

U.S. DEPARTMENT OF ENERGY FY2017

Economic Impact In Tennessee



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Foreword

The U.S. Department of Energy's Oak Ridge Reservation fuels Tennessee's innovation economy and is a pivotal asset to the nation and global community. Once home to the Manhattan Project's uranium-enrichment operations that altered the course of World War II and the Cold War, today its reach is even broader. The men and women who work in Oak Ridge deploy science and engineering innovation to make our quality of life better, our planet healthier, and our nation safer.

This study is a snapshot of DOE's economic impact in the state of Tennessee based on data and analysis from fiscal year 2017. It looks at the direct effects of DOE investment – payroll disbursements, pensions, charitable giving, taxes paid, and more – as well the ripple effects of this spending.

What's clear is that DOE's presence in Tennessee, now in its 75th year, is much weightier than the sum of its parts. For each job created and dollar paid by DOE, multiple jobs and additional tax revenue are generated in the state. In total, DOE's economic impact in Tennessee equals \$5.6 billion and supports more than 34,000 jobs, with a workforce spanning 50 of Tennessee's 95 counties.

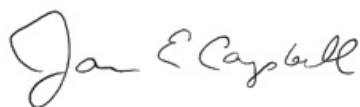
Federal investments in science and energy research and national security assets spur the growth of an innovation economy, spawning investment by corporations and infrastructure projects for big data and new nuclear technologies in the region. Manufacturing firms and companies on the cutting edge of computing and artificial-intelligence advancements are drawn to expertise found only in Oak Ridge, Tennessee. The partnerships between the Oak Ridge Reservation, the University of Tennessee, the Tennessee Valley Authority, and others create an environment ripe for recruiting and retaining top talent, who in turn put down roots in the region.

A thriving Oak Ridge Reservation is also vital to our national security, as it supports our nation's nuclear stockpile and nonproliferation efforts. Transformative science and technology research likewise ensures we are equipped to tackle coming environmental and technological challenges. The work to clean up legacies of the Manhattan Project enables new investments in science, security, and industry.

To put it plainly: Oak Ridge cements Tennessee's stature in scientific leadership and is critical to the state's economic success.

The East Tennessee Economic Council is a proud participant in advancing this innovation economy. Facilitating the partnership of federal investment with world-renowned talent and technology, ETEC is at the forefront of efforts to increase prosperity, drive economic development, and champion this region of opportunity.

This report could not have been completed without our partners: the contractors and DOE program offices for providing data, Oak Ridge Utility District (ORUD) and TNBANK for sponsoring, Booz Allen Hamilton for providing support for the data analysis, and the staff of Piper Communications for pulling it all together. We appreciate your support.



Jim Campbell
President, East Tennessee Economic Council

Booz | Allen | Hamilton



DOE Investment in Tennessee

The presence of the U.S. Department of Energy (DOE) in Tennessee generates indispensable economic benefits for the state and its residents. To assess these economic benefits, the East Tennessee Economic Council initiated an in-depth examination of DOE activities in the state. This current study, supported by Booz Allen Hamilton, summarizes the key economic benefits conveyed by DOE on Tennessee using data from fiscal year 2017 (FY17). Results from this study confirm the substantial impacts of DOE's activities on the state as well as on its residents.

KEY FINDINGS FOR FISCAL YEAR 2017 INCLUDE:

- DOE's total economic impact in the state of Tennessee equals \$5.6 billion.
- Approximately \$3.4 billion was added to Tennessee's state gross domestic product as a result of overall spending by DOE and its contractors.
- Over 34,000 full-time jobs were created in Tennessee by direct and indirect DOE investment.
- The workforce that supports DOE activities spans 50 of Tennessee's 95 counties.
- For every one job created by DOE and its contractors, an additional 1.7 jobs were created across the state.
- DOE spending supports private-sector businesses. Of the more than \$1.1 billion in non-payroll spending from DOE and its contractors, more than \$943 million went to Tennessee businesses for the procurement of raw materials, services, and supplies.
- Over \$32 million in state and local tax revenue was generated by DOE-related spending.

