



Partnership for Nuclear Energy
Strengthening America's Global Leadership in Nuclear Energy



Nuclear Energy Academic Roadmap

Guiding Your Nuclear Educational Journey

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LETTER FROM MEGHAN MILLWOOD, ORAU President and CEO

It is a pleasure to introduce the Partnership for Nuclear Energy (PNE) Nuclear Energy Academic Roadmap (NEAR), a collaborative effort aimed at strengthening the future of nuclear education and workforce capacity building in the United States. Led by the ORAU STEM Accelerator, this roadmap represents the combined expertise and dedication of educators, industry leaders, government agencies and other stakeholders working together to address one of the most pressing challenges facing the nuclear energy sector – building a skilled and resilient workforce.

The nuclear energy sector is at a turning point, with incredible opportunities to grow and innovate. The demand for clean, reliable energy is on the rise. Building a strong pipeline of skilled professionals able to meet this demand is more important than ever. The NEAR outlines how we can support students, educators and professionals at every stage of their journey, ensuring they have the tools and resources needed to succeed. By fostering collaboration across schools, universities, industries, non-profit organizations and communities, this roadmap helps pave the way to meet current and future workforce challenges.

I want to express my gratitude to everyone who contributed to the development of the NEAR. Your commitment to collaboration and innovation has been instrumental in creating a roadmap that will guide the development of the next generation of nuclear professionals. ORAU is proud to support this initiative, and I'm excited to see how it will shape the future of nuclear energy, laying the foundation for a workforce capable of driving innovation and ensuring the long-term success of nuclear energy in the United States.

A handwritten signature in black ink that reads "Meghan Millwood".

MEGHAN MILLWOOD
President and CEO, ORAU



LETTER FROM MICHELLE GOODSON, OSA Director

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 Nuclear Energy Academic Roadmap possible. Special thanks go to Lori Brady at the Nuclear Energy Institute and Olivia Blackmon, the former director of the ORAU STEM Accelerator, for the initial vision and support, and to lead authors Sue Magidson and Lyn Potter for their dedication and expertise in bringing this effort to life. Thank you to the many contributors and advisors who brought diverse perspectives and deep knowledge to the project. Coming from academic institutions, industry organizations and government agencies, this group's collective efforts enriched the roadmap and ensured it reflects the multifaceted needs of the nuclear energy sector.

This collaboration exemplifies the power of teamwork and shared purpose. By bringing together voices from across academia, industry and government, we've created a document that is not only comprehensive but also uniquely positioned to address challenges and opportunities in nuclear education and workforce development. To everyone who contributed their time, insights, and passion – thank you for helping to shape a resource that will guide the future of nuclear energy in the United States.

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

MICHELLE GOODSON, SHRM-SCP
Director, ORAU STEM Accelerator

INTRODUCTION

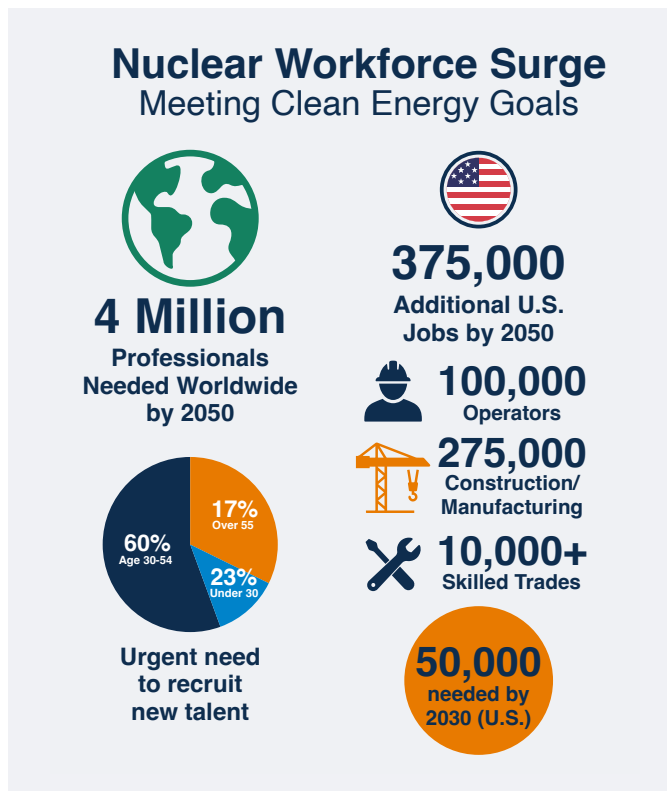
The U.S. nuclear energy sector is at a crucial juncture, presenting exciting opportunities to grow and strengthen its workforce. As the demand for carbon-free, reliable energy continues to grow, the need to attract and retain highly skilled workers becomes increasingly important. Addressing this challenge is essential to achieving a clean energy future and supporting the deployment of advanced reactors, modernization of regulatory frameworks, licensing improvements, and a resilient supply chain. To meet future energy needs, the U.S. Department of Energy (DOE) projects the sector will require over 375,000 skilled workers by 2050 to sustain ongoing nuclear power operations and continue next-generation reactor deployment.¹ Further critical needs for skilled nuclear workers are in the national security and environmental management sectors, which draw from the same workforce as nuclear energy. Additionally, the transition of an aging academic workforce underscores the importance of cultivating new talent and effectively transferring knowledge to the next generation.

Recognizing these needs, key industry organizations are coming together to develop proactive solutions. One such initiative is the Nuclear Energy Academic Roadmap (NEAR), which aims to strengthen pathways into nuclear careers, enhance educational infrastructure, and inspire a new generation of leaders in the field.

METHODOLOGY

To tackle the shortage of nuclear workers, workshops were held to brainstorm ideas on how to improve educational programs from early childhood education to higher education. These workshops aimed to find the best approaches to improve these programs. Goals included enhancing career awareness and pipeline development, assessing the financial support and other resources that academic institutions need, and optimizing academic resources including exploring new ideas to enrich education.

