

Fueling the Future:

Economic and Workforce Impacts of a Growing Nuclear Cluster in Oak Ridge and Roane County, Tennessee



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Introduction

The United States is transitioning to cleaner and more resilient energy to power the nation. Advancements in nuclear technologies are at the forefront in meeting regional and national energy objectives. The East Tennessee region has a history rooted in nuclear advancements and is preparing to support and benefit from the momentum of what is being called the “Nuclear Renaissance”. This report will examine how partnerships and coordinated efforts are positioning Roane County and Oak Ridge as national leaders in the next generation of nuclear energy through an in-depth look at regional economic development strategies, workforce development/education pipelines, and research and development ecosystems.

Not only is the nuclear industry vital to bolstering clean energy supplies, but it also plays a key role in national security, particularly in the areas of artificial intelligence and energy security. The Roane County/ Oak Ridge area, with its infrastructure, partnerships, and expertise, is emerging as an epicenter for growth and innovation, as interest in uranium enrichment, small modular reactors, and advanced fuel cycles increases. With its history rooted in the Manhattan Project and the presence of Oak Ridge National Laboratory in the area, the Oak Ridge corridor is at the forefront of nuclear research and development.

Roane County, which shares the Oak Ridge reservation, attracts and supports nuclear investment through a coordinated economic development strategy, led by the Oak Ridge Corridor Development Corporation (ORCDC) and the Roane Alliance, with the support of strong partnerships with the Tennessee Department of Economic and Community Development (TNECD), Tennessee Valley Authority (TVA), United Cleanup Oak Ridge (UCOR), and the Department of Energy (DOE). This report will highlight how infrastructure readiness, strategic

marketing, partnerships, and workforce alignment are driving sustainable workforce development and economic growth within the region, specifically Oak Ridge and Roane County.

Historical Context of Nuclear Innovation in Oak Ridge

The story of Oak Ridge coincides with the birth of the nuclear age. Explicitly founded for nuclear research and development, Oak Ridge was established by the U.S. government in 1942 as a “secret city.” Oak Ridge was an integral part of the Manhattan Project, working to support uranium enrichment, and was critical in separating uranium for use in the first nuclear weapon. This established the city as a center of nuclear innovation.

After the end of World War II, Oak Ridge’s identity as the epicenter of nuclear technology was cemented by the growth of the Oak Ridge National Laboratory (ORNL). At the forefront of nuclear research, scientists and engineers at ORNL have developed nuclear fuel, molten salt reactors, and radioactive isotopes for use in space exploration and medicine. Other significant contributions emerging from ORNL include the development of uranium isotope separation, the operation of the world’s first graphite reactor, and the production of plutonium-238, which supports national defense.

In 1942, the U.S. Army Corps of Engineers acquired almost 60,000 acres in East Tennessee, and massive facilities were constructed with an unprecedented investment from the federal government. The Y-12 plant was built for electromagnetic separation of uranium isotopes, the X-10 graphite reactor was the first continuously operational nuclear reactor, and K-25 was a gaseous diffusion plant. Billions of federal dollars were invested in the construction of the facilities and infrastructure to support them. The government needed a diverse workforce to construct and operate these facilities. Skilled tradespeople were needed for the construction of the facilities, housing, schools, and roadways. Scientists and engineers were recruited from

universities and laboratories across the country. Also, thousands of workers were required to perform technical and support roles. Oak Ridge employed more than 75,000 workers at its peak of operations. Many of these workers remained after the war, contributing to the formation of the region's specialized nuclear workforce.

Oak Ridge transformed from a top-secret wartime project to a permanent scientific research center after World War II. Scientists, engineers, and technicians shifted the focus of their work from weapons development to energy production, medical isotopes, and materials research. The Atomic Energy Commission continued the federal investment by funding additional infrastructure, continued research, and workforce development in the area. Transitioning from the Manhattan Project to peacetime uses of nuclear research ensured that the jobs, skills, and expertise developed during the project were not lost. Instead, it created the basis for today's workforce and solidified Oak Ridge as the national leader in nuclear research and technology.

