



Environmental
Impacts of Technology

The Production of Electricity

Nuclear Power



Nuclear Power

How does it work?

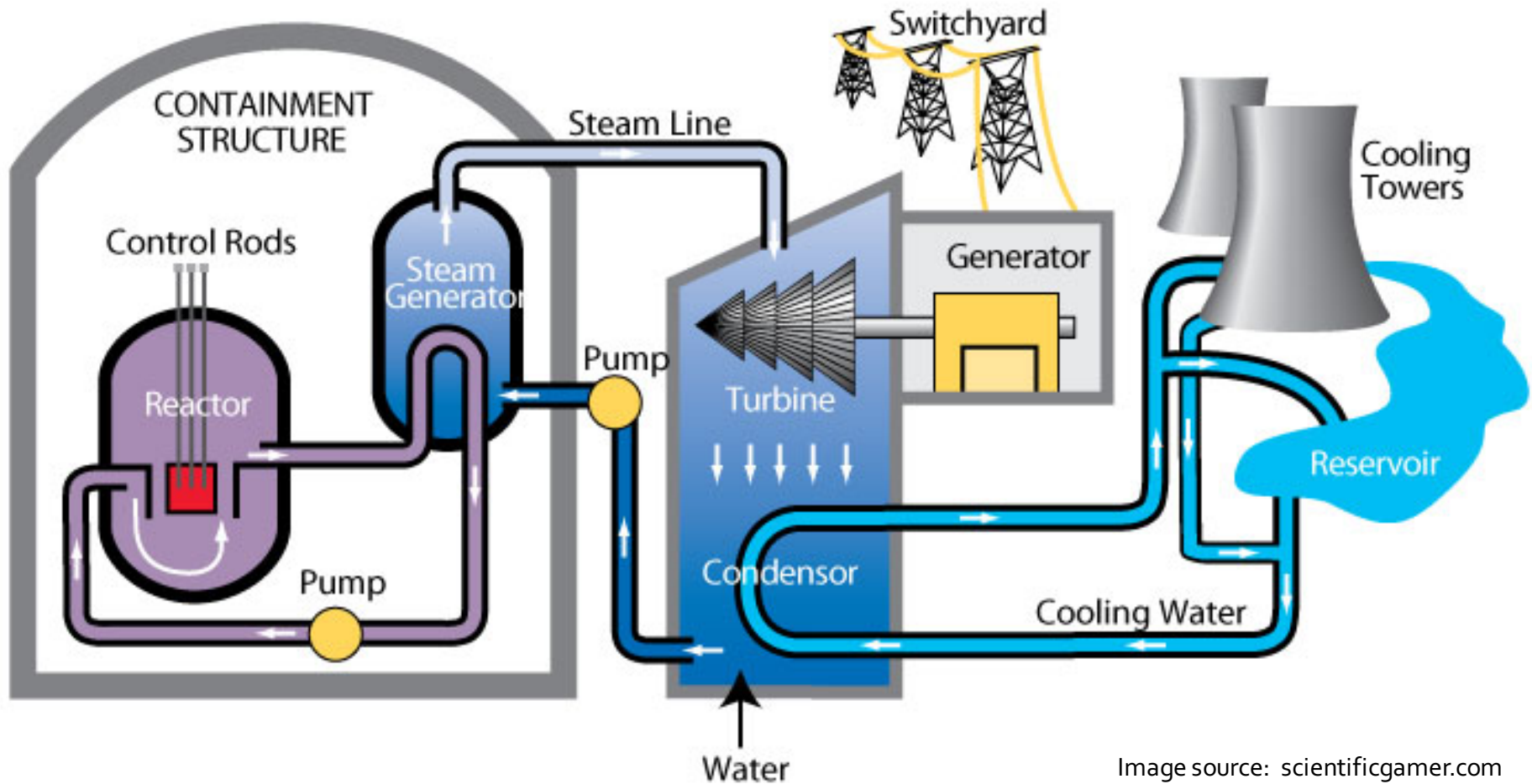
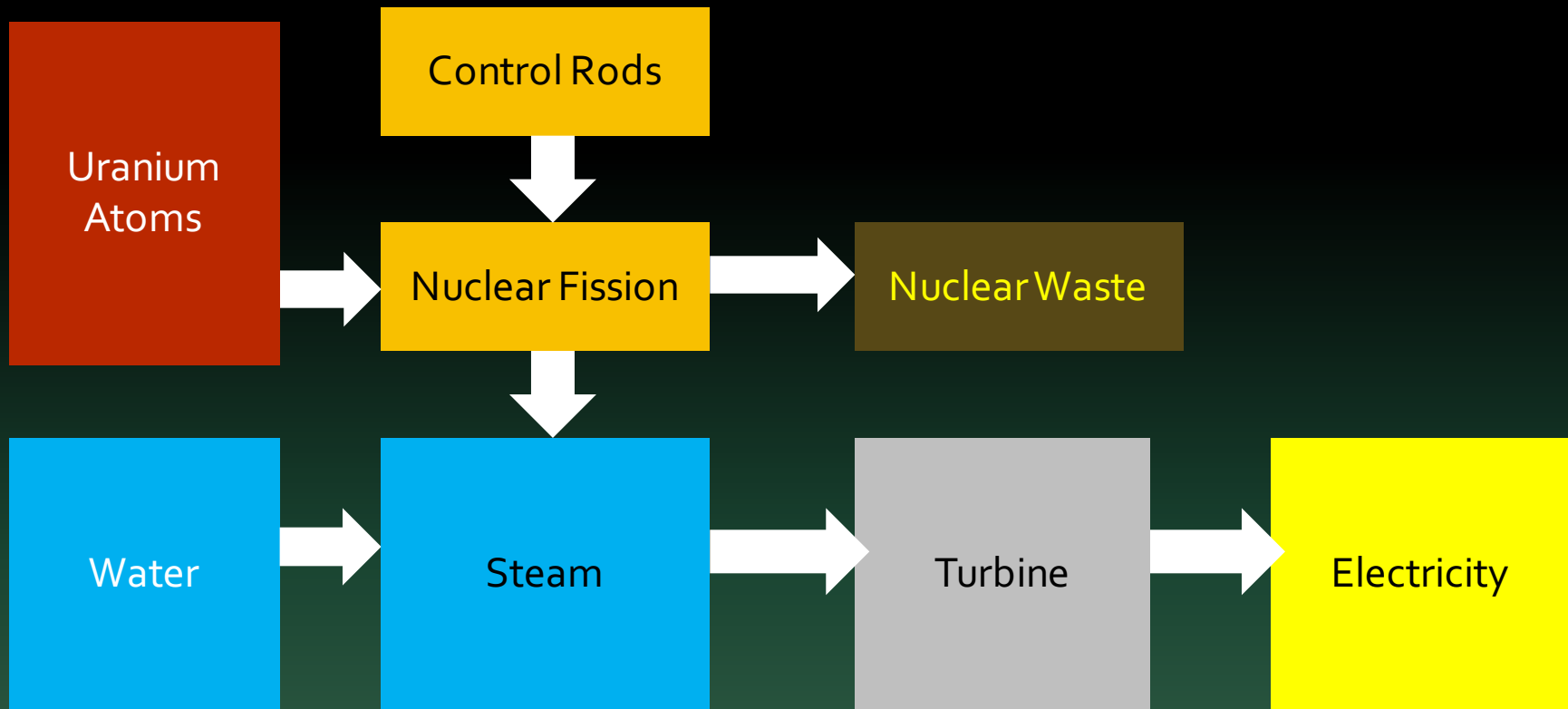


