



Rendering of TVA's Clinch River site, where the utility will build a GE Vernova Hitachi Nuclear Energy BWRX-300 small modular reactor. Photo used with permission from TVA and GE Vernova Hitachi.

East Tennessee Nuclear Workforce Demand Assessment

Michelle Goodson

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LETTER FROM MEGHAN MILLWOOD, ORAU PRESIDENT AND CEO

It is my pleasure to introduce the East Tennessee Nuclear Workforce Demand Assessment, a document that presents the findings of a months-long assessment of the workforce needs of the companies investing in East Tennessee's nuclear industry. By quantifying nuclear workforce demand as this report does,



ORAU hopes to increase investor and community confidence in the nuclear industry and to strengthen the work of stakeholders already collaborating to meet growing demand for a skilled nuclear workforce.

We know from the study that demand for workers outpaces Tennessee's existing training pipeline in several key occupations. As investment in Tennessee's nuclear industry accelerates, ensuring an adequate supply of skilled workers has become a central concern for the companies driving it and the state agencies supporting them. Access to a qualified workforce is a major factor in determining where a company chooses to locate new operations.

The results of the East Tennessee Nuclear Workforce Demand Assessment are a snapshot of Tennessee's nuclear workforce needs based on the companies interviewed for this study. New investment continues to be made in the region, so this report likely underestimates the totality of the workforce needed. The results are intended to inform discussion and planning already taking place as stakeholders from industry, education, workforce development, economic development and community organizations continue to work together to address nuclear workforce needs.

I want to express my gratitude to everyone who contributed to the development of this workforce demand assessment. I'm excited to see how this study will strengthen the collaborations needed to ensure the long-term success of nuclear energy in Tennessee and across the country.

A handwritten signature in black ink that reads "Meghan Millwood". The script is fluid and cursive.

Meghan Millwood
ORAU President and CEO

LETTER FROM MICHELLE GOODSON, SENIOR DIRECTOR, STRATEGIC GROWTH AND PARTNERSHIPS

On behalf of ORAU and the ORAU STEM Accelerator, I want to express my deepest gratitude to the exceptional team of collaborators who made the East Tennessee Nuclear Workforce Demand Assessment possible. Special thanks to the Tennessee Nuclear Network (TN²) and its member organizations, 14 of



which participated in interviews and data collection to inform the assessment.

This study is a snapshot in time of the current workforce needs based on data collected from the companies that participated. Investment in the region continues to be announced, which means the demand for skilled workers to meet the needs of the companies investing in Tennessee will continue to grow.

This report makes recommendations for expanding existing educational and training pipelines to meet the growing needs of the nuclear energy workforce, including strengthening the Tennessee Nuclear Fund's data-based portfolio management strategy to direct workforce investment where it is needed

most. Additionally, we hope this study will inform existing collaborations among nuclear energy stakeholders who will continue to work together to meet the demand for skilled nuclear workers in the region and the state.

This study is an important step in meeting those needs, but it is not the last. Let's continue the conversation!

Michelle Goodson

Michelle Goodson

ORAU Senior Director

Strategic Growth and Partnerships

EXECUTIVE SUMMARY

Tennessee's nuclear industry is experiencing a historic expansion, with the private sector pledging over \$10 billion to East Tennessee's nuclear buildout over the past five years, headlined by Orano USA's planned \$5 billion Oak Ridge enrichment facility. As this investment accelerates, ensuring an adequate supply of skilled workers has become a central concern for the companies driving it and the state agencies supporting them. As the Tennessee Nuclear Energy Advisory Council (TNEAC) found in its 2024 report to Governor Bill Lee, access to a qualified workforce is a major factor in where companies choose to site new operations. This report presents ORAU's findings on Tennessee's nuclear workforce demand and examines how the state can train and grow its workforce fast enough to keep pace with this investment.

ORAU conducted structured interviews with 14 companies across the Tennessee Nuclear Network (TN²) engaged in Oak Ridge's nuclear expansion over a three-month period, supplemented by a quantitative needs-assessment matrix and a preliminary review of publicly available workforce supply data. Among the companies surveyed, Tennessee's nuclear workforce totals approximately 17,000 workers today and is projected to reach a peak of approximately 21,000 workers by 2032, a compound annual growth rate of roughly 3.4%. This growth is driven by an ecosystem of multiple new nuclear projects rather than a single construction cycle: operations-related demand is expected to climb steadily through 2035, while construction-related demand peaks in 2032 before easing. According to this study, the demand growth is expected to outpace Tennessee's current training pipeline in several key occupations. Chemical plant and system operators face the most acute shortfall with peak demand of over 1,300 workers, compared to a pipeline of only a dozen credentialed graduates each year. Skilled trades occupations are also expected to become strained when construction peaks.

Based on the report's findings, ORAU recommends that Tennessee strengthen the Tennessee Nuclear Fund's (TNF) data-based portfolio management strategy to direct workforce investment where it is needed most; expand this workforce demand study to include a broader and more diverse set of employers; conduct a full, statewide workforce supply study with regional detail to update and validate this report's supply-side findings; and invest in training capacity for the occupations identified as most at risk of a shortfall.

This report reflects extensive engagement with participating TN² industry stakeholders and serves as a starting point for continued workforce planning discussions. Findings are intended to support ongoing collaboration among industry, education, workforce development, and public-sector partners to address emerging workforce needs.

This assessment is best understood as the first step in peeling back the onion on Tennessee's nuclear workforce needs. While the initial employer sample represents only a portion of the nuclear companies growing across East Tennessee, it provides an important view of where workforce pressure is likely to emerge and establishes a foundation for deeper, employer-informed analysis. The next phase should broaden employer participation and continue to connect projected labor demand with the training, career exploration, and workforce investments needed to meet it.

1. INTRODUCTION

This ORAU-led workforce demand study is a response to the rapidly changing needs of the U.S. energy sector. Most importantly, the U.S. is facing the first increase in electricity demand in 25 years due to the needs of artificial intelligence data centers as well as the electrification of transport, industry and residential appliances. This is leading to a renewed interest in nuclear energy accompanied by an influx of public and private sector investment. This ORAU study attempts to respond to concerns expressed across industry and government about whether the current workforce development ecosystem is sufficient to support all the stated announcements for new nuclear investment. ORAU hopes to increase investor and community confidence by quantifying nuclear workforce demand. In addition, quantifying workforce demand and clarifying expected training gaps in specific roles can help Tennessee identify the highest impact nuclear supply chain investment opportunities in workforce development. This kind of targeted investment can lead to a more qualified nuclear workforce, attracting further private sector capital into the state.

A. Tennessee's Nuclear Industry History

i) The Manhattan Project

Tennessee has a nuclear history dating back to World War II. In 1942, General Leslie Groves approved Oak Ridge, Tennessee, as the site for the Manhattan Project's pilot plutonium plant and uranium enrichment plant. Engineers quickly built a town to accommodate 30,000 workers alongside complex industrial facilities. The location was chosen for several critical reasons including Oak Ridge's remote environment and manageable size, as well as access to plenty of land, water, and electricity.¹

The K-25 and Y-12 plants supplied the enriched uranium-235 used in the first atomic bomb through gaseous diffusion enrichment and electromagnetic separation, respectively, to isolate uranium-235. The X-10 graphite reactor produced the world's first significant quantities of plutonium, which were sent to Los Alamos to help design the first atomic bombs. When the war ended, Oak Ridge was the fifth largest city in Tennessee, with original plans for 13,000 residents revised upward to 75,000² as the project expanded rapidly.³ Following the war, the Atomic Energy Commission took over the sites, which evolved into Oak Ridge National Laboratory (ORNL) and the Y-12 nuclear weapons facility.

ii) Post-War Transition: From Weapons to Research

After the war, Clinton Laboratories – renamed Oak Ridge National Laboratory – rapidly evolved into a research institution, becoming a leader in developing nuclear reactor technology and applying atomic expertise to peacetime applications.

¹ *The Atomic City: Why Oak Ridge Was Chosen for The Manhattan Project*. Explore Oak Ridge. <https://exploreoakridge.com/the-atomic-city-why-oak-ridge-was-chosen-for-the-manhattan-project/>

² *Secret No More*. Tennessee Magazine: <https://www.tnmagazine.org/secret-no-more/#:~:text=It%20was%20a%20top%2Dsecret%20location,Tennessee%20in%20the%20early%201940s.>

³ *Oak Ridge, TN*. Atomic Heritage Foundation. <https://ahf.nuclearmuseum.org/ahf/location/oak-ridge-tn/>

By 1946, X-10 began producing peacetime radioisotopes for use in industry, agriculture, medicine and research. By 1983, the K-25 Gaseous Diffusion Plant was approaching the end of its mission, Y-12 was at the height of Cold War production, and ORNL was bolstering its mission in nuclear nonproliferation, nuclear safety, transportation and building efficiency, and building the world's most powerful supercomputers. Since the turn of the century, ORNL's growth in basic research, neutron science and computing has helped it become the U.S. Department of Energy's (DOE) largest and most complex research facility.^{4,5,6}

B. Growing Interest in Nuclear Energy

i) National Energy Demand / AI

Recent developments, most notably in AI data center development, have sparked a renewed interest in nuclear energy for electricity production. Data center demand in the Tennessee Valley Authority's (TVA) service territory reached 18% of industrial electricity demand in 2025, with TVA projecting that data center growth will double in the region by 2030.⁷ Nuclear energy is attractive because of its energy density – by splitting atoms through a process called fission, one kilogram of enriched uranium can produce the same amount of electricity as 15 tons of coal.⁸ Demand for clean, reliable power to service new AI loads, electric vehicles, and greater economy-wide electrification is causing many to revisit nuclear energy as an essential part of America's electricity supply. This development mirrors discussions of a nuclear renaissance that gained momentum roughly two decades ago but stalled after the 2011 Fukushima Daiichi nuclear disaster in Japan, when three reactor cores melted down following a 9.0-magnitude earthquake and subsequent tsunami. Today the demand signal is strong.

ii) Small Modular Reactors / Advanced Nuclear Innovation Ecosystem

Enthusiasm around nuclear energy is also driven by innovative reactor designs, which are designed for enhanced safety and lower capital cost. In September 2026, TVA became the first power utility in the United States to receive a construction permit from the Nuclear Regulatory Commission (NRC) for a small modular reactor (SMR) – a GE Vernova Hitachi BWRX-300 at the Clinch River site in East Tennessee – targeting commercial operation in December 2032.⁹ Small modular reactors, generally classified as those with a capacity under 350 MW, are attractive compared to traditional large reactors for their potential to be factory-built, their inherently safe designs, and their locational flexibility.¹⁰ The Clinch River project is one of a few vying to become the first commercial SMR deployment in the United States. Only two countries, China and Russia, have deployed SMRs commercially to date.

⁴ *Decades of Discovery*. Oak Ridge National Laboratory. <https://www.ornl.gov/content/decades-of-discovery>

⁵ *Celebrating 80 Years: Top-Secret Science*. Oak Ridge National Laboratory. <https://www.ornl.gov/media/83852>

⁶ *Oak Ridge*. Tennessee Historical Society. <https://tennesseehistory.org/oak-ridge/>

⁷ *TVA pursues 6.2 GW of new generation, citing data centers, population growth*. Utility Dive. February 4, 2026. <https://www.utilitydive.com/news/tva-tennessee-valley-authority-nuclear-gas-demand-growth/811306/>

⁸ *Fuel Comparison*. European Nuclear Society. <https://www.euronuclear.org/glossary/fuel-comparison/>

⁹ *Approval to build Oak Ridge Nuclear Reactor comes ahead of schedule for TVA*. Knoxville News Sentinel. September 29, 2026.

<https://www.knoxnews.com/story/money/business/2026/09/28/tennessee-valley-authority-permit-build-oak-ridge-advanced-nuclear-reactor/91917088007/>

¹⁰ *Pathways to Commercial Liftoff: Advanced Nuclear*. U.S. Department of Energy. September 2024. Accessed via Gateways for Accelerated Innovation in Nuclear. <https://gain.inl.gov/content/uploads/4/2024/11/DOE-Advanced-Nuclear-Liftoff-Report.pdf>

DOE selected TVA to receive \$400 million in federal cost-shared funding to advance the Clinch River SMR, as part of a broader \$900 million national solicitation to de-risk Gen III+¹¹ SMR deployment. TVA's project is positioned as a national model demonstrating how advanced nuclear can deliver reliable and affordable energy at scale. Energy Secretary Chris Wright described SMRs as essential to powering the manufacturing boom, supporting data centers and AI growth, and reinforcing a stronger electric grid.¹²

iii) Public and Private Sector Investment in Tennessee's Nuclear Industry

The Clinch River project is just one example of the recent increase of public and private investment in Tennessee's nuclear industry. In 2023, Governor Bill Lee established the Nuclear Energy and Supply Chain Investment Fund through Executive Order 101, with an initial investment of \$50 million. Its purpose is to provide financial incentives to nuclear-related companies expanding in Tennessee while strengthening higher education programs training the next generation of nuclear workers. An additional \$45 million has been approved, bringing the Fund's total to almost \$100 million.¹³ Along with providing financial support for Tennessee nuclear from DOE described later in this report, the federal government is attempting to streamline the permitting, licensing and siting of nuclear energy infrastructure projects, most notably through the ADVANCE Act signed into law in 2024.¹⁴

Through that same Executive Order, Governor Bill Lee also created the Tennessee Nuclear Energy Advisory Council (TNEAC), comprising 22 members from industry, higher education, workforce development, and government. On October 31, 2024, the Council issued its Final Report with 19 recommendations in five key areas to reinforce Tennessee's nuclear leadership.¹⁵ In July 2025, Governor Lee designated the East Tennessee Economic Council's (ETEC) Nuclear Working Group as TN² – the state's official partnership advancing nuclear innovation, workforce development, and economic growth – with over 135 individuals statewide representing 75 nuclear-focused companies, academic institutions, municipalities, and federal partners.¹⁶

The private sector has also responded to the opportunity with increased investment. Since 2020, East Tennessee has seen a wave of new businesses join a resurgent nuclear industry including X-energy, Oklo, LIS Technologies, Type One Energy, Kairos Power, and Orano, alongside major expansions by established companies such as Centrus. In total, the private sector has pledged over \$10 billion of investment to east Tennessee in the last five years. These investments have the potential to create thousands of new jobs, but a more precise estimate of job creation has been difficult to date and is one of the motivations for this ORAU-led nuclear workforce demand study.¹⁷

¹¹ Gen III+ reactors rely on water cooling like legacy reactors but are engineered with passive safety systems that can shut down the reactor in response to a loss of power without operator intervention.

¹² *Energy Department Selects TVA and Holtec to Advance Deployment of U.S. Small Modular Reactors*. U.S. Department of Energy. December 2, 2025. <https://www.energy.gov/articles/energy-department-selects-tva-and-holtec-advance-deployment-us-small-modular-reactors>

¹³ *Tennessee Positions Oak Ridge to Lead Nation's Next Era of Nuclear Energy*. Tennessee's Office of the Governor. April 2, 2026. <https://www.tn.gov/governor/news/2026/4/2/tennessee-positions-oak-ridge-to-lead-nation-s-next-era-of-nuclear-energy.html>

¹⁴ *About the ADVANCE Act*. U.S. Nuclear Regulatory Commission. <https://www.nrc.gov/about-nrc/governing-laws/advance-act/about-advance-act>

¹⁵ *TN Nuclear Energy Advisory Council Final Report & Recommendations*. Tennessee Department of Environment & Conservation. November 2024. <https://www.tn.gov/environment/program-areas/energy/tneac.html>

¹⁶ *About Tennessee Nuclear Network [TN²]*. ETEC Online. <https://www.eteconline.org/tennessee-nuclear-network/about-TN2/>

¹⁷ *Our Companies*. ETEC Online. <https://www.eteconline.org/tennessee-nuclear-network/our-companies/>

C. Nuclear Workforce: workforce needs to build and operate nuclear value chain facilities

i) Tennessee's Existing Nuclear Workforce Development Ecosystem

The nuclear industry requires a highly specialized workforce to support not only electricity-producing nuclear power plants, but also the broader range of facilities and operations across the nuclear fuel cycle, including advanced manufacturing, isotope production, fuel processing, materials management, research, and national security missions. Tennessee recognizes that long-term leadership in the nuclear sector depends not only on physical infrastructure and technological innovation, but also on the strength of the surrounding workforce and community ecosystem. Housing availability, workforce development pipelines, education and training capacity, and quality-of-life infrastructure are all critical to attracting, developing, and retaining the specialized talent needed to sustain growth in the nuclear industry over the coming decades.

