

EXECUTIVE SUMMARY

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THE UNTOLD STORY:

**The Economic Benefits of
Nuclear Technologies**

**Prepared By
Management Information Services, Inc.**



**ORGANIZATIONS
UNITED**

For Responsible Low-Level
Radioactive Waste Solutions

P.O. Box 65766
Washington DC 20035
202-293-0165



The Untold Story:

The Economic Benefits of Nuclear Technologies

Executive Summary

The use of nuclear technologies in modern society is widespread and pervasive. Yet the benefits of these technologies—including nuclear energy, medical and other radioisotopes, and radioactive materials—are not widely known or sufficiently appreciated. Most people know that nuclear power plants produce electricity and that radioisotopes are used in research. But few realize that:

- The nation's 109 nuclear power plants produce 20 percent of America's total electricity, and do so cleanly.
- One-third of Americans hospitalized every year are treated with nuclear medicine techniques.
- American industry depends on radioisotopes and radioactive materials for measurement and automation, process development, quality control and testing, and cost reduction. In many cases, there are no feasible substitutes to these materials.
- Many common, widely used consumer products—such as smoke detectors—require radioisotopes for their development, production, or operation.

Nuclear Technologies Touch Everyone's Life. Nuclear technologies help drive our advanced industrial economy and improve our standard of living. For example, these technologies are used to test and improve our automobiles;

improve health and save lives while reducing health care costs; increase crop yields and improve the health and productivity of farm animals; and generate enough electricity for 64 million homes without producing emissions that may contribute to global climate change.

The Benefits of Nuclear-Generated Electricity. America's 109 nuclear power plants, which are located in 34 states, generated 673 billion kilowatt-hours of electricity in 1995. In six states, nuclear electricity accounted for more than half of total electricity production.

Nuclear energy has enabled utilities to use less fossil fuel. In 1995, for example, nuclear energy displaced: 262 million tons of domestic coal; 52 million barrels of oil, which saved utilities \$650 million in oil purchases; and 1.1 trillion cubic feet of natural gas.

Because nuclear power plants do not burn fossil fuels, they emit no combustion by-products into the atmosphere. By substituting for other fuels in electricity production, nuclear energy has significantly reduced emissions of carbon dioxide, the chief greenhouse gas, and of other emissions.

The Clinton administration's Climate Change Action Plan is intended to achieve the president's pledge to limit U.S. carbon dioxide emissions to 1990 levels by the year 2000. The plan calls for a reduction of 108 million metric tons of carbon to be achieved in the year 2000. In 1995, the use of nuclear energy to generate electricity prevented the emission of 146 million metric tons of carbon—more than the target of the administration's plan.

Emissions of nitrogen oxide and sulfur dioxide are regulated by the 1990 Clean Air Act amendments. In 1995, the nation's nuclear power plants prevented the emission of 5.1 million tons of sulfur dioxide; and 2.5 million tons of nitrogen oxide.

The Benefits of Radioisotopes and Nuclear Materials. Nuclear technologies are pervasive, ubiquitous and important throughout all aspects of life. Their uses range from treating hyperthyroidism to checking the welds on new oil and gas pipelines, from ensuring the plastic coating adheres on non-stick pans to determining the structure of DNA—the carrier of the human genetic code, from powering the generators of unmanned spacecraft to enabling smoke detectors to function.

In addition, nuclear technologies save money and protect the environment. Finally, in many cases there are no adequate substitutes for nuclear technologies at virtually any price.

National Economic and Job Benefits

Nuclear technologies produce significant economic and employment benefits for the United States. In 1995, they generated:

- 4.4 million jobs,
- \$421 billion in sales,
- \$79 billion in tax revenues to federal, state and local governments.

The revenue and jobs generated through the use of nuclear technologies are both direct and indirect.

The concept of a direct sale or job is straightforward. The sale of a turbine to a nuclear power plant or the sale of a smoke detector are examples of direct sales. A job for an engineer at a nuclear power plant or for a nuclear medicine technician at a hospital or medical center are examples of direct jobs.

“Indirect” revenue and jobs are those generated throughout the economy by the direct economic impacts. For example, if the engineer in the nuclear plant goes to lunch at a nearby restaurant, the restaurant’s revenues represent indirect sales created, and the jobs of the waiters, cooks and other workers in the restaurant represent indirect jobs generated. In addition, the revenues and jobs generated in providing food and supplies to the restaurant represent indirect economic benefits.

Perspectives on Nuclear Technologies’ Economic Benefits. One way of grasping the magnitude of nuclear technologies’ benefits in 1995 is to view them in the context of the U.S. economy as a whole. They represented:

- Four percent of total U.S. employment,
- Six percent of total U.S. gross domestic product,
- Five percent of total U.S. tax revenues.

Another way of looking at these benefits is to compare them with the impacts of the largest U.S. corporations—the nation’s Fortune 500 companies. If “Nuclear Technologies” were a company, it would have an impact on the U.S. economy 15 percent greater than that of the largest corporation in the country—General Motors.

