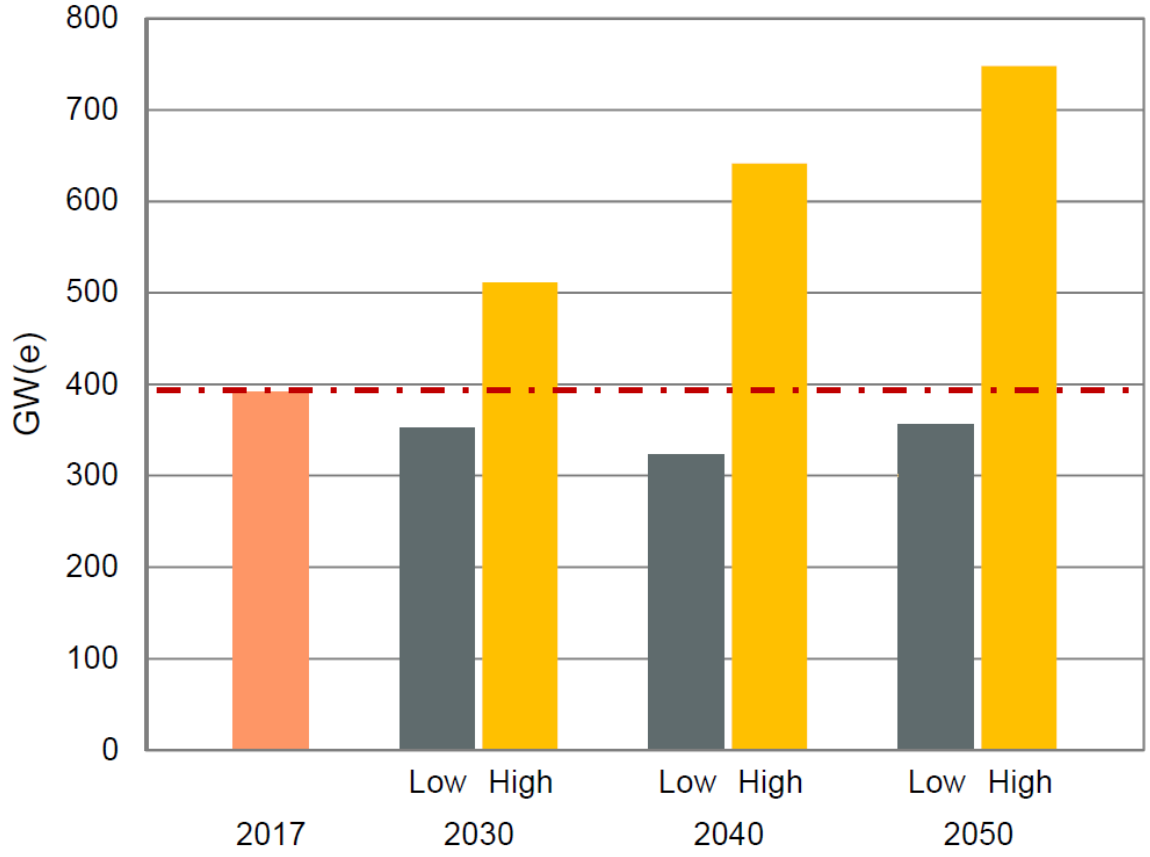
398 GW(e)

54 under construction (2/3 in Asia)

