November 2026

NUCLEAR REIMAGINED:

TENNESSEE STATEWIDE WORKFORCE ASSESSMENT

Demand, skills and supply readiness for Tennessee's next phase of nuclear growth



TNWORKS

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TN Nuclear Workforce Assessment

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01

EXECUTIVE SUMMARY

The Executive Summary Connects Evidence to Priority Actions

THE ASSESSMENT SEPARATES TODAY'S WORKFORCE FROM FUTURE PROJECT NEEDS

Today's jobs and postings give context; future demand minus job-ready talent shows the remaining need

TODAY · CONTEXT ONLY

Current employment
Who works in Tennessee's nuclear sector today

MEASURE
Jobs today (stock)
SOURCE
E4 Carolinas model, 2025–26 refresh

Not grown forward to estimate future demand

Current demand
What employers are advertising for now

MEASURE
Job postings, Jul 2024 – Aug 2026
SOURCE
Lightcast

Not annual hires and not added to demand

Context only: shows where Tennessee starts; never added to the calculation.

THE GAP CALCULATION

MODELED INPUT[1]

Future demand
Hiring the 10 announced projects need each year

MEASURE
Annual project hiring, built from project FTE*
SOURCE
10 announced projects; IAEA / DOE staffing; BLS

~12.4K is peak project FTE on site, not annual hires

−

MODELED INPUT[2]

Job-ready talent
New talent ready for nuclear work each year

MEASURE
Nuclear-adjusted annual pipeline of graduates, trainees and apprentices**
SOURCE
IPEDS / THEC; TN Comptroller OREA (USDOL RAPIDS); BLS

Not gross graduates, enrollment or active apprentices

=

MODEL OUTPUT

Gaps & response
What is still unfilled after all supply sources

MEASURE
Remaining annual requirement, by occupation
SOURCE
Occupation-level gap model

Covers the 10 announced projects only

Future demand – job-ready talent – conversion / recruitment scenarios = remaining requirement, occupation by occupation.

USE IT TO

- ✓ Size needs tied to the announced projects
- ✓ Identify priority occupations and constraints
- ✓ Sequence training, conversion, recruitment and retention

IT IS NOT

- ✗ A forecast of firm hiring or TNECD's confidential pipeline
- ✗ An assessment of any project's commercial viability
- ✗ A count of nuclear-ready workers available today

HOW TO READ THE NUMBERS

- Each measure has its own unit: never add them
- Ranges are planning scenarios, not confidence intervals
- Modeled inputs need employer validation

Note: **Annual project hiring reflects changes in staffing as the 10 projects ramp over time, plus replacement hiring within those project workforces. It does not include turnover in Tennessee's existing nuclear workforce.*
***Job-ready pipeline: deduplicated education, training and apprenticeship flows after occupation-specific nuclear capture and readiness factors.*
Sources: *(1) E4 Carolinas, Economic Impact of the Nuclear Industry in the Southeast U.S. (2024), refreshed with 2025–26 TVA, ORNL, Y-12 and BWXT data (see Appendix slide 45); (2) Lightcast job postings, Jul 2024 – Aug 2026; (3) Future demand, job-ready talent, gaps & response: modeled numbers (see Appendix slides 46–48, 51 and 49–50); (4) Model inputs: Mangum Economics for VIN Hub (2025); DOE/MPR, NP2010 Construction Infrastructure Assessment (MPR-2776, 2005); IAEA references; BLS EP Table 1.10, Occupational Separations and Openings, 2025–35; NCES IPEDS Completions; THEC data; TDLWD Apprenticeship TN data (USDOL RAPIDS); TN Comptroller OREA, Registered Apprenticeships in Tennessee: 2025 Update.*

MODELED ESTIMATE

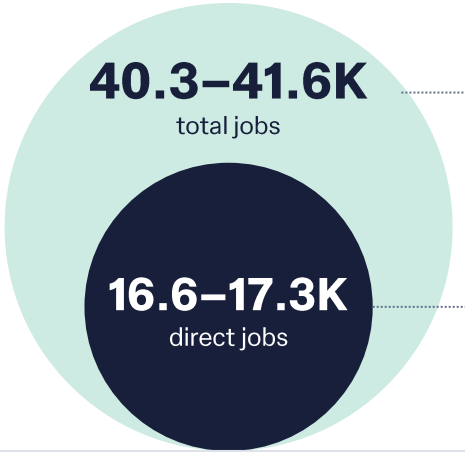
TENNESSEE STARTS WITH SCALE AS ANNOUNCED PROJECTS CREATE NEW WORKFORCE NEEDS

Today's jobs and job postings set the context; the 10 announced projects drive the new workforce need

WHERE TENNESSEE IS TODAY

01 Current employment

CONTEXT ONLY



Supported statewide
direct + indirect + induced

In nuclear employers
generation, suppliers, ORNL, Y-12

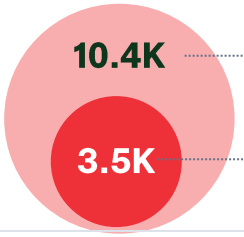
How many people the sector employs now

02 Current demand

CONTEXT ONLY

Most core postings are for

1 **Engineering & technical roles**
2 QA, regulatory and safety roles



All nuclear related job postings
over two years (Jul 2024 – Aug 2026)

Core nuclear job postings
over two years (Jul 2024 – Aug 2026)

What employers advertise for now; not annual hires

NOT YET COUNTED

Replacing people who retire or leave today's employers. This adds pressure on the same talent pool, but turnover and retirement rates by occupation are not public yet. We will size it with employer data.

WHAT NEW PROJECTS WILL NEED

03 Future demand

MODELED INPUT

TWO FUTURE WORKFORCE STREAMS

Two kinds of workers needed



Construction & installation
Craft, site delivery and installation

Operations & maintenance
Qualified operators and plant maintenance

Peak workforce on the 10 projects at once (2035–36)

SCOPE

Covers 10 major announced projects. ~12.4K is the full ten-announced-project planning scenario; no confidential or probability-weighted TNECD pipeline is included. New announcements would add demand.

WHAT THIS MEANS **The gap analysis compares announced-project hiring with job-ready talent.** Keeping today's workforce staffed adds pressure on top.

Note: Circle area shows relative scale only; jobs, postings and project FTE are different measures and are not added together.
Project hiring reflects changes in staffing as the announced projects ramp, plus replacement hiring within those project workforces. Growth and replacement at today's employers are included only when a publicly announced expansion is part of the 10-project model.
Sources: (1) E4 Carolinas, Economic Impact of the Nuclear Industry in the Southeast U.S. (2024), refreshed with 2025–26 TVA, ORNL, Y-12 and BWXT data (see Appendix slide 45); (2) Lightcast job postings, Jul 2024 – Aug 2026 (see slide 15); (3) Future demand: modeled numbers (see Appendix slides 46–48, 51).

MODELED ESTIMATE

CONSTRUCTION PEAKS EARLIER AS OPERATIONS BUILDS THE LASTING WORKFORCE

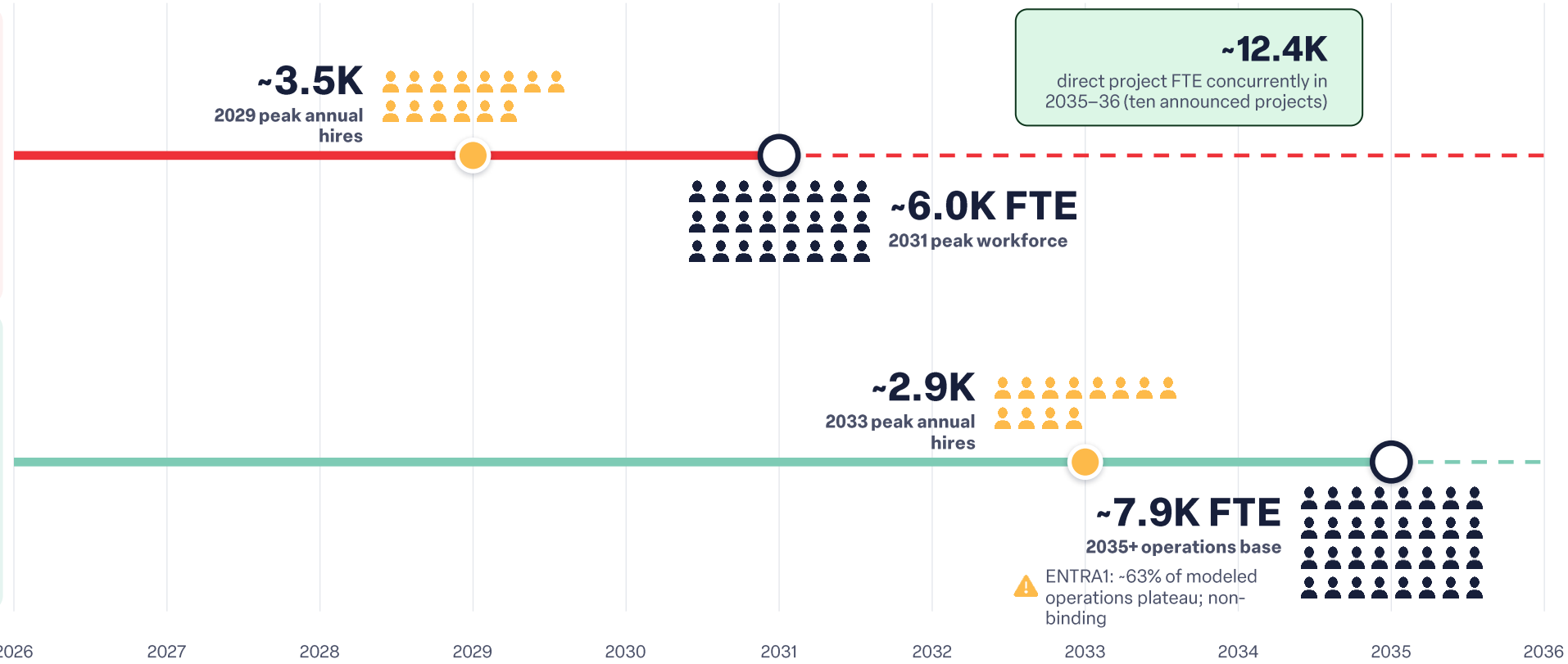
Construction requires rapid craft mobilization, while operations needs earlier pathways, qualification, licensing, and retention

CONSTRUCTION
Convert · credential · mobilize

Convert existing trades through nuclear overlays and secure mobile crews before 2029. Technical training and apprenticeships build longer-term workforce depth.

OPERATIONS
Train · license · recruit · retain

Start operator, fuel-cycle and I&C pathways early. Facility qualification and licensing take time; retention sustains the 2035+ base.



Peak annual hires new hires in the busiest year

Peak workforce people on the projects at the same time

Each figure ≈ 250 people

Note: Annual hires and concurrent FTE measure different things; the project portfolio is planning-grade, not committed hiring.
Sources: (1) Construction and operations hiring and FTE: modeled numbers (see Appendix slides 46–48 and 51; detail on slides 21–23); (2) Construction and operations pathways: readiness analysis (see slides 25, 27 and 30).