Another way to gauge the impact of nuclear technologies is to compare the total number of jobs they generated in 1995 with the total number generated (directly and indirectly) by other industries and sectors. For example, nuclear technologies generated more jobs than most industries or sectors, and almost as many jobs as the banking industry.

Yet another way of viewing the economic impact of nuclear technologies is to compare it with the economies of other nations of the world. For example, the gross sales impact of nuclear technologies was equal to 72 percent of the economy of Canada and 75 percent of the economy of Spain. It was larger than the economies of Australia, Mexico, South Korea and the Netherlands.

Jobs and Sales Created Within Specific Industries. The revenue and job benefits of nuclear energy, radioisotopes and radioactive materials are shared by all industries and sectors of the economy. Some industries and sectors benefit more than others, however. In 1995, for example, nuclear technologies generated:

- \$1.8 billion in sales and 16,000 jobs in the livestock and livestock products industry, but \$9.8 billion in sales and 85,000 jobs in the maintenance and repair construction industry.
- \$1.7 billion in sales and 8,500 jobs in the engines and turbines industry, but \$7.6 billion and 46,000 jobs in iron and steel manufacturing.

This differential job impact is the result of the fact that nuclear technologies affect some industries substantially more than others, and that some industries are much larger than others and will contain more jobs under almost any circumstances.

Jobs Generated Within Specific Occupations. While the economic impact of nuclear technologies generates jobs for all occupations and skills, as with the impact on specific industries, the impact on specific occupations is highly disparate. For example, in 1995 nuclear technologies generated:

- Jobs for 800 surveyors, but 44,000 jobs for industrial machinery repairers;

- Jobs for 600 proofreaders, but 39,000 jobs for electrical engineers;
- Jobs for 700 forging machine operators, but 25,000 jobs for welders.

Although the jobs generated by nuclear technologies are often disproportionately in technical, skilled and specialized occupations, a significant number of jobs are also generated for workers in all occupations at all skill levels. For example, in 1995 nuclear technologies generated four times as many jobs for truck drivers (77,000) as for mechanical engineers (19,800), and five times as many jobs for receptionists (30,000) as for chemists (6,600).

Significance to Specific Industries and Occupations. To obtain a better idea of the significance of nuclear technologies to specific industries and occupations, the differences were normalized by examining the percentage impact within each industry or occupation.

Even normalized by industry size, the impact of nuclear technologies varied greatly among industries. For example, in industries such as furniture, the impact was about equal to the national average of 4 percent. In industries such as engines and turbines, and glass and plastics, the impact was much greater than average, and was five times that of industries such as finance and apparel. In industries such as finance and apparel, the impact was much less than the national average.

The impact of nuclear technologies on normalized employment categorized by occupation exhibits a similar pattern.

Finally, the disparity of relative job impacts is evident even within a specific, specialized occupational grouping such as engineers. For example, in 1995 nuclear technologies generated twice as many engineering jobs as the economy-wide average—4 percent of all jobs in the economy were generated by nuclear technologies, while 8 percent of all engineering jobs resulted from nuclear technologies. In addition, nuclear technologies

significantly affected some categories of engineers, such as nuclear, industrial, metallurgical and electrical, while having little effect on aeronautical and civil engineers.