A total of 144 academic institutions participated, including 17 Kindergarten to 12th Grade (K-12) schools, 63 technical and community colleges, and 64 four-year institutions. Contributors were invited to participate based on their knowledge and interest in nuclear educational programs. They joined virtual sessions and used an online tool to provide feedback. Over 800 comments were collected and summarized by the ORAU Assessment and Evaluation team. The responses were categorized, themes identified, and subthemes elaborated through summaries, new ideas, and quotes from respondents. This information was documented in a qualitative analysis.



Graphic Credit: Lyn Potter and Nuclear News

The qualitative analysis helped create a framework that shaped the organization and structure of the roadmap. Four strategic priorities emerged: Enhancing Nuclear Career Awareness; Supporting Pipeline and Pathway Development; Identifying Financial Support, Resources and Programs; and Optimizing Academic Resources Through Collaboration. A description of each is below.

- **Enhancing Nuclear Career Awareness** informs people about various jobs, career paths, and earning potential. It aids students in choosing careers in the nuclear industry and helps employees find growth opportunities.
- **Supporting Pipeline and Pathway Development** aims to grow the nuclear workforce by linking individuals to education training and career opportunities that support advancement at every stage.
- **Identifying Financial Support, Resources, and Programs** ensures that financial barriers do not hinder students from pursuing careers in the nuclear field and guarantees the continuity and effectiveness of educational programs.
- **Optimizing Academic Resources Through Collaboration** involves sharing adaptable educational coursework and tools, equipment, and facilities among learning institutions to save time and money while helping to ensure consistent learning experiences across various educational settings.

Initially, these priorities were assigned to six groups: K-12, Vocational-Technical Schools, Community Colleges, Four-year Academic Institutions, Advanced Studies, and Professional Development. Based on this structure, a summary or synopsis was prepared to outline the main messages and recommendations for each group within each priority. Upon further review, it was observed that several of the recommendations for Vocational-Technical Schools and Community Colleges were nearly identical, as were the recommendations for Four-year Academic Institutions and Advanced Studies. Therefore, a decision was made to merge the Vocational-Technical Schools with Community Colleges and Four-year Academic Institutions with Advanced Studies, reducing the number of groups to four.



THE NUCLEAR ENERGY ACADEMIC ROADMAP: A CONTINUOUS JOURNEY



This roadmap represents a journey that begins with a child's first exposure to science concepts and continues through decades of professional growth. Each educational level builds upon the previous while preparing learners for the next phase, creating a seamless progression from curiosity to expertise. Understanding these connections is essential for stakeholders at every level, from elementary teachers introducing basic energy concepts, to senior executives mentoring working professionals throughout their careers.

The following sections trace this educational journey, beginning with the foundational years that shape initial interest and understanding. While each level has unique characteristics and challenges, the four strategic priorities remain consistent throughout, adapted to meet the specific needs and capabilities of learners at each stage. While there may be some overlap, readers are encouraged to explore recommendations beyond their immediate interests, as useful advice might be found elsewhere.

Two appendices are provided. The first appendix identifies all recommendations in the NEAR and specifies whether they require national action or can be addressed at the regional or local level. The second appendix presents a strategic approach for implementing selected recommendations, with further examples to be added in future updates of the NEAR.



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From Foundation to Application:
The Critical Bridge

As students complete their K-12 education with foundational knowledge and early career awareness in nuclear energy, they face their first major educational decision point. Many will choose pathways that lead directly into the nuclear workforce through vocational training and community college programs, while others will continue to four-year institutions or graduate programs. For those entering the technical and community college pathway, the transition represents a shift from broad exposure to focused, career-oriented education.

These institutions serve as critical bridges in the nuclear workforce pipeline, transforming early interest into practical, job-ready skills. They build directly upon the basic understanding developed in K-12 programs while providing the hands-on experience and technical competencies that industry employers specifically seek. The success of this transition relies heavily on strong partnerships between high schools, technical institutions, post-secondary educational institutions, and industry partners, ensuring that students move seamlessly from exploration to expertise without losing momentum or interest.

Vocational schools and community colleges expand access to nuclear careers by supporting adult learners and professionals transitioning from other fields. These institutions support both traditional and non-traditional students, helping the nuclear industry meet current workforce demands and develop future talent.

THE ROLE OF VOCATIONAL-TECHNICAL SCHOOLS AND COMMUNITY COLLEGES

Vocational or technical schools and community colleges both play crucial roles in preparing a skilled workforce in the nuclear energy industry, but they cater to different needs and populations:

- **Vocational or technical schools** focus on hands-on, short-term programs that prioritize job-ready skills with minimal general education, making them ideal for those looking to quickly enter a specific trade.
- **Community colleges** offer similar career-oriented training along with academic courses that can be transferred to four-year universities, providing flexibility for students to earn associate degrees and transfer credits toward bachelor programs in various fields.

Vocational or technical schools and community colleges are particularly well-positioned to support the nuclear industry by: delivering short-term, modular training for entry-level nuclear positions; facilitating pre-apprenticeship and apprenticeship pathways; offering opportunities for workers to



improve their skills throughout their careers; building strong partnerships with local employers and high schools; and making education more attainable and approachable for a wide spectrum of learners. By serving different educational needs and career goals, vocational schools and community colleges together form a comprehensive system that supports both immediate workforce entry and long-term academic advancement in the nuclear energy sector.

Despite their potential, many nuclear training programs face challenges such as declining enrollment, outdated curricula and laboratory equipment, and difficulty attracting qualified faculty. Public uncertainty about the future of nuclear energy also makes recruitment difficult. To meet the demands of both traditional and next-generation nuclear systems, the following actions are essential:

- Updating curricula with new technology such as virtual, augmented, and mixed reality tools
- Increasing outreach to high schools to build early career awareness
- Developing a sustainable pipeline of instructors through partnerships with local industry, structured onboarding, and professional development.
- Revitalizing participation in national programs like the Nuclear Uniform Curriculum Program (NUCP), a standardized curriculum for training nuclear plant workers developed by the Nuclear Energy Institute.