SUMMARY OF ECONOMIC BENEFITS

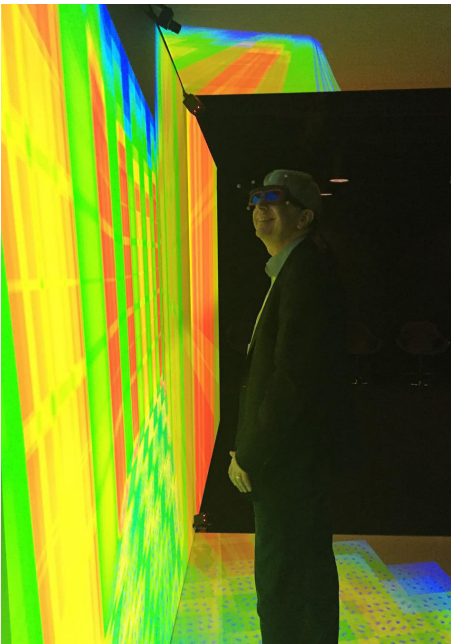
IMPACT	TOTAL	DIRECT	INDIRECT/MULTIPLIER
Output Benefit (State GDP)	\$3,385,460,423	\$2,234,100,480	\$1,151,359,944
Income Benefit	\$2,198,541,016	\$1,159,098,097	\$1,039,442,919
Employment Benefit	34,496	12,618	21,878

BENEFITS OF DOE IN TENNESSEE

DOE spending directly enriches the state economy and its residents. The employment and income generated by DOE investment in Tennessee sends ripples through the state economy, bestowing additional indirect benefits.

DOE and its major contractors directly created 12,618 full-time jobs in the state of Tennessee, with annual wages and salaries totaling more than \$1 billion.

In addition to the \$1,541,269,487 spent on payroll in 2017, \$200,409,983 was spent on pension disbursements. The total income paid to current and former employees in FY17 was \$1,643,780,953.



The multiplier effects of DOE spending created an additional 21,878 jobs in the state of Tennessee.

12,618 jobs were directly created by DOE and its contractors in Tennessee, plus an additional 21,878 created by the multiplier effects of DOE investment.

This totals at least 34,496 full-time jobs generated in Tennessee thanks to DOE-related operations. In other words, for every job created by DOE and its contractors, another 1.73 jobs were generated across the state.

The workforce that supports DOE activities spans 50 of Tennessee's 95 counties.

DOE’s total economic impact in the state of Tennessee equals \$5.6 billion.

Tennessee’s gross domestic product (SGDP) increased by \$3,385,460,423 as a result of direct and indirect effects of DOE expenditures. Additionally, \$2,198,541,016 in total personal income was generated by DOE–related activities in Tennessee.

DOE OUTPUT BENEFITS (STATE GDP)

Payroll Spending	\$1,541,269,487	46%
Pension Disbursement	\$200,409,983	6%
Non-Payroll Spending	\$1,643,780,953	49%
TOTAL OUTPUT BENEFIT	\$3,385,460,423	100%

To tally DOE’s total economic impact in the state of Tennessee, its contribution to state GDP and income benefits are added together, which equals \$5,584,001,439.

Nearly \$3.4 billion was added to Tennessee’s state gross domestic product (SGDP) as a result of overall spending by DOE and its contractors.

Changes in SGDP represent benefits of DOE on total state output from payroll, non-payroll, and pension expenditures. This figure reached \$3,385,460,423 in FY2017.

DOE’s presence in Oak Ridge creates high-quality jobs throughout East Tennessee.

The average annual salary for a DOE–related employee of \$81,000 is significantly above the statewide average. For reference, the median income for a Tennessee household as of 2016 was \$51,344.

