GEN IV International Forum
Expertise | Collaboration | Excellence

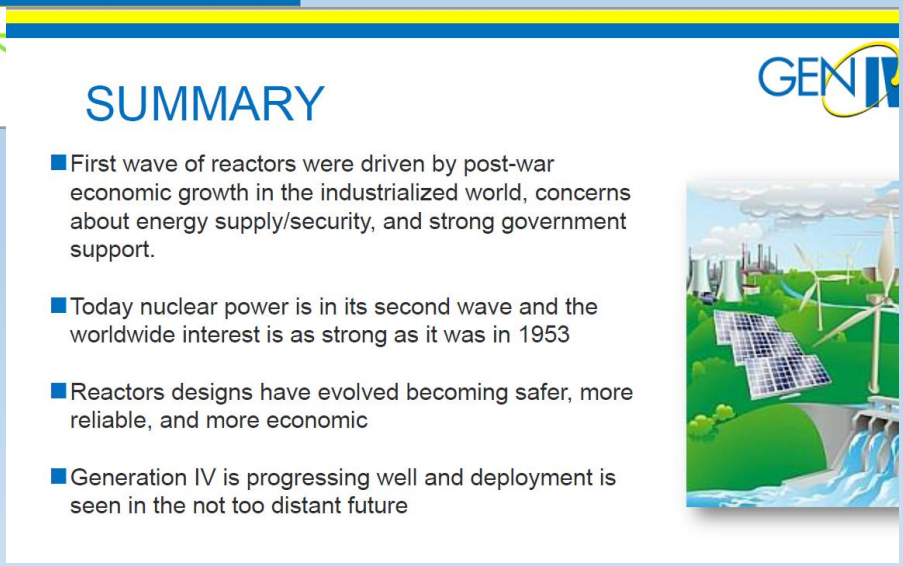
Atoms for Peace. The Next Generation

Summary / Objectives:

This webinar provides a historical perspective on the Atoms for Peace program, which launched the development of nuclear power around the globe, and describes the current outlook for the development and deployment on the next generation of nuclear power (Generation IV).

Meet the Presenter:

Dr. John E. Kelly is the Deputy Assistant Secretary for Nuclear Reactor Technologies in the Office of Nuclear Energy, U.S. Department of Energy. He is responsible for the U.S. civilian nuclear reactor research and development portfolio, which includes programs on Small Modular Reactors, Light Water Reactor sustainability, and Generation IV reactors.



For peaceful use of nuclear energy as electric power plants, President Eisenhower's speech as Atoms for peace in 1953 is a symbol of game change. After that early prototypes of power plants (Generation I) have developed into Large-scaled (Gen II) and present Evolutionary designs (Gen III including ABWR,APWR, VVER-1200,SMR). Now that we are developing Gen IV reactors.

ATOMS FOR PEACE

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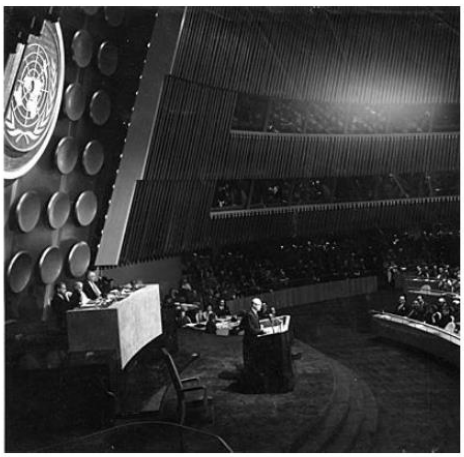

"Peaceful power from atomic energy is no dream of the future. That capability, already proved, is here – now – today."