Tennessee is uniquely positioned to meet this demand. For more than 80 years, the state has been a national leader in nuclear energy, research, manufacturing, and workforce development. Today, Tennessee maintains a strong base of nuclear workers supporting TVA's Watts Bar and Sequoyah nuclear plants, ORNL, the Y-12 National Security Complex, and a growing network of private-sector nuclear companies. In total, Tennessee's nuclear industry employs nearly 17,000 people, reflecting one of the most established nuclear economies in the nation.¹⁸

The state also benefits from a comprehensive, multi-tiered nuclear workforce development ecosystem spanning Kindergarten - 12 education, technical and vocational training, higher education, apprenticeships, workforce upskilling, and advanced research institutions. Tennessee's education and training infrastructure is designed to support both current industry needs and the anticipated growth of advanced nuclear technologies over the next two decades, and continues to respond.

The University of Tennessee, Knoxville (UT) maintains one of the nation's most established nuclear engineering programs, graduating highly skilled engineers each year and supporting cutting-edge nuclear research. Tennessee Tech University has also launched a nuclear engineering major to expand the state's engineering talent pipeline. At the technical and associate degree level, Chattanooga State Community College offers a Nuclear Power Engineering Technology program, Roane State Community College offers a Nuclear Technology program, and Mississippi State Community College offers a Chemical Radiation Technology program. In addition, Tennessee Colleges of Applied Technology (TCATs) provide vocational and skilled trades education across the state and recently received \$2.4 million in Governor's Investment in Vocational Education (GIVE) funding to support nuclear-related workforce development.

Beyond degree programs, Tennessee has a strong network of organized labor organizations, workforce boards, and industry partners supporting registered apprenticeships, pre-apprenticeships and skilled trades training essential to nuclear construction, operations, and maintenance. Organizations such as

¹⁸ *The Economic Impact of the Nuclear Industry in the Southeast United States: A Regional and State-Level Analysis. E4 Carolinas. February 2024. https://irp.cdn-webside.com/11b6ed68/files/uploaded/E4_Carolinas_Nuclear_Report_final.pdf*

TN², TNWorks, ORAU, ORNL, and Y-12 are leading collaborative public-private workforce initiatives that align training and education programs with evolving industry needs. These partnerships help expand workforce capacity through nuclear-focused academies, workforce bootcamps, technical certifications, apprenticeships, and professional-level research and training programs.

As demand for a prepared nuclear workforce continues to grow nationwide, Tennessee is actively expanding education and training capacity statewide to accommodate new nuclear companies and emerging technologies. The state has repeatedly demonstrated its ability to execute transformational infrastructure and innovation initiatives at scale. Combined with its unmatched concentration of nuclear expertise, federal assets, educational institutions, and workforce partnerships, Tennessee is exceptionally well-positioned to sustain a strong nuclear workforce development ecosystem that will support economic growth, energy security, scientific leadership, and supply chain resilience for generations to come.

ii) TNEAC Report Recommendations on Workforce Development

As mentioned earlier in this report, TNEAC submitted its final report and recommendations to Governor Lee on October 31, 2024, outlining areas and opportunities to accelerate deployment of nuclear energy in Tennessee. One of the identified areas was “Coordinating and Enhancing Nuclear Workforce Development,” after TNEAC found that “access to a qualified workforce is a major factor when companies are deciding where to site new locations or operations.” In their report, TNEAC recommended the establishment of a Tennessee Nuclear Energy Workforce Center (T-NEWC), now TN², charged with delivering “more and better qualified workers matched to industry needs.” The detailed proposal contained recommendations pertinent to this report that include:

- Establish an industry partnership to provide insights into upcoming workforce demands, labor strategies, and predictive models.
- Implement a public-private mechanism for predictive workforce analytics, which will forecast requirements across the entire nuclear ecosystem.
- Implement a comprehensive data strategy focused on collaboration, improved collection, and advanced analytics, beginning with the establishment of an industry-government data partnership.

D. Current State of Tennessee's Nuclear Workforce

Tennessee already draws on an established base of workers across many of the occupations most relevant to a growing nuclear industry, including construction, engineering, and advanced manufacturing, though the breadth of that pipeline varies by role.

Alongside its interviews with nuclear employers, ORAU supplemented this workforce demand assessment with a review of publicly available workforce supply data, mapping the nuclear value chain to relevant industry and occupation codes and reviewing post-secondary completions and registered appren-

ticeship records in occupations most relevant to Tennessee's nuclear buildout.^{19,20}

That review indicates that Tennessee's overall postsecondary completion pipeline for nuclear-relevant occupations has been roughly flat over the past several years, with modest growth in some engineering disciplines offset by declines in others. This likely understates true workforce supply, since many of these roles are filled through employer-run, on-the-job training rather than formal degree or certificate programs, and a fuller accounting of employer-provided training would be needed to assess the true sufficiency of the state's pipeline for these roles.²¹ Additionally, data reporting lags; therefore, recent efforts to increase educational capacity are likely not reflected in publicly available data yet.

By contrast, registered apprenticeship completions in Tennessee have grown notably over the past three years, though part of that growth likely reflects more existing programs registering with the U.S. Department of Labor (DOL) rather than a real increase in completions alone. A disproportionate share of the state's active apprentices is concentrated in the greater Knoxville area relative to its share of Tennessee's population,²² suggesting a comparatively strong apprenticeship ecosystem near Oak Ridge from which the nuclear industry can continue to draw.

Note that this analysis does not capture reskilling and upskilling pathways, employer-specific training investments, or regional variation in where workers live relative to where they work. The full data referenced in this section, including detailed occupational completions and apprenticeship figures, is provided in Appendix D for reference. Recommendation 3 outlines a path toward a more comprehensive, regionally resolved supply-side study that builds on this initial analysis with updated sources and a statewide, regionally disaggregated lens.

The project team recognizes that publicly available educational pipeline data may not fully capture all workforce development activities relevant to the nuclear industry. Reporting through sources such as the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS) may understate actual completions in some cases, and differences between educational reporting structures and industry workforce classifications, including how occupations are coded and translated across systems, may result in variation between reported educational outputs and industry workforce demand categories.

¹⁹ ORAU's supply-side review drew on U.S. Bureau of Labor Statistics Occupational Employment and Wage Statistics data, the North American Industry Classification System (NAICS), and the National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS), cross-walked to relevant Standard Occupational Classification (SOC) codes. See Appendix D for the complete methodology and underlying data tables.

²⁰ The workforce supply analysis utilizes publicly available IPEDS data as the most broadly available and consistently reported source of educational pipeline information. While appropriate for an initial assessment, stakeholders identified potential limitations in the completeness of these data for certain occupations and training pathways. Future phases of this work should validate findings through additional sources, including union training program data, TCAT workforce data, and other local workforce-development datasets to improve precision and better understand workforce supply dynamics.

²¹ For several of the occupations expected to be in highest demand as the nuclear industry grows, including nuclear technicians, nuclear power reactor operators, and hazardous materials removal workers, publicly available completion data provide little to no visibility into the state's training pipeline.

²² *Quick Facts*. U.S. Census Bureau. <https://www.census.gov/quickfacts/fact/table/TN,andersoncountytennessee,knoxcountytennessee,US/PST045225>

2. METHODOLOGY DESCRIPTION

To determine the additional workforce demand created by Tennessee's resurgent nuclear industry and to prepare for necessary recruitment, retention, upskilling/reskilling, and career exploration activities, ORAU conducted interviews with members of TN². ORAU focused on TN² members across the nuclear value chain with major public commitments to expand their Oak Ridge footprint, either with facility upgrades or new builds, conducting interviews with 14 separate companies over 3 months. Study participants represent the full nuclear life cycle except for mining and long-term storage, including uranium enrichment; fuel fabrication; advanced nuclear reactor design and deployment; plant operations; engineering, procurement and construction; research and development; components manufacturing; waste management; transportation; decommissioning; fusion energy; and legacy site cleanup.

Data collection focused primarily on prime organizations actively participating in the regional nuclear industry ecosystem, consistent with DOE industry terminology. The study did not comprehensively survey subcontractors, supply chain partners, or supporting organizations, and should be interpreted within that defined scope. Therefore, follow on studies are recommended to capture additional data across the Oak Ridge Corridor nuclear landscape.

Workforce demand data was collected using participant self-identification of workforce categories and labor classifications. As a result, organizations may have classified similar positions differently based on internal workforce structures, resulting in potential variation across reported occupational categories and, in some cases, inconsistencies between company classifications and external labor datasets such as the Standard Occupational Classification (SOC) system. Further study should be undertaken to resolve the inconsistencies.

The interviews covered a broad range of workforce development topics, including company expansion plans, recruitment strategies, hiring barriers and challenges, required skills and roles, and training programs. The full list of interview questions is provided in Appendix A. Due to the sensitive nature of the topics discussed during the interviews, the names of the interviewed companies are redacted, and all quantitative data has been aggregated to protect competitive and proprietary data.

In addition to the interview, stakeholders were asked to fill out a quantitative needs assessment matrix, including the company's estimated workforce demand by year and SOC code. Of the 15 interviewed organizations, 11 sent quantitative data. These data were intended to be aggregated into a statewide nuclear workforce demand profile. The needs assessment matrix is provided in Appendix B. Of the 19 TN² organizations invited to the study, four other nuclear organizations declined or did not respond to inquiries.

3. DETAILED FINDINGS: ASSESSING WORKFORCE DEMAND

A. Workforce Demand

ORAU's interviews with TN² member companies, supplemented by relevant public data, point to a substantial increase in nuclear workforce demand over the next decade, concentrated in a relatively small number of occupations that span both the construction and operations phases of Tennessee's nuclear buildout. Occupations covered in the demand assessment include both front-end innovation roles (design, engineering, technology development) and back end or enabling functions (construction, operations, safety, and support services). Overall, the data characterizes a diversified cross-section of the nuclear value chain, with participation from technology developers, builders, operators, and specialized service providers, reflecting an ecosystem-level snapshot rather than a single-industry perspective. Current activities range from design and licensing to construction, startup, fuel handling, manufacturing, transportation, and full operations, including unspent fuel disposal and site restoration.

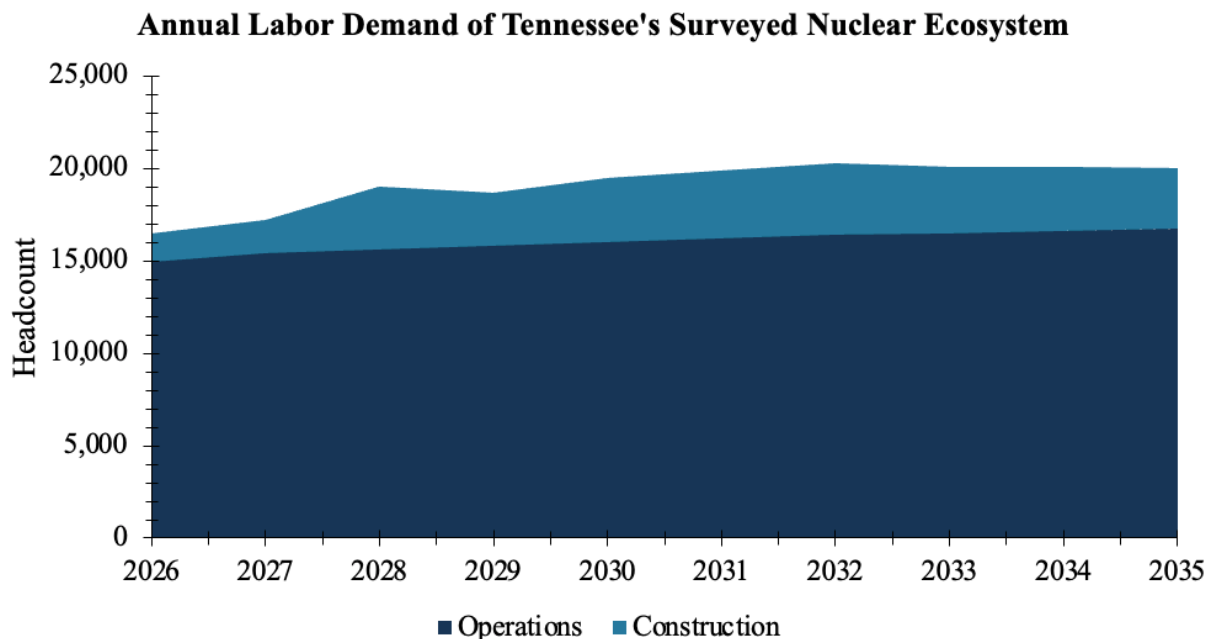


Figure 3-1. Annual Labor Demand Across Tennessee's Surveyed Nuclear Ecosystem, 2026–2035.²³

Across the companies surveyed, Tennessee's nuclear workforce totals approximately 17,000 workers today and is projected to reach a peak of approximately 21,000 workers by 2032, a compound annual growth rate of roughly 3.4%. Figure 3-1 breaks that trajectory into its two components: operations-related demand rises steadily every year through 2035, from about 15,000 to 16,700 workers, while construction-related demand peaks near 3,900 workers in 2032 before easing modestly.

²³ Findings are based on employer interviews and relevant public data, and results are not statistically representative of the full nuclear industry or any single organization's views.

Respondents confirmed this data in their interviews, indicating that projects were in various stages of research, design, or licensing, with the bulk of construction activity occurring from 2026-2032. This growth stems from an ecosystem of multiple new nuclear projects rather than a single construction cycle, making it a durable increase in workforce demand that supports the case for sustained training investment. Operational milestones were primarily projected to occur between 2027 and the early 2030s. Licensing and permitting timelines were repeatedly identified as critical path factors influencing workforce timing.

Construction phases will temporarily require significantly higher staffing levels. Many organizations use subcontractors for construction trades, specialty welding, rigging, geotechnical surveys, guard services, and janitorial services. Some rely heavily on direct hires for supervisory and technical nuclear roles. Employers anticipate subcontracting specialized technical functions such as fabrication, component manufacturing, and select engineering services to supplement their direct hires. This mixed labor model suggests the need for both long-term technical training pathways and short-term contract workforce readiness. Construction labor is often unionized, while core operations staff are generally non-union. Dual labor structures (union and non-union) require flexible workforce partnerships across both systems. Vendors may bring a mix of labor. Note that this study did not include technical staffing firms, which can provide a valuable source of temporary specialized skill sets.

Workforce forecast confidence ranges from 12 months (high confidence) to 10 years (longer-term projections). Most employers consider 18–24 months reliable, with longer projections dependent on regulatory milestones. Confidence is highest in near-term staffing plans and lower in longer-term projections due to licensing, financing, and supply chain variables. Regarding expansions, employers anticipate new facilities, additional operating units, and capital expansions, contingent upon licensing and financing. Expansion timing directly influences hiring spikes but is highly speculative. If a project expansion was not yet formally approved by an organization, the headcount was typically not included in the projections. Employers generally follow a workforce ramp-up pattern of early engineering hires, a construction surge, commissioning spikes (safety, technicians, etc.), and then steady-state operations staffing.

Licensing approvals, financing, customer demand, federal funding, and supply chain readiness are key drivers to demand. Commonly identified workforce risks include limited availability of experienced nuclear professionals, skilled trades shortages, regional competition, retirement risk, and regulatory delays. Spikes may occur during construction and commissioning. Delays in licensing or funding could shift or suppress hiring. These delays can disrupt talent pipelines, leaving recent graduates without immediate meaningful employment opportunities after completing their degrees. Aligning labor demand and supply cycles is critical for creating a sustained pipeline of qualified candidates.

Most employers prioritize local hiring but recruit nationally for specialized roles. Some relocation is expected when local supply is insufficient or talent is only available nationally or internationally, due to specialization of skills. Certain niche skills may remain external to Tennessee unless local capability is deliberately developed. Frequently cited difficult to fill roles include nuclear engineers (notably those with enrichment or licensing experience), licensing specialists, QA/QC professionals, radiation techs and health physicists, instrumentation and controls specialists, reactor operators, welders (especially alumi-

num), enrichment-experienced personnel, HVAC technicians, and cybersecurity professionals.