Image source: scientificgamer.com

Nuclear Power

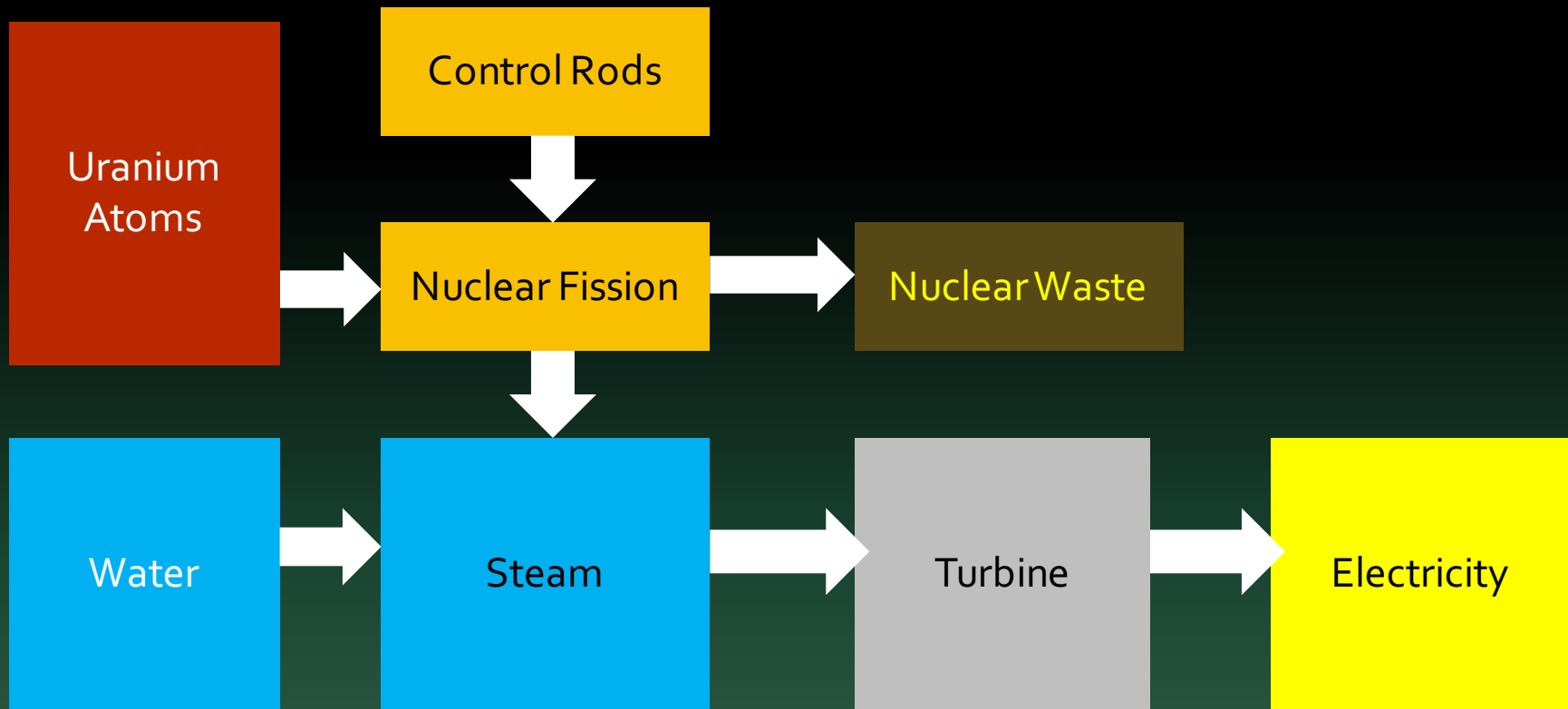
How does it work?



1. Uranium atoms split in a process called nuclear fission.
2. Fission produces heat. Fission also causes fission in other uranium atoms.
3. Control rods regulate how much fission occurs.
4. Heat turns water into steam.
5. Steam turns the blades of a turbine, which produces electricity.

Producing Electricity from Nuclear Energy

How does it impact the environment?