State Economic and Job Benefits

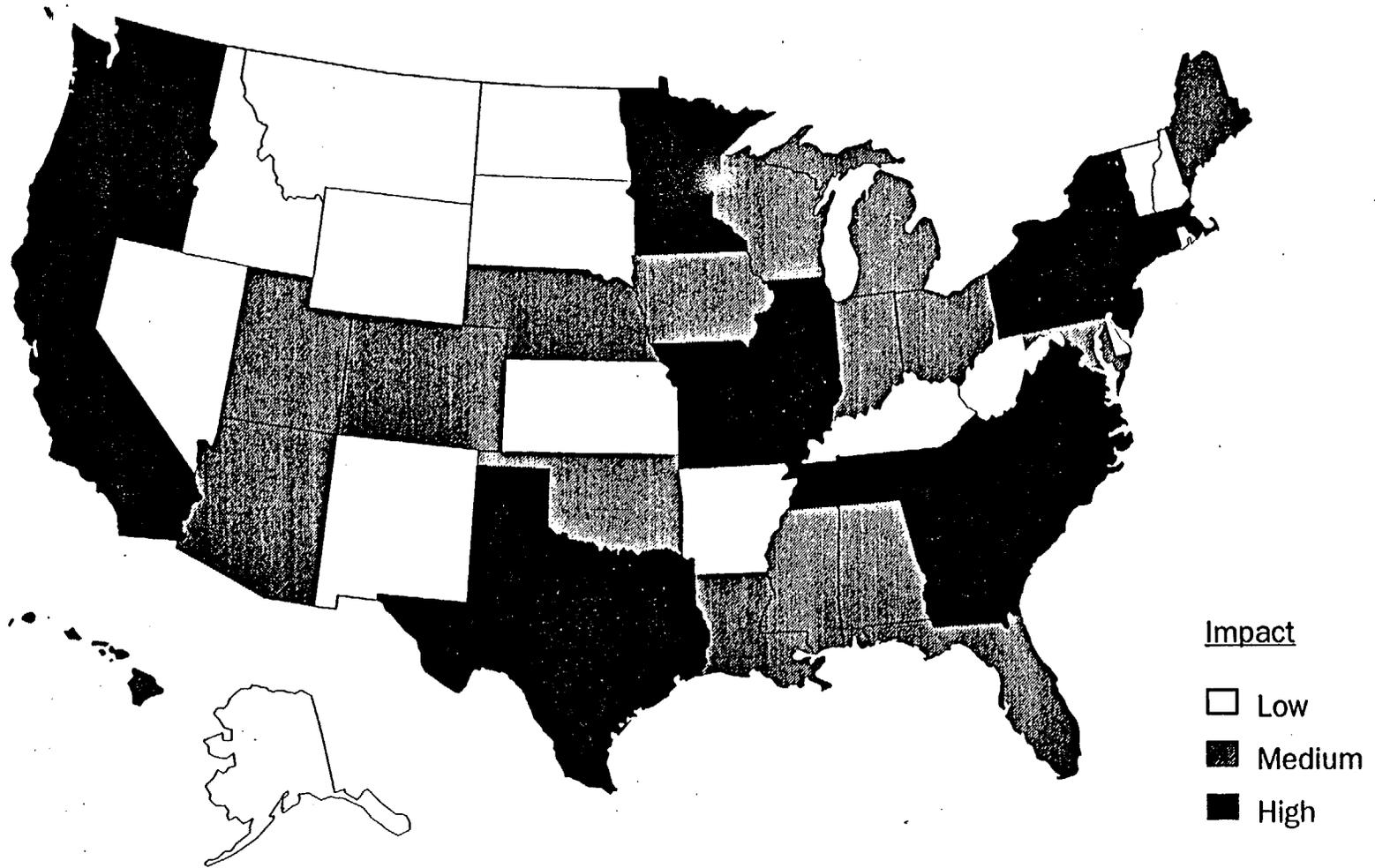
To separate out—disaggregate—the national economic and employment impacts to the state and regional level, the study used the MISI interindustry state modeling system. This type of model is used by the U.S. Department of Commerce to compile the national income and product accounts, by the U.S. Department of Labor to develop its long-range economic and employment forecasts, and by the U.S. Department of Energy's Energy Information Administration to development its long-term energy forecasts.

In disaggregating the national data, we took account of the fact that the U.S. economy is highly integrated, and there are strong interactions among all of the state economies—economic and job benefits created in one state have strong "ripple" effects in many others.

For example, a major medical center in Texas is heavily dependent on nuclear technologies, and this center creates substantial sales, jobs and tax revenues within the state. However, some of the components and supplies for this center are produced in Ohio, California, Georgia and New York, so these states benefit as well.

Economic and Employment Benefits to States. If the national benefits of nuclear technologies are averaged for the states, each state receives about \$8.4 billion in sales, 88,000 jobs and \$1.6 billion in tax revenues. In fact, the actual distribution among the states is uneven and diverse (see figure on next page). Some states—Pennsylvania, Virginia, California, Texas, Tennessee, South Carolina, Oregon, Washington, New York, Minnesota and North Carolina—benefited substantially from the use of nuclear technologies in 1995. Others—Montana, Rhode Island, North Dakota, Delaware and Wyoming—benefited relatively less. Before discussing state benefits in more detail, it is

Economic and Employment Impacts, by State, of the Use of Nuclear Technologies in 1995



useful to examine them in the context of state economic development initiatives aimed at attracting new business.

Perspective on State Economic and Job Benefits. The number of jobs generated by nuclear technologies within a state in 1995 varied widely, from as few as 5,000 to as many as 100,000. How does this range compare with the employment generated by other means?

One way to answer this question is to examine the jobs generated by representative state development initiatives in recent years—and the costs to states of these initiatives. In an effort to create jobs, states have been aggressively bidding against one another for manufacturing plants, commercial facilities and corporate headquarters. The costs of this bidding war have rapidly escalated:

- In 1993, Mercedes-Benz announced that it would locate a new assembly plant in Alabama, at a cost to the state of \$170,000 per on-site job created.
- In 1996, Blue Water Fibre received \$80 million in inducements from Michigan for a paper-recycling mill that employs 34 workers—costing the state \$2.4 million per on-site job created.

It is interesting to compare examples of the number—and cost—of jobs created by a state economic initiative with those generated through nuclear technologies.

- Alabama, for example, won the bidding war in 1993 to attract Mercedes-Benz to the state—at a cost of \$300 million in incentives. Today, that plant generates a total of about 3,000 jobs in the state. In contrast, in 1995 nuclear technologies generated 43,000 jobs in Alabama.

- In response to a generous package of tax incentives, Hughes Aircraft relocated substantial operations from California to Arizona during 1993 and 1994, resulting in the transfer of about 12,000 jobs. In contrast, in 1995 nuclear technologies generated 250,000 jobs in California and 26,000 jobs in Arizona.
- In 1993 and 1994, the city of Ypsilanti, Mich., took General Motors to court in a futile attempt to prevent the relocation of the Willow Run Assembly Plant to Arlington, Texas. The effort eventually cost the state of Michigan about 9,000 jobs. In contrast, in 1995, nuclear technologies generated 38,000 jobs in Michigan and 220,000 jobs in Texas.
- In the early 1990s, Illinois undertook the largest job-retention effort in the state's history (a \$250 million campaign) to prevent Sears, Roebuck & Co. from moving out of the state, and thus preserved about 8,000 jobs for Illinois. In contrast, in 1995 nuclear technologies generated 124,500 jobs in Illinois.