MULTIPLE TALENT SOURCES MUST BECOME JOB-READY FOR NUCLEAR WORK

Potential workers must meet capability, nuclear standards, employer acceptance, mobility, and project timing requirements

FOUR CHANNELS FEED THE POTENTIAL POOL

INCUMBENT NUCLEAR
Current nuclear workforce

ADJACENT INDUSTRIES
Construction, utilities, manufacturing, military/defense

EDUCATION, TECHNICAL TRAINING & APPRENTICESHIPS
Graduates, technical trainees, apprentices

MOBILE / INTERSTATE
Traveling and external recruits

ALL CHANNELS MUST CLEAR EVERY GATE



JOB READY TALENT

- ✓ **Nuclear-ready**
- ✓ **Site-accepted**
- ✓ **Available at project timing**

WHAT JOB READY TALENT MEANS FOR CONSTRUCTION AND OPERATIONS

The four readiness gates create different workforce strategies for construction and operations.

CONSTRUCTION · BROAD TRANSFERABLE BASE

CONVERT + MOBILIZE
Prequalify experienced craft for the 2029 peak while expanding technical training, apprenticeships and supervisory depth.

OPERATIONS · SPECIALIST AND TECHNICAL BASE

TRAIN + QUALIFY + RETAIN
Build employer-led pathways before the 2033 peak and retain scarce qualified talent.

Sources: (1) Readiness gates and talent channels: readiness analysis (see slides 25, 27 and 30); (2) 2029 construction and 2033 operations hiring peaks: modeled numbers (see Appendix slides 48 and 51).

MODELED ESTIMATE

PROJECT PIPELINES REDUCE, BUT DO NOT CLOSE, THE WORKFORCE GAP

The gap compares annual project hiring demand with nuclear-adjusted pipelines and additional supply scenarios

	01 ANNUAL PROJECT HIRING DEMAND*	−	02 MODELED JOB-READY INCOMING PIPELINE**	=	03 GAP AFTER INCOMING PIPELINE	−	04 ADDITIONAL SUPPLY SCENARIO***	=	05 REMAINING ANNUAL PROJECT REQUIREMENT
	New positions created as projects ramp, plus replacement hiring within the modeled project workforces.		ALREADY NUCLEAR-ADJUSTED Education + technical training after capture/readiness factors, plus captured apprenticeship flow		Project hiring demand less the modeled job-ready incoming pipeline		Construction conversion and mobility, or experienced operations recruitment		Unfilled need after both supply layers are applied occupation by occupation
CONSTRUCTION Craft, site delivery and installation PEAK HIRING 2029	**~0.6–0.9K** per year Project growth + replacement		**~0.2K** per year Education, technical training + captured apprenticeships		**~0.4–0.7K** per year Occupation-level gap after pipeline		**~0.1K** per year 10–25% capture scenario; 15% base		**~0.3–0.6K** per year Annual project need after both supply layers
OPERATIONS Qualified operators and plant maintenance PEAK HIRING 2033	**~0.8–1.0K** per year Project growth + replacement		**~0.3K** per year Education, technical training + captured apprenticeships		**~0.5–0.7K** per year Occupation-level gap after pipeline		**<0.1K** per year 3–10% recruitment scenario; 5% base		**~0.4–0.7K** per year Annual project need after both supply layers

WHAT THIS MEANS Construction depends on conversion and mobility; operations depends on employer qualification, experienced recruitment and retention.

Note: *Demand includes growth and replacement within the ten announced projects. The low end reflects new positions created as projects ramp. The high end also includes replacement hiring within the modeled project workforces; staffing reductions in later years are netted out.
**Incoming pipeline is already adjusted for nuclear relevance and readiness.
***Additional supply is scenario-based and applied occupation by occupation. Existing-workforce growth and replacement, plus confidential TNECD pipeline projects, are outside this quantitative gap.
Sources: (1) Annual project hiring demand: modeled numbers (see Appendix slides 46–48, 51); (2) Job-ready pipeline: modeled numbers (see Appendix slides 49–50); (3) Gap, supply scenarios and remaining requirement: modeled numbers (see slides 35–39); (4) Model inputs: BLS EP Table 1.10, Occupational Separations and Openings, 2025–35; NCES IPEDS Completions; THEC data; TDLWD Apprenticeship TN data (USDOL RAPIDS); TN Comptroller OREA, Registered Apprenticeships in Tennessee: 2025 Update.

FOUR DECISIONS TRANSLATE THE FINDINGS INTO WORKFORCE ACTION

Tennessee should validate demand, build pathways, mobilize craft, and sustain operations capability through 2035

01 Validate the baseline

NOW · FIRST 90 DAYS

- Confirm project timing, role needs and overlay acceptance
- Quantify mobilizable craft and employer supply

TNWORKS · EMPLOYERS

02 Build the pathways

FY27

- Assign operator, I&C and fuel-cycle pathway owners
- Launch craft, QA/NDE and work-control overlays

EMPLOYERS · PROVIDERS

03 Scale & mobilize

FY28–29

- Grow cohorts and prequalify contractor / union pools
- Recruit supervisors and scarce specialists before peaks

CONTRACTORS · LABOR

04 Qualify & sustain

FY30–35

- Finish plant qualifications and seat operations cohorts
- Track placement, retention and project shifts

EMPLOYERS · TNWORKS

GOVERNANCE **Refresh the model as project maturity, employer requirements and provider capacity change.**

Note: FY = Tennessee state fiscal year (July–June). Phase timing is a planning sequence, not a committed schedule.
Sources: (1) Actions and timing: assessment recommendations (see slides 40–43 for the response strategy and phased delivery).

02

CURRENT EMPLOYMENT

Tennessee's Existing Workforce Defines the Starting Point

A COMMON TAXONOMY ORGANIZES TENNESSEE'S NUCLEAR WORKFORCE

It links occupation groups, lifecycle stages and readiness requirements across employment, demand and supply.

01 · WHO
Occupation groups

Each worker is counted in one primary group only

- **Engineering & technical**
  Nuclear, mechanical, electrical engineers
- **Licensed operations**
  Reactor and qualified plant operators
- **Skilled trades & craft**
  Electricians, welders, pipefitters
- **Cyber / I&C / digital**
  I&C, OT automation, cyber systems
- **QA / regulatory / safety**
  QA/QC, radiation protection, safeguards

02 · WHERE
Lifecycle stages

The same occupation can be needed at several stages

- **R&D / design & licensing**
- **Construction / site execution**
- **Commissioning / qualification**
- **Steady-state operations**
- **Decommissioning**

Example: an electrical engineer may work in design, commissioning or operations

03 · HOW READY
Readiness indicators

A layer on top of the occupation, not a separate labor pool

- Nuclear credentials & qualifications
- NQA-1 quality assurance familiarity
- Radiation & regulated-site safety
- Security clearance (where required)
- Nuclear-grade welding & fabrication
- Configuration & change control
- Material control / safeguards
- Prior nuclear or regulated-site work

HOW THE TAXONOMY IS USED

EMPLOYMENT
Who is already in nuclear?

→

DEMAND
Who will employers need, and when?

→

SUPPLY & READINESS
Who can Tennessee train, convert or recruit?

MODELED ESTIMATE

TENNESSEE ALREADY SUPPORTS A LARGE NUCLEAR WORKFORCE BASE

Research, engineering, and operations anchor today's workforce while future demand is modeled through construction and operations

EMPLOYMENT FOOTPRINT

~16.6K–17.3K

direct nuclear ecosystem jobs

Nuclear generation, Tennessee nuclear suppliers, ORNL and Y-12

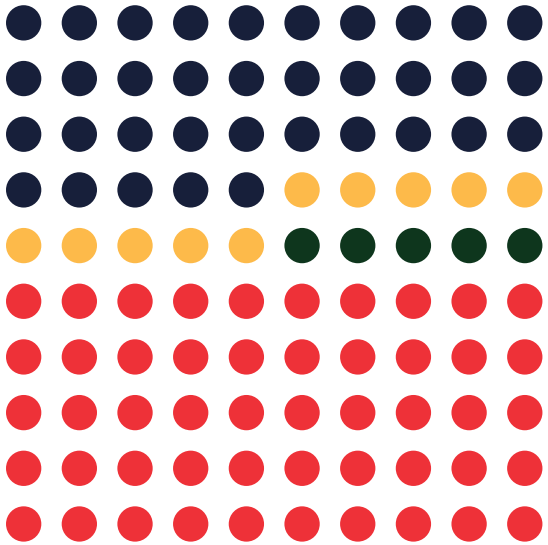
\+ **~12.7K–13.1K** Indirect / supplier-supported

\+ **~11.0K–11.3K** Induced / household spending

= **~40.3K–41.6K** **Total jobs supported statewide**

Range: the floor is E4 Carolinas' published Tennessee estimate; the upper bound is our 2025–26 refresh of the same employment categories.

WHERE TODAY'S DIRECT WORKFORCE IS ESTIMATED TO SIT



Each dot ≈ 1% of direct jobs (~170 jobs)

~35% R&D / Design & Licensing

~5.8K–6.1K jobs · *ORNL-led research and engineering; Y-12 and supplier design and licensing*

~10% Construction / Site Execution

~1.6K–1.7K jobs · *Site work, fabrication and installation across the project pipeline*

~5% Commissioning / Qualification

~0.8K–0.9K jobs · *Testing, qualification and startup - the thinnest stage today*

~50% Steady-State Operations

~8.3K–8.7K jobs · *TVA generation, Y-12 and fuel-cycle production, and maintenance*

WHAT CHANGES NEXT

The pipeline changes the mix before the total.

Construction & craft demand scales first → **Commissioning & qualification follows** → **Permanent operations build into early 2030s**

Note: Range brackets E4 Carolinas' published Tennessee estimate and the 2025–26 refresh of the same employment categories. Announced future jobs are excluded. Indirect and induced employment uses E4's Tennessee activity-specific IMPLAN 2021 relationships and represents supported economic activity, not nuclear workers.

Sources: (1) E4 Carolinas, Economic Impact of the Nuclear Industry in the Southeast U.S. (2024), TN Tables 7–10 and 37–40, IMPLAN 2021 (lower bound); (2) 2025–26 refresh: TVA, Watts Bar and Sequoyah Nuclear Plant pages; ORNL, While the Nation Sleeps (Jun 2026); Y-12, Who We Are; BWXT, Oak Ridge CMDF release (Jan 2026) (see Appendix slide 45); (3) Direct workforce by work stage: modeled numbers (see Appendix slide 45).

03

CURRENT DEMAND

Current Employer Demand Reveals Immediate Workforce Needs

SOURCED DATA

CURRENT JOB POSTINGS SHOW DEMAND BEYOND CORE NUCLEAR ROLES

Core occupations represent one-third of filtered postings, alongside substantial adjacent and industry-adopter demand statewide

10,412

Filtered unique postings
Jul 2024 – Aug 2026

3,571
Core nuclear · 34.3%

1,040
Adjacent · 10.0%

5,801
Industry adopters · 55.7%

Adjacent roles support nuclear delivery; industry adopters use nuclear-related capabilities outside the core nuclear value chain.

