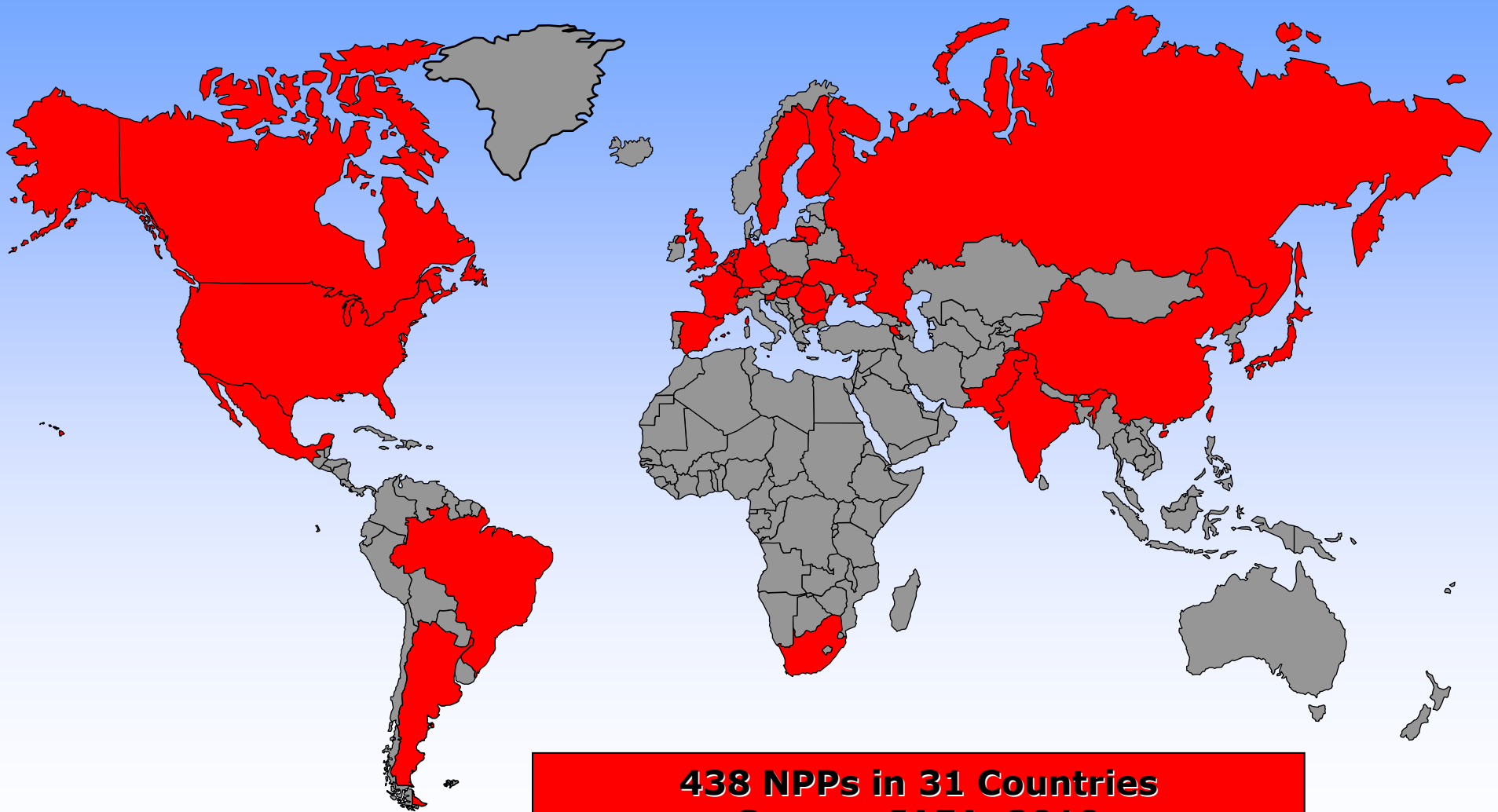


Spent fuel challenges facing small and new nuclear programmes