Hiring goals range from two weeks to 90 days, but actual timelines for specialized roles often extend to 90–180 days. “Must-have” job requirements include bachelor’s degrees for engineers, role-specific certifications, regulatory qualifications, and safety credentials. “Nice-to-have” credentials include PMP, PE, and welding certifications; radiation protection training; and military nuclear experience.

Common recruitment channels include aerospace, defense, manufacturing, oil and gas, automotive, and military transition programs; however, this can be a two-way street, as nuclear industry workers are highly attractive to other high-tech and regulated industries. Referrals and internships are heavily used, and a few employers use apprenticeships. Geographic concentration in and around Oak Ridge increases cluster-based labor competition. While this strengthens regional specialization, it intensifies competition for shared labor pools, particularly engineers and skilled trades. Engineering design and certain fabrication activities may occur outside the state and be imported, due to lack of local skillsets and supply chain availability. Developing in-state fabrication capacity would localize economic benefits but also increase pressure on infrastructure and availability of labor.

Tennessee companies compete in a national labor market for advanced nuclear talent. Candidates may find East Tennessee to be an attractive location for a variety of reasons including quality of life and outdoor recreation opportunities, lower cost of living as compared with many technology and research hubs, and access to high-profile employers and research institutions, including ORNL, Y-12, UT, and major federal contractors.

Top constraints to expansion in Tennessee include labor availability, housing affordability, infrastructure capacity, training timelines, and regulatory requirements. The constraints affect recruiting and retention. For example, housing availability influences recruitment competitiveness and relocation decisions. East Tennessee is not necessarily the least expensive housing market for nuclear industry workers, even though it has a favorable tax structure. Temporary housing may be required for short-term specialists who visit Tennessee employers for project-based work, and family housing will be necessary for mid-career relocations.

Competition for skilled workers in the Oak Ridge Corridor is increasing, and specific technical skills are becoming scarcer, including nuclear systems engineering, licensing/regulatory expertise, advanced modeling, QA/QC, welding, HVAC, cybersecurity, and specialized manufacturing or materials handling. The most constrained roles combine skills in regulation, engineering, and safety-critical responsibility. Competition within the regional cluster may drive wage escalation and talent poaching if pipeline expansion does not occur. Missing skills include a clear understanding of DOE-specific project knowledge and NRC-specific requirements. Specialized engineering and welding roles routinely exceed time-to-fill targets. Apprenticeships and targeted engineering pipelines are needed to reduce lag.

The nuclear companies noted that there are some essential technical competencies that set apart exceptional hires from a minimally qualified candidate. Responsible engineering mindset, regulatory compliance knowledge, system-level thinking, and safety culture differentiate strong candidates. While these technical and scientific skills are affirmed as critical, technical competence must be paired with disciplined safety culture. Employers emphasize accountability, communication, collaboration, reliability,

ownership, problem-solving, and a learning mindset as essential power (soft) skills that cannot be overlooked and can be viewed as foundational skills for nuclear workers. Fitness for duty and the ability to work in a highly regulated workplace are highly considered by nuclear organizations in Oak Ridge.

Most employers in the design/conceptual or start-up phase expect experienced engineers and scientists to be highly proficient in their role after a sufficient onboarding period. However, employers do not expect full mastery on Day 1 for technicians and other operational roles. In fact, Oak Ridge companies expect that it may take engineers 6 to 8 months to become productive; full productivity in complex roles may take 12 to 24 months. Foundational competencies, such as math, reading, and willingness to learn, are prioritized for technicians. Often nuclear organizations in Oak Ridge have highly skilled teams of trainers and are willing to provide on-the-job training; however, an appreciation for safety is expected on Day 1. Employers provide onboarding, reactor-specific, safety, and job-specific training internally; some safety and technical certifications may be outsourced. Employers are willing to train but expect strong baseline preparation and foundational skills. Leaders are expected to have strong emotional intelligence.

Education providers should focus on fundamentals and structured on-the-job training partnerships. Many of these partnerships currently exist and are expanding to meet specific technical needs. Most nuclear employers in the Oak Ridge Corridor already have established partnerships with community colleges, universities, and technical institutions in the region. Some employers have relationships with one or more local high schools too. Union relationships vary widely across the Oak Ridge Corridor. Strengthening all these partnerships can accelerate workforce readiness for local workers to reduce out-of-state hiring needs. Capacity could scale quickly if educational partners continue emphasizing broadly applicable knowledge and skills shared across employers, while industry focuses on providing specialized on-the-job training for the smaller share of expertise tied to proprietary processes or technologies.

Welding certifications, safety credentials, QA certifications, and nationally recognized technical certifications are trusted by the industry and allow for increased workforce mobility. Credential alignment improves hiring efficiency. Education and training organizations should work closely with industry to assess requirements for future programming. Employers are requesting stronger welding, manufacturing, troubleshooting, and technology-focused programs, particularly at high school and technician levels. Thus, early awareness and trade pipeline development are critical.

Internships, co-ops, on-the-job training combined with classroom learning, and continuous operator training are preferred training delivery formats. Work-based learning is critical to reducing time-to-productivity. Curriculum alignment, demonstrated safety culture, screening reliability, and work-based experience increase employer confidence in hiring graduates from local education and training programs; therefore, industry input into curriculum design is essential. There is significant opportunity for employers to collaborate to create customized programs sufficient to meet the needs of multiple local employers. Internships and co-ops are widely used, particularly for engineers and technical roles.

Expanding apprenticeship models to trades and technicians is a growth opportunity. Industry interest exists in apprenticeships for millwrights, pipefitters, electricians, instrument technicians, HVAC, and ra-

diation protection. Adjacent industries suitable for reskilling include aerospace, automotive, oil and gas, fabrication, and manufacturing. Structured reskilling pathways could quickly expand the labor pool.

Interview data showed that retention strategies are important to the established employers in the study. Employers repeatedly noted that poaching of talent is a top risk for their organizations. Specifically, mid-career engineers face competitive poaching risk. Some employers focus on hiring Veterans and early-career professionals, as well as increasing representation of women engineers. Retention strategies must address mid-career mobility and early career talent with 2-3 years of tenure. Pay, location, shift schedule, remote work preferences, and comfort with the nuclear sector are common factors for candidates to decline offers. Remote or hybrid work is often not available for most nuclear industry organizations, making attraction and retention more difficult than competing industries that might have more flexible working conditions. Shift tolerance and transparent scheduling are essential for attraction and retention, especially for the youngest working generation, Generation Z.

Compensation and flexibility also affect competitiveness. Employers seek coordination, shared best practices, salary benchmarking, marketing, and housing and transportation solutions. Regional collaboration led by TN² can reduce duplication and strengthen talent pipelines and pathways. Employers anticipate evolving workforce needs and emphasize a need for ongoing dialogue. Continuous data sharing and adaptive workforce planning will be essential as projects mature.

B. Summary of Anticipated Workforce Gaps

Figure 3-2 shows ORAU's estimated headcount trajectory by occupation for the highest-growth roles identified through this analysis. Demand growth is concentrated in a handful of key occupations, with the most

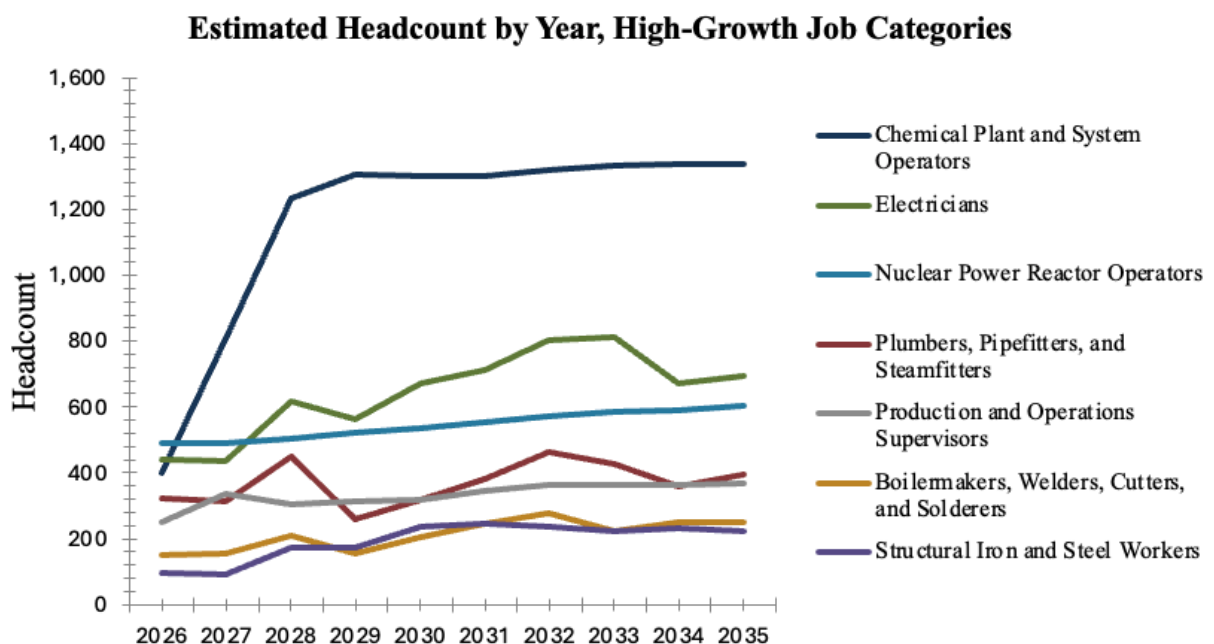


Figure 3-2. Fastest-Growing Occupations: Estimated Headcount by Year, High-Growth Job Categories, 2026–2035²⁴

²⁴ Findings are based on employer interviews and relevant public data, and results are not statistically representative of the industry or any single organization's views.

pronounced increase projected for chemical plant and system operators, whose estimated headcount nearly triples between 2026 and 2035 as new fuel production and processing facilities come online. Electricians and structural iron and steel workers see strong growth through 2031–2032, aligned with the construction peak, while nuclear reactor operators, power plant operators, and production and operations supervisors grow more steadily through 2035, reflecting permanent operations headcount. Plumbers, pipefitters, steamfitters, and boilermakers show strong but variable growth throughout the period. Understanding the pace and timing of this demand growth is an important input to Tennessee’s nuclear workforce planning, particularly for occupations where the state’s training pipeline may not be able to scale quickly enough to meet employer needs.

Due to study limitations, ORAU estimates the 2026 workforce baseline may be understated by approximately 3,600 workers, with projected 10-year growth understated by more than 2,750. These figures were excluded from the discussion to follow because they were derived from publicly available press releases rather than itemized labor category projections. The Oak Ridge Corridor workforce projections will continue to be a moving target, as new nuclear organizations enter the Corridor and established organizations expand operations.

To translate these demand projections into actionable insight, ORAU compared projected peak workforce demand for each high-growth occupation against the number of workers Tennessee’s existing training pipeline produces today, identifying where the state is most exposed to a potential shortfall. Table 1 and Figure 3-3 summarizes this workforce gap assessment.

Chemical plant and system operators, nuclear reactor operators, production and operations supervisors, and power plant operators show the largest gap between current headcount and projected peak demand, and in most cases little to no visible local training pipeline exists to help close that gap. The following insights are offered:

- For chemical plant and system operators specifically, demand is likely to outpace what East Tennessee can supply locally, suggesting employers must either increase training capacity immediately or organizations may need to recruit regionally or nationally to meet workforce needs. Immediate attention should be given to this labor category to increase capacity substantially.
- A critical gap may exist for Nuclear Reactor Operators, Production & Operations Supervisors, and Power Plant Operators due to the various technologies being developed. Traditional training pipelines will have to be aligned to SMR and Advanced Reactor training qualification specifications. Given the diversity among the new technologies and site-specific nature of nuclear reactors, it may be very difficult to scale quickly. Digital twin environments will need to be developed and deployed throughout the Oak Ridge Corridor.
- Production and operations supervisors may require talent to be acquired regionally for the 2028 initial peak; however, a corporate “promotion from within” strategy may meet the 2032 need.
- Most skilled trades have adequate pipelines today but may face strain during the 2029–2032 construction peak. Plumbers, pipefitters, and steamfitters will need further

analysis due to a predicted steep decline in 2030, followed by another peak in 2032. This may indicate a need to borrow talent from other regions during the peak seasons.

- Specifically, electricians will hit an initial peak in 2028 that may require organizations to buy talent regionally and potentially retain that talent through the 2032 peak. The good news is that we have time to develop additional talent for the second peak if we increase capacity now.
- Boilermakers, welders, cutters, and solderers stand out as the strongest current pipeline among the occupations assessed, suggesting an opportunity to align existing training programs with nuclear-specific standards and certifications rather than build new pipeline capacity from scratch.
- Welding is a complex labor category. While it does not inherently have a headcount issue, nuclear organizations seek highly skilled welders. For example, nuclear welding often requires one or more certifications, experience welding various materials, and experience with non-destructive testing and QA, in addition to fitness for duty requirements – like the ability to clear a background check and remain drug free.
- It is crucial that training programs align with the needs of Tennessee’s nuclear employers, which may require different standards and practices from other high-tech or regulated industries.
- Barriers to capacity-building should be explored as part of the supply side assessment to meet projected industry needs.

Table 1. Workforce Gap Assessment: Current State vs. Peak Demand by Occupation

Occupation	Current State (2026)	Peak Demand (with timeline)	Initial Observation
Chemical Plant & System Operators	401	1,339 peak (2035)	Demand likely to outpace local supply for initial peak in 2028-2029 – increase capacity immediately
Nuclear Reactor Operators	489	603 peak (2035)	No visible local pipeline; critical data gap
Production & Operations Supervisors	251	368 peak (2035)	No visible local pipeline
Boilermakers, Welders, Cutters & Solderers	149	279 peak (2032)	Strong pipeline — align existing programs to nuclear standards and certifications
Electricians	441	811 peak (2033)	May outpace supply during the 2029–2032 construction peak
Plumbers, Pipefitters & Steamfitters	321	462 peak (2032)	May outpace supply during the 2029–2032 construction peak
Structural Iron & Steel Workers	96	246 peak (2031)	May outpace supply in the late 2020s

This gap assessment has limitations that are important to note. The analysis may not account for normal attrition or expected retirements, which would increase the training gap in roles with older workforces or higher attrition rates. These figures also exclude workers who could be reskilled or upskilled from adjacent industries, thereby reducing the training gap. Reskilled workers could fill positions faster than anyone coming from a new or apprenticeship pipeline all sources of labor supply must be considered to meet demand in specific labor categories.

This assessment reflects the occupations found in companies included in ORAU’s initial round of interviews and does not yet reflect a comprehensive, statewide view of workforce supply. Recommendation 3 outlines ORAU’s proposed next steps to build a more complete and regionally resolved picture of Tennessee’s nuclear workforce supply. The study at hand is useful for discerning which labor categories should be explored in more depth.

