

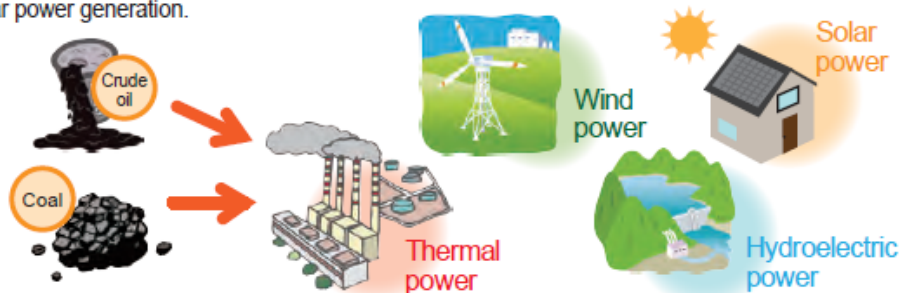
# Various forms of energy

## Mechanism of nuclear power generation

### About power generation

In today's world, electricity is vital in our daily lives. Methods to make electricity include thermal, nuclear, hydroelectric, and wind power generation. Hydroelectric and wind power generation use force from water and wind, respectively, to directly rotate generator turbines to make electricity. Thermal power generation makes electricity by combusting natural gas, petroleum, or coal. The energy obtained by nuclear power generation from just one gram of uranium is equivalent to the energy obtained by thermal power generation from 2,000 liters of petroleum.

On the other hand, various issues must be addressed, such as the global warming due to CO<sub>2</sub> emissions produced by thermal power generation, effects on the natural environment from dam construction for hydroelectric power generation, and processing and disposal of radioactive waste from nuclear power generation.



### Difference between nuclear power generation and atomic bombs

Nuclear power generation and atomic bombs both use energy from the nuclear fission of uranium. Atomic bombs must generate a vast amount of energy in an instant, thus highly enriched uranium, with close to 100% concentration of uranium 235, which easily undergoes nuclear fission, is used. In contrast, nuclear power generation aims to boil water continuously, thus low-enriched uranium, with 3-5% uranium 235 concentration, is used. Moreover, many control rods, consisting of material that absorbs neutrons, are placed like sleeves around the fuel rods in the reactor, to control the radiation emitted by the nuclear fission reaction.

	Ratio of Uranium-235 to Uranium-238 & Chain Nuclear Reaction	Method of Controlling Fission Rate
In a Nuclear Power Plant	<p>Uranium 235 (3~5%) Uranium 238 (95~97%)</p> <p>The ratio of Uranium-235 is low, so fission is sustained at a constant scale, for reasons such as absorption of neutrons by Uranium-238.</p>	<p>Many control rods are installed and the reactions are self-limiting, so the rate of fission cannot increase rapidly.</p>
In a Nuclear Bomb	<p>Gunpowder Uranium 235 (Almost 100%)</p> <p>The ratio of Uranium-235 is nearly 100% and at this high level neutrons cannot be absorbed by anything else, so one atom after another undergoes fission and the energy is released instantly as an explosion.</p>	<p>No control rods are installed and the reactions are not self-limiting, so the rapid increase in fission cannot be stopped.</p>