DOE INCOME BENEFITS

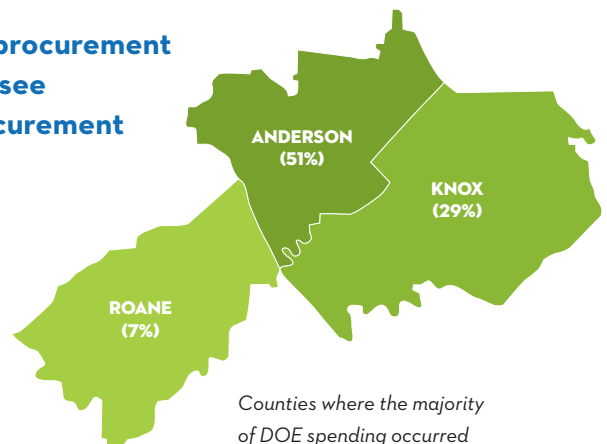
DIRECT EFFECTS	\$1,159,098,097	53%
Payroll Spending	\$1,022,072,324	46%
Pension Disbursement	\$137,025,773	6%
INDIRECT & MULTIPLIER EFFECTS	\$1,039,442,919	47%
Payroll Spending	\$495,121,088	23%
Pension Disbursement	\$71,112,533	3%
Non-Payroll Spending	\$473,209,297	22%
TOTAL INCOME BENEFIT	\$2,198,541,016	100%

DOE EMPLOYMENT BENEFITS

DIRECT EFFECTS	
DOE-Related Employees	12,618
INDIRECT & MULTIPLIER EFFECTS	
Payroll Spending	9,464
Pension Disbursement	1,339
Non-Payroll Spending	11,075
TOTAL EMPLOYMENT BENEFIT	34,496
<i>New jobs created per DOE job</i>	
	1.73

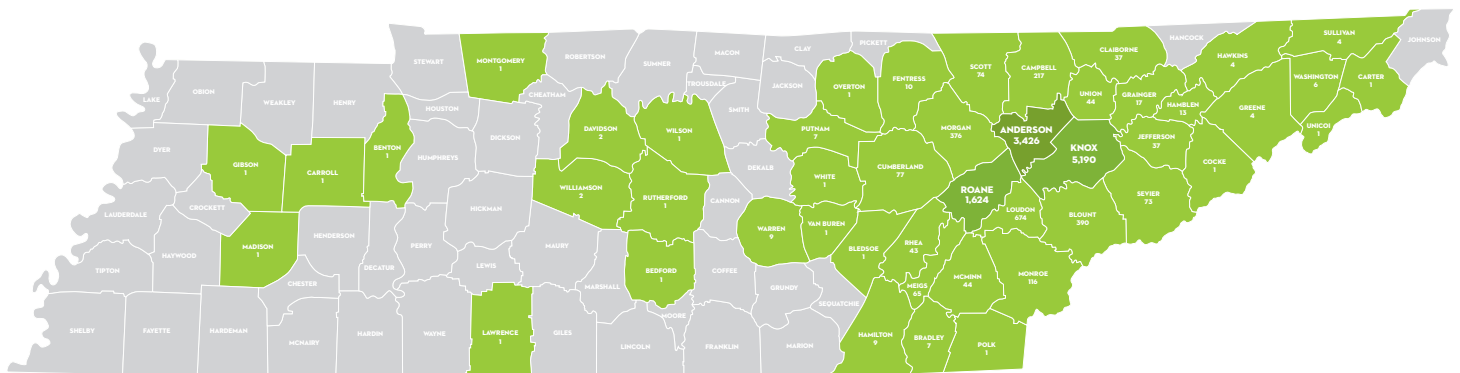
DOE and its contractors spent over \$943 million on procurement of raw materials, services, and supplies from Tennessee businesses. Non-payroll expenditures (or direct procurement spending) by DOE totaled more than \$1.1 billion.

DOE spending supports private-sector businesses. Non-payroll expenditures, or direct procurement spending, by DOE totaled more than \$1,075,002,383. Spending with Tennessee businesses totaled \$943,520,749. This non-payroll spending created sizable increases in new income and jobs across various sectors of the state economy.



DOE and its contractors directly paid more than \$32 million in state and local taxes in FY2017.

Direct tax payments to state and local governments totaled \$32,191,191 in FY2017. A portion of these tax dollars enables the City of Oak Ridge to provide critical infrastructure to support DOE missions and also funds education and schools.



Direct employees by county



CASE STUDY

ORNL SUPERCOMPUTING: THE LOCAL BENEFITS OF GLOBAL LEADERSHIP

Oak Ridge National Laboratory's supercomputing facility is responsible for 500 high-paying technical jobs, and installation of each new supercomputer boosts the local economy. The Lab's newest computer, Summit, required dozens of multi-year construction jobs and a year-long installation effort with regular visits from IBM and its partner companies.