Enhancing and expanding vocational, technical, and community college programs is essential to securing a skilled, future-ready nuclear workforce. These institutions not only prepare the next generation of nuclear professionals but also ensure the long-term safety and viability of the U.S. energy infrastructure.

SUMMARY OF FINDINGS: VOCATIONAL-TECHNICAL SCHOOLS AND COMMUNITY COLLEGES

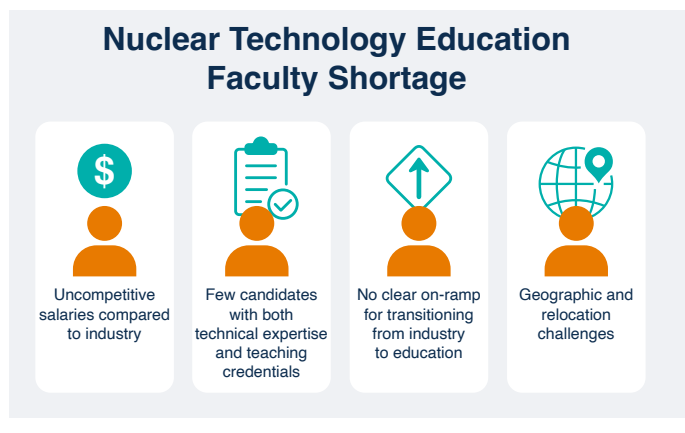
Vocational or technical schools and community colleges play a key role in developing the nuclear workforce, but face challenges that need addressing.

1. Educational Capacity and Faculty

Development: There's a shortage of qualified educators with both industry expertise and teaching skills. Recruiting and retaining faculty is especially hard due to salary disparities with the private sector. Competitive pay, structured onboarding, and professional development can help build an instructor pipeline.

2. Curriculum and Program Development:

Developing industry-aligned curricula takes time and support. Vocational schools and



Graphic Credit: Lyn Potter

community colleges need sufficient lead time to create programs that meet accreditation standards and evolving industry needs. Using experiential learning tools like augmented and virtual reality is crucial for modern nuclear training.

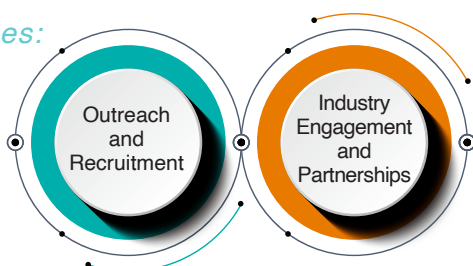
3. **Infrastructure and Equipment:** Access to specialized facilities and equipment is a significant barrier. Nuclear programs require industry-grade labs and safety infrastructure, which are costly to acquire and maintain. Without this, students cannot gain the hands-on experience necessary for safe and effective workforce entry.
4. **Industry Engagement and Partnerships:** Stronger, sustained partnerships with nuclear facilities and industry stakeholders keep training programs relevant and aligned with employer expectations. Renewed collaboration is necessary due to declining participation in programs like the Nuclear Uniform Curriculum Program (NUCP).
5. **Outreach and Recruitment:** A coordinated strategy to attract students to nuclear careers is essential. Engaging students, families, high school counselors, and educators early on that provide clear pathways from high school to postsecondary training helps build a robust talent pipeline. Coordinating efforts with local or regional industry partners and educational institutions will increase the impact across a broader community.
6. **Funding and Support:** Sustainable funding from government and industry partners is necessary to expand capacity, modernize facilities, and support both students and faculty to meet the growing demand for nuclear technicians and specialists.

STRATEGIC RESPONSE: FROM ANALYSIS TO ACTION



Strategic Priority 1: Enhancing Nuclear Career Awareness

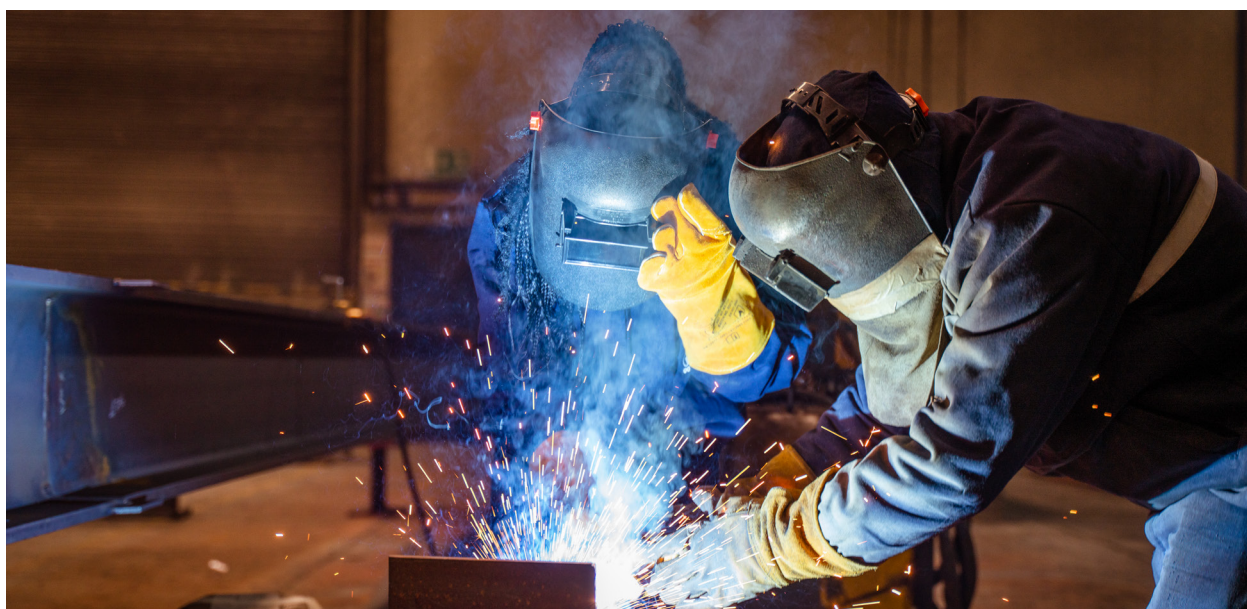
Addresses:



RECOMMENDATIONS:

- **Develop a Nuclear Energy Digital Hub:** Create a centralized platform for outreach and career exploration highlighting nuclear careers at all levels—from skilled trades to advanced degrees.
- **Unify Messaging Across Education Levels:** Launch a campaign to promote nuclear careers, addressing misconceptions and emphasizing the industry's role in carbon-free energy.