VALIDATED CORE EMPLOYER SIGNALS

Oak Ridge National Laboratory	877
Bechtel	306
Y-12 LTD	138
Boston Government Services	119
BWX Technologies	99
Tennessee Valley Authority	51

TOP CORE SOC OCCUPATIONS

17-2161 Nuclear Engineers	505
19-4051 Nuclear Technicians	240
17-2141 Mechanical Engineers	237
19-2012 Physicists	188
17-2071 Electrical Engineers	132
19-2041 Environmental Scientists	131

TOP NUCLEAR-RELEVANT NAICS

541715 R&D - physical / engineering sciences	1,014
541330 Engineering services	394
237990 Heavy & civil engineering construction	360
928110 National security	330
611310 Colleges & universities	214
332410 Power boiler & heat exchanger mfg.	99

Note: The CERT report estimates a 7.92 statewide jobs multiplier for incremental direct employment in Tennessee's nuclear-generation industry. This economic-impact benchmark is separate from the job-posting analysis; it is not applied to posting counts and does not enter the workforce gap model.
Sources: (1) Lightcast job postings, Jul 2024 – Aug 2026, filtered using the nuclear-skills and SOC crosswalk (see slide 15); (2) Tennessee Department of Economic and Community Development, Center for Economic Research in Tennessee (CERT), Nuclear Energy (2025).

SOURCED DATA

ENGINEERING AND TECHNICAL ROLES LEAD CURRENT NUCLEAR HIRING

Safety, operations, skilled trades, and digital roles remain essential across the full nuclear lifecycle

WORKFORCE CLUSTER	JOB POSTINGS		
Engineering & Technical R&D / Design · OEM	2,069	2,069	97
QA / Regulatory / Safety Licensing · O&M · Decommissioning	893	893	37
Skilled Trades & Craft Manufacturing · Construction · O&M	358	358	31
Cyber / I&C / Digital O&M · R&D / Design	202	202	3
Licensed Operations Operations & Maintenance	49	49	
Adjacent – outside the clusters Supplier, professional services & enabling roles	872	872	
Industry adopters Downstream sectors using nuclear-related capabilities	5,801	5,801	

Core Adjacent (closest fit)

HIGHEST-VOLUME JOB TITLES		
Nuclear Engineers	17-2161	506
Mechanical Engineers	17-2141	237
Electrical Engineers	17-2071	132
Nuclear Criticality Safety Engineers	17-2111 / 17-2161	90
Health Physicists	19-5011 / 19-2012	61
Nuclear Safety Engineers	17-2111 / 17-2161	58
Construction Technicians	47-2061	32
Industrial Mechanics	49-9041	28
Millwrights	49-9044	24
Instrumentation & Controls Engineers	17-2072	14
Instrumentation & Controls Technicians	17-3023	12
Cybersecurity Analysts	15-1212	10
Nuclear Operators	51-8011	14
Shift Supervisors	11-1021 / 51-1011	9
Operator Technicians	51-8011 / 51-8091	8
Project Managers	13-1082	72
Supply Chain Specialists	13-1081	64
Environmental Specialists	19-2041	41
Radiologic Technologists	29-2034	642
Medical Physicists	19-2012	318
Radiation Therapists	29-1124	293

SOC codes are mostly indicative (closest SOC crosswalk match).

WHAT THIS MEANS Core postings are concentrated in engineering and technical roles, while safety, operations and craft remain critical across the nuclear lifecycle. Industry-adopter postings primarily reflect healthcare occupations that use radiation-related capabilities outside the core nuclear value chain.

Note: 10,412 classified postings passed the nuclear-skill filter between Jul 2024 – Aug 2026 (185 unclassified postings excluded). Bars are scaled within each row for readability and are not comparable across rows. SOC codes are mostly indicative (closest SOC crosswalk match).
Sources: (1) Lightcast job postings, Jul 2024 – Aug 2026 (Q3 2026 extract); (2) Workforce clusters: assessment taxonomy (see slide 11), mapped to BLS 2018 SOC.

TNWORKS

QUALITATIVE ASSESSMENT

CURRENT NUCLEAR DEMAND SPANS MULTIPLE WORK STAGES

Construction concentrates craft demand, while operations sustains specialized, regulated, and technical roles over time

HOW ROLE INTENSITY SHIFTS BY WORK STAGE

	Engineering & Technical	Licensed Operations	Skilled Trades & Craft	QA / Regulatory / Safety	Cyber / I&C / Digital
R&D / Design	HIGH	-	-	-	MEDIUM
Licensing & Regulatory	MEDIUM	-	-	HIGH	-
Component Manufacturing	-	-	HIGH	MEDIUM	-
Construction & Installation	LOW	-	HIGH	MEDIUM	LOW
Operations & Maintenance	MEDIUM	HIGH	HIGH	HIGH	HIGH
Decommissioning	-	-	-	HIGH	-

HIGH MEDIUM LOW - Role intensity for core nuclear occupations by lifecycle phase

WHAT THE PATTERN MEANS FOR WORKFORCE PLANNING

CONSTRUCTION & INSTALLATION | BUILD WAVE

Skilled Trades & Craft anchor time-bound build windows; site qualification, supervision and craft mobilization must start early.

OPERATIONS & MAINTENANCE | SUSTAINED BASE

Four high-intensity workforce clusters shape a lasting talent base; employer qualification and retention need longer lead times.

WHAT THIS MEANS Two workforce clocks emerge: mobilize qualified craft for the build wave; develop and retain specialist operations talent for the long run.

Sources: (1) Lightcast job postings, Jul 2024 – Aug 2026, core nuclear postings mapped to lifecycle phase (see slide 15); (2) Workforce clusters and lifecycle stages: assessment taxonomy (see slide 11).

TNWORKS

04

FUTURE DEMAND

Announced Projects Define Tennessee's Future Workforce Requirements

PROJECT-BY-PROJECT MODELING CONVERTS ANNOUNCEMENTS INTO WORKFORCE DEMAND

Facility archetypes translate each project into construction and operations FTE, occupations and annual hiring demand.

WHY PROJECT BY PROJECT

Postings show today, not the ramp
Most future demand sits in facilities not yet hiring; postings miss the 2028–2035 build and operating needs.

Announcements use different units
Total commitments, permanent roles, construction peaks and person-years can't be added without a common model.

Each facility type ramps differently
Reactors, fuel-cycle plants and manufacturing facilities use different staffing shapes; fusion currently uses a provisional proxy pending validation.

FROM PROJECT TO DEMAND · FIVE STEPS

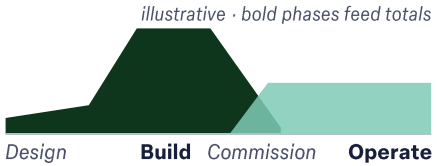
1 → 2 → 3 → 4 → 5



Define the project set
Confirm which Tennessee projects are in scope, what each facility is building and which announced projects are excluded.



Match each project to a workforce archetype
Group projects by facility type – reactor, fuel cycle or manufacturing – so each starts with the right workforce assumptions.



Map the quantified workforce phases
Model construction and operations consistently; only these feed statewide totals. Design/licensing and commissioning show timing or illustrative estimates where evidence exists.



Translate workforce into occupations
Break each phase into the engineers, trades, technicians, operators, QA and other occupations needed to deliver it.



Calculate annual hiring demand
Combine project workforce change with replacement to estimate **annual needs by occupation**.

Workforce change
Year-on-year change in project FTE by SOC; can be negative

+ Replacement
Midpoint FTE × SOC-specific BLS 2025–35 total separation rate

= Annual hires by occupation
Change + replacement, floored at zero

Note: Low vs planning case: Low case = positive project FTE growth only; planning case = workforce change plus replacement, floored at zero.
What replacement covers: Only the modeled future-project workforce, not Tennessee's existing nuclear workforce. Organic growth at existing employers is not modeled; only announced expansions count.
Phases in the totals: Construction and operations feed statewide totals; design/licensing and commissioning are shown where evidence exists but not consistently added.
Project set: Publicly announced projects through August 2026; no confidential or probability-weighted TNECD pipeline.
Sources: (1) Project set, archetypes, phases and annual hiring: modeled numbers (see Appendix slides 46–48, 51); (2) Replacement rates: BLS EP Table 1.10, Occupational Separations and Openings, 2025–35; (3) Occupation and construction-mix benchmarks: Mangum Economics for VIN Hub (2025); DOE/MPR, NP2010 Construction Infrastructure Assessment (MPR-2776, 2005); IAEA references; (4) Project status: TNECD, NRC, TVA and company announcements through Aug 2026.

QUALITATIVE ASSESSMENT

EAST TENNESSEE ANCHORS PROJECTS AS TALENT PIPELINES EXTEND STATEWIDE

Statewide pathways must prepare, qualify, and mobilize workers effectively toward concentrated East Tennessee demand

01

East Tennessee

Project hub · specialist pathways

- Oak Ridge/Clinton and Erwin anchor the identifiable project sites
- Reactors, fuel-cycle and manufacturing drive build and operations needs
- UTK, Roane State and TCAT Knoxville offer nuclear-focused training

02

Middle Tennessee

Craft & technical feeder · mobility

- Nashville metro has construction, manufacturing and maintenance talent
- TCAT Nashville/Murfreesboro teach electrical, welding and maintenance
- Tennessee Tech (Cookeville) offers nuclear engineering education

03

West Tennessee

Trade & technical feeder · recruitment

- Limited direct nuclear project activity, with potential to support workforce needs across the state.
- TCAT Memphis/Jackson offer welding, electrical and maintenance skills
- Long-distance recruitment requires qualification and worker mobility

WHAT THIS MEANS Build skills statewide; apply nuclear/site qualifications and mobilize talent as project schedules firm up.

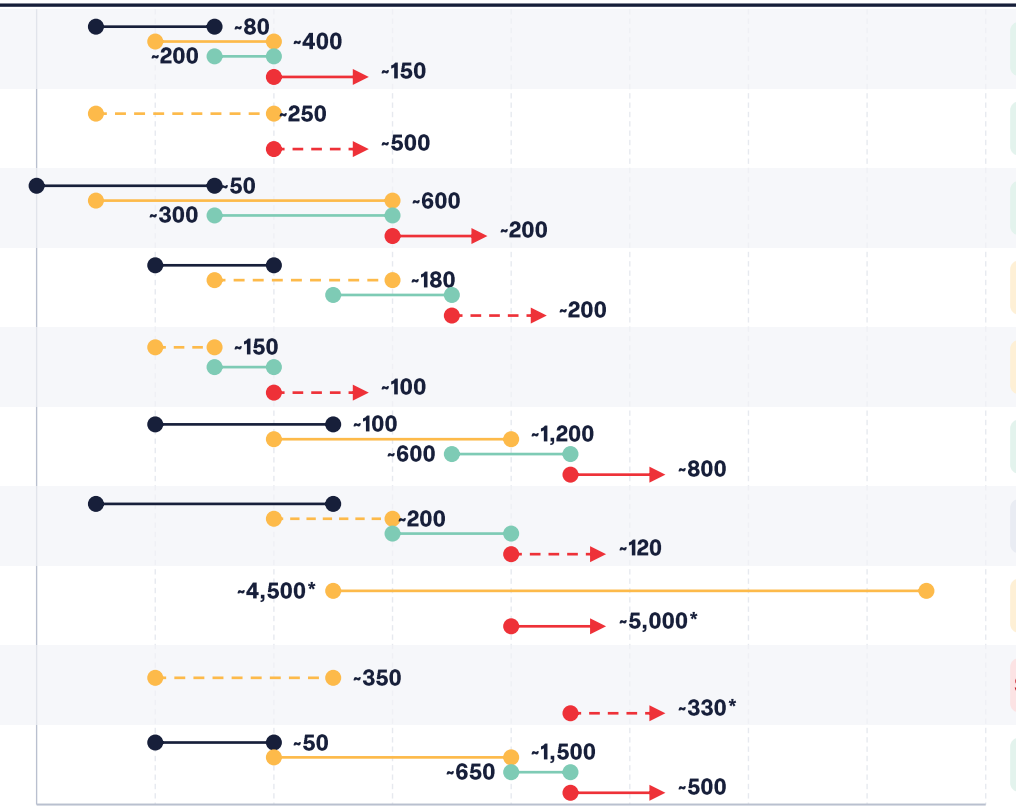
Note: Regional roles reflect identified project sites and existing training capacity. They are indicative, not a regional demand estimate.
Sources: (1) Project sites: TNECD and company announcements for Oak Ridge, Clinton and Erwin projects; (2) East TN nuclear training: UTK, UT Partners With Roane State and TCAT To Develop a Nuclear Workforce Pipeline (2025); TCAT Knoxville, Training Tomorrow's Nuclear Workforce Today (2025); (3) TTU, Tennessee Tech Launches New Degree Program in Nuclear Engineering (2024); THEC approval of TTU BSNE (May 2024); (4) TBR/TCAT awards, AY2023–24 (see slide 28); (5) BLS Current Employment Statistics, Aug 2026 (see slide 26).