~ *President Dwight D. Eisenhower, December 8, 1953, to the 470th Plenary Meeting of the United Nations General Assembly*

GENERATION IV REACTORS

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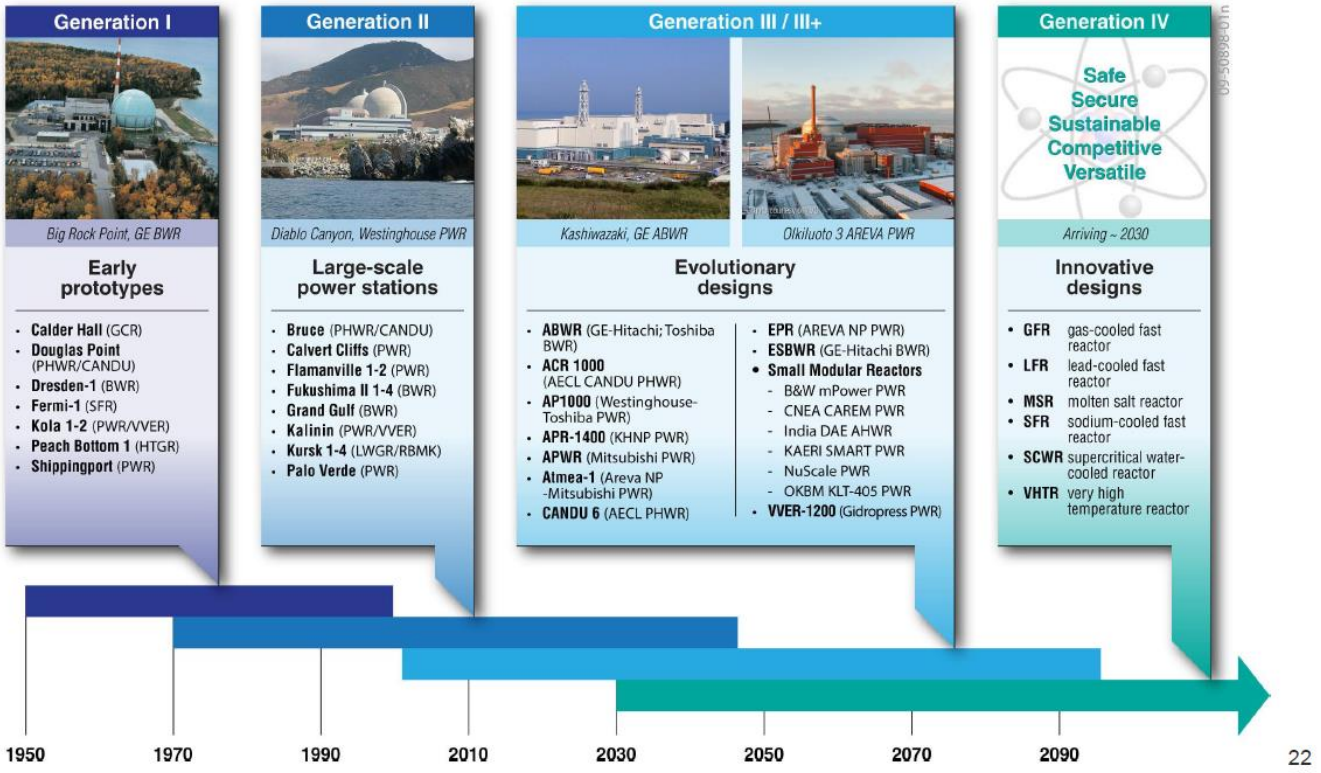
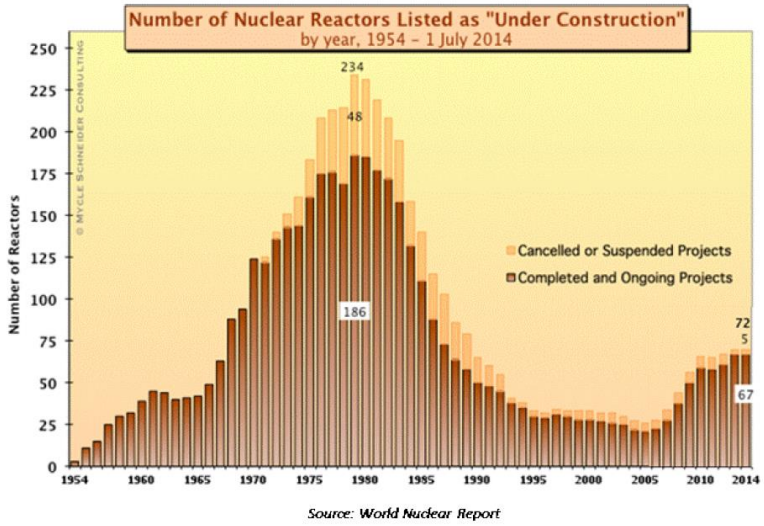