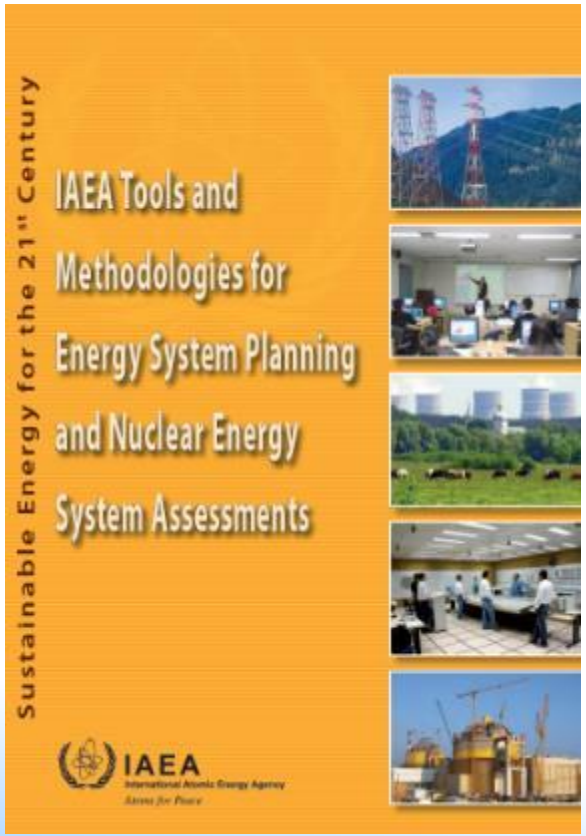
Nuclear power



IAEA Projections



Energy Planning & Analysis



148 Member States

21 Regional & Int'l Organizations

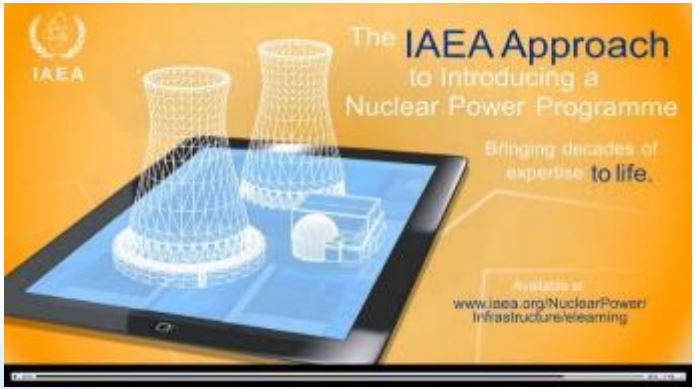
IAEA & Newcomers

“It is each country’s sovereign decision whether to add nuclear power to its energy mix.

For those who choose to do so, the IAEA role is to help them build the expertise to use nuclear power safely, securely, and sustainably.”