MODELED ESTIMATE

TEN PROJECTS SHAPE TENNESSEE'S WORKFORCE TIMELINE THROUGH 2040

Project schedules show when construction demand rises and permanent operations demand begins

PROJECT SET	ARCHETYPE	TARGET START	STATUS	VALIDATION NEEDED
TRISO-X Signal: 1,140 jobs; model predates TX-2	Fuel cycle / mfg	2028	Advanced	Rebaseline TX-2 jobs and remaining hiring
BWXT / NFS Expansion Signal: +358 TN jobs; 198 at Erwin	Fuel cycle / mfg	2028+	Advanced	Confirm hiring ramp and employer-specific model
Kairos Hermes 1 & 2 Signal: up to 100 jobs; two-reactor campus	Reactor	2030	Advanced	Confirm construction and operations headcount
LIS Technologies Signal: 203 jobs; laser enrichment	Fuel cycle / enrichment	2030s	Uncertain	Confirm TN deployment, timing and workforce profile
Radiant Signal: 175 jobs; first production targeted 2028	Nuclear mfg / microreactor	2028	Uncertain	Rebaseline construction timing and production scale
Orano Project IKE Signal: 1,000+ construction; ~300 permanent	Fuel cycle / enrichment	2032–33	Advanced	Validate occupation mix and site-workforce definition
Oklo NEW Signal: 800+ jobs; absent from prior baseline	Fuel cycle / recycling	Early 2030s	Not assessed	Build an employer-specific workforce model
ENTRA1 6 GW SMR Signal: dominant model driver; non-binding	Reactor program	2032+ model	Uncertain	Scenario-band the requirement; confirm sites and phasing
Type One Energy NEW Signal: 330 jobs; fusion program	Fusion / reactor proxy	2029 / 2033	Scope decision	Decide scope; replace the reactor proxy if retained
TVA Clinch River SMR Signal: 300 MWe; construction from late 2028	Reactor	End 2032 / 2033	Advanced	Rebaseline schedule; distinguish hires, FTE and person-years



PHASE — Design / licensing — Construction — Commissioning — Operations start

LINE — Modeled on publicly announced numbers — Project archetype

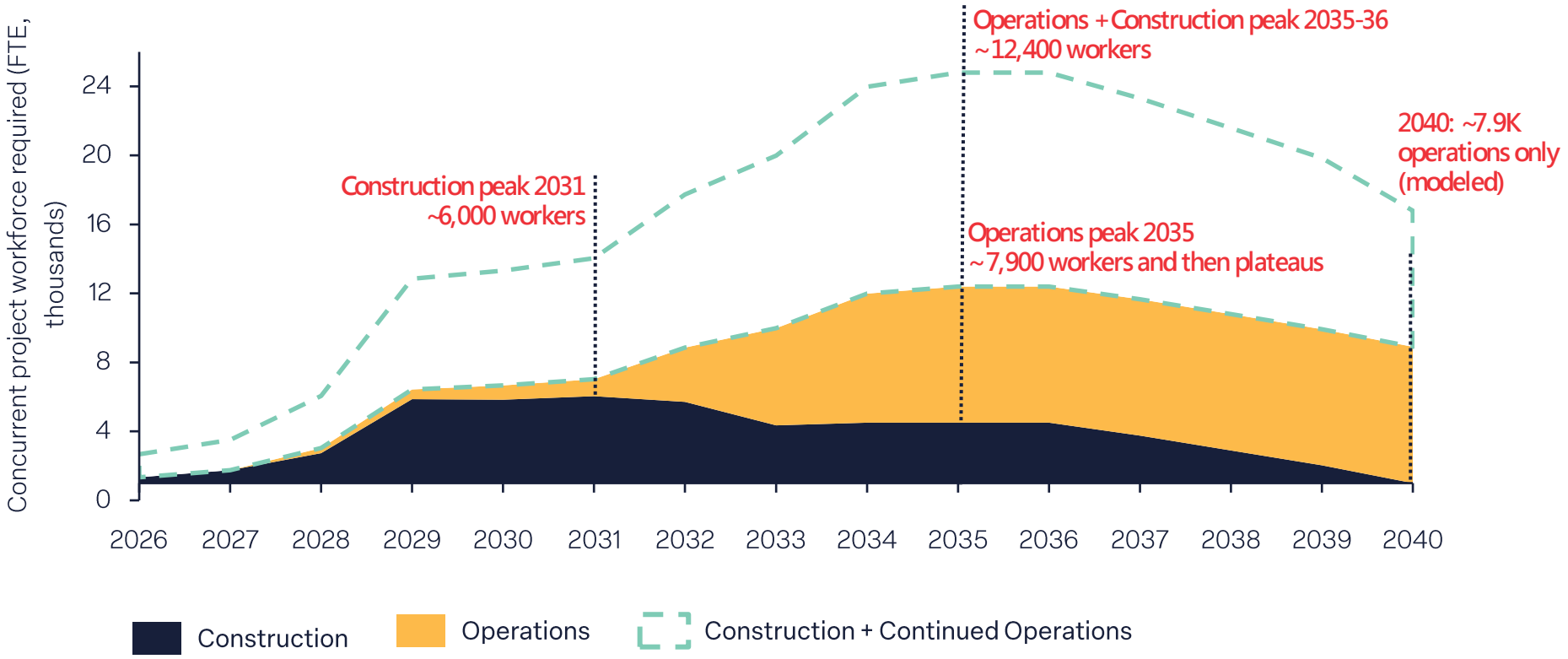
Note: *Scenario or proxy-based figure.
Not in the model: Centrus Oak Ridge (manufacturing, ~430 jobs, Advanced) is in the registry but excluded pending an occupation and timing profile.
Model cutoff: August 2026. Only construction and operations FTE feed the quantitative statewide demand model. Design/licensing and commissioning show timing or illustrative FTE where available. New projects, cancellations, delays or revised staffing plans would change the scale and timing of demand.
Sources: (1) Project signals: TNECD releases for TRISO-X (Jul 2026), BWXT/NFS Erwin (Sep 2025), BWXT Oak Ridge (Apr 2025), LIS Technologies (Jan 2026), Radiant (Oct 2025), Oklo (Sep 2025) and Type One Energy (Feb 2024); Kairos Power, Hermes 2 Groundbreaking (Apr 2026); Orano USA, Project IKE; NuScale, TVA–ENTRA1 6 GW SMR Program (Sep 2025); TVA, Clinch River SMR construction permit application to NRC (2025); (2) Excluded Centrus project: World Nuclear News, Oak Ridge at Heart of US Enrichment Supply Chain Developments (2026); (3) Lifecycle timing and FTE: modeled numbers (see Appendix slides 46–48, 51).

TNWORKS

MODELED ESTIMATE

CONSTRUCTION DRIVES EARLY GROWTH AS OPERATIONS SUSTAINS LONG-TERM EMPLOYMENT

Concurrent project employment reaches approximately 12,400 FTE as construction and operations overlap in 2035–36



How to read the chart: 2035 does not mean 12.4K people are hired that year. It means approximately **12.4K FTE are required simultaneously across the modeled projects in 2035** - ~4.5K in construction and ~7.9K in operations.

WHAT COULD MOVE THE CURVE

- ENTRA1 contributes ~63% of the operations plateau and remains non-binding.
- Design/licensing and commissioning are not consistently quantified across all ten projects.
- Centrus and later announcements are outside the current baseline.

INTERPRETATION

Training and recruitment must be sized to the construction ramp, while institutional capacity and retention must sustain the later operations base.

Note: Scenario limitation: The current model presents one integrated scenario covering the ten publicly announced projects. It does not yet separate a mature-project baseline, the full announced-project scenario, or probability-weighted upside from TNECD's confidential pipeline. These scenarios should be developed in a future phase if project-stage, timing, workforce-scale and likelihood data become available.
Design/licensing and commissioning FTE are not added to the curve to avoid double counting.
Sources: (1) Construction and operations FTE by year: modeled numbers (see Appendix slides 46–48, 51); (2) Project set and timing: TNECD, NRC, TVA and company announcements through Aug 2026 (see slide 20).

MODELED ESTIMATE

CONSTRUCTION HIRING PEAKS BEFORE THE WORKFORCE REACHES MAXIMUM SCALE

Annual hiring reaches about 3,500 in 2029, two years before construction FTE peaks statewide

~870 / yr	AVERAGE ANNUAL HIRES	~3,480	PEAK ANNUAL HIRES	4.0×	PEAK INTENSITY
	2026–35 · 623 low → ~873 planning		2029 · 3,135 ramp-up + 348 repl.		Peak-year hires ÷ decade average

CLUSTER	ANNUAL HIRES (AVG → PEAK)	LEADING OCCUPATIONS	TYPICAL READINESS
Skilled Trades & Craft ALLIED	**~650 → ~2,580** avg 461 → 648 · peak 2,320 ramp-up + 260 repl.	Electricians ~105 → 420 Pipefitters ~95 → 385 Laborers ~95 → 380 Welders ~90 → 335	**ALLIED** Site / safety / QA overlay; code qualification only for nuclear-grade scope.
Engineering & Technical ALLIED / CORE	**~90 → ~390** avg 72 → 92 · peak 361 ramp-up + 29 repl.	Construction managers ~25 → 105 Civil / mechanical engineers ~20 → 85 each	**ALLIED / CORE** Degree base plus nuclear work-control and QA experience.
QA / Regulatory / Safety CORE / SPECIALIST	**~70 → ~250** avg 44 → 67 · peak 219 ramp-up + 32 repl.	QA / NDE inspectors ~45 → 165 Safety specialists ~15 → 55	**CORE / SPECIALIST** NQA-1, NDE and role-specific credentials.
Cyber / I&C / Digital ALLIED	**~45 → ~175** avg 31 → 44 · peak 157 ramp-up + 18 repl.	I&C technologists ~20 → 70 Power-system repairers ~15 → 50	**ALLIED** Controls expertise plus site-specific qualification.
Program & Support ADJACENT	**~20 → ~90** avg 16 → 23 · peak 78 ramp-up + 9 repl.	Planning clerks ~15 → 55 Logisticians ~10 → 35	**ADJACENT** Site access, clearance and employer orientation as needed.