To further illustrate the relative importance of the jobs generated in different states by nuclear technologies, the study examines in more depth several recent developments in the nation's three largest states—Texas, California and New York.

Texas. In 1993, Congress voted to terminate work on the Superconducting Super Collider (SSC), which was being constructed near Waxahachie, Texas. When terminated, the SSC was generating about 5,000 jobs in Texas, and would have generated about 14,000 jobs had the complex been completed.

However, despite the widespread concern in the state over loss of the SSC and related jobs, nuclear technologies were already generating 220,000 jobs in Texas—nearly 16 times the number of jobs that a fully operational SSC would have created.

California. Between 1991 and 1995, the state lost an average of about 40,000 jobs a year due to downturns in defense spending and the aerospace industry. These job losses were well-recognized and publicized, and were often taken as a precursor of austere times for the California economy. Yet at the same time, nuclear technologies were generating, on an annual basis, 250,000 jobs in the state—more than six times as many as were lost in any single year in the defense and aerospace-related industries.

New York. In 1992 and 1993, New York granted \$362 million in tax incentives and other concessions to four corporations and five commodities exchanges in an attempt to deter them from moving to Connecticut or New Jersey—despite a pact among the three states to prevent such competition. At the same time that New York was providing costly incentives to retain CBS, Prudential Securities and other companies, nuclear technologies were generating 148,000 jobs in the state—25 times as many jobs as CBS and nearly 20 times as many jobs as Prudential Securities.

In many cases, the economic growth, jobs and tax revenues generated by nuclear technologies are more substantial than those provided by projects and corporations that have proven costly to attract and retain.

The Economic and Employment Benefits to Each State. The state impacts of nuclear technologies reflect many factors: the location of specific plants and activity, the facilities that fabricate commodities using the technology, the final user of the commodities and services, the final disposal site of radioactive materials, and related factors. In addition, indirect impacts accrue to states that are either major suppliers to these industries or major users of the goods and services produced, and to those that are major contributors to the general infrastructure of the U.S. economy. Obviously, many states fall into all of these categories.

Several states benefit substantially from the use of nuclear technologies:

- In Pennsylvania, \$63 billion in industry sales, 630,000 jobs, and \$11.2 billion in federal, state and local government tax revenues were created.
- In California, \$27 billion in industry sales, 250,000 jobs, and \$5.2 billion in tax revenues were created.
- In Texas, \$22 billion in industry sales, 220,000 jobs, and \$3.9 billion in tax revenues were created.
- In Illinois, \$15.5 billion in industry sales, 124,500 jobs, and \$2.8 billion in tax revenues were created.

Because states differ in the size of their populations and labor forces, more sales, jobs and tax revenues will be generated in populous states such as California, New York and Texas than in less populous states such as Wyoming, Delaware and Vermont.

A more accurate illustration of the importance of nuclear technologies to each state is obtained by normalizing for the states' economies and labor forces. The impact on job markets in Tennessee, South Carolina and Virginia, for example, is more than 10 times as great as that in Mississippi and Arizona.

The use of nuclear technologies throughout society has a greater economic impact than most people realize. To put the benefits in perspective:

- \$421 billion—the total revenue attributable to nuclear technologies in 1995—equals 6 percent of total U.S. gross domestic product.

- 4.4 million jobs—the total generated by nuclear technologies in 1995—represented four percent of total U.S. employment.
- \$79 billion—the total federal, state and local tax revenues generated by nuclear technologies—represented 5 percent of total U.S. tax revenues.

Not every benefit of nuclear technologies is quantifiable. As important, the saving of lives, the relief of pain, the production of products that create greater efficiency, convenience and safety are all outside the scope of this report. Yet all are essential to a full appreciation of the value of nuclear technologies to society.

On the following pages, benefits of using nuclear technologies are shown for each state through the amount of annual *sales* tied to the technologies, the number of *jobs* generated and the annual *tax revenues* paid by companies and other institutions.

- The first section lists states in which at least one nuclear power plant currently operates.
- The second section presents these figures for states in which no nuclear plants currently produce electricity.

Overall corresponding figures for the United States are also shown. All figures are for 1995.

Section 1

Alabama

	Alabama 1995	United States 1995
Sales related to nuclear technologies (million \$)	4,844	420,900
Jobs	42,735	4,395,900
Tax revenues (million \$)	894	78,700
Electricity produced by nuclear energy (%)	21	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1993, Alabama (at the cost of \$300 million in incentives) won the bidding war among the states for a Mercedes-Benz factory that is currently generating, in total, about 3,000 jobs in the state. This represents a cost to the state of \$170,000 per on-site job created.

In contrast, in 1995 nuclear technologies generated almost 43,000 jobs in Alabama.