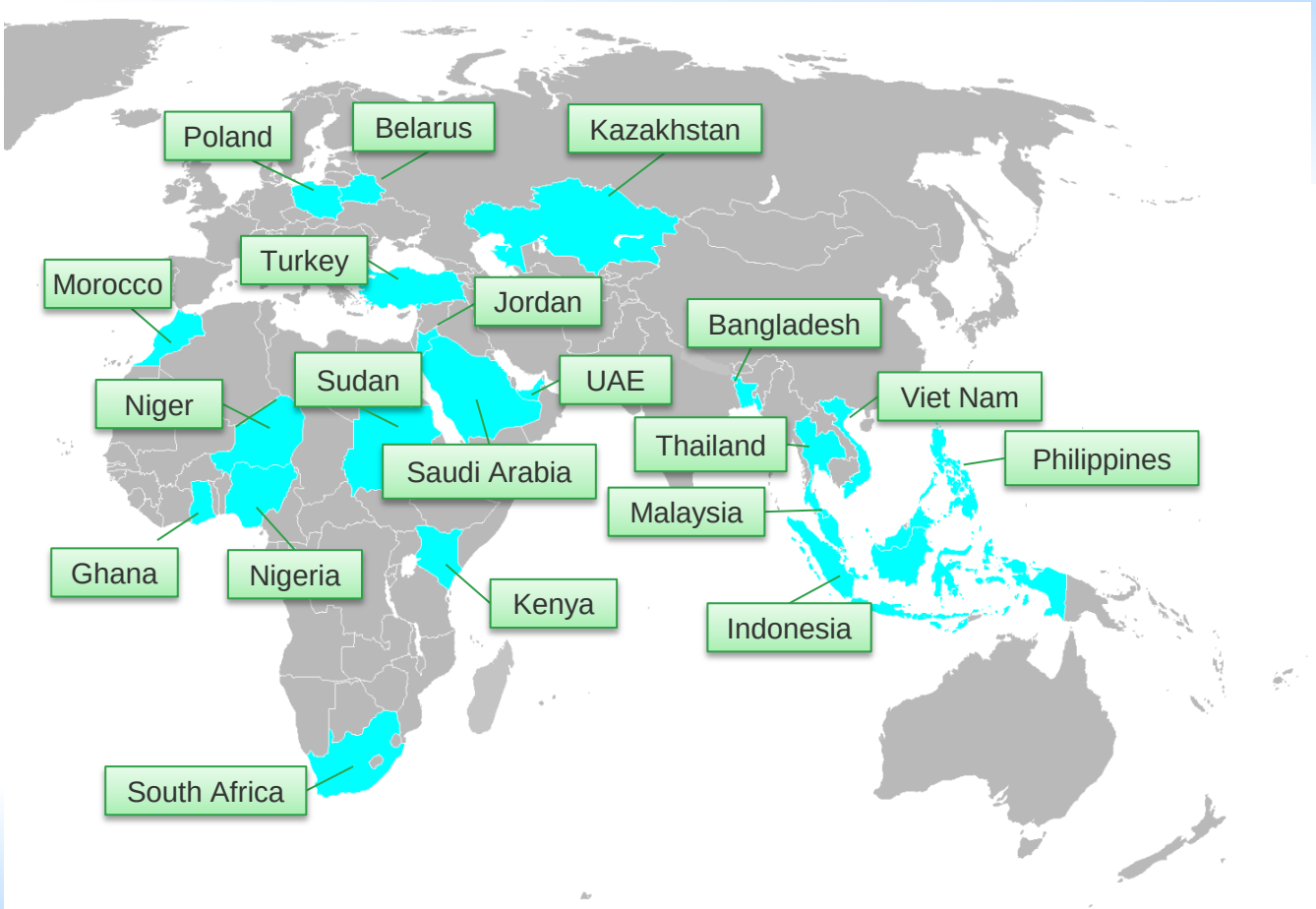
Yukiya Amano
IAEA Director General

Assistance to Newcomers



27 INIR missions, 20 MS

1.	Jordan (Phase 1)	2009
2.	Indonesia (Phase 1)	2009
3.	Viet Nam (Phase 1)	2009
4.	Thailand (Phase 1)	2010
5.	UAE (Phase 2)	2011
6.	Bangladesh (Phase 1&2)	2011
7.	Jordan follow-up	2012
8.	Belarus (Phase 1&2)	2012
9.	Viet Nam (Phase 2)	2012
10.	Poland (Phase 1)	2013
11.	South Africa (Phase 2)	2013
12.	Turkey (Phase 2)	2013
13.	Jordan (Phase 2)	2014
14.	Viet Nam follow-up	2014
15.	Nigeria (Phase 2)	2015
16.	Kenya (Phase 1)	2015
17.	Morocco (Phase 1)	2015
18.	Bangladesh follow-up	2016
19.	Poland follow-up	2016
20.	Kazakhstan (Phase 1)	2016
21.	Malaysia (Phase 1)	2016
22.	Ghana (Phase 1)	2017
23.	Niger (Phase 1)	2018
24.	UAE (Phase 3)	2018
25.	Saudi Arabia (Phase 2)	2018
26.	Sudan (Phase 1)	2018
27.	Philippines (Phase 1)	2018



Influential Factors

1. Safety
2. Funding & Financing
3. Electricity Markets & Nuclear Policies
4. Innovation: Advanced Reactors & Fuel Cycles
5. Waste Management
6. Capacity Building
7. Public Acceptance

What can we do better?

1 Safety

- Review missions - improve harmonization
- Operational experience - more open information access
- Emergency Preparedness - better exchange of technical information
- Severe Accident Management - more use of IAEA and int. experience
- Management and culture for safety - more multilateral cooperation

2 Funding & Financing

- Innovative schemes emerging
- Incentives, enabling conditions?

3 Electricity Markets & Nuclear Policies

- Support to newcomers / new operators
- Plant Life Management - operation beyond 60 years

4 Innovation: Advanced Reactors & Fuel Cycles

- FRs, HTGRs, SMRs, co-generation…

5 Waste Management

- Radioactive waste management - public reassurance that we have managed programmes for the whole lifecycle
- Cooperation in ARTEMIS missions

6 Capacity Building

- Capacity building - HR development for existing operators and the new generation

7 Public Acceptance

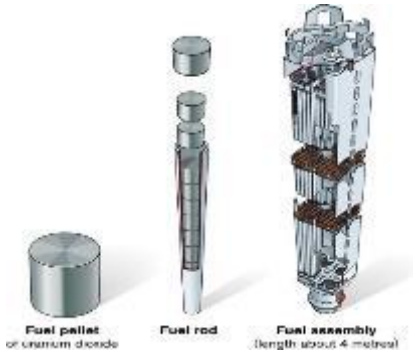
- Stakeholder involvement – reinforce social and economic benefits