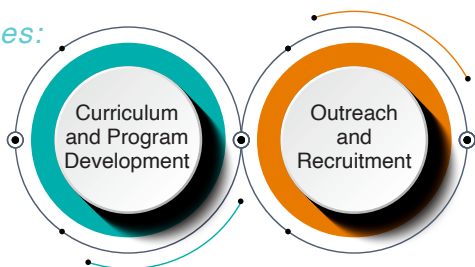
- **Create Interactive Career Pathway Tools:** Develop online platforms for students to explore nuclear careers, required skills, salary expectations, and testimonials from professionals.
- **Highlight a Range of Professional Journeys:** Showcase professionals with varied career paths and experiences to inspire the next generation of nuclear industry talent.
- **Strengthen Recruitment and Support Programs for Veterans and Emerging Talent:** Create targeted outreach and mentorship initiatives that leverage the specialized skills of veterans and professionals from nontraditional career paths, helping to drive innovation and expand the nuclear pipeline.
- **Integrate Career Awareness into STEM and CTE Programs:** Embed nuclear career pathways into existing STEM and CTE (Career and Technical Education) frameworks, such as the Green Workforce Integration cluster, aligning with student interests and labor market needs.
- **Use Immersive Technologies:** Use XR tools to simulate real-world nuclear environments, offering immersive experiences like facility tours and safety drills to enhance student engagement.
- **Provide Career Counseling and Support Services:** Provide nuclear industry career counseling, career guidance tailored to individual skills and interests, and networking opportunities to connect job seekers with industry professionals.
- **Launch Ambassador and Mentorship Programs:** Recruit industry professionals and recent graduates to serve as ambassadors and mentors to guide students through school visits, webinars, and networking events.
- **Foster Community and Industry Engagement:** Collaborate with educators and industry professionals to deliver interactive, engaging events such as career nights, STEM workshops, and mentorship programs. Focus outreach efforts on broad student participation—especially in rural, first-generation, and bilingual communities—and use student feedback to enhance future programming.





Strategic Priority 2: Supporting Pipeline and Pathway Development

Addresses:



RECOMMENDATIONS:

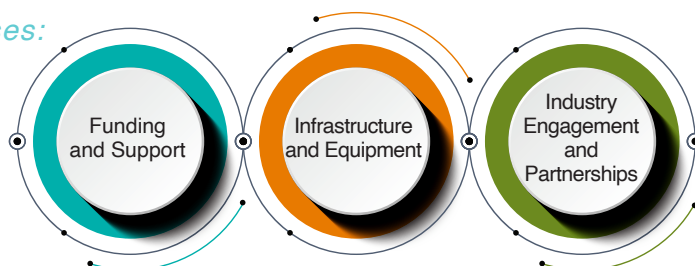
- **Expand Dual Enrollment and Early College Programs:** Partner with high schools to offer nuclear-related courses for vocational-technical school or college credit, building early interest and readiness. Develop nuclear-focused early programs, like summer institutes or career academies, to build awareness and provide hands-on experience in nuclear careers.
- **Formalize Transfer Pathways:** Create articulation agreements between academic institutions to ensure seamless credit transfer and continued education.
- **Offer Experiential Learning and Bootcamps:** Provide hands-on training to students through summer bridge programs, safety simulations, and real-world problem-solving challenges. Provide educator externships with nuclear industry partners to enhance knowledge and to support the integration of nuclear topics into curricula.
- **Develop Stackable Credential Programs:** Create modular training programs that lead to industry-recognized certifications, allowing students to build qualifications progressively.
- **Establish Apprenticeship Programs:** Develop structured pre-apprenticeship and apprenticeship pathways—registered and non-registered—designed to build a steady pipeline of skilled nuclear energy workers. These programs should combine hands-on experience with targeted instruction to meet evolving workforce demands and support long-term career growth in the sector.
- **Develop or Enhance Internship, Mentorship, and Alumni Networks:** Connect students with skilled tradespeople, alumni, and industry professionals for mentorship, job shadowing, and classroom engagement. Improve internship programs by introducing pre- and post-internship phases to introduce students to the industry and build longer-term connections.
- **Support for Emerging Talent:** Collaborate with local colleges and training organizations to offer targeted support services and outreach, ensuring students from varied backgrounds have tools for success in the nuclear industry.
- **Establish Industry Advisory Boards:** Form advisory boards with industry representatives to review and update curricula based on emerging technologies and workforce needs.

- **Integrate Advanced Nuclear Technologies:** Update curricula to include emerging technologies, reactor designs, and sustainability practices to keep pace with industry evolution.
- **Implement Data Collection Program:** Collect data on educational outcomes, student outcomes, employment rates, and satisfaction to guide educational program strategies.



