# 2016 Report of Advanced Nuclear Power Reactors Working Group

References concerning Advanced Nuclear Power Reactor Systems:

## A. Gen III+

### World Nuclear Association

**Commercial reactors of more than 700 MWe.**
http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/advanced-nuclear-power-reactors.aspx

- **Improved designs of nuclear power reactors are constantly being developed internationally.**
- **The first so-called Generation III advanced reactors have been operating in Japan since 1996. These have now evolved further.**
- **Newer advanced reactors (III+) now being built have simpler designs which reduce capital cost. They are more fuel efficient and are inherently safer.**

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### Nuclear Energy Institute

New Reactor Designs
http://www.nei.org/Issues-Policy/New-Nuclear-Energy-Facilities/New-Reactor-Designs

## B. GenIV

### World Nuclear Association

http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/generation-iv-nuclear-reactors.aspx

- **An international task force is developing six nuclear reactor technologies for deployment between 2020 and 2030. Four are fast neutron reactors.**
- **All of these operate at higher temperatures than today's reactors. In particular, four are designated for hydrogen production.**
- **All six systems represent advances in sustainability, economics, safety, reliability and proliferation-resistance.**
- **Europe is pushing ahead with three of the fast reactor designs.**
- **A separate program set up by regulators aims to develop multinational regulatory standards for Generation IV reactors**

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**GIF (GenIV International Forum)**
https://www.gen-4.org/gif/jcms/c_59461/generation-iv-systems

Six technologies selected for R&D:  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).

## C. SMR

Small Nuclear Power Reactors
SMR - Small Modular Reactors (Small and Medium Reactors - IAEA)
**World Nuclear Association**
http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/small-nuclear-power-reactors.aspx

- **There is revival of interest in small and simpler units for generating electricity from nuclear power, and for process heat.**
- **This interest in small (<300 MWe) and medium (up to 700 MWe) nuclear power reactors is driven both by a desire to reduce the impact of capital costs and to provide power away from large grid systems.**
- **The technologies involved are numerous and very diverse.**

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**Nuclear Energy Institute**
Small Reactor Designs
http://www.nei.org/Issues-Policy/New-Nuclear-Energy-Facilities/Small-Reactor-Designs

## D. Advanced Fuel Cycles

### INPRO (International Project on Innovative Reactors and Fuel Cycles)

https://www.iaea.org/INPRO/index.html

### USDOE

http://www.energy.gov/ne/nuclear-reactor-technologies/fuel-cycle-technologies

### AFCR

http://www.candu.com/site/media/Parent/CANDU%20brochure-AFCR-FINAL-HR%20SINGLES.pdf

One of the unique features of CANDU reactor design is its ability to use alternative fuels such as recovered uranium (RU) from the reprocessing of used light water reactor fuel, low-enriched uranium (LEU) and plutonium (Pu) mixed oxide, thorium and actinides, in addition to the conventional natural uranium.