Recent strategic investments by TVA supported the networking demands of the computing facility by adding fiber to carry data into and out of Oak Ridge, and the power TVA produces to support ORNL's supercomputers provides valuable base load for the regional power grid.

Most importantly, Summit and its successors offer Oak Ridge a global leadership position in high-potential fields like artificial intelligence, Big Data analysis, and more.

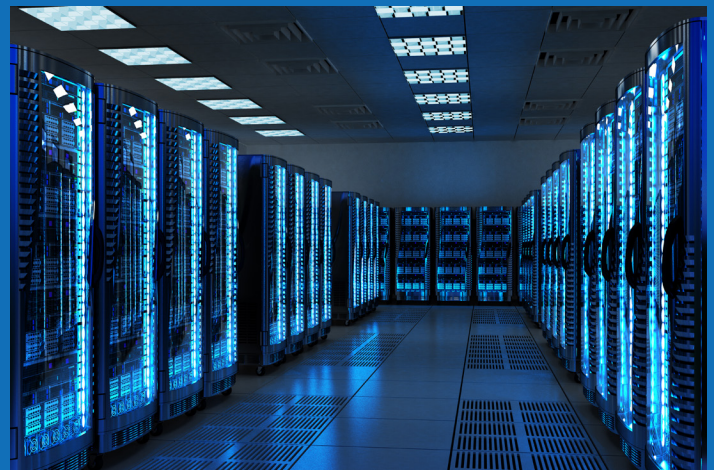
CASE STUDY

PRIVATE SECTOR IMPACT

Founded in 1988, Information International Associates (Ila) employs about 300 IT Systems designers, developers, technologists, and mission specialists serving the government, academic, and private entities from its offices in McLean, Virginia; Oak Ridge, Tennessee; Dayton, Ohio; Alexandria, Virginia and the UK.

Headquartered in Oak Ridge, Ila manages the prime contract to provide the Department of Energy (DOE) Office of Scientific and Technical Information (OSTI) with a full range of information technology (IT) infrastructure services, information science services, creative electronic arts and web design, and outreach support. For DOE Oak Ridge, Ila also supports the National Nuclear Security Agency (NNSA) Y-12/Pantex National Nuclear Security Program, and the Department of Energy's Oak Ridge National Laboratory.

For the remainder, Ila brings revenue to Oak Ridge in support of the US Patent and Trademark Office (USPTO), Nuclear Regulatory Commission (NRC), Environmental Protection Agency (EPA), National Air and Space Intelligence Center (NASIC), and the U.S. Air Force European Operations in England.





CASE STUDY

WORKING WITH INDUSTRY TO ADVANCE MANUFACTURING

More than 3,200 companies have visited the Manufacturing Demonstration Facility in Hardin Valley since it opened in 2012, resulting in over 100 collaborative research projects, including:

- The first 3D-printed car, the STRATI (with Local Motors Inc.)
- The first functional 3D-printed excavator (with Techmer PM)
- A first-of-its-kind coating to enable large-scale 3D printing of low-temperature and high-temperature composite molds (with TruDesign LLC)

The Department of Energy’s Advanced Manufacturing Office built MDF to give industry access to Oak Ridge National Laboratory’s unique capabilities for early-stage research in additive manufacturing. By working with MDF, companies reduce technical risk and build business cases for private investment in new production technologies that use less energy, reduce production costs, and create new products and high-paying jobs.

CASE STUDY

EAST TENNESSEE TECHNOLOGY PARK REINDUSTRIALIZATION

With its origins dating back to the Manhattan Project, the 2,200-acre East Tennessee Technology Park once housed a sprawling complex of facilities that enriched uranium for national security and commercial uses. To revive the site for today’s needs, DOE’s Oak Ridge Office of Environmental Management (OREM) is directing its safe and efficient clean up, demolishing deteriorating facilities, disposing of contaminated waste, and enabling the site’s transition into a thriving private sector industrial park.

Today, more than 20 businesses already call ETTP home, and once reindustrialization is complete, the park will support technological innovation, economic growth, intermodal transportation expansion, and environmental conservation.