Current Industry Landscape and Key Assets

The Oak Ridge/ Roane County region represents one of the most concentrated nuclear ecosystems in the country. It is strategically significant due to the presence of the U.S. Department of Energy and its largest science and energy laboratory, Oak Ridge National Laboratory. The Y-12 National Security Complex supports nuclear deterrence and materials management. These assets, among others, operate within the broader Oak Ridge Reservation and provide secure federal facilities that support both private-sector and government missions.

Other key contractors and institutions strengthen this ecosystem. United Cleanup Oak Ridge leads site transformation efforts and environmental management that returns previously contaminated government property to the city, county, and state for industrialization. The Oak Ridge Enhanced Technology and Training Center provides workforce preparation , hands-on

technical training, and emergency response protocols to nuclear operations. The Tennessee Valley Authority provides infrastructure and reliable power for energy-intensive nuclear operations.

Momentum continues to grow in the private sector with companies such as Centrus Energy and Kairos Power. Centrus Energy supports fuel-cycle security and uranium enrichment, while Kairos Power advances next-generation reactor technologies. X- Energy (Triso-X) produces meltdown-proof nuclear pellets to power advanced reactors. Together, these companies comprise the complete nuclear production cycle, from uranium to fuel to reactors.

The Orano USA Enrichment Project

One of the most significant nuclear fuel cycle investments by the United States in decades is the proposed uranium enrichment facility of Orano USA, known also as Project Ike. As of 2025, the United States relies on foreign sources for 70% of its enriched uranium, with Russia being the top foreign supplier. Domestic uranium enrichment has become a national security and energy priority. This project positions Oak Ridge and Roane County at the center of achieving American fuel independence. The strategic selection of Roane County was no accident. It was the result of proximity to federal nuclear assets, regional readiness/support, access to reliable power from the Tennessee Valley Authority, and a trained workforce with supportive educational programs. The availability of a secure, large parcel of land on the Oak Ridge Reservation further strengthened the position.

Roane County, and more specifically, The Roane Alliance, played a crucial and proactive role throughout the recruitment process. Orano USA had been investigating locations in other states throughout the country and was not even considering Tennessee. From the earliest stages, Roane Alliance staff worked closely with state and regional allies to coordinate four

comprehensive site visits, including detailed ground and helicopter tours of the proposed 920-acre site. Community profile, workforce capability, and infrastructure presentations were organized that demonstrated site readiness and community support. In addition, security considerations, development timelines, and utility capacities were outlined to support the project.

Beyond the physical attributes of the site, Roane County emphasized alignment and responsiveness to both Orano USA and its consulting team. Key decision-makers were provided direct access to local utility providers and TVA, local and federal permitting authorities, government officials, and workforce leaders. This demonstrated a unified commitment to the project's success. This cooperative approach gave confidence that the community possessed technical assets, governance capacity, and political will to support long-term investment. Roane County's ability to move quickly and present a clear vision for nuclear cluster growth was key in differentiating the site during a highly competitive national selection process.

Orano USA's projected impact on Roane County and Oak Ridge is substantial. The projected capital investment is over \$5 billion, the largest single capital investment in the State of Tennessee's history. A Tax Increment Financing (TIF) was established, which will result in over \$800 million in tax revenue to be split between the county and the city. This project will create more than 300 direct jobs, with an average annual wage of over \$77,000, significantly higher than Roane County's average wage. Just as important, this project has sparked a Nuclear Renaissance in East Tennessee that will encourage additional private-sector investment across the nuclear supply chain, including engineering services, component manufacturing, and logistics. When Roane County secured a cornerstone fuel cycle project, it strengthened its position within the national nuclear ecosystem and transformed the area from a historic nuclear legacy site into a leader in clean energy.

Regional Economic Development Strategy

Roane County and the City of Oak Ridge have implemented a strategic approach to economic development that supports the future growth of the Nuclear Renaissance and places the East Tennessee region as the premier location for investment in advanced energy. The Roane Alliance and the Oak Ridge Corridor Development Corporation (ORCDC) work together to align local assets and promote available properties. ORCDC includes representatives from Roane County, Anderson County, and the City of Oak Ridge, as well as education partners, industry leaders, and members of local Industrial Development Boards. Efforts target nuclear, energy, and technology-related industries, including their supply chains.