Charles McCombie

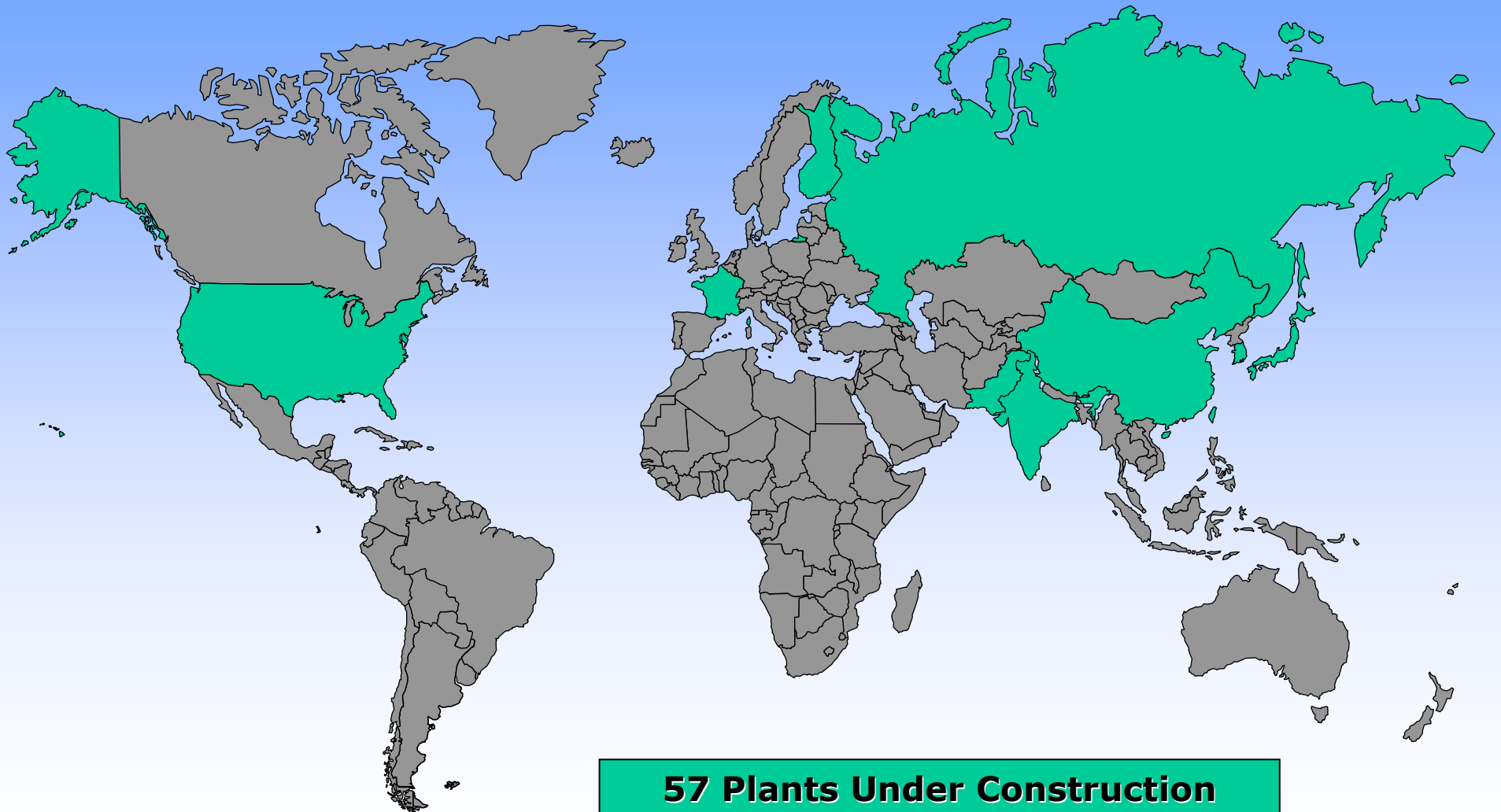
Arius Association

Countries With Operating