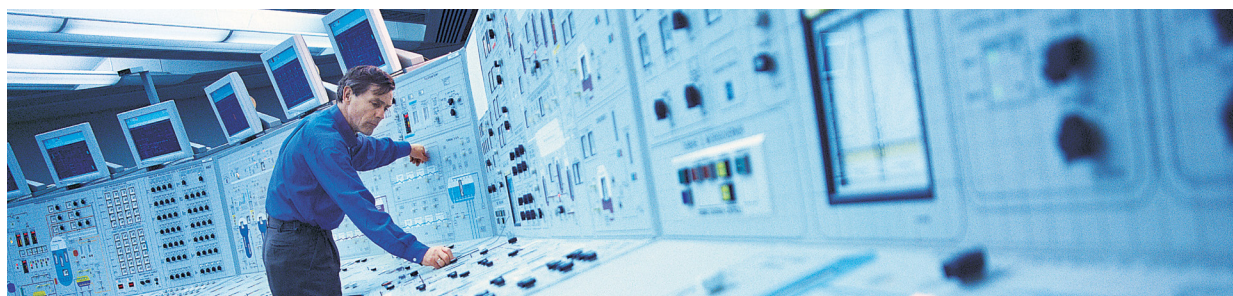
Strategic Priority 3: Identifying Financial Support, Resources, and Programs

Addresses:



RECOMMENDATIONS:

- **Develop Centralize Funding Portal:** Develop a comprehensive online hub listing scholarships, grants, internships, apprenticeships, and emergency aid for nuclear education.
- **Coordinate Work-Study and Part-Time Opportunities:** Partner with employers to offer flexible, paid work experiences aligned with students' educational programs.
- **Expand Financial Aid and Subsidized Programs:** Offer expanded financial assistance in the form of scholarships, stipends, and paid internships, to draw new talent into the nuclear industry and ensure cost is not a barrier to participation.
- **Provide Wraparound Support Services:** Offer childcare, mental health counseling, housing assistance, transportation support, and tutoring to reduce barriers for adult learners and student parents.
- **Secure Partnerships to Support Educators:** Collaborate with stakeholders to fund externships, professional development, and student financial aid.
- **Pursue Collaborative Grant Opportunities:** Encourage joint funding proposals that link colleges, industry, and government in workforce development initiatives.
- **Identify and Secure Funding:** Provide training on how to identify and secure external funding for program innovations and student support.





Strategic Priority 4: Optimizing Academic Resources Through Collaboration

Addresses:



RECOMMENDATIONS:

- **Form Inter-Institutional Partnerships:** Build coalitions among vocational-technical schools, community colleges, and universities to share best practices, faculty expertise, and curricular resources.
- **Create Educational Content:** Develop educational content that captivates students' interest while being tailored to their cognitive and developmental stage.
- **Develop Standardized Introductory Courses:** Create foundational nuclear courses and simulations shared across institutions to ensure consistent learning outcomes.
- **Launch a National Repository of Open Educational Resources:** Provide a platform for educators to share and adapt curricula, lab manuals, and XR modules.
- **Expand Access to Shared Facilities:** Advocate for broader participation in programs like the DOE Reactor Sharing Program to provide hands-on experience.
- **Establish and Institutionalize Faculty Mentorship Networks:** Pair emerging programs with experienced institutions to support curriculum development and industry alignment.
- **Invest in Faculty Development:** Offer training in emerging technologies, XR integration, and innovative teaching methods to keep instruction current.
- **Host Curriculum Innovation Summits:** Facilitate regular gatherings for educators to co-create content, share advancements, and pilot new instructional tools.
- **Establish a National Energy Education Advisory Board:** Create a board of educators, students, industry, and government representatives, convened at the federal level, to guide nuclear education strategy and resource development.

COMPLETING THE JOURNEY: A HOLISTIC APPROACH TO NUCLEAR WORKFORCE DEVELOPMENT



The professional development phase completes the nuclear workforce pipeline while also contributing to its renewal. Experienced professionals act as mentors, interactive presenters, and industry advisors for academic programs at every level, offering real-world insights that enrich classroom learning and inspire the next generation of nuclear professionals. This relationship—where industry professionals contribute to educational programs that, in turn, prepare their future colleagues—creates a sustainable ecosystem for nuclear workforce development.

The success of this system relies on strong, ongoing partnerships among all stakeholders: K-12 educators who plant the seeds of interest, vocational school/community college instructors who develop practical skills, university faculty who advance scientific knowledge, and industry professionals who apply this knowledge to address real-world challenges. Each level supports and depends on the others, creating a robust pipeline that can adapt to changing industry needs while maintaining the high standards of safety and excellence characteristic of the nuclear profession.

As the nuclear industry encounters new opportunities, from advanced reactor deployment to the growing recognition of nuclear energy's role in addressing global challenges, the strength of this educational pipeline will determine whether the U.S. can capitalize on these opportunities. The recommendations in this roadmap provide a framework for strengthening each stage in the pipeline, ensuring robust and effective connections between levels to support student achievement and highlight the success of workforce development initiatives.

ENDNOTES:

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Appendix A

Nuclear Energy Academic Roadmap Recommendations

The following four tables correspond to the Strategic Priorities outlined in the NEAR report. Each table presents a set of recommendations, categorized by group, and identifies whether it should be addressed at the national level, regional/local level, or both. To avoid redundancy, overlapping recommendations within the Strategic Priorities have been consolidated.

Strategic Priority 1: Enhance Career Awareness

Recommendation	K-12	Vo-Tech / Community College	University	Professional Development	Local / Regional	National
Expose K-12 Students to Nuclear Energy Fundamentals	●				●	
Integrate Nuclear Career Exploration into Curriculum	●				●	
Develop Unified Messaging Across Education Levels to Address Misconceptions and Promote the Benefits of Nuclear Energy	●	●	●		●	●
Highlight a Range of Professional Journeys	●	●	●		●	●
Develop a Digital Hub		●	●		●	●
Integrate Nuclear Career Pathways into Academic Programs		●	●		●	
Offer or Expand Experiential Learning Opportunities		●	●	●	●	
Provide or Enhance Career Counseling and Support Services		●	●	●	●	
Establish Nuclear Industry Ambassador Programs		●	●			●
Enhance Career Services and Mentorship Networks		●	●		●	
Create Interactive Career Pathway Tools		●			●	
Foster Community and Industry Engagement		●			●	
Develop Tiered Communication Strategies			●		●	●
Implement Targeted Communication Strategies				●	●	