https://www.gen-4.org/gif/jcms/c_59461/generation-iv-systems

NUCLEAR POWER PLANTS BUILT WORLDWIDE



Source: World Nuclear Report

Two waves of nuclear power plants built, the first 1970s-1980s and the second 2010s. Based on the different drivers.

DRIVERS FOR THE FIRST WAVE OF REACTORS

- **Encouraging drivers**
  - Re-emerging Economies Required Increased Energy in Post World War II Period
  - The Oil Crises of the 1970s
  - Strong Government Backing
- **Neutral drivers**
  - Acid Rain
  - Air Pollution
  - 1971- Inadvertent Climate Modification. Report of the Study of Man's Impact on Climate

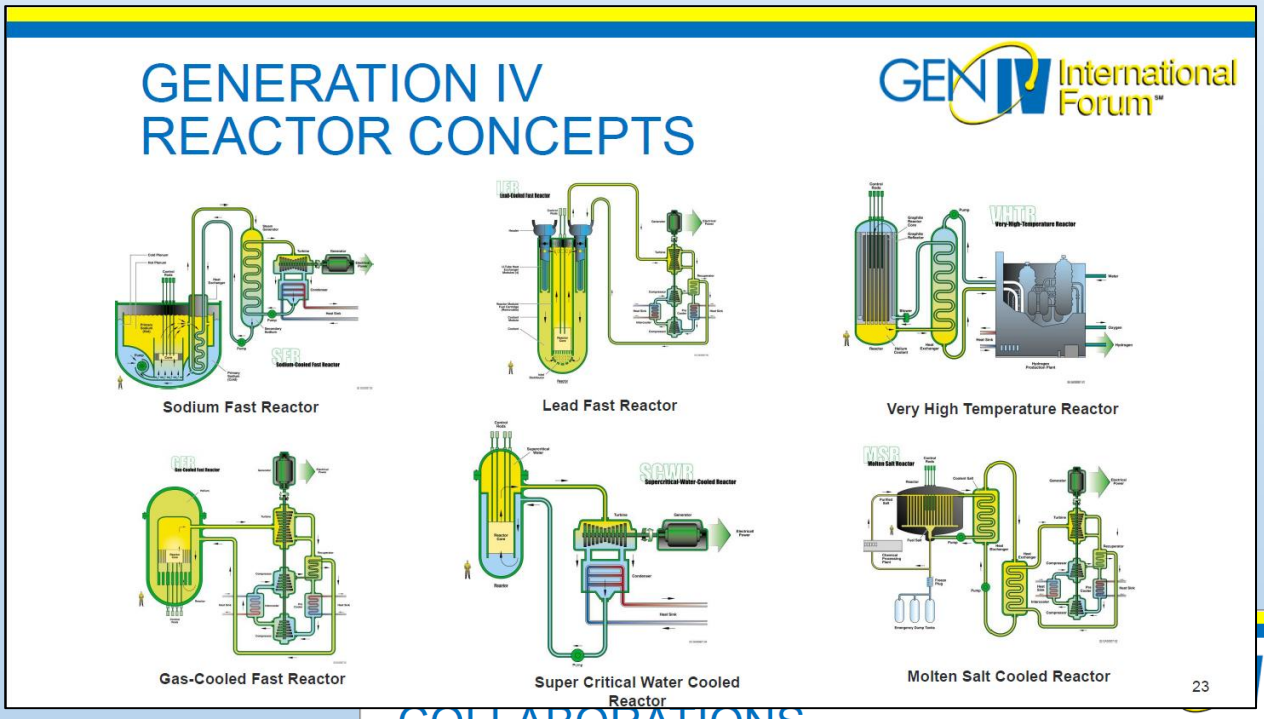
- **Discouraging drivers**
  - High Interest Rates
  - Fear of Radiation
  - Fear of Nuclear Weapons
  - Three Mile Island Accident
  - Chernobyl Accident
  - Waste Management Impasse