Arizona

	Arizona 1995	United States 1995
Sales related to nuclear technologies (million \$)	3,539	420,900
Jobs	26,144	4,395,900
Percentage of total jobs within state	1	
Tax revenues (million \$)	658	78,700
Electricity produced by nuclear energy (%)	39	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

During 1993 and 1994 Hughes Aircraft, in response to a generous package of tax incentives, relocated substantial operations from California to Arizona, resulting in the loss of about 12,000 jobs in California and the creation of an equivalent number in Arizona.

In contrast, in 1995 nuclear technologies created 250,000 jobs in California and 26,000 jobs in Arizona.

Arkansas

	Arkansas 1995	United States 1995
Sales related to nuclear technologies (million \$)	1,855	420,900
Jobs	13,314	4,395,900
Tax revenues (million \$)	346	78,700
Electricity produced by nuclear energy (%)	30	20

California

	California 1995	United States 1995
Sales related to nuclear technologies (million \$)	26,536	420,900
Jobs	250,117	4,395,900
Tax revenues (million \$)	5,157	78,700
Electricity produced by nuclear energy (%)	25	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1993 McDonnell Douglas relocated operations generating about 3,000 jobs from California to Missouri.

In contrast, in 1995 nuclear technologies generated 78,000 jobs in Missouri and 250,000 jobs in California.

During 1993 and 1994 Hughes Aircraft, in response to a generous package of tax incentives, relocated substantial operations from California to Arizona, resulting in the loss of about 12,000 jobs in the former state and the creation of an equivalent number in the latter.

In contrast, in 1995 nuclear technologies created 250,000 jobs in California and 26,000 jobs in Arizona.

California, and especially southern California, has since World War II been disproportionately affected by the defense and aerospace industries. During the early 1990s, due at least in part to reductions in federal defense and aerospace spending, California suffered from one of the most severe recessions in the state's recent history. Economic growth declined, the real estate and construction industries collapsed, and for virtually the first time in history, the state experienced significant out-migration of businesses and population. Between 1991 and 1995, the state lost, on average, about 40,000 total jobs per year due to the downturns in defense spending and the aerospace industry. These job losses were well recognized and publicized, and were often taken as a precursor of austere times for the California economy.

However, at the same time it was not appreciated that nuclear technologies were generating in California, on an annual basis, 250,000 jobs—more than six times as many as were lost in any single year in the defense and aerospace related industries.

Connecticut

	Connecticut 1995	United States 1995
Sales related to nuclear technologies (million \$)	12,248	420,900
Jobs	113,662	4,395,900
Percentage of total jobs within state	7	
Tax revenues (million \$)	2,730	78,700
Electricity produced by nuclear energy (%)	70	20

Florida

	Florida 1995	United States 1995
Sales related to nuclear technologies (million \$)	5,212	420,900
Jobs	38,313	4,395,900
Tax revenues (million \$)	973	78,700
Electricity produced by nuclear energy (%)	20	20

Georgia

	Georgia 1995	United States 1995
Sales related to nuclear technologies (million \$)	9,672	420,900
Jobs	94,285	4,395,900
Tax revenues (million \$)	1,758	78,700
Electricity produced by nuclear energy (%)	30	20

Illinois

	Illinois 1995	United States 1995
Sales related to nuclear technologies (million \$)	15,558	420,900
Jobs	124,528	4,395,900
Percentage of total jobs within state	3	
Tax revenues (million \$)	2,861	78,700
Electricity produced by nuclear energy (%)	54	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In the early 1990s, Illinois undertook the “largest job-retention effort in the state's history” (at a cost of \$250 million) to prevent Sears, Roebuck & Co. from moving out of state, and thus preserved about 8,000 jobs for Illinois.

In contrast, in 1995 nuclear technologies generated 125,000 jobs in Illinois.

Iowa

	Iowa 1995	United States 1995
Sales related to nuclear technologies (million \$)	4,132	420,900
Jobs	64,055	4,395,900
Tax revenues (million \$)	745	78,700
Electricity produced by nuclear energy (%)	11	20

Kansas

	Kansas 1995	United States 1995
Sales related to nuclear technologies (million \$)	1,534	420,900
Jobs	12,466	4,395,900
Tax revenues (million \$)	284	78,700
Electricity produced by nuclear energy (%)	26	20

Louisiana

	Louisiana 1995	United States 1995
Sales related to nuclear technologies (million \$)	2,666	420,900
Jobs	21,428	4,395,900
Tax revenues (million \$)	.513	78,700
Electricity produced by nuclear energy (%)	24	20

Maine

	Maine 1995	United States 1995
Sales related to nuclear technologies (million \$)	2,143	420,900
Jobs	29,863	4,395,900
Tax revenues (million \$)	384	78,700
Electricity produced by nuclear energy (%)	7	20

Maryland

	Maryland 1995	United States 1995
Sales related to nuclear technologies (million \$)	6,963	420,900
Jobs	77,480	4,395,900
Percentage of total jobs within state	3	
Tax revenues (million \$)	1,458	78,700
Electricity produced by nuclear energy (%)	29	20

Massachusetts

	Massachusetts 1995	United States 1995
Sales related to nuclear technologies (million \$)	11,110	420,900
Jobs	110,010	4,395,900
Percentage of total jobs within state	4	
Tax revenues (million \$)	2,306	78,700
Electricity produced by nuclear energy (%)	17	20

Michigan

	Michigan 1995	United States 1995
Sales related to nuclear technologies (million \$)	4,799	420,900
Jobs	37,880	4,395,900
Tax revenues (million \$)	892	78,700
Electricity produced by nuclear energy (%)	26	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1996, Blue Water Fibre received \$80 million in inducements from Michigan for a paper-recycling mill that employs 34 workers—thus costing the state \$2.4 million per on-site job created.