Site readiness is a core focus of the regional economic development strategy. Roane County has made significant investments in property acquisition, including due diligence, property evaluations, utility studies, and environmental assessments. Grants from the Tennessee Department of Economic and Community Development (TNECD) and the Tennessee Valley Authority (TVA) have supported these efforts. The TNECD Site Development Grant and Property Evaluation Program have helped identify and fund additional industrial sites, with support from the TVA InvestPrep Grant. Technical assistance and data have been provided through collaboration with the East Tennessee Economic Development Agency, East Tennessee Economic Council, and East Tennessee Development District. These partners and programs have helped the region prepare and market industrial sites.

Another key element of the strategy is targeted marketing. The Roane Alliance and its partners have developed branding, collateral, and media strategies that spotlight the region's assets. Emphasizing the nuclear workforce, DOE proximity, educational pipelines, and the strong historical nuclear foundation, combined with strong community support, are fundamentals of the

marketing strategy. These campaigns have been included in Site Selection Magazine, international nuclear publications, and the national Nuclear Opportunities Workshop. TNECD and TVA have designated recruiters for nuclear companies.

The region's incentive programs and infrastructure investment have been key in recruiting projects to the area. The local city and county governments have collaborated to develop Payment in Lieu of Tax (PILOT) agreements and Tax Incremental Financing (TIF) to attract and incentivize nuclear projects, providing significant tax abatements for new industries and expansions by existing companies. These incentives are structured based on the project's capital investment, job creation, and other workforce factors. Additionally, TNECD and TVA offer grants to new nuclear industries looking to locate in the region.

Research and Development Ecosystem

The Oak Ridge/Roane County region contains one of the most significant research ecosystems in the country. Oak Ridge National Laboratory (ORNL) is the U.S. Department of Energy's (DOE) largest science and energy laboratory. They are a world leader in nuclear fuels, materials science, isotope production, advanced reactor development, and high-performance computing. ORNL not only supports government initiatives but also provides private-sector companies with access to its computational capabilities and world-class facilities, providing technical expertise to accelerate innovation. Most, if not all, companies could not afford the technology or the highly trained personnel available at ORNL.

The DOE's Gateway for Accelerated Innovation in Nuclear (GAIN) program is a key part of the innovation pipeline for nuclear in our region and across the nation. This program provides private-sector nuclear developers with access to ORNL resources through technical vouchers.

Through GAIN, companies specializing in fuel cycles and advanced reactors can validate their technology, test materials, and refine licensing strategies, thereby shortening the timeline to bring a product or process to the production scalability level.

Federal research is strengthened through partnerships with regional educational institutions, including the University of Tennessee, Tennessee Technological University, Roane State Community College, and Pellissippi State Community College. The connection between academic research and workforce development helps support industry needs. The Oak Ridge Enhanced Technology and Training Center uses state-of-the-art technology, such as Extended Reality (XR) to model working with hazardous, radioactive materials in a safe environment. Following the Orano USA announcement, the University of Tennessee and the Y-12 National Security Complex have collaborated to build the National Security Prototype Center (NSPC). The facility will serve as a hub for research and development, enabling prototyping, manufacturing, and advanced technologies such as digital twins and artificial intelligence.

Workforce Development and Education Pipelines

Growth of the nuclear cluster in Oak Ridge and Roane County depends mainly on one key factor, which happens to be one of its greatest strengths-- a strong and future-focused workforce strategy. Although this region benefits from over eighty years of nuclear expertise, recent major investments in advanced reactors and fuel cycle operations require a significantly larger pipeline of workers. Not only is the region in need of nuclear engineers, but there will also be an exponentially increasing need for nuclear technicians, operators, welders, pipefitters, and other skilled trades.

The potential workforce pipeline begins in the region’s K-12 schools and classrooms. Students can begin their studies with certificate and diploma programs through Career and Technical Education (CTE) programs in local high schools, including dual enrollment, middle college, and apprenticeship pathways. Scaling back further, the region is investing in early pipeline development through initiatives such as Connect Roane, which strengthens coordination between K-12 educators and industry to ensure awareness of nuclear opportunities. All K-12 educators participate in a full-day nuclear professional development, visiting nuclear industries, Roane State’s nuclear lab, ORNL, and nuclear-focused museums to help develop field trips and STEM activities for students of all ages.