Planning implication: Construction capacity must mobilize ~3.5K hires in 2029 - four times the decade average; conversion and mobility matter more than creating entirely new occupations.

2026–35 average · peak 2029

Note: The low case counts new positions created as construction activity ramps. The planning case also includes replacement hiring within the modeled project workforces, with later staffing reductions netted out: planning case = MAX(0, annual FTE change + midpoint FTE × SOC total separation rate). Row averages show low case→ planning case. Tennessee's existing nuclear workforce is excluded.
Average = 2026–35 mean; peak = highest single-year requirement (2029). Leading occupations shown; totals include all modeled SOCs. Values rounded.
Sources: (1) Construction hiring by occupation and cluster: modeled numbers (see Appendix slides 46–48); (2) Replacement rates: BLS EP Table 1.10, *Occupational Separations and Openings, 2025–35*.

MODELED ESTIMATE

OPERATIONS HIRING BUILDS TOWARD A PERMANENT WORKFORCE BASE

Annual hiring averages about 1,000 and peaks near 2,900 as facilities ramp in 2033

~995 / yr	AVERAGE ANNUAL HIRES	~2,886	PEAK ANNUAL HIRES	2.9×	PEAK INTENSITY
	2026–35 · 790 ramp-up + 205 repl.		2033 · 2,494 ramp-up + 392 repl.		Peak-year hires ÷ decade average

CLUSTER	ANNUAL HIRES (AVG → PEAK)	LEADING OCCUPATIONS	TYPICAL READINESS
Skilled Trades & Craft ALLIED	~250 → ~720 avg 201 ramp-up + 51 repl. · peak 623 ramp-up + 96 repl.	Machinery mechanics ~70 → 205 Electricians ~60 → 170 Maintenance supervisors ~40 → 115	**ALLIED** Plant maintenance, nuclear work-control and site qualification.
Licensed Operations CORE / ALLIED	~185 → ~550 avg 147 ramp-up + 39 repl. · peak 474 ramp-up + 77 repl.	Reactor operators ~90 → 285 Process operators ~65 → 170 Power plant operators ~30 → 95	**CORE / ALLIED** NRC license or facility-specific process qualification.
Engineering & Technical CORE / ALLIED	~125 → ~380 avg 109 ramp-up + 17 repl. · peak 345 ramp-up + 32 repl.	Nuclear engineers ~50 → 155 Electrical / mechanical engineers ~30 → 90 each	**CORE / ALLIED** Degree base plus system and plant qualification.
QA / Regulatory / Safety CORE / SPECIALIST	~125 → ~350 avg 96 ramp-up + 29 repl. · peak 297 ramp-up + 54 repl.	QA / NDE inspectors ~70 → 190 Compliance ~30 → 85 Safety specialists ~25 → 75	**CORE / SPECIALIST** NQA-1, NDE and site-specific credentials.
Fuel Cycle & Manufacturing CORE	~125 → ~345 avg 91 ramp-up + 33 repl. · peak 283 ramp-up + 63 repl.	Nuclear technicians ~80 → 230 Chemical technicians ~45 → 115	**CORE** Nuclear- and facility-specific pathway.
Cyber / I&C / Digital ALLIED / CORE	~100 → ~305 avg 84 ramp-up + 17 repl. · peak 272 ramp-up + 33 repl.	I&C technologists ~65 → 195 Information security ~20 → 65 Network / systems ~15 → 45	**ALLIED / CORE** Nuclear I&C, OT and plant qualification.
Program & Support ADJACENT / ALLIED	~80 → ~235 avg 63 ramp-up + 19 repl. · peak 200 ramp-up + 36 repl.	Security ~45 → 120 Training specialists ~20 → 55 Operations managers ~20 → 55	**ADJACENT / ALLIED** Clearance, site access and employer-led training.

Planning implication: Operations pipelines must absorb ~2.9K hires in 2033; licensing, employer qualification and retention limit how quickly adjacent talent can substitute.

2026–35 average peak 2033

Note: Project ramp-up means new positions added as facilities move toward steady-state staffing. Replacement hiring covers people leaving the modeled project workforces: annual hiring = MAX(0, annual FTE change + midpoint FTE × SOC total separation rate). Growth and turnover at Tennessee's existing nuclear employers are excluded.
Average = 2026–35 mean; peak = highest single-year requirement (2033). Leading occupations shown; totals include all modeled SOCs. Values rounded.
Sources: (1) Operations hiring by occupation and cluster: modeled numbers (see Appendix slides 46–47, 51); (2) Replacement rates: BLS EP Table 1.10, *Occupational Separations and Openings, 2025–35*.

TNWORKS

05

JOB READY TALENT

Job Ready Talent Shows Which Workers Tennessee Can Deploy

QUALITATIVE ASSESSMENT

FOUR READINESS GATES DEFINE JOB-READY NUCLEAR TALENT

Potential workers become job-ready after capability, nuclear, employer, timing, and mobility requirements are met.

SUPPLY CHANNELS

Incumbent nuclear workforce	Adjacent industry talent	Education, technical training & apprenticeships	Mobile / interstate labor
Current plant, fuel-cycle, federal-site and supplier staff	Workers with transferable technical skills	Graduates, technical trainees, apprentices and employer pathways	Traveling craft and out-of-state recruits

All channels pass every gate

POTENTIAL TALENT AND PIPELINE EVIDENCE → AFTER READINESS GATES

READINESS GATES

GATE 01	GATE 02	GATE 03	GATE 04
Base capability	**Nuclear overlay**	**Employer & site acceptance**	**Time & mobility**
Can the person do the core job?	***Can they work to nuclear standards?***	***Will employers and sites accept them?***	***Can they arrive when needed?***
• Right occupation and skills • Credential or apprenticeship	• Code qualifications (NQA-1, ASME, NRC) • Safety culture • Role-specific training	• Employer sign-off • License or certification • Security clearance	• In the right place • Willing to mobilize • Fits project timing

RESULT

JOB-READY TALENT

People estimated to clear all four gates–not total employment, enrollment, or program participation.

- ✓ Nuclear-ready
- ✓ Available on time
- ✓ Deployable on site

RESIDUAL GAP

GAP AFTER ALL ALL GATES

Demand left over after all channels and gates.

- ! Missing skills or qualifications
- ! Can't mobilize in time or place
- ! Lost to wages or retention
- ! Insufficient experience or supervisory depth

Note: This slide defines the readiness framework; it does not count workers. See Appendix slide 49 for modeled annual job-ready supply and Appendix slide 50 for the calculation method.
Sources: (1) Readiness gates and supply channels: TNWorks nuclear workforce assessment framework; (2) Nuclear standards referenced in Gates 02–03: ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*; ASME BPVC Section III, *Rules for Construction of Nuclear Facility Components*, and Section IX, *Welding, Brazing, and Fusing Qualifications*; NRC, 10 CFR Part 50 Appendix B, *Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants*; NRC, 10 CFR Part 55, *Operators' Licenses*.

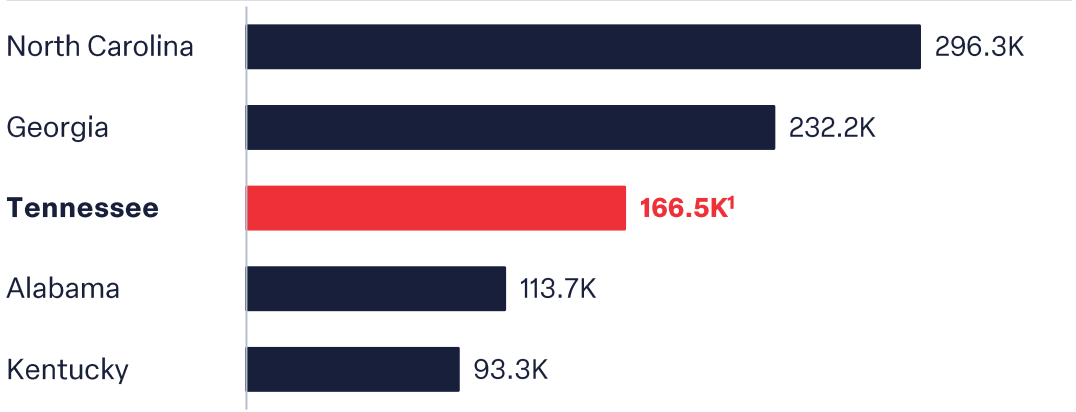
SOURCED DATA

TENNESSEE HAS CONSTRUCTION SCALE, BUT NUCLEAR AVAILABILITY IS MODELED

Employment, unemployment, and apprenticeship entrants show potential scale–not nuclear-ready annual supply.

CONSTRUCTION PAYROLL EMPLOYMENT

Aug 2026 · seasonally adjusted, thousands of jobs (revised)



NUCLEAR-RELEVANT TRADES

Electricians	**Pipefitters**	**Welders**
Industrial mechanics	**Equipment operators**	**Laborers**

Illustrative examples; not separately counted.

BROAD TALENT CONTEXT

166.5K[1]

CONSTRUCTION PAYROLL JOBS

Tennessee construction employment, August 2026

Broad workforce stock; not nuclear-ready supply.

119,623[2]

UNEMPLOYED RESIDENTS

Tennessee residents across all occupations, August 2026

Broad labor-market context; not a construction-worker count.

4,480[3]

NEW REGISTERED APPRENTICES

FY2025–26, across all occupations

Entrants, not completers or nuclear placements.

MODEL SCENARIO APPLIED LATER

MODELED ESTIMATE

10–25%*

15% base case

CONSTRUCTION INCUMBENT / ADJACENT / MOBILE CAPTURE

Applied to the occupation-level construction gap remaining after education, technical training, and apprenticeship supply–not to Tennessee's 166.5K construction workforce.

READINESS GATES Determine which potential workers can be qualified and mobilized for nuclear projects.

Note: *TNWorks planning scenario applied to the occupation-level construction gap after education, training and apprenticeship supply, not to the construction workforce. The three sourced indicators are different pools and should not be added; none represents nuclear-qualified or deployable workers. State figures are revised Aug 2026 estimates (BLS, Oct 20, 2026).

Sources: (1) BLS State and Area Employment (CES), construction by state, Aug 2026, seasonally adjusted (revised); (2) BLS LAUS, Tennessee, Aug 2026, seasonally adjusted, via TDLWD, Tennessee Economic Analysis – August 2026; (3) TDLWD Apprenticeship TN, Program Data and Reports (USDOL RAPIDS), FY2025–26; (4) Capture scenario: modeled numbers (see slide 36).

TNWORKS

QUALITATIVE ASSESSMENT

CONSTRUCTION ROLES REQUIRE DIFFERENT NUCLEAR OVERLAYS BEFORE DEPLOYMENT

Requirements increase for code work, inspection, quality assurance, and experienced supervision roles.

