



External Costs of Energy Technologies

Position Statement

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The American Nuclear Society believes that decisions concerning national energy policy should take external costs into account. External costs are not included in the price of the energy produced; they are borne by groups of persons or by society at large, generally without consent or due compensation. External costs should be an essential element in energy policy because, without them, the resulting mix of energy sources is unlikely to minimize the cost to society, nor is the distribution of costs and benefits likely to be equitable.

External costs may be related to many factors, including impacts on public health, environmental damage (to fauna, flora, land, building materials, structures, or objects of cultural value), degradation of quality of life (noise, eyesores or visual disturbance, disagreeable odors, traffic), degradation of agricultural land, climate changes, and depletion of natural resources. These costs are incurred at various stages of the life cycle of an energy technology. The effects may be local, regional, or global.

An external cost can be negative—a benefit that is not properly reflected in the market price. An important example of this is the external cost associated with the availability of reliable, long-term, national sources of energy that are immune to changing international circumstances and less sensitive to weather-related conditions.

Every energy technology has some deleterious side effects. Only an in-depth analysis of the entire life cycle can result in a valid comparison with other technologies. Among the life-cycle aspects whose side effects need to be considered are mining, fabrication, and transportation of fuel; production of building and construction materials; construction, operation, and maintenance of the facility; air pollution; management of solid and liquid waste products; facility decommissioning; and restoration of the affected land, lake, or ocean areas.

While some energy technologies may appear to have smaller environmental impacts than others, their external costs may not be negligible when taking into account the complete life cycle. Also, an energy source that is inherently intermittent should not be considered by itself because it will require, for most applications, either a backup energy supply or an energy storage facility, whose external costs must also be considered.

Studies by independent scientific and technical organizations¹⁻³ have concluded that nuclear energy is associated with some of the lowest external costs and also shows significant negative external costs (benefits). Still lower external costs are expected for future fast-breeder reactors, in which the same amount of mined uranium is capable of yielding more than one hundred times as much energy. This fast-neutron reactor technology will greatly diminish the cost and duration of storage and management of spent fuel and will produce a waste with radioactivity that will reach background level in less than 500 years.



Decisions concerning the nation's energy policy are of the utmost importance because of their long-term consequences. It is in the public interest that energy technologies be evaluated on a level playing field, by taking all costs into account.

References

1. European Commission, DG XII: Report ExternE: *Externalities of Energy*, Vols. 1 through 6 (1995) and Vols. 7 through 10 (1999).
2. OECD Nuclear Energy Agency: Report NEA-4372: "Nuclear Electricity Generation: What Are the External Costs?" (2003).
3. Swedish Academy of Sciences: "External Costs of Nuclear Energy" (Nils Starfelt et al.) (2000).

The American Nuclear Society, founded in 1954, is a not-for-profit scientific and educational society of more than 10,000 scientists, engineers, and educators from universities, government and private laboratories, and industry.

Position Statements are the considered opinions and judgments of the Society in matters related to nuclear science and technology. They are intended to provide an objective basis for weighing the facts in reaching decisions on important national issues.