Additionally, a new museum at the site will teach future generations about the historical significance of the site and the dedicated workers who helped bring an end to WWII.



ADDITIONAL BENEFITS AND INITIATIVES

Many other benefits of DOE investment are not as easily quantified. Nonetheless, these activities have a significant and positive impact on Tennessee, its residents, and the future of the state.

- DOE and its contractors gave \$2,416,668 in charitable contributions that include education, economic development, healthcare and community impact projects.
- DOE facilities in Oak Ridge attracted over 50,000 visitors. This figure includes business, education and science related visitors. The number of visitors is poised to grow as Heritage Tourism is set to increase with announcements of the Manhattan Project National Historical Park and History Museum, K-25 History Center, and the renewed American Museum of Science and Energy.
- DOE and its contractors hold 2,296 patents and licenses. 127 of those were secured during the 2017 fiscal year, a clear indication of the global expertise and innovation that follows the Department of Energy's investments in Oak Ridge.



Department of Energy Sites and Offices in Oak Ridge

OAK RIDGE NATIONAL LABORATORY

ORNL is the largest DOE science and energy laboratory, conducting basic and applied research to deliver transformative solutions to compelling problems in energy and security.

ORNL's diverse capabilities span a broad range of scientific and engineering disciplines, enabling the Laboratory to explore fundamental science challenges and to carry out the research needed to accelerate the delivery of solutions to the marketplace. ORNL supports DOE's national missions of:

- **Scientific discovery**—Assemble teams of experts from diverse backgrounds, equip them with powerful instruments and research facilities, and address compelling national problems;
- **Clean energy**—Deliver energy technology solutions for energy-efficient buildings, transportation, and manufacturing, and study biological, environmental, and climate systems in order to develop new biofuels and bioproducts and to explore the impacts of climate change;
- **Security**—Develop and deploy “first-of-a-kind” science-based security technologies to make the world a safer place.



ORNL supports these missions through leadership in four major areas of science and technology:

- **Neutrons**—Operate two of the world’s leading neutron sources, which enable scientists and engineers to gain new insights into materials and biological systems;
- **Computing**—Accelerate scientific discovery through modeling and simulation on powerful supercomputers, advance data-intensive science, and sustain U.S. leadership in high-performance computing;
- **Materials**—Integrate basic and applied research to develop advanced materials for energy applications;
- **Nuclear**—Advance the scientific basis for 21st century nuclear fission and fusion technologies and systems, and produce isotopes for research, industry, and medicine.

ORNL is managed and operated by UT-Battelle, LLC., a private not-for-profit company established in the year 2000, for the DOE Office of Science.



OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

ORISE is a DOE asset that is dedicated to enabling critical scientific, research, and health initiatives of the department and its laboratory system by providing world-class expertise in STEM workforce development, scientific and technical reviews, and the evaluation of radiation exposure and environmental contamination.

ORISE accomplishes its mission by providing superior, integrated solutions to:

- Recruit and prepare the next generation of our nation’s scientific workforce;
- Promote sound scientific and technical investment decisions through independent peer reviews;
- Facilitate and prepare for the medical management of radiation incidents in the U.S. and abroad;
- Evaluate health outcomes in workers exposed to chemical and radiological hazards on the job;
- Ensure public confidence in environmental cleanup through independent environmental assessments.

ORISE is managed by Oak Ridge Associated Universities, a 122-member consortium of major Ph.D.–granting academic institutions cultivating collaborative partnerships that enhance the scientific research and education enterprise of our nation. ORAU, a 501(c)(3) nonprofit corporation, manages ORISE for DOE’s Office of Science.

Y-12 NATIONAL SECURITY COMPLEX

The Y-12 National Security Complex is one of six production facilities in the NNSA's Nuclear Security Enterprise. Y-12's unique emphasis is the processing and storage of uranium and development of technologies associated with those activities. Y-12 has three primary national security missions that protect our country and our allies around the world.: Maintaining the U.S. nuclear stockpile, reducing global threats, and fueling the U.S. Nuclear Navy are key activities at this historic site.



The Uranium Processing Facility (UPF) project is being built at Y-12 by Consolidated Nuclear Security, a limited-liability company of which Bechtel is a majority partner, to replace aging facilities with a modern, more efficient, and safer facility for highly-enriched uranium operations.