The educational system in the region offers a comprehensive spectrum of postsecondary education pathways designed to support nuclear-focused careers at every level. Tennessee College of Applied Technology- Harriman (TCAT) offers certificate and diploma programs in industrial maintenance, welding, electrical systems, machining, and other high-demand trades essential to nuclear operations. Roane State Community College offers associate degrees in many nuclear-related areas, including chemical engineering, mechatronics, nuclear technician, cybersecurity, project management, and environmental health. Enrollment in the nuclear technician program has increased every year, from an initial 12 students to over 30 in 2025, and to more than 70 in 2026.

Roane County was awarded \$180,000 from the State of Tennessee’s ThreeStar Program to fund a nuclear “wrapper” program for high school and TCAT Harriman students that integrates foundational nuclear knowledge, safety culture, and industry awareness into existing CTE and technical programs. Graduating students leave with both credentials and familiarity with nuclear safety protocols, giving them a competitive advantage for immediate entry into the workforce. Complementing this effort is the production of a series of educational videos promoting nuclear

career awareness from elementary through high school, and to inform parents and the community about career pathways, required education, and potential jobs/salaries in the industry.

One key partner in the workforce pipeline is Oak Ridge Associated Universities (ORAU). This organization, comprising postsecondary institutions and other stakeholders, partners with federal agencies to manage research, educational programs, and workforce development in nuclear-related fields. Graduate and post-graduate students gain access to internships, research and development appointments, and fellowships through ORAU partnerships. These opportunities complement bachelor's, master's, and Ph.D. programs at Tennessee Technological University and the University of Tennessee, both of which offer nationally recognized nuclear engineering degrees.

From early-elementary classroom awareness and community outreach initiatives, Roane County and Oak Ridge have intentionally built a seamless nuclear talent pipeline. Students can move directly into entry-level careers from high school CTE programs and TCAT Harriman workforce training and then earn associate degrees at Roane State Community College, and transfer to bachelor's and advanced degree programs at University of Tennessee and Pellissippi State Community College, demonstrating a fully aligned pathway from awareness to advanced specialization. This coordinated approach reflects the region's strategic planning, historic leadership in nuclear innovation, and forward-thinking workforce preparation to support the emerging nuclear renaissance.

Supply Chain and Infrastructure Consideration

Tennessee is home to a strong and varied nuclear supply chain, with over 230 nuclear-related companies operating at more than 350 locations across the state. These companies include

manufacturers, suppliers, and hazardous material transportation, handling, and disposal. Firms like EnergySolutions provide processing, packaging, transport, and disposal of radioactive materials in Oak Ridge and throughout the country. The supply chain network includes environmental management firms, component makers, logistics providers, and specialty service companies that support both existing and upcoming nuclear operations and energy projects.

Despite the robust supply chain, gaps remain in heavy component fabrication, nuclear-grade machining, specialized materials production, and certified skilled trades. Vulnerabilities in the supply chain create both opportunities and risks. Developing a strategy to recruit manufacturers and expand existing suppliers offers an opportunity to attract additional investment and create high-paying, quality jobs in Roane County. With the workforce in critical demand and land at a premium, the risk is overpromising resources that are not available.

Infrastructure plays a central role in enabling the region's successful nuclear supply chain. Interstate 40 and Interstate 75 connect suppliers to national freight corridors and ports and are within one day's drive of more than 70% of the country's markets. While these roadways are assets that help move materials, heavy equipment, and the workforce, this traffic artery experiences congestion related to growth. Heavy traffic and slowdowns highlight a need for ongoing improvements to safely and efficiently support future industrial and community demands as more companies move in, bringing additional workers and vehicles onto the roadways.

The Tennessee Valley Authority (TVA) provides another critical advantage- reliable energy. TVA has one of the country's largest power generation portfolios, including significant nuclear capacity, supplying stable, large-scale power for load-intensive nuclear manufacturing and enrichment operations. While they have sustained reliable power with the necessary redundancy for current nuclear projects, new high-load projects are coming online at a fast pace. Coordinating

planning with TVA, local utility providers, and other stakeholders will be essential to ensure that capacity, transmission, and resiliency keep pace with the exponentially increasing regional demand. One solution to the power supply issue is small modular reactors, which are ironically driving the need for additional power to produce. TVA is currently engaged in demand studies and plans to build approximately 3,800 MW of new generation to meet the region's growing demand.