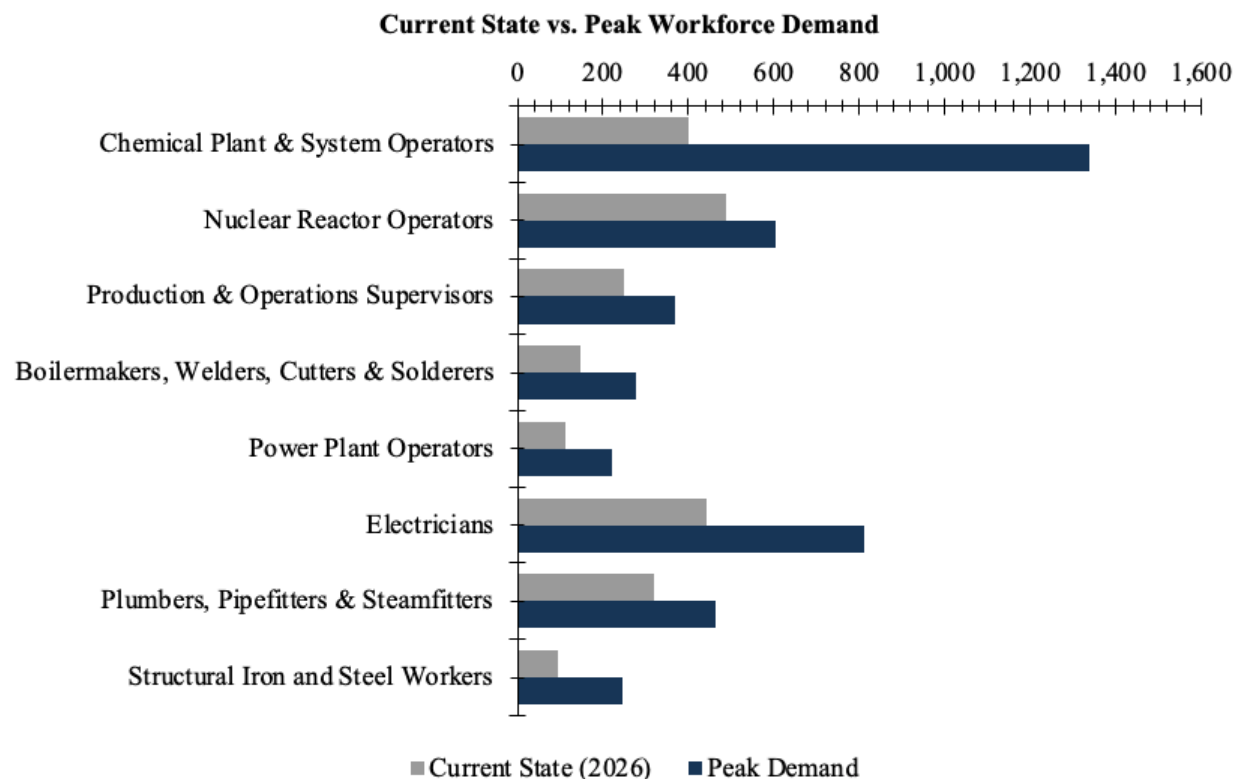


Figure 3-3. Workforce Gap Assessment: Current State vs. Peak Workforce Demand. Rows are ordered by shortfall risk (critical to at risk) and by peak headcount demand; occupations flagged “no public data” represent a data gap rather than confirmed low risk.^{25,26,27}

C. Key Workforce Implications

These findings converge on three implications that should shape how Tennessee funds, builds, and sustains its nuclear workforce.

²⁵ See Recommendation 3, Conduct a Statewide Workforce Supply Study with Regionality, for ORAU’s recommended next steps to build on this assessment.

²⁶ Annual training completion figures shown in the original presentation version of this figure, drawn from NCES IPEDS postsecondary completions and U.S. Department of Labor RAPIDS registered apprenticeship data, have been omitted from the graphic for consistency with this report’s focus on workforce demand. The complete underlying training-completion data table is provided in Appendix D.

²⁷ Findings are based on employer interviews and relevant public data, and the results are not statistically representative of the industry or any single organization’s views.

- **Diversified nuclear ecosystem.** The nuclear ecosystem in Tennessee is highly diversified, requiring workforce development pipelines that support both front-end (fuel, enrichment, reactor design) and back-end (waste, decommissioning, cleanup) functions, as well as advanced R&D and manufacturing. Because employers span multiple value chain segments, workforce strategies must support engineers, scientists, technicians, skilled trades, operators, and regulatory professionals simultaneously. This diversity increases demand complexity and requires coordinated, multi-level workforce planning.
- **Identified supply gaps.** Anticipated workforce gaps are concentrated in a specific set of high-growth occupations. Investment should target these roles directly through expanded educational and apprenticeship pipelines, particularly ahead of the 2029–2032 construction peak when demand is most likely to outpace local supply. For some roles, such as chemical plant and system operators, employers may need to recruit regionally or even nationally to fill the gap. Ideally, employers will seek employees from adjacent industries and those transitioning from the military to fill gaps. Adjacent regulated industries provide strong reskilling opportunities. Unemployed, underemployed, and overemployed workers are a candidate pool worth exploring. As noted in the employer interviews, the best hires often come from military backgrounds, specific technical programs, prior employers, and referrals. Military transition programs are a high-value pipeline; however, formal partnerships between Oak Ridge nuclear companies and military organizations were not prevalent. The safety mindset and ability to follow standard operating procedures makes Veterans particularly attractive hires and building Veteran pathways and pipelines should be encouraged.
- **Surge, then steady state.** Demand follows two distinct profiles: a temporary construction hiring surge that builds by 2028 and crests in 2032, and a durable operations baseline that rises steadily to anchor long-term employment. Tennessee’s funding strategy should address both, rather than treating the construction peak as the full extent of the state’s workforce need. Workforce ramp-ups will likely spike during overlapping construction and commissioning periods in the late 2020s. Training programs must anticipate demand before peak construction begins to avoid lag. Construction workforce demand will be partially mediated through subcontractors and downsizing of other local projects, making coordination with union apprenticeship programs and regional trade councils essential. While construction surges are expected to be temporary, operations employment should be stable over the long term. Workforce programs must balance short-term trades surges with sustainable operator and technician pipelines.
- **Well-positioned to act.** Tennessee has significant funding already in place to respond to these findings, including the Nuclear Energy Supply Chain Investment Fund, the Tennessee Higher Education Commission’s (THEC) Nuclear Equipment Funding program, and GIVE program, together totaling over \$150 million in state funds allocated to nuclear workforce development. A data-based program management framework tied to these workforce

grants, as described in Recommendation 1, can help ensure funds are directed to the areas of greatest need and maximize their impact.

- Employer engagement should remain at the center of this effort. Tennessee should continue to use employers to define the skills, credentials, timing, and work-based learning experiences required in priority occupations, then align training and career exploration investments accordingly. This will help ensure that public dollars build talent for the jobs employers need. Workforce planning should operate on rolling 12- to 24-month updates rather than fixed long-term forecasts. Ongoing refreshes of the demand study data will ensure the Oak Ridge Corridor is equipped to meet labor demand as it shifts throughout the next 10 to 15 years. Workforce development initiatives should remain flexible and responsive to milestone-driven shifts. Contingency planning is critical for both educational institutions and employers.

4. WORKFORCE DEVELOPMENT INVESTMENT AND COLLABORATION OPPORTUNITIES

Scaling existing nuclear workforce development programs, and initiating new ones, is essential to meet future workforce demand. It requires long-term government investment in educational institutions that can implement employer-engaged training programs. Over the last three years, universities, community colleges, and technical schools in Tennessee have expanded or initiated programs in important technical areas like nuclear engineering and technology. There is an opportunity to apply this cross-sector approach to the skilled trades through greater investment in apprenticeship and pre-apprenticeship programs.

Additionally, there is an opportunity to build on the efforts of this workforce demand assessment to establish a data-based program management framework to maximize the effectiveness of the Tennessee Nuclear Supply Chain Investment Fund's workforce development grants.

Career exploration must also be treated as a workforce pipeline strategy. Tennessee cannot expect young people to envision careers they have never encountered or understood. Exposing students and jobseekers to the breadth of careers across the nuclear value chain – from skilled trades and plant operations to engineering, technology, and advanced manufacturing – can build awareness early and create a stronger pipeline into training and employment.

A. State and Local Opportunities

Both the Governor's office and the State Assembly have been strongly supportive of the nuclear industry in recent years, offering at least three pathways for companies and educational institutions to receive grant funding for workforce development: the Nuclear Energy Supply Chain Investment Fund, THEC's Nuclear Equipment Funding (NEF) program, and the GIVE program. These programs have allocated over \$150 million to the nuclear industry, according to ETEC.²⁸

In 2023, Governor Bill Lee proposed a \$50 million Nuclear Energy Supply Chain Investment Fund to catalyze investment in facilities, equipment, and workforce training across the nuclear fuel cycle. Since then, the fund has received an additional \$45 million in state appropriations and allocated a portion of this funding to education and workforce development. Notable investments include the establishment of a nuclear engineering minor at UT and equipment for a nascent Nuclear Technology program at Roane State Community College.²⁹

THEC also supports nuclear workforce development through its NEF program. In April 2026, THEC announced \$900,000 of NEF grant awards to Chattanooga State Community College, Roane State Community College, Tennessee Tech University, and University of Tennessee-Knoxville for the purchase of advanced training equipment, a key component of building a skilled workforce.³⁰

The Tennessee Department of Higher Education also administers the GIVE program, which provides

²⁸ *Nuclear Industry Hub*. East Tennessee Economic Council. <https://www.eteconline.org/nuclear-industry-hub/>

²⁹ Governor Lee, *Commissioner McWhorter Announce New Funding for Nuclear Education*. Tennessee Department of Economic and Community Development. May 16, 2024. <https://tneecd.com/news/governor-lee-commissioner-mcwhorter-announce-new-funding-for-nuclear-education/>

³⁰ *THEC Awards Nearly \$900,000 in Nuclear Equipment Funding to Support Workforce Development*. Tennessee Higher Education Commission. April 13, 2026. <https://www.tn.gov/thec/news/2026/4/13/nuclear-equipment-funding.html>

grant funding to enhance career and technical education opportunities in rural counties. Although not solely focused on nuclear energy, the GIVE program has made notable investments in nuclear education, including a \$2 million grant to a partnership led by TCAT Knoxville to establish a Nuclear Science Pathway training program for secondary and post-secondary students in select technical specialties interested in a career in the nuclear industry.³¹

Innovative partnerships between educational institutions and nuclear companies, bolstered by state government funding, illustrate that unique workforce training opportunities arise when government, industry, and higher education collaborate. Capacity-building in these programs should be prioritized to help scale the workforce quickly. Public-private partnerships are critical to the success of local workforce development and that value cannot be understated.

B. Federal Opportunities

There are several opportunities to leverage federal investment for Tennessee's nuclear workforce pipeline – investment that has historically made Tennessee one of the nation's premier nuclear hubs.

ORNL is a world-class nuclear research center, and one of East Tennessee's largest employers with substantial congressional appropriations. In recent years, ORNL has reached agreements with various Tennessee institutions of higher education to shape programs that may increase Tennessee's supply of skilled nuclear workers. In 2024, ORNL entered into a memorandum of understanding with Tennessee Tech University to develop a new undergraduate program in nuclear engineering supported by ORNL's nuclear experts, who provide seminars, lectures and technical exchanges.³² This partnership, supplemented by the state's \$1 million grant outlined above, has since expanded to include Roane State Community College's Oak Ridge campus. In 2025, the three institutions signed an articulation agreement to create a 2+2 degree program in project management and project controls, allowing students to complete a bachelor's degree through a combination of in-person and online classes.³³ These types of partnerships with ORNL increase the number and variety of pathways for students to enter the nuclear workforce.

DOE's Office of Nuclear Energy also provides federal funding to different nuclear industry priority areas, including workforce development. In April 2026, they announced almost \$50 million across 10 awards through their Nuclear Reactor Safety Training and Workforce Development Program to support the development, demonstration, and implementation of enhanced nuclear safety curricula and training, including an award to UT.³⁴ A second round of solicitations for proposals may be announced later in 2026, and Tennessee educational institutions could begin building proposal partnerships that would scale Tennessee's nuclear safety training capacity.

³¹ TCAT Knoxville awarded GIVE Grants for career and technical education partnership to enhance career and workforce readiness. TCAT Knoxville. August 29, 2024. <https://tcatknoxville.edu/news/tennessee-college-applied-technology-knoxville-awarded-give-grants-career-technical-education>.

³² ORNL partners with Jackson State, Tennessee Tech to enhance nuclear research, education. Oak Ridge National Laboratory. July 24, 2024. <https://www.ornl.gov/news/ornl-partners-jackson-state-tennessee-tech-enhance-nuclear-research-education>

³³ Tennessee Tech, Roane State and ORNL team up for degree emphasizing project management skills. Tennessee Tech. September 5, 2025. <https://www.tntech.edu/news/releases/25-26/tennessee-tech-roane-state-and-ornl-team-up-for-degree-emphasizing-project-management.php>

³⁴ Office of Nuclear Energy Awards \$49M to Enhance Nuclear Safety Training and Workforce Development. U.S. Department of Energy. April 7, 2026. <https://www.energy.gov/ne/articles/office-nuclear-energy-awards-49m-enhance-nuclear-safety-training-and-workforce>

Finally, the U.S. Department of Education has been a source of federal funding for Tennessee nuclear workforce development in the past. In June 2023, Tennessee Tech University was awarded \$3 million from their Higher Education Congressionally Funded Community Projects Program to acquire equipment and other technology resources needed to outfit the state-of-the-art laboratories needed for nuclear engineering education.³⁵

C. Leveraging Partnerships to Expand the Skilled Trades Pipeline

Although Tennessee institutions have been successful in expanding two- and four-year nuclear degree programs through innovative funding mechanisms, there is an opportunity to apply that experience to the skilled trades. By leveraging a mix of federal and state funding sources rather than relying on a single program, these partnerships could increase the quantity and quality of apprenticeships and pre-apprenticeships and meet the anticipated need for skilled workers in the nuclear industry.

Roane State Community College has already demonstrated the effectiveness of this mixed funding approach: in 2023, Roane State received \$100,000 from ORNL’s managing contractor, UT-Battelle, and a \$1.4 million grant from DOL to help launch their nuclear technology program. In 2024, the college received three grants supporting the program, including \$546,000 from the National Science Foundation, \$462,000 from the NEF and \$450,000 from the GIVE) program.³⁶

At the federal level, the clearest funding source to expand the skilled trades pipeline is tDOL’s new Pay-for-Performance Incentive Payments Program, which makes up to \$145 million available to expand apprenticeships in priority sectors including nuclear energy infrastructure. That is directly relevant for programs in welding, electrical, pipefitting, HVAC, and other trades tied to Tennessee’s nuclear build-out.³⁷ Regardless, the Secretary of Labor cited the Administration’s view of registered apprenticeships as “the premier, high-quality solution to boost America’s skills development pipeline,” indicating support for apprenticeships from DOL is likely to continue.

At the state level, a combination of Apprenticeship TN, GIVE, and NEF funds, along with the state’s Nuclear Supply Chain Investment Fund, can be a powerful catalyst for expanding apprenticeships and pre-apprenticeships in high-demand trades. Partnerships that pursue funds in these program areas would benefit from including organized labor.

³⁵ *Tennessee Tech launches new degree program in nuclear engineering.* Tennessee Tech. May 21, 2024. <https://www.tntech.edu/news/releases/24-25/tennessee-tech-launch-es-new-degree-program-in-nuclear-engineering.php>

³⁶ *Paving paths for a new nuclear workforce.* Oak Ridge National Laboratory. December 17, 2024. <https://www.ornl.gov/blog/paving-paths-new-nuclear-workforce>

³⁷ *US Department of Labor announces \$145M in funds supporting performance-based Registered Apprenticeship expansion across key industry sectors.* U.S. Department of Labor. February 13, 2026. <https://www.dol.gov/newsroom/releases/eta/eta20260213-0>

5. RECOMMENDATIONS

A. Recommendation 1: Strengthen the Tennessee Nuclear Fund's Data-Based Portfolio Management Strategy

This workforce demand assessment provides a cursory view of the high-priority occupations that will sustain Tennessee's nuclear industry momentum for decades to come. However, this assessment is limited by incomplete workforce demand data. For future workforce demand assessments to be successful, a more defined stakeholder engagement and data sharing framework should be prioritized. Further, an assessment of this type could assist Tennessee in establishing a data-based program management approach for the workforce development portion of Tennessee's Nuclear Supply Chain Investment Fund portfolio. An implementation roadmap for this data-based portfolio management strategy is shown in Figure 5 2 at the end of this section and described below in detail.

i) Make a Start

This strategy would first define the initiative's geographic scope, nuclear ecosystem coverage, and planning horizon. It's important for Tennessee to put in place secure data-sharing frameworks early in the process so that employers, education providers, workforce agencies, and public-sector partners can contribute information with confidence. These frameworks should define what data will be shared, at what level of detail, by whom, for what purpose, and under what protections, including governance, confidentiality, aggregation rules, and safeguards for commercially sensitive and security-relevant information. This should resolve many of the data sharing concerns that challenged this ORAU-led effort.

ii) Assess Current Workforce Landscape

With that foundation established, the state can assess the current workforce landscape by cataloging existing, in-development, and planned nuclear projects; identifying the critical occupations, skills, credentials, and education and training programs that support them; and mapping the priority stakeholder groups across industry, government, education, and workforce systems.

iii) Engage Stakeholders

Stakeholder engagement should then be used as the main strategy for refining the analysis. Focus groups and workshops can build alignment around the goals and value of a shared workforce demand assessment, while also testing and strengthening the data-sharing framework to ensure it is practical and trusted. Targeted interviews with employers, training providers, and other stakeholders should then validate priority occupations and confirm skill shortages and hiring pain points. The state can then work with stakeholders to collect the quantitative and qualitative data needed to assess workforce demand across the planning horizon.

iv) Forecast Workforce Needs

Once stakeholder data has been assembled, Tennessee can forecast workforce demand using a combination of employer-provided projections, Bureau of Labor Statistics employment data and external labor market indicators such as job postings in priority occupations. That demand view should be paired with a supply-side assessment of labor availability and training capacity using sources such as IPEDS, Workforce Innovation and Opportunity Act, training provider data, and K-12 pipeline information. This analysis helps reveal the training gaps that exist across the Tennessee nuclear sector. The result should be a set of baseline snapshots showing current and projected gaps by region, occupation, and employer type, supported by a public-facing dashboard that tracks a limited set of high-value metrics while preserving confidentiality through appropriate aggregation and disclosure controls. A theoretical visualization of this type of public-facing dashboard is provided in Figure 5-1 for illustration.