Nuclear Power Plants



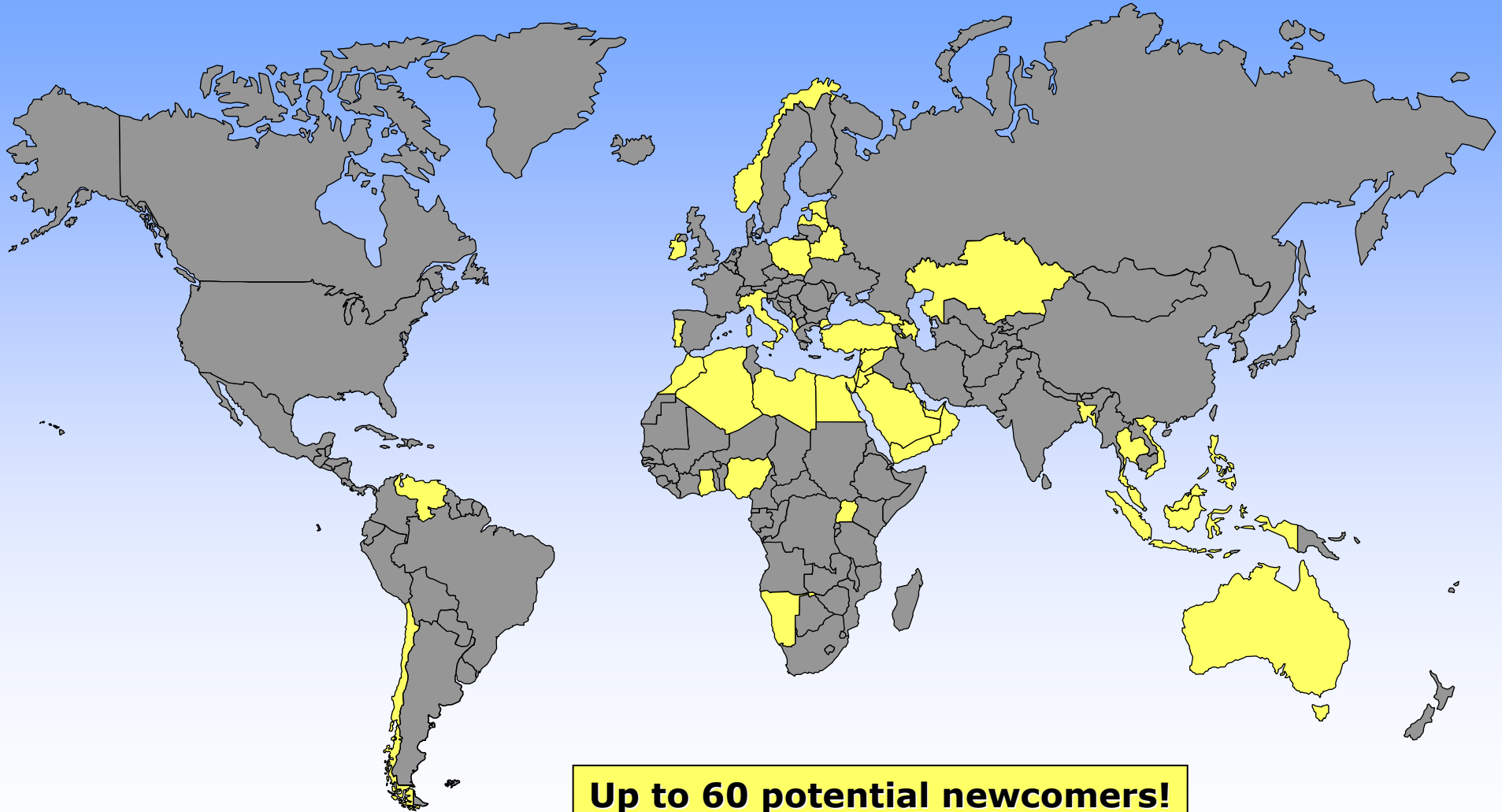
438 NPPs in 31 Countries
Source: IAEA, 2010