OCCUPATION	MAIN SUPPLY CHANNEL	NUCLEAR OVERLAY	READINESS LIFT
Construction laborers ADJACENT / ALLIED	General construction workforce	LOW–MEDIUM	Site access, safety and project orientation
Electricians ALLIED	Industrial electricians + apprenticeships	MEDIUM	Site electrical / QA procedures; documented testing
Pipefitters / steamfitters ALLIED	Apprenticeships + mobile craft	MEDIUM–HIGH	Approved fit-up procedures and inspection hold points
Welders ALLIED	Experienced welders + apprenticeships	MEDIUM–HIGH	Employer procedure qualification and inspection acceptance
Mechanics / millwrights ALLIED	Industrial maintenance workforce	MEDIUM	OEM / site procedures and QA documentation
QA / NDE inspectors CORE SPECIALIST	Existing QA / NDE specialists	HIGH	Method-specific experience, exams, independent inspection
Supervisors / foremen EXPERIENCE-DEPENDENT	Experienced journey-level craft	HIGH	Regulated-project oversight and safety leadership

CONSTRUCTION TAKEAWAY Nuclear readiness is a work-scope overlay on proven craft - prioritize targeted qualification, documentation and mobilization.

Note: Qualitative assessment of typical nuclear-readiness requirements by occupation. No headcount or annual supply is calculated on this slide. Final qualification depends on employer, work scope and site acceptance.
Sources: (1) Readiness lift ratings and supply channels: assessment framework (see slide 25); (2) Nuclear overlays referenced: ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications;* NRC, 10 CFR Part 50 Appendix B, *Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants;* ASME BPVC Section III, *Rules for Construction of Nuclear Facility Components;* ASME BPVC Section IX, *Welding, Brazing, and Fusing Qualifications;* ASNT SNT-TC-1A, *Personnel Qualification and Certification in Nondestructive Testing*

SOURCED DATA

TECHNICAL PROGRAMS CREATE A BROAD CONSTRUCTION CANDIDATE POOL

Reported awards and participation precede nuclear capture, qualification, and employer acceptance.

STATEWIDE TECHNICAL EDUCATION OUTPUT

Selected TCAT awards, AY 2023–24 · tile area is proportional to awards

LARGEST PATHWAY

995[1]

Welding technology
Arc / TIG, pipe and structural fabrication

12-MONTH PROGRAM

407[1] 16 MO

HVAC / refrigeration
Ventilation and mechanical systems

234[1]

Industrial electricity

12 MO

202[1]

Industrial maintenance

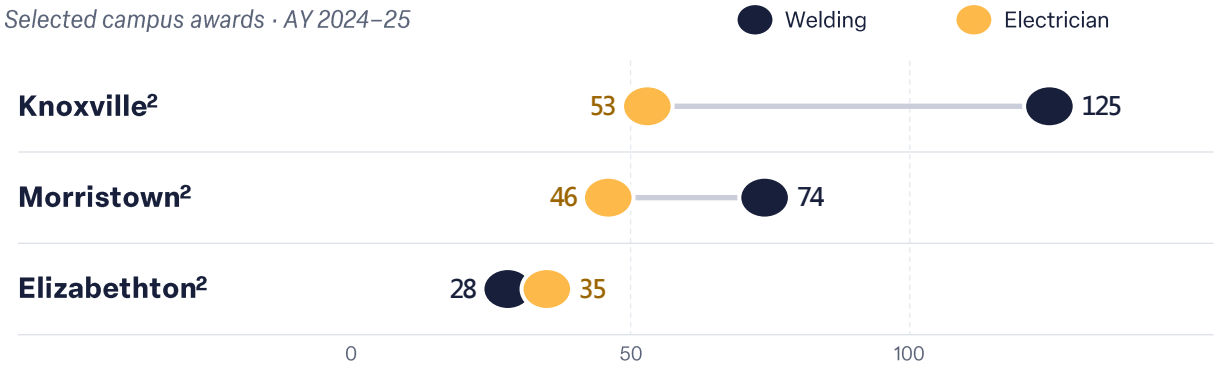
16 MO

Pipefitting / plumbing 12-month program · statewide awards not yet isolated

Four selected TCAT programs; industrial maintenance also feeds operations. Awards are not nuclear-ready workers.

EAST TENNESSEE TRAINING FOOTPRINT

Selected campus awards · AY 2024–25



Institution-level awards; different period and coverage from statewide figures.

AN EARLY NUCLEAR FAMILIARIZATION BRIDGE

15h
pilot course

100+[3]
CUMULATIVE COURSE COMPLETERS
Through December 2025
15-hour nuclear-familiarization bridge

Then
employer / site qualification

Annual completers are not publicly reported; employer and site qualification follow.

WHAT THIS SLIDE SHOWS Reported awards, campus output, and participation across potential construction pathways.

WHAT THIS SLIDE DOES NOT SHOW Unique people entering nuclear or modeled annual job-ready supply.

CONSTRUCTION TAKEAWAY Education and technical training create entry candidates; experience and site qualification determine who becomes job-ready.

TNWORKS

Note: Figures use different periods and coverage and are not additive; awards and participation are not unique people or nuclear-ready workers. Program lengths are typical at TCAT Knoxville (Elizabethton for pipefitting). See Appendix slide 49 for modeled job-ready supply.
Sources: (1) THEC, 2025 Fact Book, Table 2.23 (TBR data), AY2023–24; (2) O*NET OnLine, Tennessee Training: Welders (51-4121) and Electricians (47-2111), IPEDS 2024–25; (3) UT Tickle College of Engineering, UT Partners With Roane State and TCAT To Develop a Nuclear Workforce Pipeline (Dec 2025); (4) TCAT Knoxville and TCAT Elizabethton program pages.

SOURCED DATA

APPRENTICESHIPS SHOW CAPACITY, COMPLETION FLOW, AND TIME TO JOURNEY LEVEL

Stocks and completions precede nuclear capture, qualification, and project availability.

01 / CURRENT TALENT BASE

FY2024 · REGISTERED APPRENTICES

5,475[1]

Tennessee construction registered apprentices

Active statewide stock, FY2024

2026 · UNION APPRENTICES

1,200[2]

Knoxville-area building trades, 14 programs

Separate local stock; do not add to the statewide count

02 / TRADE DEVELOPMENT ROUTES

OJT + classroom

Work + learn

- **3yr** — **Ironworkers / boilermakers**: Structural steel · pressure work
- **4yr** — **Millwrights / sheet metal**: Equipment setting · ventilation
- **5yr** — **Electricians / pipefitters**: Electrical systems · piping work

Local program durations[4]; actual duration varies by sponsor and does not include nuclear qualification.

BEFORE JOURNEY LEVEL · Y-12 UPF[5]

Pipefitter and second-year ironworker apprentices supported work in 2026 under supervision.

03 / REPORTED 2023 COMPLETIONS[3]

Tennessee · 2023 · selected trades, all industries

LARGEST OF THE SELECTED TRADE COUNTS

334* Electricians completions

95 Pipefitters	**47** Sheet Metal Workers
39 Ironworkers	**29** Millwrights

**334 = 318 interior electricians + 16 general electricians. Completions do not imply nuclear placement.*

WHAT THIS SLIDE SHOWS Active apprentice stocks, pathway duration, and reported all-industry completion evidence.

WHAT THIS SLIDE DOES NOT SHOW The share entering nuclear or clearing nuclear and site requirements.

CONSTRUCTION TAKEAWAY Apprentices build supervised experience and journey-level capacity; nuclear qualification remains a separate requirement.

TNWORKS

Note: Active stocks, local union apprentice counts and annual completions are different measures and are not additive. Completions are all-industry and do not imply nuclear placement or qualification.

Sources: (1) TN Comptroller OREA, An Overview of Registered Apprenticeships in Tennessee: 2025 Update (USDOL RAPIDS), construction active apprentices, federal FY2024; (2) C.A.L.M., Apprenticeship Numbers: Knoxville Building and Construction Trades Council, 2026; (3) TDLWD, Tennessee's Economy 2023–2024, Table 39: State Apprenticeship Completers by Occupation; (4) C.A.L.M., Craft Apprenticeship Training Standards; (5) Y-12 / CNS, New Faces of Construction: UPF pipefitter and ironworker apprentice profiles (2026).

QUALITATIVE ASSESSMENT

OPERATIONS ROLES REQUIRE EMPLOYER QUALIFICATION AND LONGER LEAD TIMES

Licensing, plant training, and documented experience separate candidates from plant-ready operations talent.

OCCUPATION	MAIN SUPPLY CHANNEL	NUCLEAR OVERLAY	READINESS LIFT
Reactor operators CORE NUCLEAR	Utility operators + pre-operator trainees	HIGH	Employer initial license training and NRC examination
Nuclear technicians CORE NUCLEAR	Nuclear technology + related technical programs	MEDIUM–HIGH	Site-specific task training and employer qualification
Fuel-cycle process operators ALLIED → FACILITY CORE	Chemical, process and manufacturing operators	HIGH	Facility process training and authorization
I&C technologists / technicians ALLIED	Industrial controls, electrical and automation	MEDIUM–HIGH	Plant systems and procedure qualification
Maintenance electricians / mechanics ALLIED	Industrial maintenance and craft workforce	MEDIUM	Site qualification for assigned systems
QA / compliance / radiation protection CORE SPECIALIST	Regulated-industry specialists + nuclear programs	HIGH	Documented competence and employer authorization
Engineers CORE / ALLIED	Engineering graduates + regulated industries	MEDIUM–HIGH	Systems / regulatory training and role-specific experience

OPERATIONS TAKEAWAY Employer qualification, facility experience, and licensing–not education alone–determine when candidates become job-ready.

Note: Qualitative assessment of typical operations-readiness requirements by occupation. No headcount or annual supply is calculated on this slide. Employer-qualified and licensed operator pathways are not quantified in the model.

Sources: (1) Readiness lift ratings and supply channels: assessment framework (see slide 25); (2) Reactor operators: NRC, 10 CFR Part 55, *Operators' Licenses*; NRC, NUREG-1021, *Operator Licensing Examination Standards for Power Reactors* (Rev. 12, 2021); (3) Plant training and qualification: NRC, 10 CFR 50.120, *Training and Qualification of Nuclear Power Plant Personnel*; NRC RG 1.8, *Qualification and Training of Personnel for Nuclear Power Plants* (endorses ANSI/ANS-3.1); (4) Fuel-cycle facilities: NRC, 10 CFR Part 70, *Domestic Licensing of Special Nuclear Material*; ANSI/ANS-8.20, *Nuclear Criticality Safety Training*; (5) QA and radiation protection: ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Applications*; NRC, 10 CFR Part 20, *Standards for Protection Against Radiation*; (6) Pre-operator pathway: TVA, *Student Generating Plant Operator (SGPO) Training*.

SOURCED DATA

OPERATIONS PIPELINES COMBINE NUCLEAR SPECIALISTS AND TRANSFERABLE TECHNICAL CANDIDATE CANDIDATE

Awards, enrollment, and projections precede employer qualification, licensing, and site acceptance.