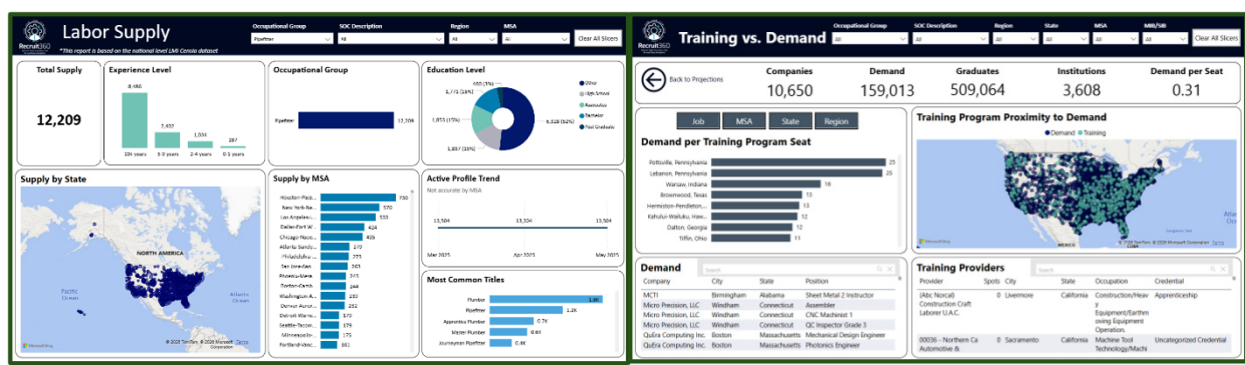


Figure 5-1. Workforce Snapshot Dashboard. For illustrative purposes only.

v) Translate Findings and Monitor Progress

The final step is to translate those findings into a practical action plan: a prioritized roadmap that identifies which gaps Tennessee should fund first, which partnerships should be launched or expanded, and where the Nuclear Supply Chain Investment Fund can have the greatest near- and long-term impact. To keep the strategy useful, the state should also establish a regular refresh cadence for demand, supply, and training capacity data and update the dashboard accordingly, allowing Fund leadership to monitor progress, adjust investments, and respond to changes in the nuclear project pipeline over time.

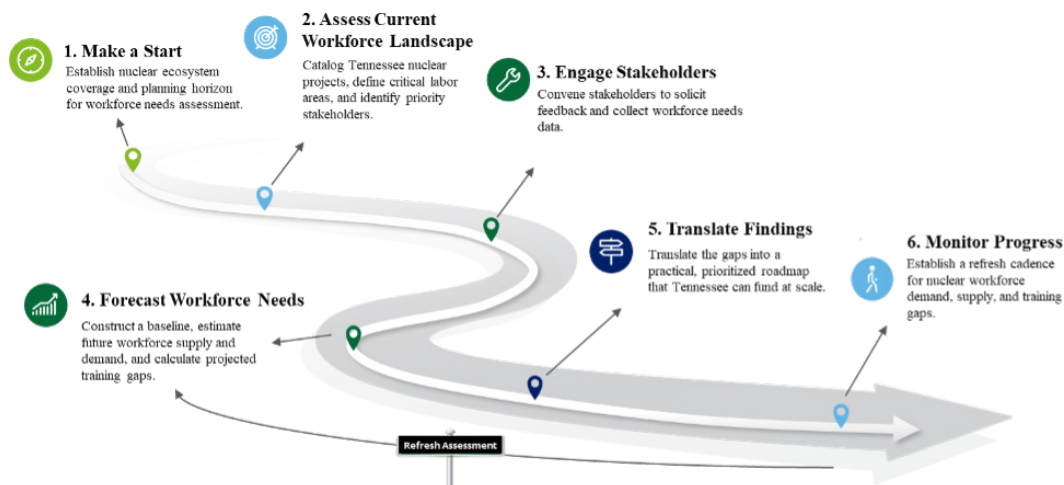


Figure 5-2. Portfolio Management Roadmap.

B. Recommendation 2: Expand Workforce Demand Study

This initial workforce demand assessment, based on interviews with 14 companies engaged in Oak Ridge's nuclear expansion, provides a valuable but partial view of Tennessee's nuclear workforce needs. ORAU recommends a second phase of this study that substantially broadens the pool of participating employers along three dimensions:

- Deepen coverage of Oak Ridge construction activity by engaging a more complete set of general contractors, subcontractors, and construction management firms supporting announced nuclear projects; this initial round captured only a limited slice of construction employers.
- Add Oak Ridge technical staffing firms, which play a significant role in supplying contract engineering, technical, and skilled trades labor to the nuclear industry and were not systematically represented in this study.
- Expand geographically beyond Oak Ridge by inviting nuclear-focused prime organizations from across the state to participate, building a more complete statewide picture of demand beyond the current concentration in East Tennessee.

Because this expansion would reach further into secondary- and tertiary-tier suppliers, it will necessarily involve more assumptions than the initial round of interviews, and ORAU expects this second phase to be primarily quantitative in nature (i.e., structured around the needs assessment matrix) rather than repeating the full interview protocol with every new participant. ORAU also recommends returning to the original study participants to go a layer deeper on the assumptions underlying their initial projections; this should be framed carefully with participating companies, positioned as an opportunity to refine and validate projections rather than revisit sensitive commitments.

This expanded study should also further evaluate specialized workforce categories that may not be explicitly represented within available workforce datasets or broader occupational classifications, including quality assurance, quality control, document control, and other technical support functions supporting nuclear operations. These categories were identified during this initial round of interviews as warranting additional investigation.

C. Recommendation 3: Conduct Statewide Workforce Supply Study with Regionality

Alongside expanding the demand-side study, ORAU recommends a more comprehensive follow-on study of Tennessee's nuclear workforce supply. The supply-side review conducted for this report (summarized detailed in Appendix D) offers a view built on publicly available data: each segment of the nuclear value chain was mapped to relevant industry classifications,³⁸ employment and educational

³⁸ The North American Industry Classification System is a standardized 6-digit numerical code used by government agencies and businesses to classify a company's primary industry. NAICS codes are self-assigned by businesses.

requirements for the resulting occupations were drawn from Bureau of Labor Statistics data,³⁹ and workforce pipeline capacity was estimated using postsecondary completions and registered apprenticeship records cross-walked to those occupations. While informative, this approach has real limits: it does not capture employer-provided training, reskilling and upskilling pathways, or regional variation in where the workforce lives and works, and it stops at a statewide level without resolving differences across Tennessee's diverse labor markets.

A more robust supply study should be structured statewide, with the ability to disaggregate results by region. Anecdotally, worker mobility appears to vary meaningfully by occupation type: some workers, particularly higher-skilled technical staff, may be willing to relocate to East Tennessee for the right opportunity, but skilled tradespeople more typically prefer to remain close to home and take per diem pay for travel rather than relocate outright. That pattern may be shifting, however, as some older tradespeople nearing the end of their careers increasingly prioritize stability over continued travel, and may be willing to settle with a single employer in East Tennessee even at a somewhat lower rate of pay, particularly since wages in the Oak Ridge area are already solid relative to other markets. A regionally focused supply study would help Tennessee and its nuclear employers understand these dynamics with more precision and design recruitment and retention strategies accordingly.

To improve on the analysis in this report, ORAU recommends the updated study incorporate a broader and more current set of supply-side sources beyond NCES IPEDS and DOL's Registered Apprenticeship Partners Information Database System (RAPIDS) alone, potentially including state occupational licensing board data, union workforce data, TCAT data, employer-reported on-the-job and internal training program data, K–12 career and technical education enrollment and completion figures, and other local workforce data not captured in this initial study. In addition, updated regional cost-of-living and wage data to better understand relocation incentives across Tennessee's labor markets may be helpful in the next study phase.

D. Recommendation 4: Invest in Training to Close Anticipated Workforce Gaps

The workforce gap assessment in Section 3.B highlights several occupations where targeted training investment is likely to have the greatest impact on Tennessee's nuclear workforce readiness. ORAU recommends prioritizing:

- Nuclear reactor operators, production and operations supervisors, and power plant operators, where projected demand significantly exceeds current headcount and no visible public training pipeline currently exists. These roles typically require extensive on-the-job qualifications in addition to any formal education, so early investment in employer-led training partnerships and simulator-based training capacity may be especially valuable.

³⁹ U.S. Bureau of Labor Statistics. (2026, April). Occupational Employment and Wage Statistics. https://www.bls.gov/oes/oes_overview.htm

- Chemical plant and system operators, where demand is projected to grow the fastest of any occupation assessed and is very likely to outpace what Tennessee's training pipeline can supply locally; the state may need to combine local training investment with a regional or national recruitment strategy for this role.
- Electricians, plumbers/pipefitters/steamfitters, and structural iron and steel workers, where existing training pipelines are comparatively robust today but may be outpaced by demand during the peak construction years between the late 2020s and early 2030s; targeted, time-limited investment to expand training capacity ahead of that peak, rather than a permanent capacity increase, may be the most efficient use of funds for these trades.

By contrast, boilermakers, welders, cutters, and solderers already benefit from a comparatively strong existing pipeline; for this occupation, the more valuable investment may be aligning existing training curricula with nuclear-specific standards and certifications rather than expanding capacity outright. For example, the profession of welding would benefit from an alignment of training programs that go beyond standard structural or industrial welding to include specialty instruction, welding of nuclear-relevant materials, and a focus on quality assurance, documentation and code compliance.

These priorities should be revisited and refined as the expanded workforce demand study (Recommendation 2) and statewide supply study (Recommendation 3) described above are completed.

Training investment should be paired with employer-led career exploration, work-based learning, and retention strategies. The objective is not simply to place Tennesseans into openings, but to create pathways to gainful employment and self-sustaining careers that connect residents to the nuclear economy while helping employers build and retain the talent they need.

6. CONCLUSION

The State of Tennessee has indicated its support for the nuclear industry in the clearest terms, initiating and expanding a now \$95 million Nuclear Energy Supply Chain Investment Fund to catalyze private sector investment and increase the supply of skilled labor through targeted workforce development programs.

This assessment shows that workforce demand tied to Tennessee's nuclear buildout is substantial, durable, and concentrated in a specific set of occupations where the state's current training pipeline may not keep pace. Left unaddressed, these gaps risk undermining the economic growth Tennessee has worked to attract. The state's existing workforce funding, combined with the data-based prioritization approach described in Recommendation 1 provides a practical foundation for closing them.

Realizing that potential will require building on this initial study. Expanding the demand-side assessment to a broader set of employers, conducting a full statewide supply-side study with regional detail, and targeting training investment toward the occupations facing the largest gaps together form a roadmap for turning this analysis into a durable workforce strategy. ORAU looks forward to continuing this work with the State of Tennessee, TN² member companies, and the state's education and training providers as Tennessee's nuclear industry continues to grow.

Bringing Tennesseans along must be central to that strategy. The opportunity is not only to meet employer demand, but to help residents discover and access meaningful careers, strengthen the communities in which nuclear investment occurs, and ensure that Tennessee's nuclear growth is broadly understood, embraced, and sustained.

7. APPENDICES

A. Employee Demand Interview Guide

Context and scope

- **1.** What part of the nuclear value chain are you in?
 - **Response options:**
 - Uranium enrichment
 - Fuel fabrication
 - Reactor design
 - Reactor deployment
 - Plant operations
 - EPC
 - Research, Development, and Testing
 - Components Manufacturing
 - Other (please specify)
- **2a.** Which Tennessee sites are in scope for this conversation, and what do you do at each site?
- **2b.** For each Tennessee site in scope, when do you anticipate entering and exiting each of the following phases?
 - Research/Design/Engineering/Licensing Phase
 - Construction Phase
 - Startup Phase
 - Operation Phase
 - Recycling/Storage of Waste
 - Other (please specify)
- **2c.** Do you intend to subcontract to a local construction firm? If so, which firm?
- **2d.** What is the total headcount expected when in full operations in Tennessee?
- **2e.** Are you planning to use subcontractors for technical work? If so, for which types of roles?
- **3.** Are your workers unionized, or do you anticipate using union labor?
 - **Response options:**
 - Yes
 - No
- **4.** What is the longest time horizon for which you actively forecast workforce with reasonable confidence?

- o **Question type:** Multiple choice
- o **Response options:**
 - 12 months
 - 24 months
 - 36 months
 - 60 months
 - Other
- **5.** What is your confidence level in the workforce numbers you are providing today?
 - o **Response options:**
 - High
 - Medium
 - Low
 - o **Follow-up:** What events or assumptions would most likely cause these numbers or timelines to shift (e.g., licensing delays, financing, supply chain, EPC schedule changes)?
- **6.** What are the top 3 workforce risks to your business over the next 2–3 years?

Workforce demand: what roles, how many, when, where

- **7.** What is the workforce ramp curve by phase (e.g., design/engineering → construction → commissioning → operations), and when does staffing peak?
- **8.** What roles will be hired locally vs. relocated from other facilities or hired nationally?
 - o Do you have an intended local hiring percentage?
- **9.** Which 5 roles are hardest to fill today?
 - o Why?
- **10.** What are your typical time-to-fill targets vs. reality for those roles?
- **11.** What credentials are “must-have” vs. “nice-to-have”?
 - o **Response categories:**
 - Degrees
 - Licenses
 - Certifications
 - Prior nuclear experience
 - Other (please specify)
- **12.** What shift patterns and work conditions apply (e.g., rotating shifts, outage travel, on-call, radiological work)?
 - o How does that affect hiring and retention?

- **13.** Where do you recruit from today (e.g., local, regional, national; competitors; military; adjacent industries)?

Expansion plans in Tennessee

- **14.** What Tennessee expansions are likely in the next one to five years?
 - o **Response options:**
 - New facilities
 - Upgrades
 - New units/SMRs
 - Manufacturing lines
 - Life extensions
 - Outages
 - Capital projects
 - Vendor growth
 - Other (please specify)
- **15.** What decision gates or timing factors drive those expansions?
 - o **Response options:**
 - Permitting
 - Financing
 - Interconnect
 - Customer commitments
 - Federal funding
 - Supply chain
 - Other (please specify)
- **16.** Are there any periods over the next three to five years where workforce demand could spike sharply or drop unexpectedly that are not captured in the previous questions?
- **17.** If you intend to bring in talent from other states, what employee levels and labor categories do you expect these to be (e.g., design engineers)?
- **17b.** Will some work be conducted outside of Tennessee and imported to the Tennessee facility (e.g., engineering design, fabrication or modular construction)?
 - o If so, what type of work would that be?
- **18a.** What are the top constraints to expanding in Tennessee?
 - o **Response options:**
 - Labor availability
 - Housing
 - Training capacity
 - Licensing

- Suppliers
 - Security requirements
 - Other (please specify)
- **18b.** Housing needs: Will your company need temporary housing for any of the following phases?
 - o Design/Engineering/Licensing Phase
 - o Construction Phase
 - o Startup Phase
 - o Operation Phase
 - o Other
 - **18c.** Which labor categories are likely to need temporary housing?
 - o Will this housing need to be multi-family, mobile-friendly, or single family?
 - **18d.** Will your organization relocate employees and their families for any of these phases?
 - o If so, how many families would you anticipate relocating?
 - o Design/Engineering/Licensing Phase
 - o Construction Phase
 - o Startup Phase
 - o Operation Phase
 - o Other

Skills and proficiency

- **19.** What essential technical competencies differentiate a “qualified” hire from an “exceptional” hire?
- **20.** What are the top five skills that are most scarce in the market right now?
- **21.** What soft skills (power skills) are critical in your environment?
- **22.** What proficiency level do you need at Day 1 vs. after 6–12 months?