Strategic Priority 1: Enhance Career Awareness, continued

Recommendation	K-12	Vo-Tech / Community College	University	Professional Development	Local / Regional	National
Develop Centralized Digital Platforms				●	●	●
Foster Tri-Sector Partnership Councils			●	●	●	●
Strengthen Recruitment and Support Programs for Veterans and Emerging Talent		●	●	●	●	●

Strategic Priority 2: Support Pipeline and Pathway Development

Recommendation	K-12	Vo-Tech / Community College	University	Professional Development	Local / Regional	National
Develop Reproducible STEM Programs	●				●	●
Partner Educators with Industry Experts	●				●	
Introduce Nuclear Safety Culture	●				●	
Offer or Expand Experiential Learning Opportunities and Bootcamps	●	●	●	●	●	●
Implement Multi-Channel Outreach	●	●	●		●	●
Expand Dual Enrollment and Early College Programs		●			●	
Develop Stackable Credential Programs and Certificates		●	●	●	●	●
Support for Emerging Talent		●	●		●	●
Develop Internships and Mentorship Programs and Alumni Networks		●	●		●	●
Establish Pre-Apprenticeship and Apprenticeship Programs		●			●	●
Foster Academic Pathways and Transfers and Formalize Transfer Pathways		●		●	●	
Integrate Advanced Nuclear Technologies into Curricula		●	●	●	●	●
Implement Data Collection Program and Track Outcomes and Share Successes			●	●	●	●

Strategic Priority 2: Support Pipeline and Pathway Development, continued

Recommendation	K-12	Vo-Tech / Community College	University	Professional Development	Local / Regional	National
Integrate Sociotechnical Competencies in Curriculum			●	●	●	●
Provide Research Placement Opportunities			●		●	●
Develop Leadership-Focused Graduate Programs			●		●	
Promote Faculty Exchanges and Industry Externships			●		●	
Establish Industry Advisory Boards		●	●		●	
Broaden Access to Training				●	●	●
Establish Regional Training Hubs				●	●	●
Update Training Curriculum Regularly				●	●	
Create Career Mapping Tools				●		●
Formalize Mentorship and Peer Learning				●	●	
Offer Detail Assignments and Rotational Programs				●	●	
Leverage Professional Expertise				●	●	
Integrate Advanced Learning Technologies into Training				●	●	

Strategic Priority 3:

Identify Financial Support, Resources, and Programs

Recommendation	K-12	Vo-Tech / Community College	University	Professional Development	Local / Regional	National
Develop a Centralized Funding Portal	●	●	●	●		●
Engage Industry and Government Partners	●	●	●		●	●
Expand Student Financial Support, Financial Aid, and Subsidized Programs	●	●	●		●	●
Develop a Strategic Sustainability Plan to Secure Long-Term Funding	●	●	●	●	●	●
Coordinate Work-Study and Part-Time Opportunities		●			●	
Provide Wraparound Support Services		●			●	
Pursue Collaborative Grant Opportunities		●	●		●	
Identify and Secure Funding		●			●	
Secure Long-Term Funding Commitments			●		●	●
Support Educator Development		●	●		●	●
Advocate for Dedicated Funding Streams				●	●	
Offer Financially Supportive Programs				●	●	●
Leverage Career Centers and Online Resources				●	●	
Encourage Professional Association Memberships				●	●	

Strategic Priority 4: Optimize Academic Resources Through Collaboration

Recommendation	K-12	Vo-Tech / Community College	University	Professional Development	Local / Regional	National
Raise Awareness and Promote Existing Programs	●				●	
Create an Open Educational Resource Repository	●	●	●	●	●	●
Develop Standardized Introductory Courses		●	●	●	●	●
Establish a Consortium for Online Learning	●				●	
Develop National Teaching Guidelines	●					●
Foster/Promote a Culture of Continuous Learning	●	●	●	●	●	
Form Inter-Institutional Partnerships		●	●		●	
Expand Access to Shared Facilities and Leverage Federal Reactor and Training Programs		●	●		●	●
Establish and Institutionalize Faculty Mentorship Networks		●	●	●	●	
Invest in Faculty Development		●			●	
Host Curriculum Innovation Summits		●	●		●	●
Establish a National Advisory Board at the Federal Level		●	●			●
Establish Academic Consortia			●		●	●
Develop Train-the-Trainer and Pedagogical Programs			●		●	

Strategic Priority 4: Optimize Academic Resources Through Collaboration, continued

Recommendation	K-12	Vo-Tech / Community College	University	Professional Development	Local / Regional	National
Strengthen Academic-Industry Partnerships				●	●	
Establish a Consortium for Online Learning				●	●	●
Incorporate Experiential and Immersive Learning				●	●	



Appendix B

Nuclear Energy Academic Roadmap Example Implementation Methods, Tools and Resources

The following four tables align with the Strategic Priorities outlined in the NEAR Report. The tables include example recommendations, implementation strategies, and possible tools and resources. Future updates of the NEAR Report will provide more examples.

Strategic Priority 1: Enhance Career Awareness

Recommendation: Develop Unified Messaging Across Education Levels to Address Misconceptions and Promote the Benefits of Nuclear Energy

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University	• Collaborate with non-governmental organizations (e.g., NEI, ANS, EPRI, ORAU PNE) and academic partners to standardize messaging • Develop a national branding campaign to promote the benefits and career pathways of nuclear energy • Develop and distribute informational materials (e.g., brochures, videos, digital content) tailored for diverse audiences • Ensure all outreach materials highlight current and emerging career opportunities in the nuclear sector • Share resources with schools, community organizations, and workforce partners nationwide • Host career fairs, webinars, and information sessions for students, families, and community members	• Nuclear industry websites - American Nuclear Society (ANS): https://www.ans.org/ - Nuclear Energy Institute (NEI): https://nei.org/ - World Nuclear Association: https://world-nuclear.org/ - International Atomic Energy Agency (IAEA): https://www.iaea.org/ - Nuclear Regulatory Commission (NRC): https://www.nrc.gov/ - Nuclear Innovation Alliance: https://nuclearinnovationalliance.org/ • Educational curricula and learning resources - ANS Navigating Nuclear Curriculum • National Energy Education Development curriculum • Virtual nuclear reactor tours (video or 3D) • Digital media and communication platforms - Social media platforms (e.g., LinkedIn, X, Instagram, TikTok) - Video hosting platforms (e.g., YouTube, Vimeo) - Podcasts focused on science, technology, and energy - Online webinar platforms (e.g., Zoom, Microsoft Teams) • Public engagement opportunities - National Science Week and other STEM-focused public events - Virtual or in-person outreach sessions for schools and community groups