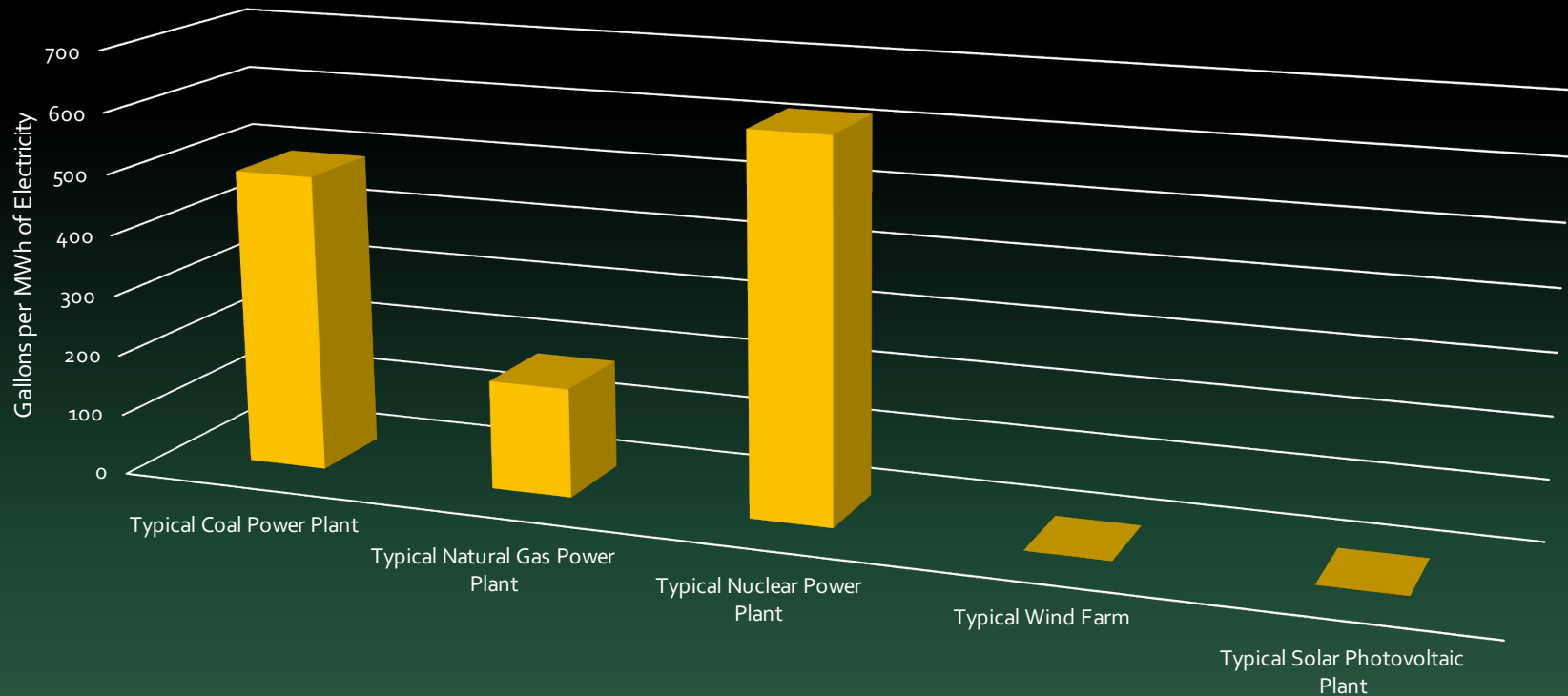


Air Quality and Greenhouse Gas Emissions from Nuclear Energy

- Nuclear power has ZERO GHG emissions and ZERO air pollution during use.
- But, nuclear energy is responsible for some GHG emissions during manufacturing, transport, installation, and decommissioning – about 0.06 pounds of carbon dioxide equivalent gases per kWh of energy produced compared to 2 pounds per kWh for burning coal.

Producing Electricity from Nuclear Energy

How does it impact the environment?