In 1993 and 1994 Ypsilanti, Mich., took General Motors to court in a futile attempt to prevent the relocation of the Willow Run Assembly Plant to Arlington, Texas, which eventually cost the state of Michigan about 9,000 total jobs.

In contrast, in 1995, nuclear technologies generated 38,000 jobs in Michigan and 220,000 jobs in Texas.

Minnesota

	Minnesota 1995	United States 1995
Sales related to nuclear technologies (million \$)	12,961	420,900
Jobs	132,149	4,395,900
Percentage of total jobs within state	6	
Tax revenues (million \$)	2,413	78,700
Electricity produced by nuclear energy (%)	31	20

Mississippi

	Mississippi 1995	United States 1995
Sales related to nuclear technologies (million \$)	1,837	420,900
Jobs	16,161	4,395,900
Percentage of total jobs within state	1	
Tax revenues (million \$)	339	78,700
Electricity produced by nuclear energy (%)	30	20

Missouri

	Missouri 1995	United States 1995
Sales related to nuclear technologies (million \$)	7,240	420,900
Jobs	78,000	4,395,900
Tax revenues (million \$)	1,300	78,700
Electricity produced by nuclear energy (%)	13	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1993 McDonnell Douglas relocated operations generating about 3,000 jobs from California to Missouri.

In contrast, in 1995 nuclear technologies generated 78,000 jobs in Missouri and 250,000 jobs in California.

Nebraska

	Nebraska 1995	United States 1995
Sales related to nuclear technologies (million \$)	1,775	420,900
Jobs	14,594	4,395,900
Tax revenues (million \$)	328	78,700
Electricity produced by nuclear energy (%)	30	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In the late 1980s Nebraska gave ConAgra \$10 million in incentives to build a new laboratory in the state that currently generates about 800 jobs.

In contrast, in 1995 nuclear technologies created 15,000 jobs in Nebraska.

New Hampshire

	New Hampshire 1995	United States 1995
Sales related to nuclear technologies (million \$)	924	420,900
Jobs	4,970	4,395,900
Percentage of total jobs within state	9	
Tax revenues (million \$)	202	78,700
Electricity produced by nuclear energy (%)	60	20

New Jersey

	New Jersey 1995	United States 1995
Sales related to nuclear technologies (million \$)	14,667	420,900
Jobs	126,686	4,395,900
Tax revenues (million \$)	3,057	78,700
Electricity produced by nuclear energy (%)	62	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1992, New Jersey offered \$50 million to First Chicago Corp. in a successful effort to induce it to move to the state from New York, thus creating about 2,500 jobs in New Jersey.

In contrast, in 1995 nuclear technologies created 127,000 jobs in New Jersey and 148,000 jobs in New York.

New York

	New York 1995	United States 1995
Sales related to nuclear technologies (million \$)	18,501	420,900
Jobs	147,841	4,395,900
Tax revenues (million \$)	4,010	78,700
Electricity produced by nuclear energy (%)	26	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1992 and 1993, New York state and city granted \$362 million in tax incentives and other concessions to four corporations and five commodities exchanges to prevent them from moving to Connecticut or New Jersey—despite a "non-aggression pact" the three states signed in 1991 to prevent such competition. For example:

- In 1993, CBS Inc. received \$50 million in tax incentives in return for a pledge to keep its headquarters in New York for 15 years. About 6,000 total jobs were preserved for New York by this agreement.
- In 1993, Prudential Securities received \$106 million in tax incentives and low-cost energy rates in return for a pledge to keep its employees in New York for 20 years. This agreement preserved a total of about 8,000 jobs for New York.

In contrast, in 1995 nuclear technologies created 148,000 jobs in New York.

North Carolina

	North Carolina 1995	United States 1995
Sales related to nuclear technologies (million \$)	12,432	420,900
Jobs	128,846	4,395,900
Tax revenues (million \$)	2,251	78,700
Electricity produced by nuclear energy (%)	37	20

Ohio

	Ohio 1995	United States 1995
Sales related to nuclear technologies (million \$)	6,462	420,900
Jobs	68,960	4,395,900
Tax revenues (million \$)	1,222	78,700
Electricity produced by nuclear energy (%)	12	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1993 the state of Kentucky outbid Ohio and Pennsylvania for a Canadian steel mill that would create 800 total jobs—at a cost to Kentucky of \$14 million in foregone tax revenues.

