



**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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*Developed in partnership with:*



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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

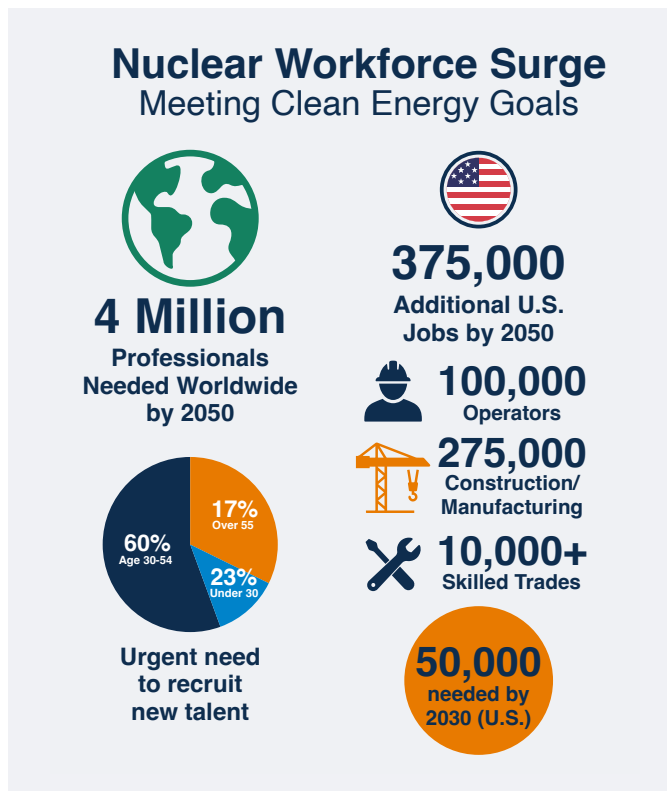
The U.S. nuclear energy sector is at a crucial juncture, presenting exciting opportunities to grow and strengthen its workforce. As the demand for carbon-free, reliable energy continues to grow, the need to attract and retain highly skilled workers becomes increasingly important. Addressing this challenge 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.<sup>1</sup> 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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## Building the Nuclear Workforce: **The Role of K-12**

K-12 education forms the bedrock of lifelong learning and career development. Introducing nuclear science and technology concepts early can ignite curiosity and lay the groundwork for future careers in the nuclear field. This early exposure helps students develop a foundational understanding that can evolve with their education. Early exposure to nuclear science cultivates a generation that is not only informed but also inspired to innovate. Sustained opportunities throughout K-12 are essential for maintaining student interest and participation. Family involvement is equally vital. Family and community support significantly influences students' academic interests and career aspirations. Hosting informative sessions and hands-on activities for students and families fosters a collaborative learning environment, provides sources of accurate factual information, and helps dispel misconceptions about nuclear energy and nuclear systems.



Empowering educators is essential to the success of K-12 nuclear education. Identifying knowledge gaps, offering targeted professional development, and building supportive educator networks will enable teachers to grow, share best practices, and confidently deliver accurate, engaging content. Involving industry partners in the design and implementation of nuclear-related programs ensures relevance and sustainability.

In summary, a comprehensive approach to nuclear education—targeting students, families, communities, and educators—strengthens the talent pipeline and supports a resilient, innovative future for nuclear energy.

## SUMMARY OF FINDINGS: K-12 GROUP

1. **Early Engagement:** Introducing nuclear science concepts at the elementary level through age-appropriate lessons, storytelling, and interactive demonstrations can build curiosity and long-term interest in the subject.
2. **Integration into STEM Programs:** Integrating nuclear energy awareness into STEM education initiatives, such as science experiments, provides opportunities for students to learn about nuclear technology and its relevance to various scientific and engineering disciplines. Nuclear science content may be incorporated into broader STEM curricula, including physics, chemistry, biology, and environmental science.
3. **Tailored Educational Activities:** Grade-specific activities—such as nuclear-themed games, model reactor kits, radiation detection experiments, and virtual lab simulations—can be introduced to students at appropriate levels. Establishing a centralized platform for sharing resources and lesson

plans across schools and districts would support teachers delivering these activities.

4. **Family and Community Involvement:** Actively involving families empowers them to support and direct their children toward potential careers in the nuclear sector. Assigning educational projects that involve family members and organizing events such as science nights, open houses, and community workshops are effective methods to educate family members.



**Graphic Credit:** National Institute of Health Sciences Office of Science Education & Outreach

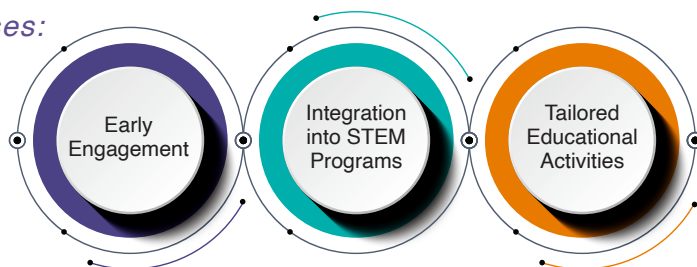
5. **Educator Support and Training:** Professional development workshops, online courses, and mentorship programs should be offered to enhance educator confidence and competence in nuclear topics. Peer networks and discussion forums can facilitate collaboration and resource sharing among educators. Efforts to maintain continuity and program sustainability may address staff turnover by building capacity among multiple educators.
6. **Sustainable Infrastructure and Resources:** Infrastructure and resources are necessary for promoting K-12 nuclear awareness and education. Funding is needed for curriculum development, lab equipment, network-based collaborations, and field trips. Partnering with industry to provide expertise, guest speakers, and internship opportunities can help address these needs. Sustainability efforts may include integrating programs within broader educational frameworks and involving stakeholders to ensure consistency despite personnel or leadership changes.