Training pathways: what exists, what works, what’s missing

- **23.** Which training programs are you already partnered with in Tennessee?
- **24.** Where do your best hires come from today?
 - o **Response options:**
 - Specific schools/programs
 - Military MOS/ratings
 - Apprenticeships
 - Prior employers
 - Employee referrals
 - Other (please specify)

- **25a.** What training do you provide internally?
- **25b.** Can this training be outsourced to local education or training providers, or must you rely on internal training? If you cannot outsource, is that due to proprietary technologies, quality assurance, or another reason?
- **26.** Do you rely on external providers?
 - If so, for what?
- **27.** What is the most valuable “ready on day one” training a provider could deliver (e.g., industrial fundamentals + safety + QA documentation + basic rad worker)?
- **28.** What credentials or certifications would you trust from an external provider?
 - Which are non-negotiable?
- **29.** What training delivery formats work best?
 - **Response options:**
 - Internships
 - Paid apprenticeships
 - Co-ops
 - Night/weekend
 - Short bootcamps
 - Hybrid
 - Mobile labs
 - Labs located at a local university
 - Other (please specify)
- **30.** What would make you hire more graduates from a program (e.g., curriculum alignment, screening, work-based learning, reliability, safety culture)?
- **31.** Does your organization use work-based learning opportunities (e.g., internships, co-ops, apprenticeships)?
 - If yes, how many per year and in what roles?
 - Do you administer these programs internally or use an external provider?
- **32a.** Are you interested in starting new programs? If so, which labor categories do you need to address?
- **32b.** What types of adjacent industry workers does your organization target for reskilling opportunities? Are there specific roles that are particularly well suited to bring into your organization from another industry?

Supply, retention, and competitiveness

- **33a.** What are your current turnover and retirement risk areas? Which roles are most vulnerable?

- **33b.** What is your current attrition rate for the company?
- **33c.** Are there specific demographic profiles that you are targeting in your hiring strategy (e.g., early career, women, veterans, etc.)?
- **34.** What are the top reasons prospective or current employees decline offers or resign?
 - o **Response options:**
 - Pay
 - Schedule
 - Location
 - Culture
 - Clearance delays
 - Other (please specify)
- **35.** How can local schools—high schools, TCATs, and 2- and 4-year colleges—best help your organization with your hiring and staffing goals?
- **36.** How can the Tennessee Nuclear Network help your organization or other new employers in the East Tennessee region?
- **37.** Do you have any additional information or concerns related to workforce that might assist us with this study?

B. Needs Assessment Matrix

Figure 7-1 Employer Needs Assessment Matrix

SOC Codes	Occupation Description	Clearance Required?	Controlled Materials* Position?	Choose one phase that is primary for this role.**	Choose one phase that is secondary for this role.**	Is this a temporary or permanent position?	If Temporary, estimate length of employment or contract.	Where do you expect to recruit for this position?	Estimate Average Headcount	Estimate Peak Headcount	2026	2027	2028
Skilled Trades													
51-4121	Welders, Cutters, Solderers, and Brazers												
47-2152	Plumbers, Pipefitters, and Steamfitters												
47-2111	Electricians												
47-2031	Carpenters												
47-2021	Brickmasons and Blockmasons												
47-2221	Structural Iron and Steel Workers												
47-2073	Operating Engineers and Other Construction Equipment Operators												
47-2141	Painters, Construction and Maintenance												
47-2181	Roofers												
47-2111	Heating, Air Conditioning, and Refrigeration Mechanics and Installers												
47-2211	Sheet Metal Workers												
47-2051	Cement Masons and Concrete Finishers												
Professional/Management													
Management Occupations													
11-1021	General and Operations Managers												
11-3021	Computer and Information Systems Managers												
11-3051	Industrial Production Managers												
11-9041	Architectural and Engineering Managers												
11-9199	Managers, All Other												
Business and Financial Operations Occupations													
13-1082	Project Management Specialists												
13-1111	Management Analysts												
13-1151	Training and Development Specialists												
13-1161	Market Research Analysts and Marketing Specialists												
13-1199	Business Operations Specialists, All Other												
Computer and Mathematical Occupations													
15-1252	Software Developers												
Architecture and Engineering Occupations													
17-2071	Electrical Engineers												
17-3023	Electrical and Electronic Engineering Technologists and Technicians												
17-2112	Industrial Engineers												
17-2161	Nuclear Engineers												
17-3023	Electrical and Electronic Engineering Technologists and Technicians												
Life, Physical, and Social Science Occupations													
19-2031	Chemists												
19-4031	Chemical Technicians												
19-4051	Nuclear Technicians												
Protective Service Occupations													
33-9032	Security Guards												
Office and Administrative Support Occupations													
43-5061	Production, Planning, and Expediting Clerks												
Installation, Maintenance, and Repair Occupations													
49-2095	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay												
49-9041	Industrial Machinery Mechanics												
49-9051	Electrical Power-Line Installers and Repairers												
49-9071	Maintenance and Repair Workers, General												
Production Occupations													
51-1011	First-Line Supervisors of Production and Operating Workers												
51-9011	Nuclear Power Reactor Operators												
51-9013	Power Plant Operators												
51-9091	Chemical Plant and System Operators												
51-9011	Chemical Equipment Operators and Tenders												
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders												
Other, Please List													

*The needs assessment matrix has been modified for readability. The version sent to stakeholders asked for annual labor needs from 2026 through 2035.

C. Complete SOC Code List

Below is the list of 145 SOC codes relevant to Tennessee's nuclear industry, along with their respective education and training requirements.

Figure 7-2. Full List of SOC Codes with Education and Training Requirements.

Occupation	SOC ID (2018)	Education Needed for Entry	Work Experience in a Related Occupation	OTJ Training Required	Associated CIP Code(s)
Accountants and Auditors	13-2011	Not found	None	None	30.1601, 43.0405, 52.0301, 52.0303, 52.0304, 52.0305, 52.1601
Architectural and Civil Drafters	17-3011	Associate's degree	None	None	04.0901, 04.0902, 04.0999, 15.0101, 15.1301, 15.1302, 15.1303, 15.1304, 15.1307
Architectural and Engineering Managers	11-9041	Not found	5 years or more	None	04.0201, 04.0202, 04.0301, 04.0401, 04.0402, 04.0501, 04.0601, 04.0902, 14.0101, 14.0201, 14.0202, 14.0299, 14.0301, 14.0401, 14.0501, 14.0601, 14.0701, 14.0702, 14.0799, 14.0801, 14.0802, 14.0803, 14.0804, 14.0805, 14.0899, 14.0901, 14.0902, 14.0903, 14.0999, 14.1001, 14.1003, 14.1004, 14.1099, 14.1101, 14.1201, 14.1301, 14.1401, 14.1801, 14.1901, 14.2001, 14.2101, 14.2201, 14.2301, 14.2401, 14.2501, 14.2701, 14.2801, 14.3201, 14.3301, 14.3401, 14.3501, 14.3601, 14.3801, 14.3901, 14.4001, 14.4101, 14.4201, 14.4301, 14.4401, 14.4501, 14.4701, 14.4801, 14.4802, 14.4899, 14.9999, 15.1501, 15.1502, 15.1503, 40.1001, 52.0216
Biochemists and Biophysicists	19-1021	Doctoral or professional degree	None	None	26.0202, 26.0203, 26.0205, 26.0206, 26.0207, 26.0210, 26.0499, 26.0913, 51.2003
Biological Scientists, All Other	19-1029	Bachelor's degree	None	None	26.0101, 26.0204, 26.0207, 26.0208, 26.0209, 26.0210, 26.0299, 26.0301, 26.0305, 26.0307, 26.0308, 26.0399, 26.0401, 26.0403, 26.0404, 26.0406, 26.0407, 26.0499, 26.0503, 26.0504, 26.0505, 26.0506, 26.0507, 26.0508, 26.0509, 26.0702, 26.0707, 26.0801, 26.0802, 26.0803, 26.0804, 26.0805, 26.0807, 26.0899, 26.0910, 26.1001, 26.1004, 26.1101, 26.1102, 26.1104, 26.1199, 26.1201, 26.1301, 26.1302, 26.1303, 26.1304, 26.1305, 26.1306, 26.1307, 26.1308, 26.1310, 26.1311, 26.1399, 26.1501, 26.1502, 26.1503, 26.1504, 26.1599, 26.9999, 27.0306, 30.1901, 30.2701, 30.3201, 42.2706
Biological Technicians	19-4021	Bachelor's degree	None	None	26.0101, 26.0102, 26.0202, 26.0204, 26.0406, 26.0502, 26.0503, 26.0508, 26.0701, 26.0708, 26.0709, 26.0801, 26.1102, 26.1103, 26.1104, 26.1302, 26.1304, 26.1501, 41.0101
Boilermakers	47-2011	High school diploma or equivalent	None	Apprenticeship	48.0801
Bookkeeping, Accounting, and Auditing Clerks	43-3031	Some college, no degree	None	Moderate-term on-the-job training	52.0302
Bus and Truck Mechanics and Diesel Engine Specialists	49-3031	High school diploma or equivalent	None	Long-term on-the-job training	47.0605, 47.0613

Business Operations Specialists, All Other	13-1199	Not found	None	None	52.0201, 52.0208, 52.0499, 52.0904, 52.1101
Carpenters	47-2031	High school diploma or equivalent	None	Apprenticeship	46.0201
Cement Masons and Concrete Finishers	47-2051	No formal educational credential	None	Moderate-term on-the-job training	46.0402
Chemical Engineers	17-2041	Bachelor's degree	None	None	14.0701, 14.0702, 14.0799, 14.3201, 14.4001, 14.4301, 14.4401
Chemical Equipment Operators and Tenders	51-9011	High school diploma or equivalent	None	Moderate-term on-the-job training	41.0301, 41.0303
Chemical Plant and System Operators	51-8091	High school diploma or equivalent	None	Moderate-term on-the-job training	41.0301, 41.0303
Chemical Technicians	19-4031	Associate's degree	None	Moderate-term on-the-job training	41.0301, 41.0303
Chemists	19-2031	Bachelor's degree	None	None	40.0501, 40.0502, 40.0503, 40.0504, 40.0506, 40.0507, 40.0508, 40.0509, 40.0510, 40.0511, 40.0512, 40.0599, 40.1002, 51.2004
Civil Engineering Technologists and Technicians	17-3022	Associate's degree	None	None	15.0101, 15.0201, 15.1001, 46.0415
Civil Engineers	17-2051	Bachelor's degree	None	None	14.0801, 14.0802, 14.0803, 14.0804, 14.0805, 14.0899, 14.3301
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	51-9124	High school diploma or equivalent	None	Moderate-term on-the-job training	47.0603
Compliance Officers	13-1041	Not found	None	Moderate-term on-the-job training	03.0103, 03.0104, 03.0208, 03.0209, 30.4101, 43.0121, 51.0717, 51.0720, 51.2213, 52.1001, 52.1002
Computer and Information Systems Managers	11-3021	Not found	5 years or more	None	11.0101, 11.0103, 11.0401, 11.0701, 11.0802, 11.0901, 11.1001, 11.1002, 11.1003, 11.1005, 30.0801, 30.1601, 30.3101, 30.3901, 30.7001, 52.0205, 52.1201, 52.1206, 52.1207, 52.1299, 52.2101

Computer Hard-ware Engineers	17-2061	Bachelor's degree	None	None	14.0901, 14.0902, 14.1001, 14.4701
Computer Network Support Specialists	15-1232	Not found	None	Moderate-term on-the-job training	01.0106, 11.1006, 51.0709
Computer Numerically Controlled Tool Operators	51-9161	High school diploma or equivalent	None	Moderate-term on-the-job training	48.0503, 48.0510
Computer Systems Analysts	15-1211	Bachelor's degree	None	None	11.0101, 11.0103, 11.0501, 11.0901
Construction and Building Inspectors	47-4011	High school diploma or equivalent	5 years or more	Moderate-term on-the-job training	46.0403
Construction Laborers	47-2061	No formal educational credential	None	Short-term on-the-job training	99.9999
Construction Managers	11-9021	Bachelor's degree	None	Moderate-term on-the-job training	15.1001, 44.0402, 52.2001, 52.2002, 52.2099
Control and Valve Installers and Repairers, Except Mechanical Door	49-9012	High school diploma or equivalent	None	Moderate-term on-the-job training	47.0302, 47.0303
Cost Estimators	13-1051	Not found	None	Moderate-term on-the-job training	14.1801, 14.1901, 14.3301, 14.3601, 15.1001, 52.0101, 52.0201
Crane and Tower Operators	53-7021	High school diploma or equivalent	Less than 5 years	Moderate-term on-the-job training	49.0202, 49.0206
Customer Service Representatives	43-4051	High school diploma or equivalent	None	Short-term on-the-job training	52.0406, 52.0411
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	51-4031	High school diploma or equivalent	None	Moderate-term on-the-job training	48.0501, 48.0506

Data Scientists	15-2051	Not found	Not found	Not found	Not found
Drywall and Ceiling Tile Installers	47-2081	No formal educational credential	None	Moderate-term on-the-job training	46.0404
Earth Drillers, Except Oil and Gas	47-5021	Not found	Not found	Not found	Not found
Electric Motor, Power Tool, and Related Repairers	49-2092	High school diploma or equivalent	Less than 5 years	Moderate-term on-the-job training	47.0101
Electrical and Electronic Engineering Technologists and Technicians	17-3023	Associate's degree	None	None	15.0303, 15.0305, 15.0306, 15.0399, 15.0406, 15.0616, 15.1201, 15.1202
Electrical and Electronics Drafters	17-3012	Associate's degree	None	None	15.1301, 15.1302, 15.1305, 15.1307
Electrical and Electronics Repairers, Commercial and Industrial Equipment	49-2094	Postsecondary nondegree award	None	Long-term on-the-job training	47.0104, 47.0105
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	49-2095	Postsecondary nondegree award	Less than 5 years	Moderate-term on-the-job training	15.0303, 15.1702, 46.0301, 47.0199
Electrical Engineers	17-2071	Bachelor's degree	None	None	14.1001, 14.1099, 14.4101, 14.4701
Electrical Power-Line Installers and Repairers	49-9051	High school diploma or equivalent	None	Long-term on-the-job training	46.0301, 46.0303, 46.0399
Electricians	47-2111	High school diploma or equivalent	None	Apprenticeship	46.0302
Electro-Mechanical and Mechatronics Technologists and Technicians	17-3024	Associate's degree	None	None	15.0403, 15.0404, 15.0405, 15.0406, 15.0407, 15.0499