The facility will be a multi-building, state-of-the-art complex for enriched uranium operations related to nuclear security. It will not only ensure the long-term viability, safety, and security of the enriched uranium capability in the U.S., but also support the nation's nuclear weapons stockpile, the downblending of uranium to prevent the spread of nuclear weapons, and provides uranium for fuel for U.S. Navy submarines and aircraft carriers. Currently, these unique capabilities reside in aging World War II and Cold War-era buildings that are inefficient and costly to operate and maintain.

At an estimated \$6.5 billion, UPF is one of DOE's largest investments in Tennessee since the Manhattan Project and one of the NNSA's largest construction projects.

Y-12 is managed and operated by Consolidated Nuclear Security, LLC. CNS operates Y-12 and the Pantex Plant in Amarillo, Texas, in support of the NNSA.



CASE STUDY

NATIONAL SECURITY MISSION MEETS ECONOMIC DEVELOPMENT

As the nation's national security programs evolve to meet new global challenges, the facilities that serve these critical missions must adapt as well.



In Oak Ridge that means the Y-12 Nuclear Security Complex is recapitalizing its factories with modern technology, safety equipment, and enhanced security. The biggest piece of that modernization program is the Uranium Processing Facility, a \$6.5 billion complex now under construction that will take over manufacturing operations from the current World War II-era operating factories.

This constitutes the largest construction project in Tennessee history. The completed state-of-the-art facility allows for security upgrades, a reduced environmental footprint and the revitalization of the nuclear supply chain. Its construction alone will create an estimated 2,000 jobs, and approximately one-third of the business generated has been awarded to Tennessee companies.

CASE STUDY

PRESERVING HISTORY CREATES HERITAGE TOURISM

The story of Oak Ridge's 75 years of service to the nation is being refreshed.

The Department of Energy's Office of Science is revitalizing an old Oak Ridge institution, the American Museum of Science and Energy. DOE's environmental management program is currently building a new history center at the K-25 Gaseous Diffusion Plant, now known as the East Tennessee Technology Park, to tell the story of the nation's enrichment program.

Those two facilities - along with the recent creation of the Manhattan Project National Historical Park - are creating a renewed sense of interest in Oak Ridge and its role in World War II, the Cold War, and the history of transformative science over the last 75 years.



Heritage tourism will increase as visitors come from around the country to experience the Manhattan Project, one of the greatest stories of the 20th century.

CASE STUDY

INVESTMENT IN EDUCATION AND FUTURE WORKFORCE

Since its founding in 1946, one of the original missions of Oak Ridge Associated Universities (ORAU) has been STEM education. ORAU and its employees can be found carrying that STEM advancement mission into their many communities.

Some key ORAU STEM programs that are making an impact on Tennessee students include:

Extreme Classroom Makeover: Each year ORAU awards one \$25,000 grand prize for a teacher to purchase technology and classroom upgrades. In its 10th year, ORAU has awarded more than \$370,000 to classrooms from Anderson, Knox, Loudon, Sevier, Blount, Grainger, Monroe, and Morgan counties.

Education Grants: In 2017, ORAU awarded 38 teachers from 14 East Tennessee schools with classroom grants. Since the program's inception in 2002, ORAU has provided \$487,000 to area schools.

Since 2001, ORAU has partnered with **Dolly Parton's**

Imagination Library to donate more than 400,000 books to area preschoolers, with nearly 10,500 graduates of the program.

ORAU also offers a series of free summer activities for students including:

- Oak Ridge Robotics Academy
- Appalachian Regional Commission/Oak Ridge National Laboratory High School Summer Math-Science-Technology Institute
- Appalachian Regional Commission/Oak Ridge Associated Universities Middle School Science Academy

The companies that work on the DOE Oak Ridge Reservation invested \$637,500 in cash in Tennessee education programs in FY2017. They gave even more in mentoring programs and assistance to classroom teachers. In addition, DOE contractors CNS and UCOR sponsored apprenticeship programs in the building trades to foster the next generation of craftsmen.