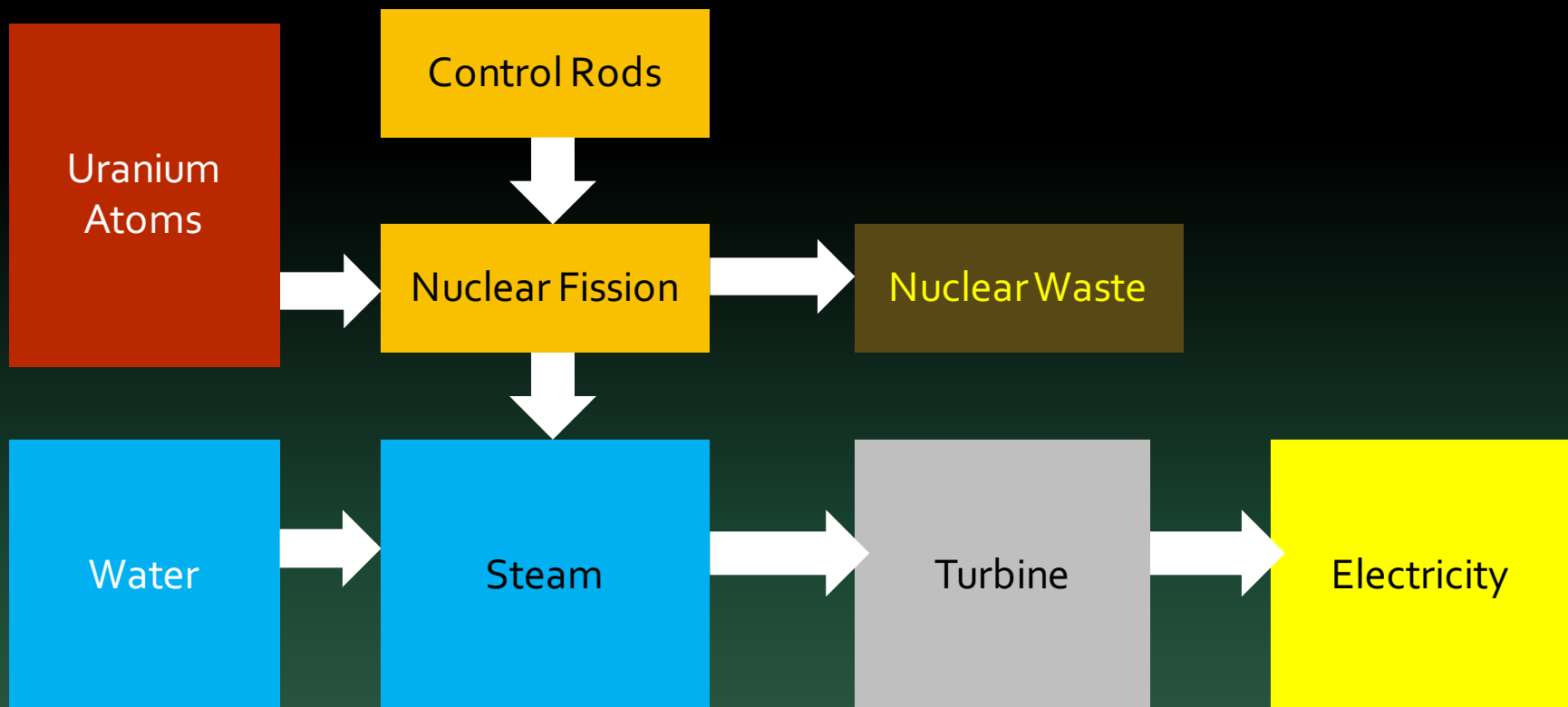


Water Usage

- Nuclear power can use large amounts of water, but some of this water is returned to its point of origin rather than evaporating, leaving about 400 gallons/MWh consumed in the production of electricity

Producing Electricity from Nuclear Energy

How does it impact the environment?



Other Impacts

- Land Usage: Like natural gas and coal burning plants, nuclear power plants consume very small amounts of land per electricity produced.

Producing Electricity from Nuclear Energy

How does it impact the environment?

Other Impacts

- While nuclear power plants release very small amounts of radiation into water and air surrounding the plants, the most serious environmental (and public health) threat imposed by nuclear energy is that of nuclear waste.
- In theory, nuclear waste can be stored safely in geological repositories (in the earth), but the extreme ecosystem and human health consequences of a leak or release of such waste makes it difficult to find a community willing to store it.



Image Source: CDC



Image Source: Jason Minshull

The Bottom Line

When operating “normally”, nuclear energy is safe, clean, and cost effective. However, environmental and health impacts can skyrocket during accidents – whether those accidents occur at the nuclear power plants themselves or at waste facilities.

Producing Electricity from Nuclear Energy

Why does the U.S. use nuclear power?