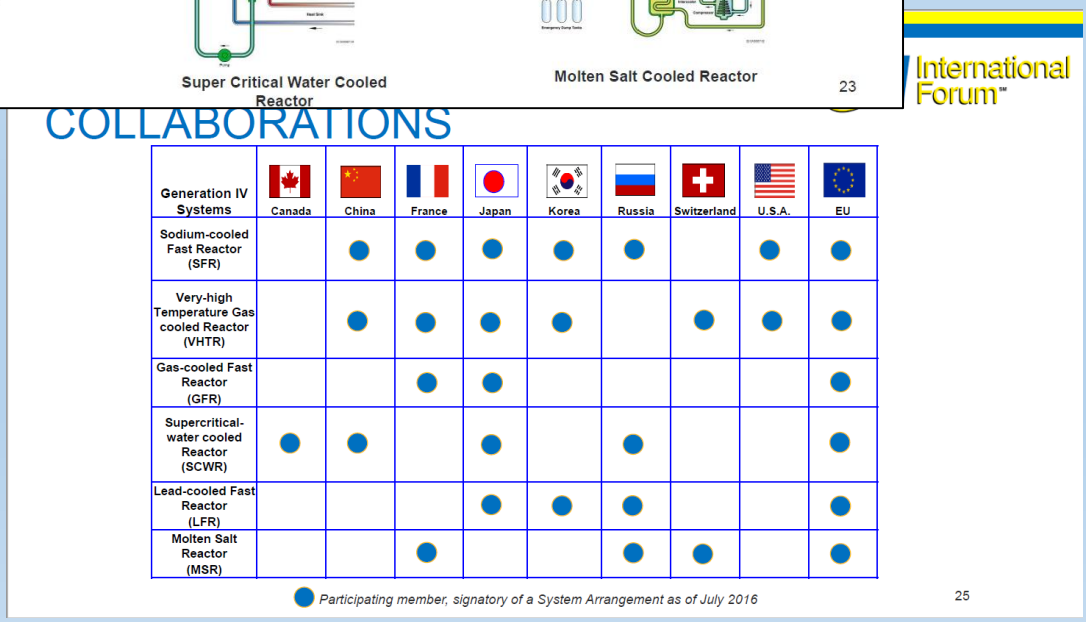
CURRENT DRIVERS FOR NUCLEAR POWER

- **Energy security**
  - Nuclear shelters countries from imports of costly fossil fuels
  - Replacing retired nuclear or coal generation plants
- **Economic incentives**
  - Nations rich in fossil fuel would prefer to export those resources and use nuclear for domestic electricity production
- **Environmental protection**
  - Replacing coal with nuclear can alleviate air pollution problems
- **Climate change concerns**
  - Nuclear is the "emission-free" base load generation technology
  - Dry condenser cooling possible with small modular reactors when water usage is restricted

GIF has led international collaborative efforts to develop next generation nuclear energy systems that can help meet the world's future energy needs. Generation IV designs will use fuel more efficiently, reduce waste production, be economically competitive, and meet stringent standards of safety and proliferation resistance.

With these goals in mind, some 100 experts evaluated 130 reactor concepts before GIF selected six reactor technologies for further research and development. These include the: Gas-cooled Fast Reactor (GFR), Lead-cooled Fast Reactor (LFR), Molten Salt Reactor (MSR), Supercritical Water-cooled Reactor (SCWR), Sodium-cooled Fast Reactor (SFR) and Very High Temperature Reactor (VHTR).





As of 2016, for the latest see the below site.
https://www.gen-4.org/gif/jcms/c_9342/framework-agreement