Public Policy and Government Support

Policies from the state and federal government have accelerated nuclear investment and strengthened the ecosystem in Roane County and throughout Tennessee. Governor Bill Lee and the Tennessee General Assembly established the Tennessee Nuclear Energy Fund in 2023 with an initial allocation of \$70 Million. The purpose of the fund is to encourage nuclear investment, workforce training, and site development. The fund has provided financial support for 14 projects, investing \$47 million to help attract private capital, expand the supply chain, and supplement educational programs. The thousands of new jobs and billions in private investment that have been committed demonstrate the impact of targeted state support. The Tennessee Nuclear Energy Advisory Council, now known as the Tennessee Nuclear Network, was also established by the governor and provides policy guidance that ensures funds are directed toward vetted activities that will build long-term investment and competitiveness with other states vying for nuclear business.

Recent federal policies are rapidly improving the regulatory environment to support nuclear deployment in a faster, more efficient way. The Nuclear Regulatory Commission (NRC) was tasked with implementing a quicker review timeline, such as 12 months for license renewals and 18 months for new reactor applications. This would reduce the process from a previous 3-year timeframe to a more manageable timeframe while still balancing safety with the need for the timely deployment of nuclear technologies. In addition to policies, the U.S. Department of Energy

invested \$1.8 billion in January 2026 for uranium enrichment, with Oak Ridge companies Orano USA and Centrus Energy each awarded \$900 million to build and expand their domestic enrichment capacity. In addition, the U.S. Department of Defense (DOD) contracts play an important role in nuclear innovation tied to national security and weaponry.

Local support for nuclear growth in Oak Ridge and Roane County is second nature. The community itself was originally established to support the Manhattan Project and has maintained its nuclear mission-focused identity for generations. The region's culture is defined by the importance of national security and energy innovation, resulting in a well-informed and supportive public. Local leadership meets regularly to plan, coordinate, and communicate. Zoning, permitting processes, and industrial land planning are structured to accommodate complex projects.

Economic and Workforce Impact Projections

The expansion of the nuclear cluster in Oak Ridge and Roane County will generate significant direct, indirect, and induced jobs in the East Tennessee region and across the state. The projected number of permanent job creations associated with major projects is over 2,100. These positions will cover a full spectrum of skill levels, from skilled trades and technicians to engineers, project managers, and research scientists. The total job count is estimated at over 3,000, including supply chain effects and induced employment from local spending. During peak development periods, estimated between 2027-2032, construction activity alone is expected to require over 5000 skilled construction workers.

With a growing workforce, the impact on housing and population growth is significant. A demand for approximately 1,800 new housing units over the next 5-7 years includes a wide range of housing options, including single-family homes, multifamily developments, and workforce

housing. The Roane County government is being proactive with strategic planning for zoning and a Multi-Family Housing Pilot to incentivize builders to choose the area for development. The struggle is to ensure that the housing supply keeps pace with demand while maintaining affordability and aligning responsible growth with the community's small-town feel and citizens' concerns.

A partnership comprising Oak Ridge Associated Universities, Tennessee Nuclear Network, and the Roane Alliance is currently conducting a comprehensive workforce and economic impact study. This study combines data from over 20 new and expanding nuclear companies and will provide a detailed Gantt chart outlining ramp-up phases, peak construction periods, and ramp-down, with a transition to long-term permanent employees. Once completed, strategic planning for workforce, housing, and infrastructure readiness can be based on solid data instead of estimates.

Capital investment and facility construction will significantly strengthen the local tax base. The estimated tax revenue over a 40-year period is \$1 billion. Additional impacts are expected on sales tax and utility revenues. This expanded tax base will provide new resources to support schools, infrastructure, and community services while decreasing reliance on existing taxpayers.

Conclusion

A Nuclear Renaissance- the growth of a nuclear cluster in Oak Ridge and Roane County is a combination of a rich history and a bold step into the future. This capstone report demonstrates that the East Tennessee region has an excellent formula for success in the nuclear industry: 80 years of nuclear legacy dating back to the Manhattan Project; a statewide network of over 230 nuclear-related companies; strong local partnerships; and significant state and federal funding. These investments, along with the Department of Defense Involvement, Oak Ridge National Lab's

research and development, and the Tennessee Valley Authority's presence and projects, reinforce Tennessee's national leadership in nuclear energy development.