Countries Building New Nuclear Power Plants



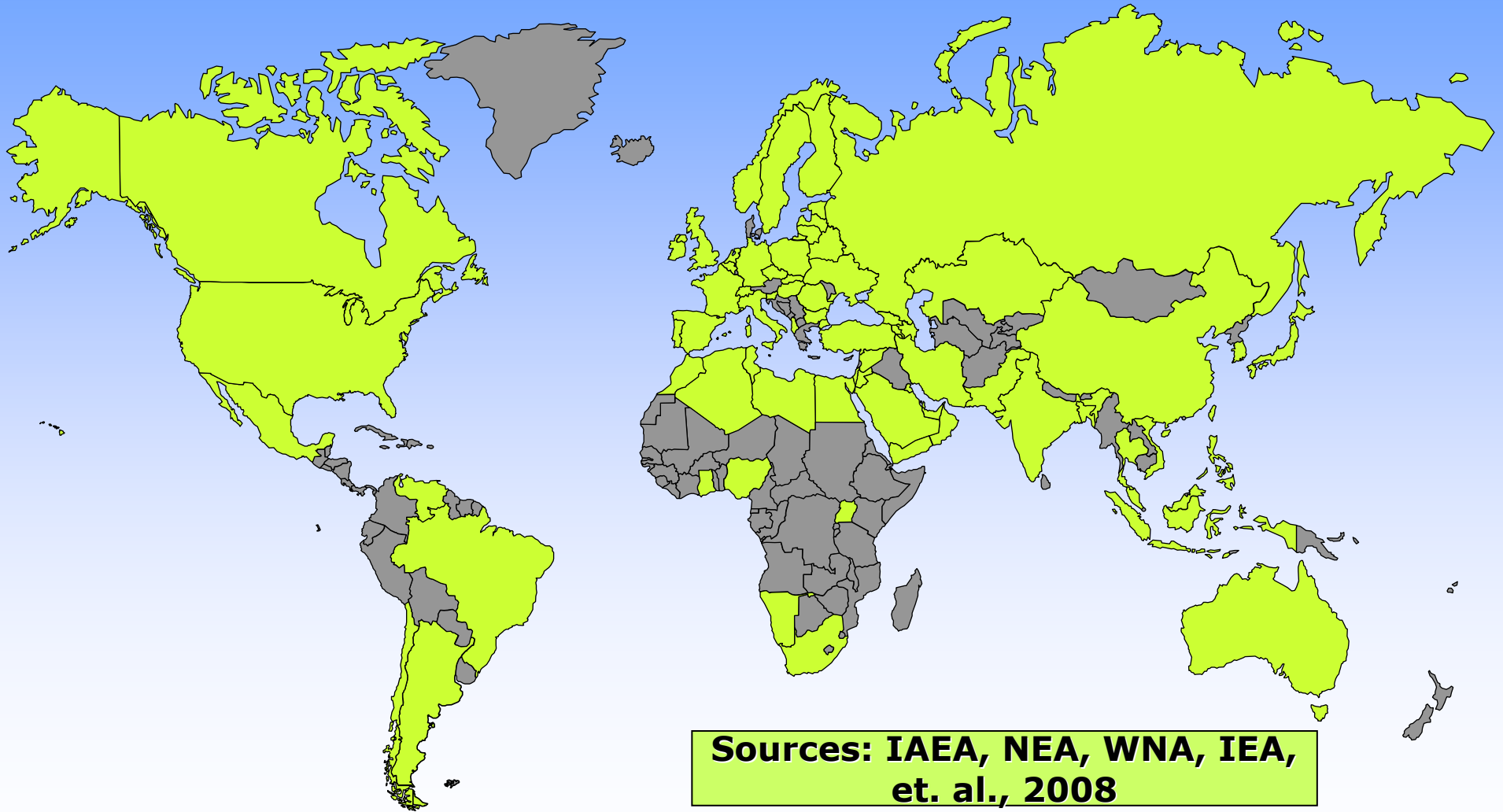
57 Plants Under Construction
Source: IAEA, 2010

Non-nuclear Countries Considering Nuclear Power Plants



Up to 60 potential newcomers!