Emergency Management Directors	11-9161	Not found	5 years or more	None	43.0119, 43.0120, 43.0301, 43.0302, 43.0303, 43.0304, 61.0603
Emergency Medical Technicians	29-2042	Postsecondary nondegree award	None	None	51.0904
Engineering Technicians, Except Drafters, All Other	17-3029	Associate's degree	None	None	15.0001, 15.0101, 15.0304, 15.0307, 15.0401, 15.0501, 15.0599, 15.0607, 15.0611, 15.0614, 15.0615, 15.0617, 15.0806, 15.0807, 15.0901, 15.1103, 15.1201, 15.1202, 15.1203, 15.1204, 15.1299, 15.1401, 15.1503, 15.1701, 15.1702, 15.1703, 15.1704, 15.1705, 15.1706, 15.1799, 29.0303, 29.0306, 29.0307, 29.0409
Engineers, All Other	17-2199	Bachelor's degree	None	None	14.0101, 14.0103, 14.0401, 14.0702, 14.0802, 14.0805, 14.1003, 14.1004, 14.1101, 14.1201, 14.1301, 14.2401, 14.2701, 14.3301, 14.3401, 14.3601, 14.3801, 14.3901, 14.4001, 14.4101, 14.4201, 14.4301, 14.4401, 14.4501, 14.4701, 14.4801, 14.4802, 14.4899, 14.9999, 15.1502, 15.1601, 51.2312
Environmental Engineering Technologists and Technicians	17-3025	Not found	None	None	15.0506, 15.0507, 15.0508, 15.0704, 26.1006
Environmental Engineers	17-2081	Not found	None	None	14.0802, 14.0805, 14.1401
Environmental Science and Protection Technicians, Including Health	19-4042	Associate's degree	None	None	03.0104, 15.0506, 15.0507, 15.0508, 26.1006, 30.3301, 30.4101, 30.4401, 40.0509, 41.0399, 41.9999
Environmental Scientists and Specialists, Including Health	19-2041	Bachelor's degree	None	None	03.0103, 03.0104, 26.1004, 26.1005, 26.1006, 30.3201, 30.3301, 30.4101, 30.4401, 40.0509, 51.2202
Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers	51-6091	High school diploma or equivalent	None	Moderate-term on-the-job training	99.9999
Financial Managers	11-3031	Not found	5 years or more	None	30.1601, 30.7104, 52.0215, 52.0304, 52.0305, 52.0801, 52.0806, 52.0808, 52.0809, 52.0810, 52.0899
Firefighters	33-2011	Postsecondary nondegree award	None	Long-term on-the-job training	03.0208, 43.0201, 43.0203, 43.0206, 43.0299
First-Line Supervisors of Construction Trades and Extraction Workers	47-1011	High school diploma or equivalent	5 years or more	None	46.0000, 46.0101, 46.0201, 46.0302, 46.0401, 46.0402, 46.0403, 46.0404, 46.0406, 46.0408, 46.0410, 46.0412, 46.0413, 46.0414, 46.0415, 46.0502, 46.0503, 46.0504, 46.0505

First-Line Supervisors of Mechanics, Installers, and Repairers	49-1011	High school diploma or equivalent	Less than 5 years	None	46.0301, 46.0303, 47.0000, 47.0600, 47.0617, 47.0618, 47.0701, 47.0703, 47.0704, 47.0705, 47.0706, 52.0205
First-Line Supervisors of Production and Operating Workers	51-1011	High school diploma or equivalent	Less than 5 years	None	52.0205
First-Line Supervisors of Transportation Workers, Except Aircraft Cargo Handling Supervisors	53-1047	High school diploma or equivalent	Less than 5 years	None	Not found
Gas Compressor or Gas Pumping Station Operators	53-7071	High school diploma or equivalent	None	Moderate-term on-the-job training	99.9999
General and Operations Managers	11-1021	Not found	5 years or more	None	01.8202, 31.0301, 31.0399, 44.0401, 52.0101, 52.0201, 52.0206, 52.0212, 52.0215, 52.0701, 52.0704, 52.0801, 52.0810, 52.1101, 52.1301
Hazardous Materials Removal Workers	47-4041	High school diploma or equivalent	None	Moderate-term on-the-job training	15.0508
Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	17-2111	Not found	None	None	14.1401, 14.9999
Health Physicists	19-1041	Master's degree	None	None	26.0401, 26.0509, 26.1309, 26.1311, 51.1401, 51.2202
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	49-9021	Postsecondary nondegree award	None	Long-term on-the-job training	15.0501, 47.0201
Heavy and Tractor-Trailer Truck Drivers	53-3032	Postsecondary nondegree award	None	Short-term on-the-job training	49.0205
Helpers - Pipelayers, Plumbers, Pipefitters, and Steamfitters	47-3015	High school diploma or equivalent	None	Short-term on-the-job training	99.9999

Helpers-Electricians	47-3013	High school diploma or equivalent	None	Short-term on-the-job training	99.9999
Helpers-- Production Workers	51-9198	High school diploma or equivalent	None	Short-term on-the-job training	99.9999
Human Resources Specialists	13-1071	Not found	None	None	42.2804, 52.0201, 52.1001, 52.1003, 52.1006, 52.1099
Industrial Engineering Technologists and Technicians	17-3026	Associate's degree	None	None	15.0001, 15.0612, 15.0613, 15.0699, 15.0703, 15.0705, 15.1501
Industrial Engineers	17-2112	Bachelor's degree	None	None	14.2701, 14.3501, 14.3601, 15.1501, 15.1503
Industrial Machinery Mechanics	49-9041	High school diploma or equivalent	None	Long-term on-the-job training	47.0303, 47.0701, 47.0705, 47.0706
Industrial Production Managers	11-3051	Not found	5 years or more	None	14.3501, 15.1501, 51.2006, 51.2009, 52.0101, 52.0201, 52.0203, 52.0205, 52.0216
Industrial Truck and Tractor Operators	53-7051	No formal educational credential	None	Short-term on-the-job training	49.0209
Inspectors, Testers, Sorters, Samplers, and Weighers	51-9061	High school diploma or equivalent	None	Moderate-term on-the-job training	15.0702
Insulation Workers, Floor, Ceiling, and Wall	47-2131	No formal educational credential	None	Short-term on-the-job training	46.0414
Insulation Workers, Mechanical	47-2132	High school diploma or equivalent	None	Apprenticeship	46.0414
Laborers and Freight, Stock, and Material Movers, Hand	53-7062	No formal educational credential	None	Short-term on-the-job training	99.9999
Lawyers	23-1011	Doctoral or professional degree	None	None	22.0101, 22.0201, 22.0202, 22.0203, 22.0204, 22.0205, 22.0206, 22.0207, 22.0208, 22.0209, 22.0210, 22.0211, 22.0212, 22.0213, 22.0214, 22.0215, 22.0216, 22.0217, 22.0218, 22.0219, 22.0220, 22.0221, 22.0222, 22.0223, 22.0224, 22.0299
Life, Physical, and Social Science Technicians, All Other	19-4099	Associate's degree	None	None	40.0401, 40.1001, 40.1002, 41.0000, 41.0303, 41.0399, 41.9999, 43.0100, 43.0104, 43.0402, 43.0406, 45.0401

Logisticians	13-1081	Not found	None	None	52.0201, 52.0203, 52.0205
Machinists	51-4041	High school diploma or equivalent	None	Long-term on-the-job training	48.0501, 48.0503
Maintenance and Repair Workers, General	49-9071	High school diploma or equivalent	None	Moderate-term on-the-job training	46.0401
Management Analysts	13-1111	Not found	Less than 5 years	None	13.0601, 13.0603, 13.0604, 13.0608, 13.0699, 27.0601, 30.7101, 30.7102, 30.7103, 30.7104, 30.7199, 42.2804, 52.0101, 52.0201, 52.0213, 52.0601, 52.1301
Managers, All Other	11-9199	Not found	Less than 5 years	None	09.0702, 11.1005, 25.0101, 25.0103, 30.0601, 30.1202, 30.3901, 30.4001, 30.4201, 30.4501, 30.4601, 30.4701, 30.5101, 30.5201, 30.5202, 30.5203, 39.0801, 42.0101, 42.2701, 42.2702, 42.2703, 42.2704, 42.2705, 42.2706, 42.2707, 42.2708, 42.2709, 42.2710, 42.2799, 42.2801, 42.2802, 42.2803, 42.2804, 42.2805, 42.2806, 42.2807, 42.2808, 42.2809, 42.2810, 42.2811, 42.2812, 42.2813, 42.2814, 42.2899, 42.9999, 43.0100, 43.0103, 43.0115, 43.0202, 43.0301, 43.0302, 43.0303, 43.0304, 43.0404, 44.0401, 44.0402, 44.0499, 45.0101, 45.0102, 45.0103, 45.0199, 45.0201, 45.0202, 45.0203, 45.0204, 45.0205, 45.0299, 45.0301, 45.0401, 45.0501, 45.0502, 45.0599, 45.0601, 45.0602, 45.0603, 45.0604, 45.0605, 45.0699, 45.0701, 45.0702, 45.0799, 45.0901, 45.0902, 45.0999, 45.1001, 45.1002, 45.1003, 45.1004, 45.1099, 45.1101, 45.1102, 45.1103, 45.1199, 45.1201, 45.1301, 45.1501, 45.9999, 50.1001, 50.1002, 50.1004, 50.1099, 51.0719, 51.2009, 52.0101, 52.0201, 52.0206, 52.0210, 52.0211, 52.0213, 52.0214, 52.0216, 52.0701, 52.0702, 52.0703, 52.0704, 52.0903, 52.0999, 52.2101, 54.0101, 54.0102, 54.0103, 54.0104, 54.0105, 54.0106, 54.0107, 54.0108, 54.0199
Materials Engineers	17-2131	Bachelor's degree	None	None	14.0601, 14.1801, 14.2001, 14.2801, 14.3201
Materials Scientists	19-2032	Bachelor's degree	None	None	19.0904, 40.1001, 40.1002, 40.1099
Mechanical Drafters	17-3013	Associate's degree	None	None	15.1301, 15.1302, 15.1306, 15.1307
Mechanical Engineering Technologists and Technicians	17-3027	Associate's degree	None	None	15.0803, 15.0805, 15.0899, 15.1103

Mechanical Engineers	17-2141	Bachelor's degree	None	None	14.1101, 14.1901, 14.4101
Medical and Health Services Managers	11-9111	Not found	Less than 5 years	None	01.8201, 01.8202, 26.0509, 44.0503, 51.0701, 51.0702, 51.0704, 51.0706, 51.0718, 51.0719, 51.0720, 51.0721, 51.0722, 51.2001, 51.2002, 51.2007, 51.2008, 51.2011, 51.2201, 51.2208, 51.2210, 51.2211, 51.2213, 51.2214, 51.2299, 51.3206, 51.3299, 51.3802, 51.3818, 51.3820, 52.0206, 52.0210, 52.0214, 52.0216
Medical Scientists, Except Epidemiologists	19-1042	Doctoral or professional degree	None	None	26.0102, 26.0202, 26.0203, 26.0204, 26.0205, 26.0401, 26.0403, 26.0404, 26.0406, 26.0407, 26.0503, 26.0504, 26.0505, 26.0507, 26.0508, 26.0509, 26.0806, 26.0901, 26.0902, 26.0903, 26.0904, 26.0905, 26.0907, 26.0908, 26.0909, 26.0910, 26.0911, 26.0912, 26.0913, 26.0999, 26.1001, 26.1002, 26.1003, 26.1004, 26.1005, 26.1006, 26.1007, 26.1099, 26.1102, 26.1309, 26.1401, 26.1502, 26.1503, 26.1504, 26.1599, 30.1001, 30.1101, 42.2709, 45.0205, 51.1401, 51.1402, 51.1405, 51.1499, 51.2003, 51.2004, 51.2005, 51.2010, 51.2202, 61.0101, 61.0102, 61.0103, 61.0104, 61.0105, 61.0106, 61.0107, 61.0108, 61.0109, 61.0110, 61.0111, 61.0112, 61.0113, 61.0114, 61.0115, 61.0116, 61.0117, 61.0118, 61.0119, 61.0120, 61.0121, 61.0122, 61.0123, 61.0124, 61.0125, 61.0199, 61.0202, 61.0203, 61.0205, 61.0206, 61.0208, 61.0209, 61.0210, 61.0212, 61.0213, 61.0214, 61.0215, 61.0216, 61.0217, 61.0218, 61.0299, 61.0301, 61.0399, 61.0499, 61.0502, 61.0503, 61.0599, 61.0602, 61.0603, 61.0699, 61.0799, 61.0804, 61.0805, 61.0806, 61.0807, 61.0808, 61.0809, 61.0810, 61.0811, 61.0812, 61.0813, 61.0814, 61.0816, 61.0818, 61.0899, 61.0901, 61.0902, 61.0903, 61.0904, 61.0999, 61.1099, 61.1103, 61.1104, 61.1105, 61.1106, 61.1107, 61.1199, 61.1299, 61.1302, 61.1303, 61.1304, 61.1399, 61.1499, 61.1502, 61.1503, 61.1504, 61.1505, 61.1599, 61.1699, 61.1702, 61.1703, 61.1799, 61.1804, 61.1805, 61.1806, 61.1807, 61.1808, 61.1809, 61.1810, 61.1811, 61.1812, 61.1813, 61.1814, 61.1815, 61.1899, 61.1902, 61.1903, 61.1904, 61.1905, 61.1906, 61.1907, 61.1908, 61.1909, 61.1910, 61.1911, 61.1912, 61.1913, 61.1914, 61.1915, 61.1917, 61.1999, 61.2002, 61.2003, 61.2099, 61.2103, 61.2199, 61.2299, 61.2399, 61.2402, 61.2403, 61.2404, 61.2405, 61.2406, 61.2499, 61.2599, 61.2603, 61.2606, 61.2607, 61.2608, 61.2609, 61.2612, 61.2699, 61.2703, 61.2704, 61.2705, 61.2706, 61.2707, 61.2708, 61.2799, 61.2802, 61.2899, 61.9999
Millwrights	49-9044	High school diploma or equivalent	None	Apprenticeship	47.0303
Mining and Geological Engineers, Including Mining Safety Engineers	17-2151	Bachelor's degree	None	None	14.0802, 14.2101, 14.3901
Mixing and Blending Machine Setters, Operators, and Tenders	51-9023	High school diploma or equivalent	None	Moderate-term on-the-job training	99.9999

Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	51-4081	High school diploma or equivalent	None	Moderate-term on-the-job training	48.0501, 48.0503
Natural Sciences Managers	11-9121	Not found	5 years or more	None	14.1201, 14.3701, 26.0101, 26.0202, 26.0203, 26.0204, 26.0205, 26.0206, 26.0207, 26.0208, 26.0209, 26.0210, 26.0299, 26.0301, 26.0305, 26.0307, 26.0399, 26.0401, 26.0403, 26.0406, 26.0499, 26.0502, 26.0503, 26.0504, 26.0505, 26.0507, 26.0508, 26.0599, 26.0701, 26.0702, 26.0707, 26.0799, 26.0802, 26.0804, 26.0805, 26.0807, 26.0899, 26.0910, 26.0912, 26.1001, 26.1004, 26.1101, 26.1102, 26.1104, 26.1199, 26.1201, 26.1301, 26.1302, 26.1303, 26.1310, 26.1311, 26.1399, 26.1401, 26.1501, 26.1502, 26.1503, 26.1504, 26.1599, 26.9999, 27.0101, 27.0102, 27.0103, 27.0104, 27.0105, 27.0199, 27.0301, 27.0303, 27.0304, 27.0305, 27.0306, 27.0399, 27.0501, 27.0503, 27.0599, 27.0601, 27.9999, 30.0101, 30.0801, 30.1001, 30.1501, 30.1801, 30.1901, 30.2501, 30.2599, 30.2701, 30.3001, 30.3201, 30.3301, 30.3401, 30.3501, 30.3801, 30.4101, 30.4301, 30.4401, 30.4901, 30.5001, 30.7001, 30.7099, 38.0102, 40.0101, 40.0201, 40.0202, 40.0203, 40.0299, 40.0401, 40.0402, 40.0403, 40.0404, 40.0499, 40.0501, 40.0502, 40.0503, 40.0504, 40.0506, 40.0507, 40.0508, 40.0509, 40.0510, 40.0511, 40.0512, 40.0599, 40.0601, 40.0602, 40.0603, 40.0604, 40.0605, 40.0606, 40.0607, 40.0699, 40.0801, 40.0802, 40.0804, 40.0805, 40.0806, 40.0807, 40.0808, 40.0809, 40.0810, 40.0899, 40.1002, 40.1099, 40.1101, 40.9999, 51.1401, 51.2006, 52.0210, 52.0214, 52.0216, 54.0104
Nuclear Engineers	17-2161	Bachelor's degree	None	None	14.2301
Nuclear Medicine Technologists	29-2033	Associate's degree	None	None	51.0905
Nuclear Power Reactor Operators	51-8011	High school diploma or equivalent	None	Long-term on-the-job training	41.0205
Nuclear Technicians	19-4051	Associate's degree	None	Moderate-term on-the-job training	15.1401, 41.0204, 41.0205, 41.0299, 51.0916
Occupational Health and Safety Specialists	29-9011	Not found	Not found	Not found	Not found
Office Clerks, General	43-9061	High school diploma or equivalent	None	Short-term on-the-job training	52.0408
Operating Engineers and Other Construction Equipment Operators	47-2073	High school diploma or equivalent	None	Moderate-term on-the-job training	49.0202, 49.0206

