



Your **ECOLOGICAL** footprint

How Much Nuclear Waste Do You Generate?

There are 104 commercial nuclear generating units licensed to operate in the United States (Figure 1). Every 12–24 months each plant is shut down, and the oldest fuel assemblies are removed and replaced. Those spent fuel assemblies become high-level nuclear waste. How much of that nuclear waste is associated with your lifestyle? The answer depends on how much of the electricity you use comes from nuclear power plants. In turn that depends on how much electricity you use and what fraction of that electricity comes from nuclear power.

The first step of calculating your nuclear waste footprint is to get a recent copy of your electric utility bill. If you live in a dorm or someplace where you don't see your bill, get a recent one from your parents. Your bill contains information about the quantity of electricity used in the past month (and perhaps year-to-date figures) in units of kilowatt-hours. From that information, estimate the total number of kilowatt-hours you use in a year (if you keep your old bills, you may be able to calculate this directly).

How many of those kilowatt-hours came from a nuclear facility? The answer depends on where you live. Table 1 lists the fraction of electricity generated from nuclear power by region in the United States for 2004. Note the strong regional differences and the fact that even if you live in a state with no nuclear reactors, you may still use power generated by a nuclear reactor. This is due to the fact that the power transmission system crosses state boundaries. Find your regional fraction from Table 1 and multiply it by your annual electricity use. This is the number of kilowatt-hours you use in a year that come from a nuclear facility.

Those 104 nuclear plants in the United States generate 532 million megawatt-hours of electricity each year. They also produce about 2,407 metric tons of uranium in the form of spent fuel each year. Use these two quantities to calculate a waste intensity for nuclear power in units of kilograms per kilowatt-hour. In the final step, multiply that intensity by

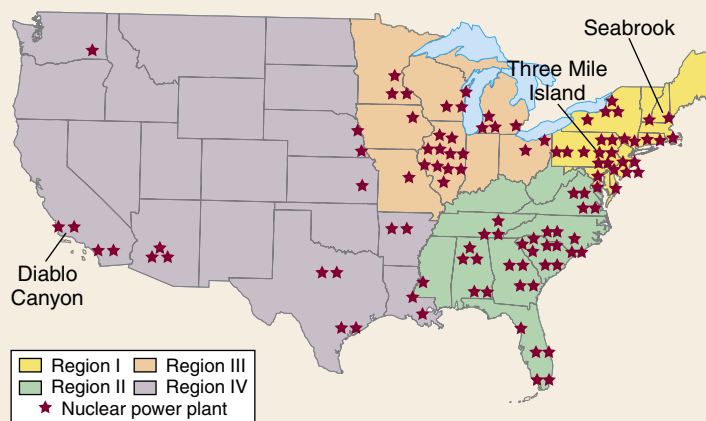


FIGURE 1 The location of nuclear power plants licensed to operate in 2006. Note that a single nuclear facility can have more than one reactor. For example, the Diablo Canyon facility has in California two reactor units. (Source: Data from U.S. Department of Energy.)

your annual electricity use to approximate nuclear waste generated by the electricity you use.

STUDENT LEARNING OUTCOME

- Students will be able to describe how their use of electricity is tied to the generation of nuclear wastes.

TABLE 1 Regional Share of Electricity Generated by Nuclear Plants

Regions (States)	Fraction of Total Electricity Use That Comes from Nuclear Power
New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont)	.25
Middle Atlantic (New Jersey, New York, Pennsylvania)	.35
East North Central (Illinois, Indiana, Michigan, Ohio, Wisconsin)	.23
West North Central (Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota)	0
South Atlantic (Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia)	.24
East South Central (Alabama, Kentucky, Mississippi, Tennessee)	.18
West South Central (Arkansas, Louisiana, Oklahoma, Texas)	.11
Mountain (Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming)	.08
Pacific Contiguous (California, Oregon, Washington)	.13
Pacific Noncontiguous (Alaska, Hawaii)	0

Source: Data from U.S. Department of Energy, *Electric Power Monthly*.