The Nuclear Future???



**Sources: IAEA, NEA, WNA, IEA,
et. al., 2008**

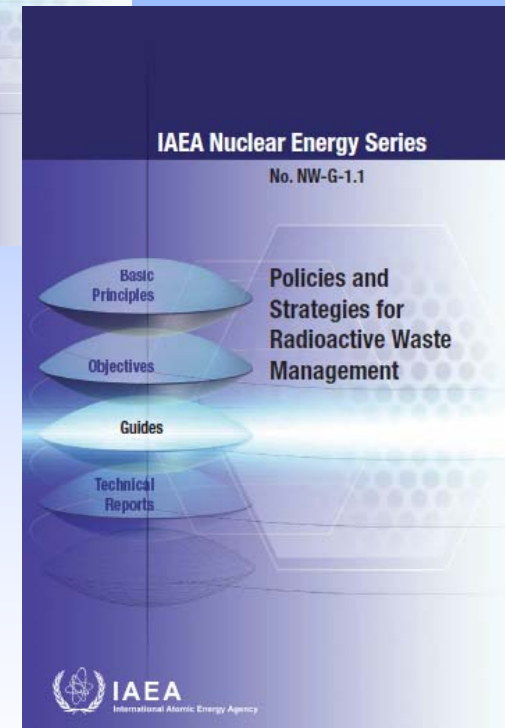
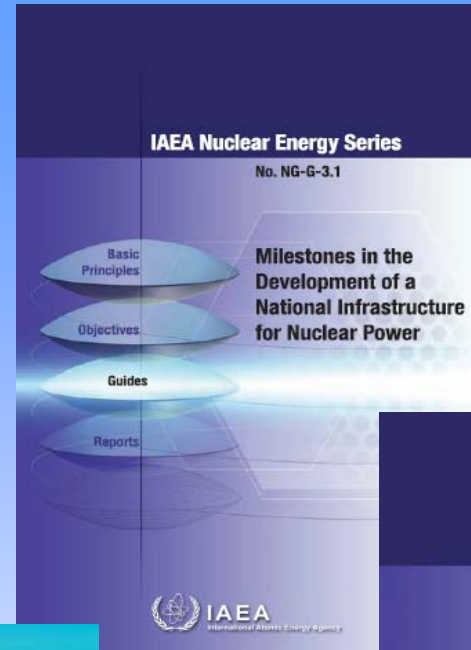
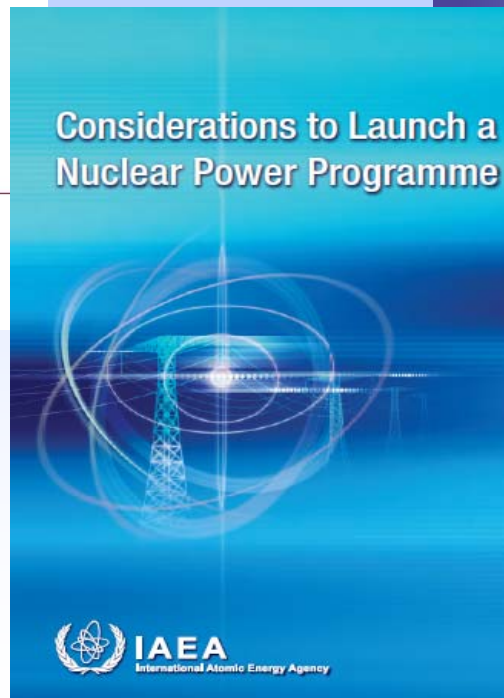
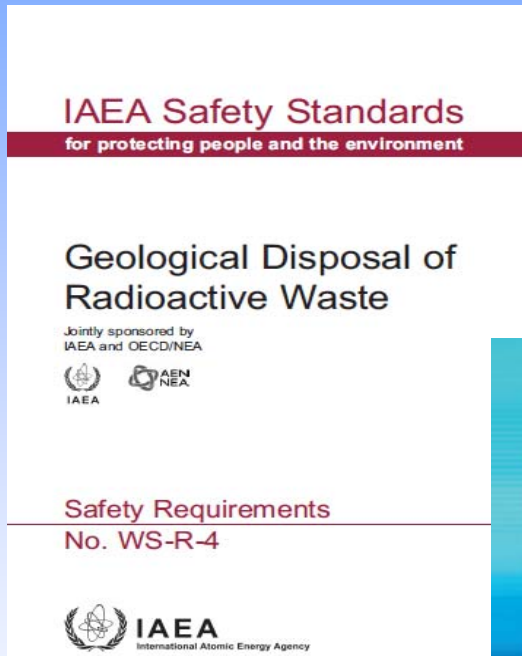
from www.ncitd.org