In contrast, in 1995 nuclear technologies generated 18,000 jobs in Kentucky, 70,000 jobs in Ohio, and 630,000 jobs in Pennsylvania.

Pennsylvania

	Pennsylvania 1995	United States 1995
Sales related to nuclear technologies (million \$)	62,901	420,900
Jobs	629,616	4,395,900
Percentage of total jobs within state	11	
Tax revenues (million \$)	11,231	78,700
Electricity produced by nuclear energy (%)	39	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1993 the state of Kentucky outbid Ohio and Pennsylvania for a Canadian steel mill that would create 800 total jobs—at a cost to Kentucky of \$14 million in foregone tax revenues.

In contrast, in 1995 nuclear technologies generated 630,000 jobs in Pennsylvania, 18,000 jobs in Kentucky, and 70,000 jobs in Ohio.

South Carolina

	South Carolina 1995	United States 1995
Sales related to nuclear technologies (million \$)	19,382	420,900
Jobs	240,990	4,395,900
Percentage of total jobs within state	13	
Tax revenues (million \$)	3,493	78,700
Electricity produced by nuclear energy (%)	63	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1992, South Carolina granted the German automobile manufacturer BMW \$150 million in tax breaks and other incentives to build an automobile assembly plant near Spartanburg which, by 1995, was generating about 3,000 total jobs in the state.

In contrast, in 1995 nuclear technologies generated 240,000 jobs in South Carolina.

Tennessee

	Tennessee 1995	United States 1995
Sales related to nuclear technologies (million \$)	29,173	420,900
Jobs	325,766	4,395,900
Percentage of total jobs within state	13	
Tax revenues (million \$)	5,194	78,700
Electricity produced by nuclear energy (%)	19	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In the mid-1980s, Tennessee outbid other states for the location of General Motors' much sought after Saturn automobile factory. This manufacturing plant generates about 6,000 jobs in the state, and cost Tennessee more than \$100 million in various types of financial incentives.

In contrast, in 1995 nuclear technologies generated 325,000 jobs in Tennessee.

In 1992, Kentucky—at a cost of \$39 million in incentives—outbid Tennessee for an International Paper Co. label manufacturing plant that currently generates about 800 jobs.

In contrast, in 1995 nuclear technologies created 18,000 jobs in Kentucky and 325,000 jobs in Tennessee.

Texas

	Texas 1995	United States 1995
Sales related to nuclear technologies (million \$)	21,834	420,900
Jobs	220,456	4,395,900
Tax revenues (million \$)	3,919	78,700
Electricity produced by nuclear energy (%)	14	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1993 Congress voted to terminate work on the Superconducting Super Collider (SSC), which was being constructed near Waxahachie, Texas. The decision was made due to continuing cost overruns in the project and to Congress' mood of fiscal restraint. It was also made despite the fact that \$2.7 billion had been committed for the \$11 billion project, which was already 20 percent complete. The Texas state government and congressional delegation lobbied intensely to save the project—largely out of concern for the economic development and jobs it would mean for Texas—and worried that the SSC's demise was a major blow to the Texas economy. When terminated, the SSC was generating about 5,000 jobs in Texas, and when fully operational it would have generated about 14,000 total jobs.

However, it was not realized that nuclear technologies were already generating 220,000 jobs in Texas—nearly 16 times the number of jobs that even a fully operational SSC would have created.

Vermont

	Vermont 1995	United States 1995
Sales related to nuclear technologies (million \$)	1,299	420,900
Jobs	11,793	4,395,900
Percentage of total jobs within state	4	
Tax revenues (million \$)	248	78,700
Electricity produced by nuclear energy (%)	80	20

Virginia

	Virginia 1995	United States 1995
Sales related to nuclear technologies (million \$)	28,246	420,900
Jobs	379,137	4,395,900
Percentage of total jobs within state	12	
Tax revenues (million \$)	5,042	78,700
Electricity produced by nuclear energy (%)	48	20

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1995 Virginia offered \$165 million in incentives to the Disney Co. to build a Disney America theme park that would have generated a total of about 12,000 jobs.

In contrast, in 1995 nuclear technologies generated 379,000 jobs in Virginia.

Washington

	Washington 1995	United States 1995
Sales related to nuclear technologies (million \$)	18,421	420,900
Jobs	243,381	4,395,900
Tax revenues (million \$)	3,277	78,700
Electricity produced by nuclear energy (%)	7	20

Wisconsin

	Wisconsin 1995	United States 1995
Sales related to nuclear technologies (million \$)	3,818	420,900
Jobs	32,573	4,395,900
Tax revenues (million \$)	706	78,700
Electricity produced by nuclear energy (%)	22	20

Section 2

Alaska

	Alaska 1995	United States 1995
Sales related to nuclear technologies (million \$)	307	420,900
Jobs	3,599	4,395,900
Tax revenues (million \$)	71	78,700

Colorado

	Colorado 1995	United States 1995
Sales related to nuclear technologies (million \$)	3,169	420,900
Jobs	37,853	4,395,900
Tax revenues (million \$)	569	78,700

Delaware

	Delaware 1995	United States 1995
Sales related to nuclear technologies (million \$)	795	420,900
Jobs	8,092	4,395,900
Tax revenues (million \$)	145	78,700