ENVIRONMENTAL MANAGEMENT



The Oak Ridge Office of Environmental Management (OREM) is a DOE field site located in Oak Ridge, Tennessee. The site dates back to 1942 as part of the Manhattan Project. Engineers developed three distinct campuses within the Oak Ridge Reservation, and each pursued a different technology to enrich uranium. In the decades since, each of these campuses—(ORNL, Y-12, and East Tennessee Technology Park (ETTP))—evolved and conducted different missions for the Department. Scientists and engineers purified isotopes, conducted research, built weapons, and created environmental legacies that the program has worked to clean and remove since 1989.

At Y-12, OREM is working to address excess and contaminated facilities, remove mercury soil and groundwater contamination, and enable modernization that allows the NNSA to continue its crucial national security and nuclear non-proliferation responsibilities. At ORNL, Environmental Management is working to remove excess and contaminated facilities to improve safety and make way for DOE to continue its advanced supercomputing, materials, and energy research at the site.

ETTP, the former K-25 Gaseous Diffusion Plant/uranium enrichment site, has a legacy of contaminated buildings, soil, sediment, and groundwater that require remediation. EM's goal is to remove these structures and legacy contamination and transfer the property to become a private-sector industrial park managed by CROET, the Community Reuse Organization of East Tennessee. ETTP cleanup began in 1989; since then, the EM program has achieved considerable progress. Several major projects remain to achieve Vision 2020, a goal to complete cleanup at the site in the near future.

OREM uses three prime contractors to conduct its major cleanup projects at the site: URS | CH2M Oak Ridge LLC (UCOR), North Wind Solutions LLC, and Isotek Systems LLC.

OFFICE OF SCIENTIFIC AND TECHNICAL INFORMATION

OSTI.GOV

A unit of the Office of Science, DOE's Office of Scientific and Technical Information (OSTI) fulfills agency-wide responsibilities to collect, preserve, and disseminate both unclassified and classified scientific and technical information (STI) emanating from DOE-funded R&D activities at DOE national laboratories and facilities and at universities and other institutions nationwide. OSTI provides access to DOE STI through a suite of web-based, searchable discovery tools and through other commonly used search engines, offering ever-expanding sources of R&D information to DOE, the research community, and the science-attentive public.

Established in 1947, OSTI grew out of the post-World War II initiative to make the scientific research of the Manhattan Project as freely available to the public as possible, and its corporate function is authorized in several laws covering DOE and its predecessor agencies.

OAK RIDGE OFFICE / INTEGRATED SUPPORT CENTER

The Office of Science's (SC) Integrated Support Center (ISC) provides essential administrative, business, and technical support to the ten Office of Science national laboratories and site offices located throughout the country.

Through the ISC's services and customer support, national laboratories and site offices can continue operations efficiently and advance the fields of science, engineering, and technology for our nation.

The ISC serves customers in SC headquarters as well as other DOE programs in the areas of procurement, financial assistance, and as landlord for the Oak Ridge Reservation in Tennessee.

The ISC is a virtual organization comprised of the combined support capabilities of offices in Chicago, Illinois, and Oak Ridge, Tennessee.

OFFICE OF SECURE TRANSPORTATION

A part of the NNSA, the Office of Secure Transportation (OST) is responsible for the safe and secure transport of government-owned special nuclear materials in the contiguous United States. These classified shipments can contain nuclear weapons or components, enriched uranium, or plutonium. Cargo is transported in highly modified secure tractor-trailers and escorted by armed federal agents in other vehicles who provide security and national incident command system response in the event of emergencies.



There are three commands from which OST Federal Agents operate: Albuquerque, New Mexico; Amarillo, Texas; and Oak Ridge, Tennessee. Headquarters is located in Albuquerque, while the OST Training Command is located at Fort Chaffee, Arkansas.

A key component of OST operations is the law enforcement/emergency management liaison program. OST provides briefings to various federal, tribal, state, and local organizations on which OST depends for support.