Support for operators

Instrumentation & control

Maintenance/
Outage management

Plant life management



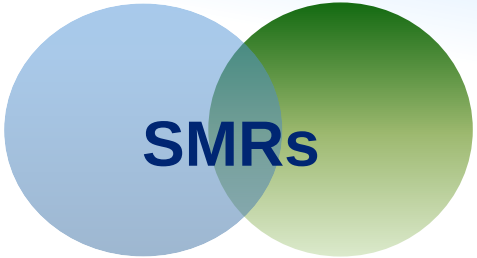
Nuclear Fuel

Spent fuel

Spent fuel pool

Dry storage

Advanced Reactors

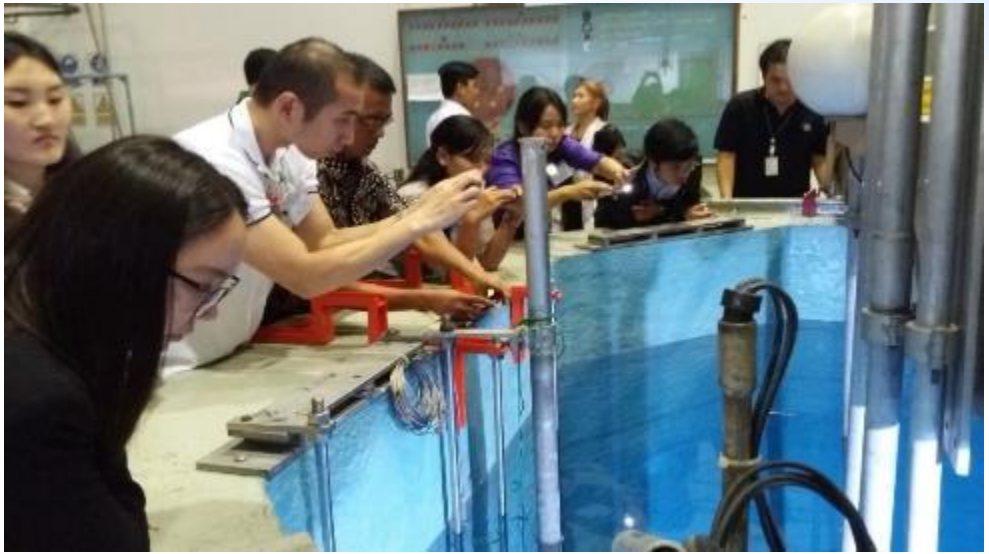


CAREM-25, HTR-PM, KLT-40, RITM-200, AHWR, NuScale, SMART, 4S, PRISM…

ABWR, ACR 1000, AP1000, APWR, Atmea-1, CANDU 6, EPR, ESBWR, VVER 1200, CAP1400, APR1400, HPR1000…

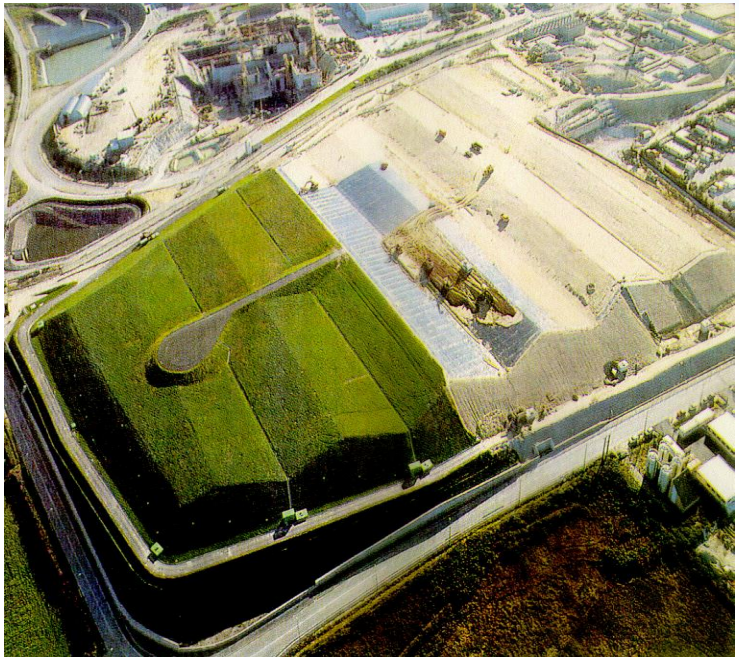
LFR, GFR, SFR, SCWR, VHTR, MSR, ADS…

Research Reactors



“Internet Reactor”

Waste Management



LLW: la Manche, France

Spent fuel:
Onkalo, Finland

Nuclear Knowledge Management

Training the Nuclear Leaders: The First IAEA Nuclear Energy Management School in Russia Emphasizes Development of Nuclear Knowledge Infrastructure

23 Sep 2016
Maxim Gladyshev, IAEA Department of Nuclear Energy

Technical tour of the full-scope simulator of the Floating NPP "Akademik Lomonosov". (Photo:ROSATOM-CICE&T)

Not a member yet?