ROUTE, EVIDENCE AND ROLE

TIME IN EDUCATION

THEN

Start · 1 yr · 2 yrs · 3 yrs · 4 yrs

01 Nuclear Engineering

83[1]
UT Knoxville awards, AY2023–24
39 BS · 31 MS · 10 PhD · 3 certificates

69 enrolled / 0 awards[2]
Tennessee Tech
Fall 2026 enrollment / AY2025–26 awards

~4 yrs (BS)

Engineers / technical specialists → Employer qualification

02 Nuclear Technology

Roane State[3]
5 / 10 projected graduates
AY2025–26 / AY2026–27

Chattanooga State[3]
43 enrolled
Nuclear power concentration, Fall 2025

Pellissippi State[3]
3 inaugural graduates
December 2024

~2 yrs

Nuclear technicians / radiation protection → Employer qualification

03 Transferable Technical

138 awards[4]
Selected Chattanooga State programs, AY2024–25 (incl. nuclear concentrations)

234 + 202 awards[4]
TCAT Industrial Electricity + Industrial Maintenance, AY2023–24

12–24 mo

I&C / maintenance / process ops → Employer qualification

Shared candidate pools supporting multiple construction and operations occupations.

RO Reactor Operator Exception†

TVA SGPO[5]

- Paid employer training
- Approximately 12–18 months
- NRC RO / SRO licensing remains separate

Employer training 12–18 mo

No education bar - qualification happens inside the employer

Annual qualified completers and licensing outcomes are not publicly reported.

Plant-ready

Once employer qualification clears:

01 Nuclear work standards

02 Employer / site sign-off

03 Timing / mobility

Education bars to scale (MS / PhD add time beyond the BS); employer qualification is not to scale.

WHAT THIS SLIDE SHOWS Sourced candidate pathways, program scale, and approximate time in education.

WHAT THIS SLIDE DOES NOT SHOW Licensed operators, employer-qualified workers, or plant-ready annual supply.

OPERATIONS TAKEAWAY Education builds the entry pool, but plant training, qualification, experience, and licensing where required are what make talent job-ready.

Note: †Employer-qualified operator pathways are excluded from quantified supply; annual qualification and licensing outcomes are unavailable. Awards, enrollment and projections are not additive; awards are not unique people. The 138 awards include Chattanooga State's nuclear power and radiation protection concentrations.

Sources: (1) NCES IPEDS, UT Knoxville Nuclear Engineering, AY2023–24; (2) Tennessee Tech IARE, College Report, Fall 2026; (3) THEC, Roane State program approval (Aug 2024); Chattanooga Times Free Press (Sep 29, 2025); Knox TN Today (Dec 2024); (4) NCES IPEDS, Chattanooga State, CIP 15.0000, 15.0303, 15.0403, 15.0406, 15.0615, 15.0702, 15.0799 and 41.0303, AY2024–25; THEC 2025 Fact Book, Table 2.23; (5) TVA, SGPO Training.

07

APPENDIX

Methods, detailed tables, assumptions and source status

MODELED ESTIMATE

HOW THE CURRENT ESTIMATE WAS BUILT - E4 CAROLINAS' TENNESSEE BASELINE, REFRESHED WITH 2025-26 DATA

Direct jobs are refreshed from public employer sources; ripple effects reuse E4's Tennessee IMPLAN 2021 ratios

01 MODEL ORIGIN

E4 CAROLINAS · 2024

The Economic Impact of the Nuclear Industry in the Southeast U.S.

Southeast Nuclear Advisory Council study, funded by the U.S. EDA

16,596

Tennessee direct jobs, built from three activities - generation, supply chain, federal facilities

Ripple effects: indirect and induced jobs modeled with IMPLAN 2021

02 STARTING INPUTS

03 MULTIPLIERS

04 RESULT

ACTIVITY	E4 2024	2025–26	REFRESH EVIDENCE	INDIRECT ×	INDUCED ×	SUPPORTED JOBS
Generation ACTIVITY 1	2,000	**~2,000**	TVA: Watts Bar ~1,000 + Sequoyah 1,000+ full-time jobs	**1.49×**	**1.24×**	**~7,400**
Supply chain ACTIVITY 2	2,796	**~2,900**	E4 base + ~100 new BWXT Oak Ridge CMDF staff	**0.66×**	**0.57×**	**~6,500**
Federal facilities ACTIVITY 3	11,800	**~12,400**	ORNL 7,400 (Jun 2026) + Y-12 ~5,000 direct employees	**0.66×**	**0.57×**	**~27,700**
Published-to-refreshed total SAME THREE ACTIVITIES	**16,596**	**~17,300**	Same three activities; announced future jobs excluded	–	–	**40.3K–41.6K**

HOW THE ESTIMATE BREAKS DOWN

Published E4 baseline
LOWER BOUND · 2024

2025–26 refreshed estimate
UPPER BOUND · SAME THREE ACTIVITIES



ESTIMATE TAKEAWAY

The range is ~16.6K–17.3K direct jobs and ~40.3K–41.6K total jobs supported; indirect and induced jobs are not nuclear workers.

Note: The lower bound is E4's published estimate; the upper bound refreshes the same three activities with 2025–26 employer data. E4's Tennessee activity-specific ratios are held constant as proxy impacts, not a new IMPLAN run. Indirect and induced jobs are not nuclear workers. Announced future jobs and Y-12's ~8,600 contractor-and-subcontractor figure are excluded. Figures are rounded independently.

Sources: (1) E4 Carolinas, The Economic Impact of the Nuclear Industry in the Southeast United States (Feb 2024), Tennessee Tables 7–10 and 37–40 (IMPLAN 2021); (2) TVA, Watts Bar and Sequoyah Nuclear Plant pages; (3) ORNL, While the Nation Sleeps (Jun 2026); (4) Y-12 National Security Complex, Who We Are; (5) BWXT, Oak Ridge CMDF release (Jan 2026).

METHOD, SOURCE TIERS AND LIMITATIONS

Every number should state whether it is verified, modeled or assumed.

MORE CERTAIN → LESS CERTAIN

A TIER A Verified

- Project announcements, licensing status and public filings
- BLS wages, occupational definitions and 2025–35 SOC separation rates
- Published aggregate completions and provider inventories

B TIER B Modeled

- SOC staffing shares and construction ramp curves
- Occupation-level project demand
- CIP-to-SOC allocation and all-industry openings
- Application of BLS separation rates to modeled midpoint project FTE

C TIER C Planning assumptions

- Operations ramps and uncertain project phasing
- Nuclear-ready share and transition lead time

KEY LIMITATIONS

- Employer staffing is modeled, not reported hiring plans.
- Program-level completions and readiness shares are not yet audited.
- Apprenticeship, employer training, mobility and migration are incomplete.
- Current federal-site employment and replacement needs are partly obscured.
- Project timing – especially large multi-unit development – materially moves the peak.
- BLS separation rates are occupational replacement proxies and do not represent employer-specific turnover or same-occupation movement between employers.

Note: Tier A inputs are used directly with the source retained; Tier B inputs are modeled from public or industry benchmarks; Tier C inputs are planning or scenario assumptions and are flagged, not presented as fact. Tiers apply to model inputs, not to every figure in the deck.
Sources: (1) TNWorks nuclear workforce supply-demand model, Assumptions & Sources tab; (2) BLS Employment Projections Table 1.10, Occupational Separations and Openings, 2025–35.

TNWORKS

PROJECT-LEVEL DEMAND RESTS ON PUBLIC SIGNALS, FACILITY ARCHETYPES AND PUBLISHED STAFFING RATIOS

Estimates show concurrent FTE by lifecycle phase - planning figures, not employer hiring commitments

STEP	WHAT IT DOES	KEY ASSUMPTIONS	BASIS / SOURCE
1 **Define the project set**	Ten projects with a public Tennessee site, announcement or TVA agreement	Centrus Oak Ridge (~430 jobs) excluded pending an occupation and timing profile; announcements after Aug 2026 not included	*TNECD, company and DOE releases; NRC dockets*
2 **Match to an archetype**	Group by facility type: reactor, fuel cycle, manufacturing or fusion	Each facility type sets a staffing shape; Type One Energy uses a reactor proxy until its fusion scope is decided	*Announced projects*
3 **Map the quantified workforce phases**	Model construction and operations FTE consistently.	Show design/licensing and commissioning where project evidence exists, but do not add them to statewide totals. Occupations selected using IAEA staffing references, DOE MPR-2776 and Mangum Economics (2025); timing from public milestones.	*IAEA references; DOE MPR-2776 (2005); Mangum (2025); company announcements*
4 **Translate to occupations**	Split each phase into occupations and the five shared clusters	Project-specific occupation mix where a model exists; cluster-intensity profile where no validated model exists yet	*Announced project information; TN supply-demand model (SOC level)*
5 **Calculate annual hiring demand**	**Low case:** positive FTE increases by SOC. Planning case: FTE change + replacement, floored at zero.	**Replacement:** calculated using midpoint annual FTE and the SOC-specific BLS 2025–35 separation rate. **Annual hires:** MAX(0, annual FTE change + replacement).*	*BLS Occupational Separations and Openings*

**Replacement covers separations within the modeled future-project workforce only; it excludes replacement demand for the existing Tennessee nuclear workforce.*

HOW EACH PROJECT FIGURE IS ESTIMATED

——— PROJECT-SPECIFIC MODEL

TRISO-X · Kairos · Orano IKE · TVA Clinch River

Phase FTE and occupation mix built per project

– – ARCHETYPE ESTIMATE

BWXT · LIS Technologies · Radiant · Oklo

Facility-type ratios; announced jobs shown as a signal

*** SCENARIO / PROXY**

ENTRA1 · Type One Energy

Non-binding or fusion proxy; never quoted as TN jobs

READING THE FIGURES

- **FTE are concurrent headcount,** not cumulative hires
- **Announced jobs are cross-checks,** not added on top
- **Phases without an FTE label** show timing only
- **Low case** = ramp-up only. **Planning/high case** = staffing change + replacement, floored at zero; used for headline figures.

METHOD TAKEAWAY every project figure traces to a public signal and a published ratio - and is replaced as employers validate.

TNWORKS

Note: Project figures are planning estimates, not employer hiring commitments; project status checked through Aug 2026. Modeled figures will be replaced with employer data through the 90-Day Employer Demand Sprint.
Sources: (1) TNECD, NRC, TVA, DOE and company announcements (see slide 20); (2) IAEA staffing references; DOE/MPR Associates, NP2010 Nuclear Power Plant Construction Infrastructure Assessment (MPR-2776, 2005); Mangum Economics for VIN Hub (2025); (3) BLS Employment Projections Table 1.10, Occupational Separations and Openings, 2025–35; (4) modeled numbers.