The initial project, guided by the Roane Alliance, was Orano USA's uranium enrichment project with a capital investment of over \$5 billion dollars and 300 projected jobs, announced on September 4th, 2024. Also known as Project Ike, this marked the beginning of a nuclear rebirth in Roane County and Oak Ridge that has led other projects to quickly follow suit and locate within the area. One year later, on September 4th, 2025, OKLO's advanced fuel center committed to a \$1.7 Billion dollar investment and 800 new jobs. BWXT announced its nuclear fuel services project on September 20th, 2025, which consisted of 198 jobs and a \$127 million investment. With a \$280 Million investment and 175 jobs, Radiant announced its nuclear generation facility on October 13th, 2025. LIS Technologies announced on November 16th, 2025, that its laser enrichment facility would bring 200 jobs and a \$1.38 billion investment to Roane County. Most recently, Centrus announced 428 jobs and a \$560 million investment in its centrifuge manufacturing plant. There are no signs of the momentum slowing down.

The long-term economic impact goes beyond individual projects, totaling more than \$9 Billion in investment and 2,100 new jobs (see chart on resource page). With sustained effort, strategic planning, and ongoing collaboration, the East Tennessee region is positioned to strengthen U.S. energy independence. Roane County and Oak Ridge are prepared to translate billions in investment into generational opportunity, offering a better quality of life to all of its citizens.

Resources

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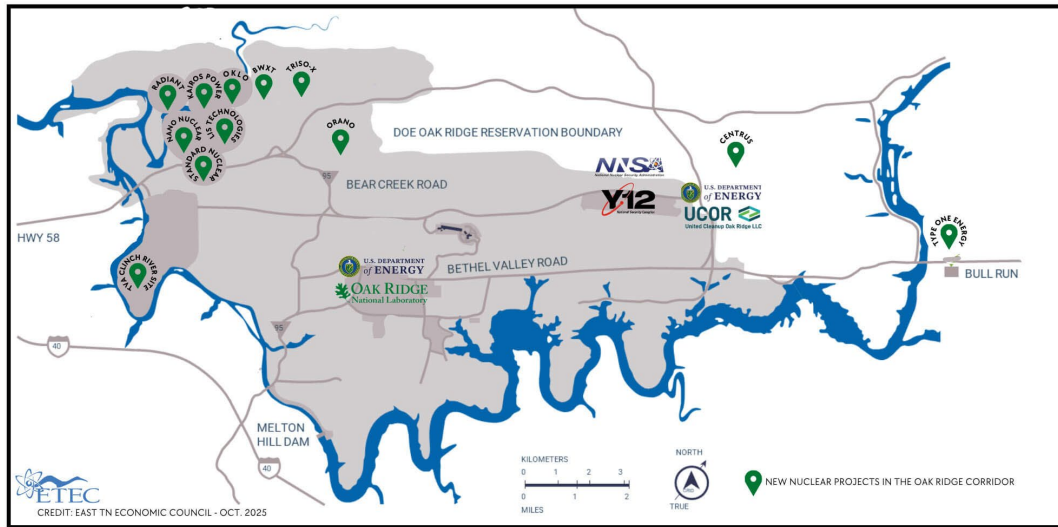
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Nuclear Energy Innovation - Oak Ridge Corridor



Company / Project	Announcement Date	Project Type	Capital Investment	Projected Jobs
Orano USA – Project Ike	September 4, 2024	Uranium Enrichment Facility	\$5+ Billion	300
OKLO – Advanced Fuel Center	September 4, 2025	Advanced Fuel Production	\$1.7 Billion	800
BWXT – Nuclear Fuel Services Project	September 20, 2025	Nuclear Fuel Services	\$127 Million	198
Radiant – Nuclear Generation Facility	October 13, 2025	Nuclear Generation / Microreactor Manufacturing	\$280 Million	175
LIS Technologies – Laser Enrichment Facility	November 16, 2025	Laser Uranium Enrichment	\$1.38 Billion	200
Centrus Energy – Centrifuge Manufacturing Plant	Most Recent Announcement	Centrifuge Manufacturing	\$560 Million	428

Total Known Investment: ~\$9.047 Billion

Total Projected Jobs: 2,101