bDN CBH CGULS
DISP ENV IDN
IPN LAB MSN
NKM NNE RRIH
RSLS SFM URF

Human resource development

IAEA

INMA
International Nuclear Management Academy

Coordinated Research Projects

- ~1,600 research institutions involved
- 150 CRPs: ~ 1/4 related to Nuclear Energy

Russia – IAEA Cooperation

Support for HEU Removal

Decommissioning

Russia – IAEA Cooperation

Capacity Building/ Training Programmes

Russia – IAEA Cooperation

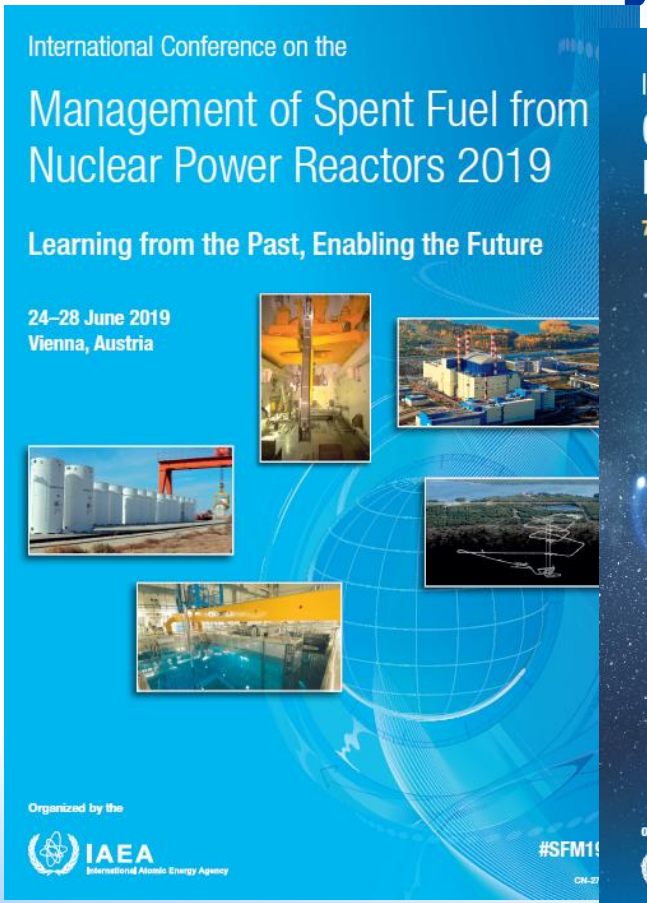
Research Projects

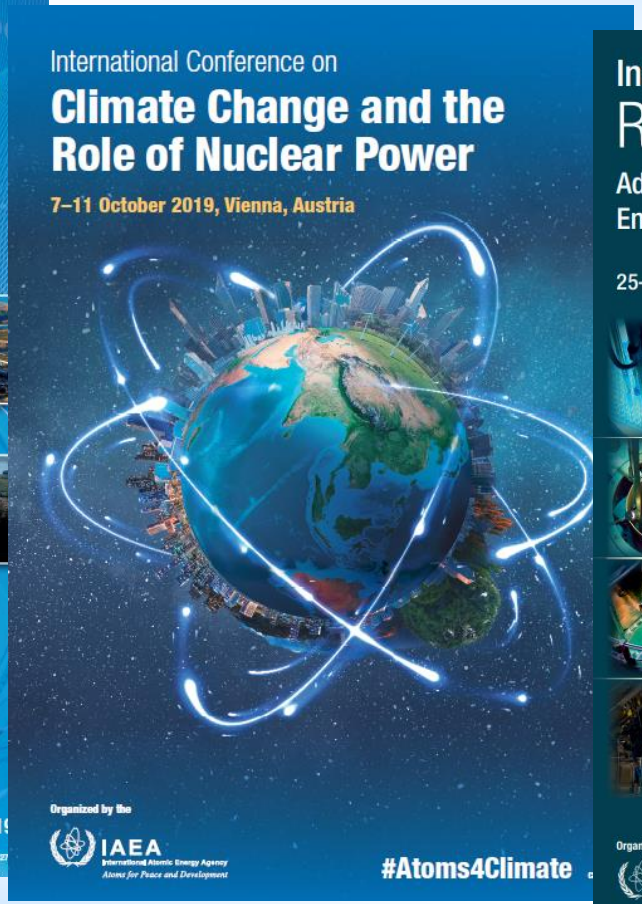
- Fast Reactors
- Fuels
- SMRs

Russia – IAEA Cooperation

Extra Budgetary Funding for Infrastructure Capacity Building

Major Events 2019





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