MODELED ESTIMATE

CONSTRUCTION DEMAND IS A TEMPORARY PEAK - MODELED FROM PROJECT BUILD WINDOWS AND ONE COMMON CRAFT MIX

Concurrent construction FTE are built project by project, then converted into the hires needed each year

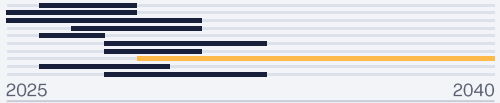
HOW THE CONSTRUCTION ESTIMATE IS BUILT

1 Build windows

Peak construction FTE and build start / end year for each of the ten projects, from announced project information and milestones

9,330

sum of project peaks - never on site at once



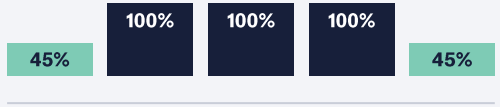
Tier A timing · Tier B peaks · ENTRA1 Tier C

2 Ramp profile

45% of peak FTE in the first and final build year, 100% in between; ENTRA1 follows its own multi-site phasing to 2039

6,042

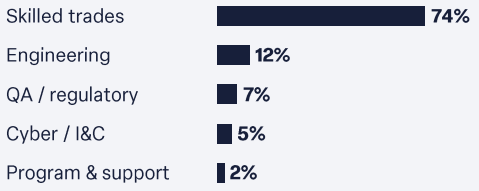
peak concurrent construction FTE, 2031



Tier B ramp convention · ENTRA1 Tier C

3 Occupation mix

One common matrix of 24 construction SOCs, applied to every project and calibrated to a 300 MWe benchmark



Tier B · IAEA, DOE MPR-2776, Mangum 2025

4 Annual hiring

Low case counts positive year-on-year increases in construction FTE. Planning/high case = MAX(0, annual construction FTE change + midpoint annual FTE × SOC-specific BLS 2025–35 separation rate).

~623–873

average hires a year, 2026–35 (low–high)



Tier B · BLS 2025–35 separations

WHAT THE ESTIMATE COVERS

IN THE ESTIMATE

Direct on-site construction FTE across the ten projects, averaged over 2026–35

NOT ADDED

Design / licensing and commissioning FTE (avoids double counting); indirect and induced jobs

SCENARIO-DRIVEN

From 2033 ENTRA1 is the only active build - its phasing and TN allocation are Tier C

READING THE FIGURES

- **Hiring peaks in 2029,** two years before FTE peaks
- **Low** = ramp-up only; **planning/high** adds replacement, net of later staffing reductions.
- **Headline figures use the planning/high case**—ramp-up plus replacement.
- **Craft is mobile and transferable,** so supply can flex

CONSTRUCTION TAKEAWAY size training to a sharp 2029 hiring peak - construction demand after 2033 rests on the ENTRA1 scenario.

TNWORKS

Note: *Values rounded. Design/licensing and commissioning FTE and indirect/induced jobs are not added. Construction mix is calibrated to a ~305 annual FTE benchmark for a 300 MWe SMR.*
Sources: *(1) Build windows and peaks: announced project information (see slide 20) and modeled numbers; (2) Occupation mix: Mangum Economics for VIN Hub (2025); DOE MPR-2776 (2005); IAEA staffing references; (3) BLS Employment Projections Table 1.10, Occupational Separations and Openings, 2025–35.*

MODELED ESTIMATE

READINESS ADJUSTMENTS NARROW GROSS PIPELINES TO JOB-READY ANNUAL SUPPLY

Sourced annual flows are deduplicated, mapped by occupation, and adjusted using planning assumptions.

01 SOURCED PIPELINE INPUTS[1]

Education and technical training

- Annual awards or completers
- Observed, projected, and modeled inputs remain separately tagged
- Enrollment and cumulative participation are excluded from annual worker counts

Apprenticeships

- Reported annual completions where traceable
- Statewide active stocks where annual completions are unavailable

Gross candidate evidence—before readiness adjustment

02 MODEL ADJUSTMENTS*

1 Count shared pipelines once

- Deduplicate shared program pools
- Map program groups to relevant occupations
- Allocate shared pools across occupations using modeled demand shares

2 Apply occupation-specific capture / readiness factors

Pipeline type	Planning band*
Nuclear-specific programs	**85–95%**
Direct technical / regulated programs	**10–30%**
Allied / transferable programs	**4–10%**
Broad / enabling programs	**2–6%**

Higher factors reflect closer occupational alignment. Lower factors account for competing industries, geographic leakage, and additional nuclear, employer, and site requirements.

3 Annualize apprenticeship flow

Active occupation-specific stock → **÷ 4-yr average duration*** → **× 50% completion*** → **× 15% nuclear capture***

Planning assumptions—not observed nuclear placement rates

03 MODELED ANNUAL OUTPUT*

CONSTRUCTION

~0.18–0.25K / YEAR*

Education, technical training, and captured apprenticeship flow

OPERATIONS

~0.26–0.34K / YEAR*

Education, technical training, and captured apprenticeship flow

Modeled annual range, consistent with the construction and operations supply bridges (Slides 36 and 38). The calculation is performed occupation by occupation; surplus candidates in one occupation do not offset shortages in another.

INCLUDED IN THESE OUTPUTS

- Education
- Technical training
- Captured apprenticeship flow

APPLIED LATER IN GAPS & RESPONSE

- Construction incumbent, adjacent, and mobile capture: **10–25%*, 15% base**
- Operations experienced and external recruitment: **3–10%*, 5% base**

NOT QUANTIFIED†

Employer-led operator pathways without published annual qualified or licensed outcomes.

Note: *Model step, planning assumption, or model output; capture, readiness, completion and nuclear-capture factors are planning assumptions, not observed placement rates. †Documented pathway excluded from quantified supply because annual trainee, qualification, licensing and retention outcomes are unavailable.
Sources: (1) Sourced candidate inputs: THEC, 2025 Fact Book, Table 2.23; NCES IPEDS Completions; TN Comptroller OREA, Registered Apprenticeships in Tennessee: 2025 Update (see slides 28, 29 and 31); (2) Apprenticeship duration and completion: TN Comptroller OREA; (3) modeled numbers.

TNWORKS

MODELED ESTIMATE

HOW PIPELINE EVIDENCE BECOMES MODELED JOB-READY ANNUAL SUPPLY

Sourced inputs are standardized, deduplicated, mapped, and adjusted through transparent model assumptions.

HOW THE ESTIMATE IS BUILT

STEP	WHAT HAPPENS	CLASSIFICATION
1. Compile pipeline evidence	Assemble annual education and technical-training awards, apprenticeship evidence, and named employer pathways. Tag every input as observed, projected, modeled, or unquantified.	SOURCED[1] / TAGGED
2. Standardize annual flow	Use annual awards or completers where available. Enrollment, local active stocks, cumulative participants, and investments remain supporting evidence unless they can be converted defensibly into an annual flow.	MODEL RULE*
3. Deduplicate and map	Count each shared program pool once, map the program or CIP to relevant SOCs, and allocate shared pools across occupations using modeled demand shares.	MODELED*
4. Apply readiness assumptions	Apply an occupation-specific compound capture / readiness factor. Annualize statewide apprenticeship stocks using duration, completion, and nuclear-capture assumptions.	ASSUMPTION*
5. Calculate annual incoming supply	Sum adjusted flows separately for construction and operations by SOC. Surplus in one occupation does not offset a shortage in another.	MODEL OUTPUT*

INCLUDED

- Readiness-adjusted education and technical-training flow
- Captured annualized statewide apprenticeship flow

NOT INCLUDED

- Enrollment treated as annual workers
- Local active apprentice stocks added to statewide totals
- Cumulative participants or training investments
- Construction incumbent / mobile capture
- Operations experienced / external recruitment
- Employer-qualified operator pathways without annual outcomes†

KEY ASSUMPTIONS*

Education and technical training*

Nuclear-specific	**85–95%**
Direct technical / regulated	**10–30%**
Allied / transferable	**4–10%**
Broad / enabling	**2–6%**

The factor combines expected nuclear capture and immediate readiness. It reflects competing-industry and geographic leakage plus nuclear, employer, and site requirements.

Apprenticeships*

Average duration	**4 years**
Completion rate	**50%**
Nuclear capture	**15%**

Active statewide occupation stock ÷ duration × completion rate × nuclear capture

MODEL OUTPUT*

STREAM	UNDERLYING ANNUAL MODEL RANGE*	MAIN-SLIDE PRESENTATION
Construction	~0.18–0.25K	**~0.2K**
Operations	~0.26–0.34K	**~0.3K**

Annual figures; rounded on Slides 8, 41 and 42 for presentation.

Note: *Modeled step, planning assumption, or model output; capture/readiness percentages are editable Tier C planning assumptions, not observed placement rates. †Employer-qualified operator routes are documented but excluded until annual trainee, completion, qualification, licensing and retention outcomes become available.
Sources: (1) THEC, 2025 Fact Book, Table 2.23 (TBR data); NCES IPEDS / O*NET annual awards; TN Comptroller OREA (USDOL RAPIDS) apprenticeship stocks; documented employer and provider pathways; (2) modeled numbers.

TNWORKS

MODELED ESTIMATE

OPERATIONS DEMAND IS THE LASTING BASE - MODELED FROM STEADY-STATE STAFFING AND TWO FACILITY MIXES

Operating roles are credential- and site-specific, so reactors and fuel-cycle plants are staffed separately

HOW THE OPERATIONS ESTIMATE IS BUILT

1 Steady-state staffing

Steady-state operating FTE and first operating year per project; proxy models where no employer model exists

7,900

operating FTE plateau, reached in 2035



Tier B · Orano at ~800 total-site FTE

2 Ramp-up

40% of steady-state FTE in year one, 75% in year two and 100% from year three; no wind-down before 2040

3 years

from first operations to full staffing



Tier C ramp convention

3 Occupation mix

Separate matrices for reactors (6,030 FTE at plateau) and fuel-cycle / manufacturing plants (1,870 FTE)

	REACTOR	FUEL CYCLE
Skilled trades	24%	30%
Licensed ops	20%	14%
Engineering	14%	13%
QA / regulatory	12%	14%
Cyber / I&C	12%	8%
Fuel cycle techs	11%	13%
Program & support	8%	8%

Tier B · IAEA, TVA, Orano / X-energy

4 Annual hiring

Annual operations hiring equals new positions created as facilities ramp plus replacement hiring based on midpoint annual FTE and SOC-specific BLS 2025–35 separation rates. Because modeled operations staffing does not decline, the two components are additive.

~790–995

average hires a year, 2026–35 (low–high)



Tier B · BLS 2025–35 separations

WHAT THE ESTIMATE COVERS

IN THE ESTIMATE

Permanent operating FTE from each facility's first operating year through 2040

NOT ADDED

Commissioning-phase staffing (avoids double counting); indirect and induced jobs

SCENARIO-DRIVEN

ENTRA1 is 5,000 of the 7,900 plateau (~63%); phasing and TN allocation are Tier C

READING THE FIGURES

- **Hiring peaks in 2033** as ENTRA1, TVA and Orano ramp
- **Replacement alone is ~700 a year** at plateau
- **Low** = project ramp-up only; **high** = project ramp-up plus replacement. Once facilities reach steady state, replacement becomes the ongoing hiring requirement.
- **Headline figures use the high case**—ramp-up plus replacement.

OPERATIONS TAKEAWAY operations hiring never returns to zero - once plants reach steady state, replacement sustains ~700 hires a year.

TNWORKS

Note: Values rounded. Commissioning-phase staffing and indirect/induced jobs are not added. ENTRA1 phasing and Tennessee allocation are Tier C planning assumptions.
Sources: (1) Steady-state staffing: announced project information (see slide 20) and modeled numbers; (2) Operations mix: IAEA staffing references; TVA, Orano and X-energy staffing references; (3) BLS Employment Projections Table 1.10, Occupational Separations and Openings, 2025–35.