New Interest in Nuclear Power

- ◆ **61 nations have requested support from IAEA on what they need to introduce to have nuclear power**
 - **Africa 20**
 - **Latin America 12**
 - **Asia Pacific 20**
 - **Europe and FSU 9**

Advice from the IAEA



A Secure, Safe, Energy Future

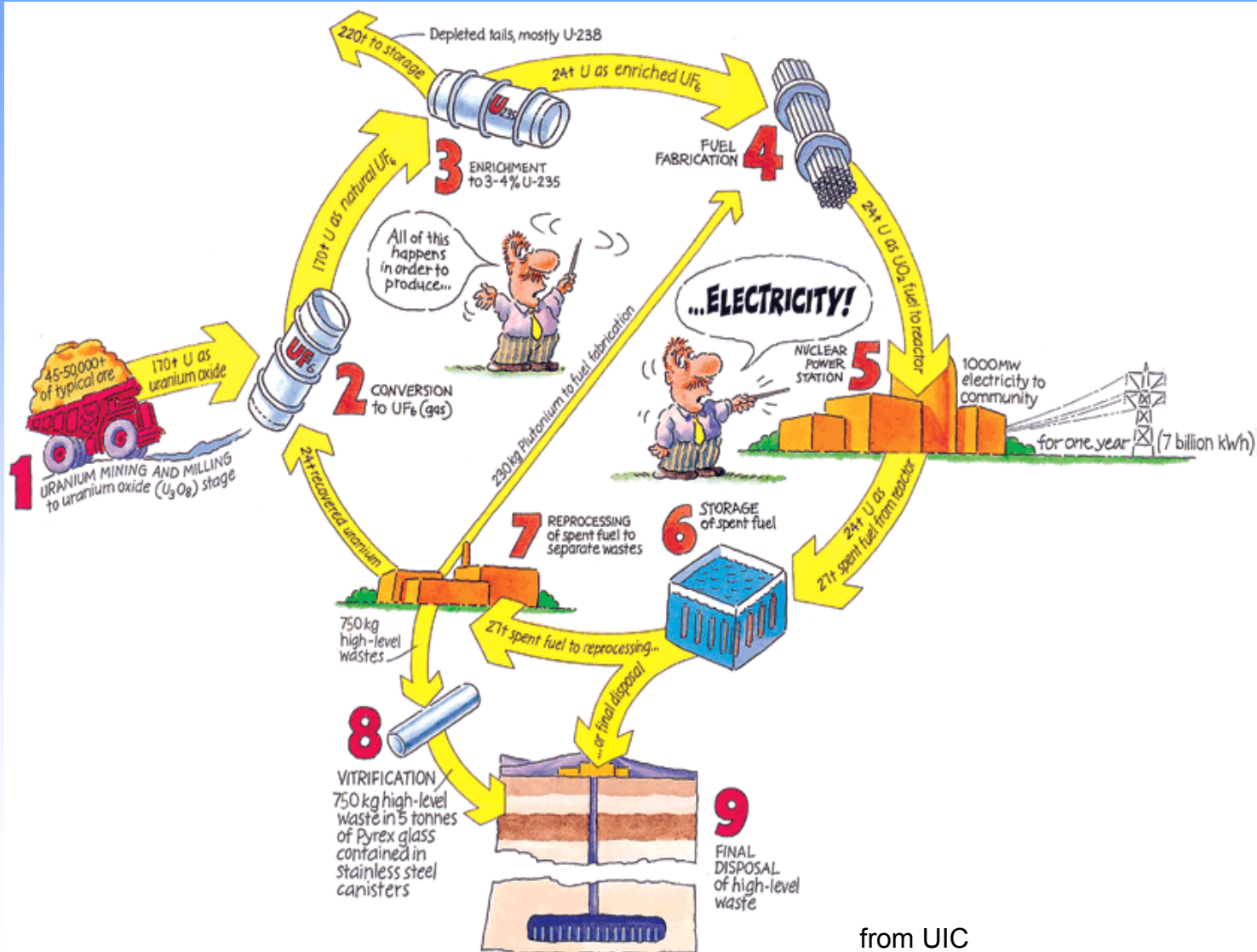
◆ Global goals:

