Nuclear energy is released from the fission of heavy elements like uranium, a weakly radioactive metal found around the world. Fission splits large atoms into smaller atoms, releasing enormous amounts of energy. During electricity generation, the process of fission emits only water vapor but leaves behind spent fuel, which remains highly radioactive. Milling uranium, processing uranium into nuclear fuel, and operating nuclear power plants all create various types of nuclear waste, both low-level and high-level.

Why does nuclear energy matter?

The United States has used nuclear power since the mid-20th century. Nuclear energy makes up around 20% of U.S. electricity supply. There are currently 98 commercial nuclear reactors operating at 60 nuclear power plants in thirty states.[1][2]
How does geoscience help inform decisions about nuclear energy?

Geoscientists find and extract our supply of heavy elements like uranium. They evaluate the safety of nuclear power plants to withstand natural hazards such as earthquakes, floods, and tsunamis, and also play a central role in identifying safe options for short- and long-term management of nuclear wastes, including underground storage of spent-fuel and high-level waste.

References

2 How many nuclear power plants are there in the United States, and where are they located? EIA, https://www.eia.gov/tools/faqs/faq.php?id=207&t=3

Learn More

Introductory Resources

- Nuclear Explained (Webpage), Energy Information Administration
  This web article provides an overview of nuclear energy, uranium as a fuel for nuclear fission, the operation of U.S. nuclear power plants, the nuclear fuel cycle (uranium exploration, mining, milling, conversion, and enrichment, fuel use, and fuel disposal), uranium sources, status of the U.S. nuclear industry and power plants, and environmental impacts of nuclear power.

- What You Need to Know About Energy: Nuclear (Webpage), The National Academies
  An overview of the role of nuclear energy in the United States, the benefits and disadvantages of nuclear, and opportunities and challenges for using nuclear energy in the future.

Resources for Educators

- Education Resources Network, AGI's Center for Geoscience & Society
  Search for nuclear energy resources in: Curricula & Instruction, Teaching Media

- NGSS Performance Expectations, Next Generation Science Standards
  K-ESS3-1, 4-ESS3-1, MS-ESS3-1, HS-ESS3-1, HS-ESS3-2, K-ESS2-2, 5-ESS3-1, MS-ESS3-3, MS-ESS3-4, HS-ESS3-3, HS-ESS3-4, HS-PS1-8

- NGSS Disciplinary Core Ideas, Next Generation Science Standards

Frequently Asked Questions

What are the major sources and users of energy in the United States?
U.S. Energy Information Administration

How much electricity does a typical nuclear power plant generate?
U.S. Energy Information Administration

How many nuclear power plants are there in the U.S.?
U.S. Energy Information Administration

Do you have a question that’s not listed here? Search all FAQs

Maps & Visualizations
Visualization of energy use in every state
Lawrence Livermore National Laboratory

The Lawrence Livermore National Laboratory, under the direction of the U.S. Department of Energy and using data from the Energy Information Administration, has produced flow charts showing the major sources and uses of energy in every U.S. state in the year 2014. Energy flows from the sources (...