Strategic Priority 1: Enhance Career Awareness, continued

Recommendation: Highlight a Range of Professional Journeys

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University	• Create video interviews and written profiles of professionals from varied backgrounds • Share stories through university, industry, and social media channels • Hold community events and school visits highlighting the benefits of a diverse workforce • Partner with professional societies for outreach events • Partner with institutions and schools serving a wide range of students	• Online platforms for hosting webinars (e.g., Zoom) • Social media platforms • Video hosting platforms (e.g., YouTube) • Industry conference • School-sponsored events • Nuclear Science Week • Boy and Girl Scouts merit badge workshops

Recommendation: Integrate Nuclear Energy Awareness into Broader STEM initiatives

Groups	Implementation Strategies	Tools & Resources
K-12	• Partner with STEM organizations to create and incorporate nuclear energy modules • Develop nuclear energy-focused workshops and activities at STEM fairs and events	• STEM organizations (e.g., Project Lead the Way, For Inspiration and Recognition of Science and Technology, Women in Science, ORAU K-12 STEM Education Programs) • STEM curricula providers • STEM fair organizers • Online learning platforms • National Science Week toolkits

Strategic Priority 1: Enhance Career Awareness, continued

Recommendation: Provide or Enhance Career Counseling and Support Services

Groups	Implementation Strategies	Tools & Resources
VO-TECH / CC University Prof. Devel.	• Establish formal career counseling and mentoring programs • Offer resume workshops and interview coaching • Host career fairs and information sessions • Maintain a job/internship board specific to nuclear careers • Assign dedicated career counselors • Establish mentorship programs tied to professional organizations	• Career offices and staff • American Nuclear Society: ans.org • Nuclear Energy Institute: NuclearWorks.org • Center for Energy Workforce Development: cewd.org/resources, getintoenergy.org • Nukeworker.com/job

Recommendation: Provide Research Placement Opportunities

Groups	Implementation Strategies	Tools & Resources
University	• Establish formal agreements for student research placements • Create joint research projects and internships • Establish summer research internships at national labs • Promote student participation in DOE/NEUP and NRC-funded projects	• Existing legal and partnership frameworks • Placement coordinators

Recommendation: Strengthen Recruitment and Support Programs for Veterans and Emerging Talent

Groups	Implementation Strategies	Tools & Resources
VO-TECH / CC University Prof. Devel.	• Partner with veterans' organizations and develop veteran-specific outreach and transition programs • Highlight transferable skills in recruitment activities • Offer scholarships and transition support (e.g., targeted transition workshops) • Offer credit for military experience	• Veterans Affairs offices – liaison staff • Transition program guides • Partnerships with Veteran groups • Industry mentors

Strategic Priority 2: Support Pipeline and Pathway Development

Recommendation: Create/Offer/Expand Experiential Learning Opportunities and Bootcamps

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University Prof. Devel.	• Partner with organizations that have created internship, mentorship, and summer programs for students • Integrate AR/VR modules in education and training • Host virtual reality tours and simulations • Integrate industry site visits, hands-on labs, and facility tours into curriculum • Partner with industry to obtain case studies for use in the classroom	• Existing experiential learning frameworks (e.g., Kolb's Experiential Learning Cycle) • Immersive learning tools (e.g., GE Hitachi Virtual Reality Solution, AR Deni) • Online learning platforms (e.g., Riipen.com) • Educational websites and databases (e.g., IAEA's Nuclear Energy Education Resource Hub, ScienceEducation.gov) • Simulations and interactive tools (e.g., PhET Interactive Simulations) • Virtual nuclear reactor tours (video or 3D)

Recommendation: Develop or Enhance Internship and Mentorship Programs and Alumni Networks

Groups	Implementation Strategies	Tools & Resources
VO-TECH / CC University	• Expand partnerships with companies for internship and co-op placements • Develop formal mentorship networks • Establish a phased internship program with pre-and post-internship activities to better prepare and retain students • Formalize and establish a communication plan for mentorship programs • Encourage graduate students to act as mentors • Organize peer learning forums and technical exchanges	• University career services and alumni associations • Professional organizations (e.g., ANS) • Government agencies and programs (e.g., NRC, DOE) • Online platforms and software (e.g., Engage2Serve, Pathways to Career Success, Zintellect.com)

Strategic Priority 2: Support Pipeline and Pathway Development

Recommendation: Develop Stackable Credential Programs and Certificates

Groups	Implementation Strategies	Tools & Resources
VO-TECH / CC University Prof. Devel.	• Partner with academic institutions, trade unions, and workforce boards • Develop curriculum and certification standards • Advertise availability of programs/ certificates	• “Stackable Credentials Tool Kit- Mapping Upward”, Center for Occupational Research and Development, April 2018 • Apprenticeship program templates • Certification bodies • Industry trainers

Recommendation: Provide Research Placement Opportunities

Groups	Implementation Strategies	Tools & Resources
University	• Establish formal agreements for student research placements • Create joint research projects and internships • Establish summer research internships at national labs • Promote student participation in DOE/NEUP and NRC-funded projects	• Existing legal and partnership frameworks • Placement coordinators • Utilize existing resources like the DOE ORISE Program and Zintellect.com

Recommendation: Integrate Advanced Nuclear Technologies into Curricula and Update Training Curriculum Regularly

