



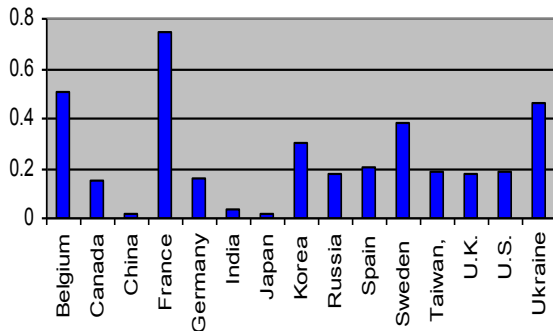
# • Nuclear Energy Fact Sheet •

By: Austin Luginbuhl

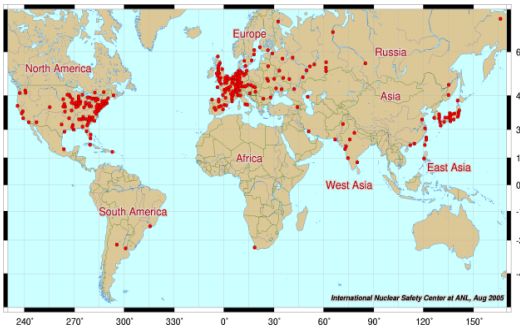


## General World Information

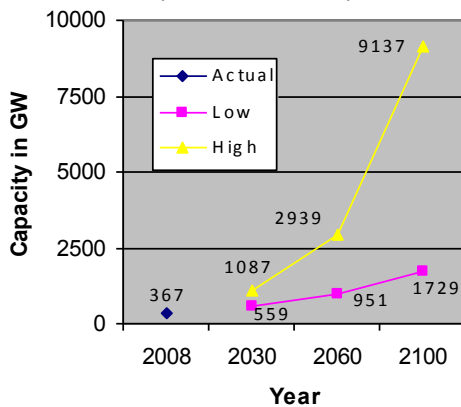
Percentage of Energy Output (2012)



Geographic Distribution of Reactors



Projected World Capacity (Present – 2100)



## Environmental Concerns

**Air Emissions:** One of the big most important aspects of nuclear energy production is that there is no release of pollutants during the production process; however just like any other production method, there are carbon emissions associated with the mining and transportation of fuel.

**Radioactive Waste:** The disposal of spent fuel is one of the biggest environmental problem for the nuclear energy sector. Once all of the energy is extracted, what is left is radioactive waste with a very long half-life. Currently the spent fuel is stored on site in either underground, water-filled, steel-lined, concrete vaults or aboveground, steel-reinforced containers.

**Water Use:** Nuclear plants are constructed near large bodies of water because they use large quantities of water to cool their reactors, this can affect the biodiversity in and around the body of water. Once the water has cooled the reactor, the higher temperature discharge is released and can be contaminated with heavy metals and salts, greatly affecting water quality and aquatic life.

## United States Information:

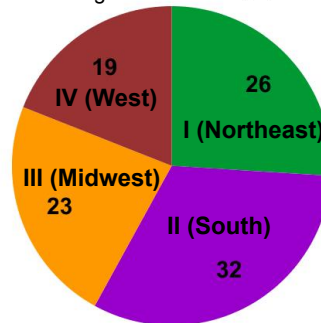
**Policy:** The majority of the Nuclear energy in the U.S. is produced by private companies. The government is heavily involved in other fields such as safety and environmental regulations, energy goals and R&D funding. Policy is also trying to solve the ongoing issue around the disposal of radioactive material.

### Quick Facts

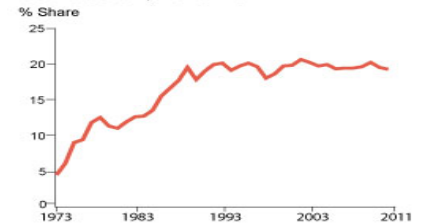
- Produced 821b kWh in 2011
- Tax credit of 1.8 – 2.1 ¢/kWh
- Loan guarantees for nuclear reactors and emission free technology

- Four new reactors are slated to come online by 2017
- EIA projects the industry will gain 19.1 GW of energy by 2040

Number of Reactors per Region



Nuclear Share of Electricity Net Generation, 1973-2011



Source: U.S. Energy Information Administration, Monthly Energy Review, Table 7.2a (March 2012).

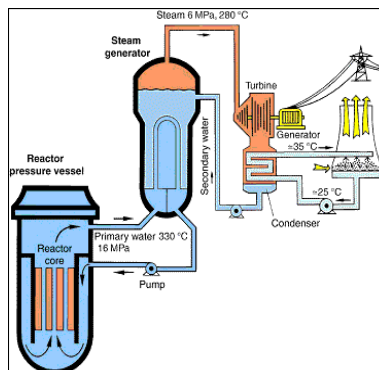
## Reactor Basics

•Reactors maintain a chain reaction that produces a flow of neutrons generated by splitting the atom (nuclear fission), commonly uranium-235

•There are two types of reactors: Research and Power, only power reactors are considered in the publication

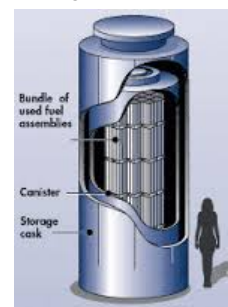
•The heat from the fission heats water into very high pressure steam which powers a turbine to run a generator

•The most common fuel is uranium-235 but Plutonium is also used which has a much greater energy content: 1g Pu = 1 tonne U<sup>235</sup>



## Waste Storage

### Aboveground Cask



### Underwater Barrels



Waste storage is the most limiting factor in nuclear energy production

Percentage of Energy Output

“World Nuclear Generation and Capacity”. *NEI.org*. Nuclear Energy Institute, January 2014. Web. 13, April 2014.

This graph shows the nuclear production of a number of countries as a proportion of their total energy production.

Geographic Distribution of Reactors

Nuclear Power in the U.S. from the World Nuclear Association

This map shows the location of the nuclear reactors across the United States.

Projected World Capacity

WNA Nuclear Century Data from the World Nuclear Association

This graph depicts the projected growth in the nuclear energy field over the next 100 years, current, high estimate and low estimate are shown as blue, yellow and magenta respectively.

Environmental Concerns

Nuclear Energy Environmental concerns from the Environmental Protection Agency

All of the information regarding environmental concerns was taken from the EPA because it was the most reliable source for environmental information.

Policy

U.S. Nuclear Power Policy from the World Nuclear Association

Quick Facts

- WNA: Nuclear Power in the USA
- WNA: U.S. Nuclear Power Policy
- Same as above
  - Number of Reactors
  - Numbers from a dataset published by the Nuclear Regulatory Commission

- EIA: Nuclear Energy in Brief
- Same as above

Nuclear Generation by Percent  
This graphic was made by the EIA depicting the change in percentage of nuclear energy from 1973-2011

Reactor Basics

All of the information as well as the graphic was from the European Nuclear Society

Waste Storage

Underwater picture is from the WNA  
Aboveground graphic is from the EIA