Hawaii

	Hawaii 1995	United States 1995
Sales related to nuclear technologies (million \$)	1,556	420,900
Jobs	23,931	4,395,900
Tax revenues (million \$)	288	78,700

Idaho

	Idaho 1995	United States 1995
Sales related to nuclear technologies (million \$)	335	420,900
Jobs	4,041	4,395,900
Tax revenues (million \$)	61	78,700

Indiana

	Indiana 1995	United States 1995
Sales related to nuclear technologies (million \$)	3,692	420,900
Jobs	41,119	4,395,900
Tax revenues (million \$)	664	78,700

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1986, Fuji-Isuzu agreed to locate a new plant in Indiana, at a cost to the state of \$50,000 per on-site job created.

Kentucky

	Kentucky 1995	United States 1995
Sales related to nuclear technologies (million \$)	1,641	420,900
Jobs	18,257	4,395,900
Tax revenues (million \$)	299	78,700

PERSPECTIVES ON ECONOMIC DEVELOPMENT

In 1992, Kentucky—at a cost of \$39 million in incentives—outbid Tennessee for an International Paper Co. label manufacturing plant that currently generates about 800 jobs.

In contrast, in 1995 nuclear technologies created 18,000 jobs in Kentucky and 325,000 jobs in Tennessee.

In 1993 the state of Kentucky outbid Ohio and Pennsylvania for a Canadian steel mill that would create 800 total jobs—at a cost to Kentucky of \$14 million in foregone tax revenues.

In contrast, in 1995 nuclear technologies generated 18,000 jobs in Kentucky, 70,000 jobs in Ohio, and 630,000 jobs in Pennsylvania.

Montana

	Montana 1995	United States 1995
Sales related to nuclear technologies (million \$)	351	420,900
Jobs	4,570	4,395,900
Tax revenues (million \$)	66	78,700

Nevada

	Nevada 1995	United States 1995
Sales related to nuclear technologies (million \$)	945	420,900
Jobs	10,502	4,395,900
Tax revenues (million \$)	197	78,700

New Mexico

	New Mexico 1995	United States 1995
Sales related to nuclear technologies (million \$)	546	420,900
Jobs	5,823	4,395,900
Tax revenues (million \$)	103	78,700

North Dakota

	North Dakota 1995	United States 1995
Sales related to nuclear technologies (million \$)	112	420,900
Jobs	997	4,395,900
Tax revenues (million \$)	22	78,700

Oklahoma

	Oklahoma 1995	United States 1995
Sales related to nuclear technologies (million \$)	6,413	420,900
Jobs	72,030	4,395,900
Percentage of total jobs within state	5	
Tax revenues (million \$)	1,141	78,700

Oregon

	Oregon 1995	United States 1995
Sales related to nuclear technologies (million \$)	20,761	420,900
Jobs	241,381	4,395,900
Tax revenues (million \$)	3,834	78,700

Rhode Island

	Rhode Island 1995	United States 1995
Sales related to nuclear technologies (million \$)	291	420,900
Jobs	3,245	4,395,900
Tax revenues (million \$)	54	78,700

South Dakota

	South Dakota 1995	United States 1995
Sales related to nuclear technologies (million \$)	327	420,900
Jobs	3,607	4,395,900
Tax revenues (million \$)	60	78,700

Utah

	Utah 1995	United States 1995
Sales related to nuclear technologies (million \$)	3,233	420,900
Jobs	41,110	4,395,900
Percentage of total jobs within state	5	
Tax revenues (million \$)	598	78,700

West Virginia

	West Virginia 1995	United States 1995
Sales related to nuclear technologies (million \$)	973	420,900
Jobs	11,255	4,395,900
Tax revenues (million \$)	178	78,700

Wyoming

	Wyoming 1995	United States 1995
Sales related to nuclear technologies (million \$)	335	420,900
Jobs	4,255	4,395,900
Tax revenues (million \$)	65	78,700

Methodology and Data Base

Estimating the National Economic and Employment Effects of Nuclear Technologies

Important economic benefits of nuclear technologies are generated directly and indirectly by the sales, profits, jobs and tax revenues resulting from the widespread use of these technologies throughout the economy. Here this impact is assessed by estimating the economic benefits of the use of nuclear technologies on the U.S. economy and on specific states. Specifically, the effects on the economy in 1995 of the myriad uses of nuclear technologies in that year are estimated, focusing on the following impacts:

- *Direct and indirect economic effects.* The impacts estimated here include those resulting from the initial use of nuclear technologies as well as those generated indirectly throughout the economy by the expenditures. The effects on each of 80 all-inclusive two-digit Standard Industrial Code industries are estimated, including the output, sales and profits generated by nuclear technologies.
- *Employment.* The total numbers of jobs created in each of the 80 industries and in each of 475 all-inclusive occupations are estimated.
- *National impacts.* Output, sales, profits and employment are estimated for each industry at the national level, and for each occupation, the total number of jobs created nationwide is derived.
- *State-specific effects.* Output, sales and employment are estimated at the state level, and the tax revenues generated in the state are computed.