Groups	Implementation Strategies	Tools & Resources
VO-TECH / CC University Prof. Devel.	• Contact nuclear organizations (e.g., NEI, ANS), to identify subject matter experts from industry and academia • Partner with subject matter experts and create modules to be used in established courses or summer programs	• NRC training materials • EPRI programs • Online DOE STEM Resources • Workshops (e.g., DOE/NNSA and Gateway for Accelerated Innovation in Nuclear (GAIN))

Strategic Priority 2: Support Pipeline and Pathway Development

Recommendation: Establish Industry Advisory Boards

Groups	Implementation Strategies	Tools & Resources
VO-TECH / CC University	• Define purpose and scope of the board • Work with professional organizations to identify and recruit members • Establish clear expectations and structure • Create an onboarding process • Manage board activities and outcomes	• Existing advisory boards and committees (e.g., TN Nuclear Energy Advisory Council, Advisory Committee on Reactor Safeguards, PNE Advisory Council) • Federal Advisory Committee Act • NRC Best Practices and Guidelines Reports to Congress

Strategic Priority 3:

Identify Financial Support, Resources, and Programs

Recommendation: Develop a Centralized Funding Portal

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University Prof. Devel.	• Coordinate with industry and government agencies to collect information on funding opportunities • Contact nongovernmental agencies or not-for-profit organizations to determine who would manage and maintain the database and set up its functionality • Create and launch a database listing scholarships, grants, and internship opportunities • Regularly update and promote funding opportunities to students and educators • Offer application workshops to students	• Development frameworks • Management software • Funding discovery and tracking tools • Web analytics • Social media management • Generative AI • NSF – Advanced Technical Education - Mentoring services for grant writing: - Mentor Connect: http://mentor-connect.org - Mentor Links: http://www.aacc.nche.edu/programs/mentorlinks/ - Mentor Up: https://atementorup.org

Recommendation: Develop a Centralized Funding Portal Engage Industry and Government Partners

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University	• Partner with industry to provide in-kind and financial support of nuclear education programs and resources • Partner with government agencies for financial support of nuclear education programs and resources	• Requests for Information • Industry days • One-on-one meetings • Industry and government association meetings • Trade groups • Conferences • NSF-ATE Business and Industry Leadership Team: https://connectedtech.org/business-industry-leadership-team/

Strategic Priority 3: Identify Financial Support, Resources, and Programs

Recommendation: Expand Student Financial Support, Financial Aid, and Subsidized Programs

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University	• Increase university and industry-sponsored scholarships • Apply for federal and state grants	• Promote and expand federal and state financial aid programs • Institutional scholarships and grants • Tuition assistance programs • Employer and Union assistance programs • Online scholarship databases (e.g., scholarships.com, financialaidtoolkit.ed.gov)

Recommendation: Develop a Strategic Sustainability Plan to secure long-term funding

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University Prof. Devel.	• Develop long-term funding strategies • Advocate for government and industry investment • Seek grant funding	• Building partnerships and collaborations • Online courses and workshops • Guidance from experts

Recommendation: Support Educator Development

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University	• Establish partnerships across academic institutions and identify educator needs • Create summer externships • Create research opportunities for educators	• Online learning platforms and courses • Professional development organizations, such as ORAU K-12 STEM Educator Programs • Conferences, workshops, bootcamps • Collaboration and mentorship

Strategic Priority 4: Optimize Academic Resources Through Collaboration

Recommendation: Create an Open Educational Resource Repository

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University Prof. Devel.	- Determine which non-governmental or not-for-profit organization will create, manage, and maintain repository - Evaluate existing open educational platforms and perform a gap analysis to identify unmet needs - Collaborate with industry and government agencies to collect, curate, and develop high-quality curriculum materials - Develop a searchable online database - Promote and communicate availability of resource repository to educators, institutions, and stakeholders	- Existing open educational resource platforms such as: - IAEA's e-learning platform - IAEA NUCLEUS information resource portal - DOE Fundamentals Handbook - Open Educational Resource: oercommons.org - Open.edu/openlearncreate - MIT OpenCourseWare - DOE's website: energy.gov/doe-stem - NRC's website: https://www.nrc.gov/reading-rm/ - ANS's website: nuclearconnect.org - Nuclearscienceweek.org - Idaho National Laboratory (INL) Education Resources: inl.gov/education - NSF-ATE Regional Center for Nuclear Education & Training: https://gonuke.org/ - ORAU K-12 STEM Education Lesson Plans: https://orau.org/k12/educator/lesson-plans.html

Recommendation: Develop Standardized Introductory Courses

Groups	Implementation Strategies	Tools & Resources
VO-TECH / CC University Prof. Devel.	- Establish a partnership with representatives from academia, industry, and government - Perform foundational planning - Develop course content and learning activities - Establish a peer review process - Collect feedback and make improvements	- Existing open educational resource platforms - Existing introductory courses from selected universities and organizations

Strategic Priority 4: Optimize Academic Resources Through Collaboration

Recommendation: Foster/Promote a Culture of Continuous Learning

Groups	Implementation Strategies	Tools & Resources
K-12 VO-TECH / CC University Prof. Devel.	• Offer micro-credentials • Host regular professional development seminars • Encourage attendance at conferences and seminars • Encourage lifelong learning incentives	• Existing technology including online learning platforms, VR/AR, data analytics, mentorship programs • In-house workshops, seminars, and on-the-job training • Government and industry specialized training (e.g., Westinghouse Nuclear)

Recommendation: Establish and Institutionalize Faculty Mentorship Networks

Groups	Implementation Strategies	Tools & Resources
VO-TECH / CC University Prof. Devel.	• Evaluate and expand existing mentorship programs and networks to support new training initiatives • Facilitate knowledge transfer between institutions through formal or informal agreements • Pair emerging programs with experienced mentors to guide curriculum and workforce alignment • Provide guidance on program development based on best practices	• Mentorship guides and handbooks • Mentorship programs and models (e.g., National Research Mentoring Network)