DEPARTMENT OF ENERGY PROGRAM OFFICES IN OAK RIDGE:

Office of Science

- Oak Ridge National Laboratory Site Office (<https://science.energy.gov/oso>)
 - Oak Ridge National Laboratory (<https://www.ornl.gov>)
 - Oak Ridge Institute for Science and Education (<https://orise.ornl.gov>)
- Oak Ridge Office / Integrated Support Center (<https://science.energy.gov/isc/about>)
 - DOE Liaison for the Manhattan Project National Historical Park in Oak Ridge (<https://science.energy.gov/isc/about>)
- Office of Scientific and Technical Information (<https://www.osti.gov>)

National Nuclear Security Administration

- National Nuclear Security Administration Production Office (<https://www.energy.gov/nnsa/locations>)
 - Y-12 National Security Complex (<https://www.y12.doe.gov>)
 - Uranium Processing Facility Project Office (<https://www.bechtel.com/projects/uranium-processing-facility>)
- Office of Secure Transportation Eastern Command (<https://www.energy.gov/nnsa/office-secure-transportation>)

Office of Environmental Management

- Oak Ridge Office of Environmental Management (<https://www.energy.gov/orem/oak-ridge-office-environmental-management>)

Office of Nuclear Energy

- Nuclear Energy Oak Ridge Site Office (<https://www.energy.gov/ne/office-nuclear-energy>)

Appendix

OVERVIEW OF METHODOLOGY

To translate direct effects into total effects of DOE investments in the state, this analysis used the Regional Input-Output Modeling System (RIMS II) multipliers for the state of Tennessee developed by the Bureau of Economic Analysis to calculate the indirect/multiplier effects of DOE's spending in the state. It assessed industries that align to DOE's work in Tennessee (waste management and remediation services, in addition to professional, scientific, and technical services) as well as 51 other industries from which DOE acquires products and service.

There are two main components of the analysis:

- **The direct effects of the DOE:** the total expenditure by DOE in the state of TN including salaries paid to current employees throughout the state, pension benefits to former employees, procurement of products and services, as well as other expenditures (public services, charitable contributions, utilities and taxes).
- **The indirect/multiplier effects:** benefits of DOE's purchase of raw material, services and supplies (non-payroll spending) acquired from businesses throughout the state; and benefits arising from DOE's payroll and pension expenses on additional income and jobs in the state.

The impact analysis reviewed DOE's impact to three components of the state's economy:

- **Output Benefits (state GDP):** represent benefits of DOE on total state output from payroll and non-payroll expenditures. It calculates the total increase in SGDP for every dollar spent by DOE.
- **Income Benefits:** represent the total state income generated for every dollar DOE and its contractors spent on salaries and pensions.
- **Employment Benefits:** represent the total number of jobs created in the state for every \$1 million spent by DOE.

ACRONYMS

AI	artificial intelligence
AMSE	American Museum of Science & Energy
BEA	Bureau of Economic Analysis
CROET	Community Reuse Organization of East Tennessee
CNS	Consolidated Nuclear Security, LLC
DOE	U.S. Department of Energy
EM	Environmental Management
ETEC	East Tennessee Economic Council
ETTP	East Tennessee Technology Park
FY	fiscal year
GDP	gross domestic product
HEUMF	Highly Enriched Uranium Materials Facility
IIA	Information International Associates
ISC	Integrated Support Center
IT	information technology
K-25	original name for Oak Ridge Gaseous Diffusion Plant, now East Tennessee Technology Park
MDF	Manufacturing Demonstration Facility
MPNHP	Manhattan Project National Historical Park
NAICS	North American Industry Classification System
NASIC	National Air and Space Intelligence Center
NNSA	National Nuclear Security Administration
NPO	NNSA Production Office
NRC	Nuclear Regulatory Commission

ORAU	Oak Ridge Associated Universities
OREM	Oak Ridge Environmental Management
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSTI	Office of Scientific and Technical Information
PHD	Doctor of Philosophy
R&D	research and development
RIMS II	Regional Input-Output Modeling System
SGDP	state gross domestic product
SNS	Spallation Neutron Source
SC	Office of Science
STI	Scientific and Technical Information
STEM	science, technology, engineering, and mathematics
TVA	Tennessee Valley Authority
UCOR	URS CH2M Oak Ridge LLC
UPF	Uranium Processing Facility
USPTO	U.S. Patent and Trademark Office
US	United States of America
UT	University of Tennessee - Knoxville
X-10	original name for Oak Ridge National Laboratory
Y-12	Y-12 National Security Complex
YSO	Y-12 Site Office



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