- Security of supply of energy
(NB resource and geopolitical concerns)
- Low-carbon electricity generation
(Climate change deniers are now scarce)

◆ Expanded nuclear power can help but we must have:

- Safe and secure NFC facilities & materials
- Security of supply of front-end services
- Security of availability of back-end services including reprocessing - if requested
- Access to geologic disposal - in all cases

Nuclear Fuel Cycle



from UIC

<http://www.world-nuclear.org/education/nfc.htm>

Waste types to be managed by new nuclear nations

- ◆ **Wastes from reactor operation**
- ◆ **Wastes from decommissioning**
- ◆ **Spent Fuel**
- ◆ **Wastes from reprocessing and recycling**
- ◆ **Other wastes**
 - **Medical wastes**
 - **Industrial wastes**
 - **Research wastes**

Spent Fuel Management Options

- ◆ **National storage and disposal (early or late)**
- ◆ **Reprocessing abroad. Recycling and waste disposal nationally**
- ◆ **Reprocessing, recycling and waste disposal abroad**
- ◆ **National storage; disposal in a shared repository**
- ◆ **Fuel leasing (similar to point above)**
- ◆ **Retention of spent fuel as a valuable commodity**

Multilateral solutions?

- ◆ **Spent fuel storage**
 - Takes place *de facto* at reprocessors
 - Has been proposed by Russia

- ◆ **Reprocessing**
 - Commercial services offered

- ◆ **Disposal**
 - Wastes have been transferred, but
 - No credible project at present

A credible disposal strategy

- ◆ **Allocate responsibilities for long-term management**
- ◆ **Establish a funding mechanism.**
- ◆ **Develop a sound engineering concept for disposal**
- ◆ **Define a practicable storage strategy ensuring safety and security.**
- ◆ **Initiate a modestly sized national siting programme**
- ◆ **Ensure that the necessary core competence in waste management is built up and then maintained at the national level.**

Criteria for Assessing Options

◆ **Safety**

◆ **Political**

◆ **Security**

◆ **Legal**

◆ **Feasibility**

◆ **Societal**

◆ **Economics**

Conclusions and Recommendations

- ◆ Consider the lifecycle of all nuclear facilities and all radioactive materials from the outset;
- ◆ Even if disposal is far off, planning and organization should begin early
- ◆ Resources must be made available
- ◆ Lessons can be learned from advanced programmes – but
- ◆ A “wait and see” policy - if this implies that no actions are being taken or planning being initiated - should not be an option

The most urgent tasks

- ◆ Establishing a know-how base
- ◆ Ensuring that all at-reactor facilities needed for safe handling and treatment of operational wastes will be available from day one
- ◆ Ensuring sufficient storage capacity will be available at ALL future times
- ◆ Establishing credible disposal options
 - It is not necessary to choose definitive solutions at the outset; options can be kept open, but a minimum level of engagement is required for all open options

The End