Packaging and Filling Machine Operators and Tenders	51-9111	High school diploma or equivalent	None	Moderate-term on-the-job training	99.9999
Painters, Construction and Maintenance	47-2141	No formal educational credential	None	Moderate-term on-the-job training	46.0408
Paralegals and Legal Assistants	23-2011	Associate's degree	None	None	22.0000, 22.0302
Paramedics	29-2043	Postsecondary nondegree award	Less than 5 years	None	51.0904
Physicists	19-2012	Doctoral or professional degree	None	None	14.1201, 40.0202, 40.0801, 40.0802, 40.0804, 40.0805, 40.0806, 40.0807, 40.0808, 40.0809, 40.0810, 40.0899, 40.1101, 51.2205
Plasterers and Stucco Masons	47-2161	No formal educational credential	None	Long-term on-the-job training	99.9999
Plumbers, Pipefitters, and Steamfitters	47-2152	High school diploma or equivalent	None	Apprenticeship	46.0502, 46.0503, 46.0599
Police and Sheriff's Patrol Officers	33-3051	High school diploma or equivalent	None	Moderate-term on-the-job training	03.0208, 43.0100, 43.0107, 43.0114, 43.0115, 43.0119, 43.0120, 43.0122, 43.0402
Power Distributors and Dispatchers	51-8012	High school diploma or equivalent	None	Long-term on-the-job training	99.9999
Power Plant Operators	51-8013	High school diploma or equivalent	None	Long-term on-the-job training	15.1702, 15.1705
Production Workers, All Other	51-9199	High school diploma or equivalent	None	Moderate-term on-the-job training	99.9999
Production, Planning, and Expediting Clerks	43-5061	High school diploma or equivalent	None	Moderate-term on-the-job training	52.0409
Project Management Specialists	13-1082	Not found	None	None	11.1005, 52.0101, 52.0201, 52.0211, 52.0216, 52.2002
Quality Control Analysts	19-4091	Not found	Not found	Not found	Not found
Radiation Therapists	29-1124	Associate's degree	None	None	51.0907

Refuse and Recyclable Material Collectors	53-7081	No formal educational credential	None	Short-term on-the-job training	99.9999
Riggers	49-9096	High school diploma or equivalent	None	Moderate-term on-the-job training	99.9999
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	41-3091	High school diploma or equivalent	None	Moderate-term on-the-job training	52.1803, 52.1804
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	41-4012	High school diploma or equivalent	None	Moderate-term on-the-job training	01.0105, 52.1801, 52.1899, 52.1902, 52.1904, 52.1909
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	43-6014	High school diploma or equivalent	None	Short-term on-the-job training	52.0401, 52.0402
Security Guards	33-9032	High school diploma or equivalent	None	Short-term on-the-job training	43.0109
Service Unit Operators, Oil and Gas	47-5013	No formal educational credential	Less than 5 years	Moderate-term on-the-job training	15.0901
Sheet Metal Workers	47-2211	High school diploma or equivalent	None	Apprenticeship	48.0506
Shipping, Receiving, and Inventory Clerks	43-5071	High school diploma or equivalent	None	Short-term on-the-job training	99.9999
Software Developers, Systems Software	15-1252	Not found	None	None	11.0102, 11.0103, 11.0104, 11.0201, 11.0202, 11.0203, 11.0204, 11.0205, 11.0401, 11.0701, 11.0804, 11.0902, 14.0901, 14.0903, 15.1204, 30.0801, 30.1601, 30.3901, 30.4801, 30.7001
Stationary Engineers and Boiler Operators	51-8021	High school diploma or equivalent	None	Long-term on-the-job training	99.9999

Structural Iron and Steel Workers	47-2221	High school diploma or equivalent	None	Apprenticeship	46.0411
Structural Metal Fabricators and Fitters	51-2041	High school diploma or equivalent	None	Moderate-term on-the-job training	48.0503, 48.0511
Surveying and Mapping Technicians	17-3031	High school diploma or equivalent	None	Moderate-term on-the-job training	15.1102, 45.0701, 45.0702
Surveyors	17-1022	Bachelor's degree	None	Internship/residency	14.3801, 15.1102
Training and Development Specialists	13-1151	Not found	Less than 5 years	None	09.0901, 13.0501, 13.1201, 42.2804, 52.1001, 52.1005, 52.1006
Underground Mining Machine Operators	47-5041	No formal educational credential	None	Moderate-term on-the-job training	49.0202
Water and Wastewater Treatment Plant and System Operators	51-8031	High school diploma or equivalent	None	Long-term on-the-job training	15.0506
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	43-5111	High school diploma or equivalent	None	Short-term on-the-job training	99.9999
Welders, Cutters, Solderers, and Brazers	51-4121	High school diploma or equivalent	None	Moderate-term on-the-job training	15.0614, 48.0508

D. Nuclear Workforce Supply Data (Original Analysis, For Reference)

This appendix reproduces ORAU’s original supply-side methodology and findings largely as first developed, before this report’s shift toward a demand-focused narrative (see Recommendation 3). It is retained here for reference and to support the more comprehensive, regionally resolved supply study recommended in Recommendation 3.

The supply-side findings in this appendix were developed using publicly available workforce and educational data sources and were not derived from the industry demand survey described in Section 3. This supply-side analysis was not part of the original survey effort; additional work, as described in Recommendation 3, would be required to develop a comprehensive workforce supply assessment.

i) Supply-Side Methodology

Understanding Tennessee’s skilled worker pipeline capacity is an important step in evaluating where industry and government can collaborate to improve workforce readiness and meet the coming demand for a skilled workforce across the nuclear supply chain.

In addition to ORAU’s interview process, this methodology for estimating Tennessee’s potential nuclear workforce supply included a detailed analysis of publicly available data sources. First, each component of the nuclear value chain was assigned a 6-digit North American Industry Classification System (NAICS) code,⁴⁰ as shown in Figure 7-3.

Figure 7-3. Nuclear Value Chain Breakdown by NAICS Code.

Industry Segment	NAICS Code	Description	Examples
Power Generation	221113	Nuclear Electric Power Generation	TVA (Watts Bar, Sequoyah)
Fuel Production	325188	All Other Basic Inorganic Chemical Manufacturing	Uranium enrichment, conversion, and fuel production
Components Manufacturing	332410	Power Boiler and Heat Exchanger Manufacturing	Nuclear steam supply systems, containment vessels manufacturing
Research & Development	541715	R&D in Physical, Engineering, and Life Sciences	Oak Ridge National Lab (ORNL), Fusion R&D
Engineering	541330	Engineering Services	Nuclear plant design, safety systems, retrofit design
Waste & Remediation	562211	Hazardous Waste Treatment and Disposal	Radioactive waste storage and processing

⁴⁰ The North American Industry Classification System is a standardized 6-digit numerical code used by government agencies and businesses to classify a company’s primary industry. NAICS codes are self-assigned by businesses.

Next, employment statistics for each NAICS code were obtained through the Bureau of Labor Statistics' Occupational Employment and Wage Statistics Query System.⁴¹ A down-selected list was compiled of unique (SOC) codes which constituted more than 1% of national employment in each NAICS industry. This list was combined with SOC codes identified from other public and private sector data sources on the nuclear workforce.^{42,43,44,45,46} For the final list of 145 SOC codes, BLS provides educational requirements⁴⁷ and a database linking SOC codes with a Classification of Instructional Programs (CIP) (an "SOC-CIP crosswalk," jointly developed with the NCES)⁴⁸ to align occupations with the correct educational programs in Tennessee. The full list of SOC codes, along with their required education, work experience, and on-the-job training, is provided in Appendix C.

Finally, data was collected from two sources to estimate workforce supply and educational capacity from certification and training programs, apprenticeship programs, and post-secondary education, including: 1) publicly available registrars of graduates, apprentices, and certificate completers in Tennessee from the NCES' IPEDS, in the relevant SOC codes, and; 2) RAPIDS. By understanding the number of potential skilled workers entering the workforce each year in various roles, this approach approximates future training gaps in areas where workforce demand is anticipated to significantly outpace supply.

IPEDS was selected as the primary source for post-secondary completions because it is a standard, publicly available workforce-development data source maintained by NCES, and it was the most accessible and consistently available source across relevant occupations at the time of this analysis. While these data provide a valuable baseline understanding of workforce supply, additional validation through local and industry-specific sources, as described in Recommendation 3, may improve precision in future analyses.

ii) Workforce Supply Findings

Tennessee has a robust pipeline of specialized workers in several fields relevant to the nuclear industry such as construction, engineering and manufacturing, but the exact workforce supply varies significantly by occupation.

Using the methodology described above, ORAU found the number of post-secondary certificate or degree holders for all 145 SOC codes across the state. A selection of completions across the most in-demand roles is given in Figure 7-4.⁴⁹

⁴¹ U.S. Bureau of Labor Statistics. (2026, April). Occupational Employment and Wage Statistics. https://www.bls.gov/oes/oes_overview.htm

⁴² U.S. Department of Energy (2025, August). 2025 U.S. Energy and Employment Report. <https://www.energy.gov/policy/us-energy-employment-jobs-report-user>

⁴³ E4 Carolinas (2024, February). The Economic Impact of the Nuclear Industry in the Southeast United States. https://www.commerce.virginia.gov/media/governorvirginiagov/secretary-of-commerce-and-trade/va-nuclear/E4_Carolinas_Economic_Impact_Report_Final.pdf

⁴⁴ SRS Community Reuse Organization (2009, June). Regional Approach for Skilled Nuclear Workforce of the Future. <https://www.energy.gov/documents/srs-cro-presentationpdf>

⁴⁵ PwC (2025). The Economic Impact of a Two-Unit Westinghouse AP1000 Project at V.C. Summer.

⁴⁶ Oxford Economics, Nuclear Energy Institute (2024, October). The Economic Contribution of the U.S. Nuclear Power Industry. <https://www.oxfordeconomics.com/wp-content/uploads/2024/10/The-economic-contribution-of-the-US-nuclear-power-industry.pdf>

⁴⁷ U.S. Bureau of Labor Statistics (2024). Education and training assignments by detailed occupation. <https://www.bls.gov/emp/tables/education-and-training-by-occupation.htm>

⁴⁸ National Center for Education Statistics, Bureau of Labor Statistics (2020). CIP SOC Crosswalk. <https://nces.ed.gov/ipeds/cipcode/post3.aspx?y=56>

⁴⁹ These SOC codes were selected based on a number of factors including % of national employment in key NAICS industries, and expected relevance to the Tennessee nuclear industry.

Figure 7-4. Tennessee IPEDS Completions by Occupation.

Occupation	2022 Completions (IPEDS)	2023 Completions (IPEDS)	2024 Completions (IPEDS)
Project Management Specialists	5397	5299	5083
Welders, Cutters, Solderers, and Brazers	986	1222	1108
First-Line Supervisors of Construction Trades and Extraction Workers	498	576	572
Mechanical Engineers	634	564	546
Industrial Machinery Mechanics	495	571	521
Heavy and Tractor-Trailer Truck Drivers	328	538	485
Civil Engineers	285	344	342
Electrical Engineers	313	278	292
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	221	235	255
Architectural and Civil Drafters	131	137	214
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	232	232	212
First-Line Supervisors of Mechanics, Installers, and Repairers	98	142	116
Nuclear Engineers	79	95	83
First-Line Supervisors of Production and Operating Workers	50	53	45
Electrical and Electronics Repairers, Commercial and Industrial Equipment	50	20	24

Occupation	2022 Completions (IPEDS)	2023 Completions (IPEDS)	2024 Completions (IPEDS)
Structural Metal Fabricators and Fitters	32	18	23
Chemical Equipment Operators and Tenders	13	18	12
Chemical Plant and System Operators	13	18	12
Operating Engineers and Other Construction Equipment Operators	0	0	0
Sheet Metal Workers	0	0	0
Nuclear Technicians	0	0	0
Nuclear Power Reactor Operators	0	0	0
Mixing and Blending Machine Setters, Operators, and Tenders	0	0	0
Hazardous Materials Removal Workers	0	0	0
Security Guards	0	0	0

A few important conclusions can be drawn about Tennessee workforce supply from this data:

- Tennessee’s overall skilled workforce pipeline for the nuclear industry was essentially flat over three years. Total completions across these occupations in 2024 were only 0.9% above 2022.
- Engineering completions were mixed. From 2022 to 2024, Mechanical Engineering declined from 634 to 546 (-13.9%), while Civil Engineering increased from 285 to 342 (+20.0%), and Electrical Engineering and Nuclear Engineering were relatively stable overall (313 to 292, and 79 to 83, respectively).
- Publicly available data is likely insufficient to forecast Tennessee’s nuclear workforce supply. There is no data on post-secondary completions for key roles like Nuclear Technicians, Nuclear Power Reactor Operators, and Hazardous Materials Removal Workers.

For many of the occupations that are important to Tennessee’s future nuclear industry, more comprehensive data on employer-provided, on-the-job training programs would be necessary to provide a full picture of the sufficiency of Tennessee’s skilled workforce pipeline.

This list does not present a fully comprehensive view of Tennessee’s workforce supply, for a few reasons. Firstly, many of these occupations do not require a formal post-secondary degree or certificate for employment. Second, some employers in the state may operate their own specialized on-the-job training, which would not be captured in the IPEDS data.

To augment the workforce supply estimate from IPEDS, ORAU collected data on Tennessee apprenticeship completions over the last three years in relevant occupations,⁵⁰ a summary of which is given in Figure 7-5. Apprenticeships provide a viable pathway to careers in skilled trades which will be vital to the future success of Tennessee’s nuclear industry, especially as many of the announced nuclear projects will soon enter the construction phase.

Figure 7-5. Completer Apprentices in Tennessee by Occupation.

Occupation	FY23 Completer Apprentices (RAPIDS)	FY24 Completer Apprentices (RAPIDS)	FY25 Completer Apprentices (RAPIDS)
Electricians	271	336	477
Electrical Power-Line Installers and Repairers	110	104	140
Plumbers, Pipefitters, and Steamfitters	119	122	136
Chemical Equipment Operators and Tenders	55	83	127
Heavy and Tractor-Trailer Truck Drivers	44	52	64
Industrial Machinery Mechanics	38	42	55
Carpenters	53	56	47
Structural Iron and Steel Workers	37	32	36
Sheet Metal Workers	51	38	34
Construction Laborers	11	-	17
Chemical Technicians	-	11	14
Boilermakers	15	11	12
Power Plant Operators	-	-	11
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	15	15	-

⁵⁰ For details on how SOC codes were deemed relevant to the nuclear industry, see Appendix D.i, Supply-Side Methodology.

The data shows that Tennessee experienced strong growth in apprenticeship completions over the three years shown (43%). However, during that time, the number of Tennessee programs registering their apprenticeships with tRAPIDS also increased by 27%. Therefore, it may be reasonable to assume that part of this growth in apprenticeship completions can be attributed to the RAPIDS data including more of the already existing apprenticeships rather than a real increase in completions.

In FY25, there were 288 registered apprenticeship programs in the RAPIDS system across potentially relevant NAICS industries,⁵¹ with 7,880 active apprentices. About 17% of all active apprentices in Tennessee in FY25 were registered in the greater Knoxville area (Knox and Anderson Counties), despite those counties only containing 8% of the state's population, according to U.S. Census data.⁵² This indicates a relatively strong apprenticeship ecosystem in the greater Knoxville area from which the nuclear industry can draw a skilled workforce.

Finally, these data sources do not consider the workers across many disciplines that could be reskilled or upskilled for roles in the nuclear industry. These workers could fill positions more quickly than those who need to complete degree programs or apprenticeships.

⁵¹ Construction; Management; Manufacturing; Mining, Quarrying, and Oil and Gas Extraction; Professional, Scientific and Technical Services; Transportation and Warehousing; Utilities.

⁵² *Quick Facts*. U.S. Census Bureau. <https://www.census.gov/quickfacts/fact/table/TN,andersoncountytennessee,knoxcountytennessee,US/PST045225>