Nuclear energy is clean and reasonably cost effective, but is neither abundant or renewable. The U.S. is the world's leading producer of nuclear energy, and after a 30 year period during which few new reactors were built, the U.S. is now in the process of licensing and building several new reactors.

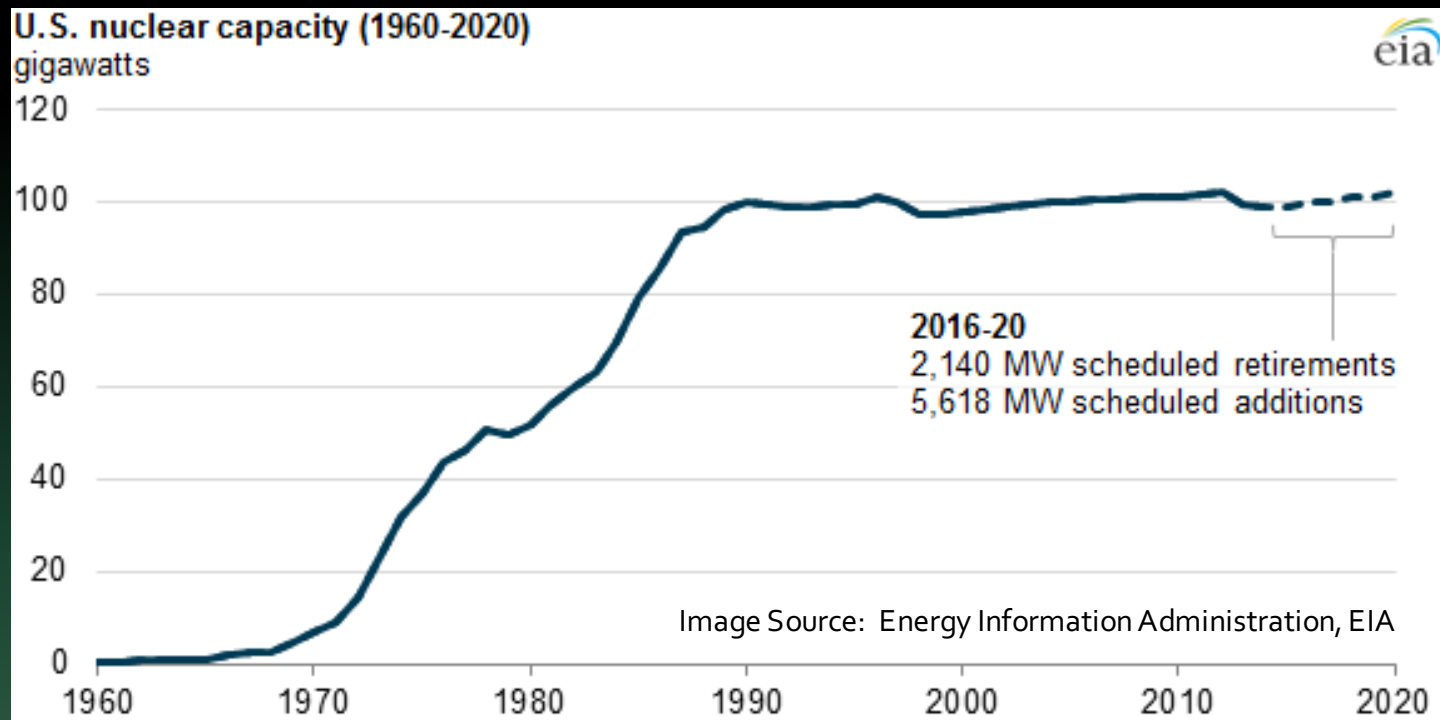
Nuclear
Power
Plants in the
U.S.



Image Source: world-nuclear.org

Producing Electricity from Nuclear Energy

What's next for the U.S.?



The expansion of natural gas, lower cost of fossil fuels, expansion in renewable energy sources, and changes in wholesale electricity markets have combined to make the addition of nuclear reactors and power plants in the U.S. more difficult, hence limiting future expansion of nuclear energy.



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Additional Impacts

<http://comingalongside.org/Technology/>

<http://labs.ee.washington.edu/community/EnvironmentallImpacts/>