## STRATEGIC RESPONSE: FROM ANALYSIS TO ACTION



### Strategic Priority 1: Enhancing Nuclear Career Awareness

*Addresses:*



### RECOMMENDATIONS:

- **Expose K-12 Students to Nuclear Energy Fundamentals:** Introduce students to nuclear energy concepts in ways suited to their academic level. Elementary students might explore atoms and energy sources through games and experiments. Middle school students may study radiation and

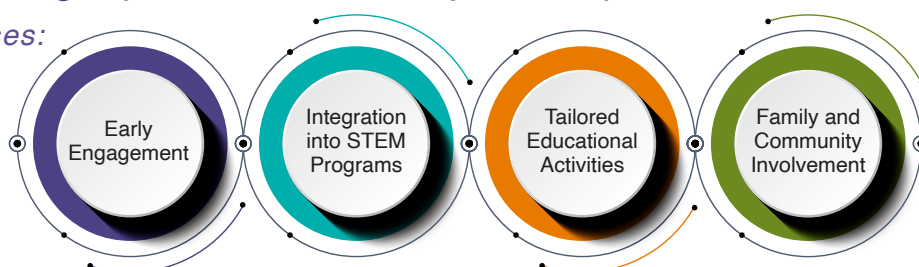
nuclear reactors with projects and simulations. High school students could tackle nuclear physics, reactor design, and environmental impacts through lab experiments, research projects, and industry collaborations.

- **Integrate Career Exploration into Curriculum:** Introducing students to nuclear careers broadens their understanding of the energy sector, encourages critical thinking, and prepares them for future roles. Including nuclear energy topics in wider energy education—through age-appropriate classroom activities, expert demonstrations, and use of XR tools—demonstrates the breadth of career opportunities.
- **Clearly Present the Benefits and Limitations of Nuclear Energy:** Educate students and families on nuclear energy’s contributions to clean power generation and climate change solutions, using fact-based, balanced resources—such as the ANS Navigating Nuclear Curriculum—to help them understand its benefits and limitations.
- **Unify Messaging and Address Misconceptions:** Develop a communication strategy to present consistent, accurate information about nuclear careers and dispel common myths.
- **Highlight a Range of Professional Journeys:** Showcase professionals with varied career paths and experiences to inspire the next generation of nuclear industry talent.



## Strategic Priority 2: Supporting Pipeline and Pathway Development

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### RECOMMENDATIONS:

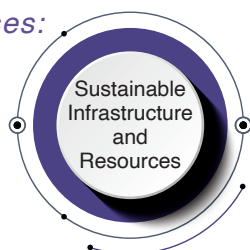
- **Develop Reproducible STEM Programs:** Create nuclear-focused STEM modules that are easy to implement across schools and adaptable to different regions and grade levels.
- **Partner Educators with Industry Experts:** Facilitate collaborations between teachers and nuclear professionals to co-develop curriculum and ensure scientific accuracy and educational relevance.
- **Introduce Nuclear Safety Culture:** Teach students the fundamentals of nuclear safety aligned with their academic level, using real-world case studies to instill a sense of responsibility and awareness.
- **Create Experiential Learning Opportunities:** Work with industry partners to offer internships, summer camps, and hands-on projects that introduce students to nuclear careers. While traditional internships may be restricted due to access, safety, and regulatory requirements, age-appropriate alternatives—such as job shadowing, project-based mentoring, university partnerships, or virtual lab simulations—can offer exposure to and maintain interest in nuclear careers.

- **Implement Multi-Channel Outreach:** Engage students through a variety of channels—online, in the community, and via STEM education partners—to increase understanding of nuclear energy and encourage career exploration.



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

*Addresses:*



#### RECOMMENDATIONS:

- **Develop a Centralized Funding Portal:** Create a national website listing scholarships, grants, internships, and teaching resources to streamline access and increase utilization.
- **Engage Industry and Government Partners:** Secure financial and programmatic support from commercial and public sector stakeholders to fund externships, curriculum development, and outreach.
- **Expand Financial Support to Students, Educators, and Family Members:** Offer scholarships and stipends tailored to meet a wide range of student needs making nuclear education more affordable and appealing.
- **Plan for Long-Term Sustainability:** Establish a strategic plan for maintaining and expanding funding programs, including regular evaluation and stakeholder engagement.





## Strategic Priority 4: Optimizing Academic Resources Through Collaboration

Addresses:



### RECOMMENDATIONS:

- **Raise Awareness of Existing Programs:** Increase awareness and adoption of established resources like ANS Navigating Nuclear, Scouting America's Nuclear Science Merit Badge, and Girl Scouts' Get to Know Nuclear Patch.
- **Create an Open Educational Resource Repository:** Develop a centralized platform for sharing adaptable, high-quality nuclear education materials among educators nationwide.
- **Establish a Consortium for Online Learning:** Collaborate across institutions to create and share online courses and lab simulations that provide consistent, scalable learning experiences.
- **Develop National Teaching Guidelines:** Create standardized, scalable, and flexible frameworks to help educators effectively teach nuclear topics while adapting to varied educational formats and learner profiles.
- **Foster a Culture of Continuous Learning:** Encourage ongoing professional development for educators to stay current with advancements in nuclear science and pedagogy.





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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

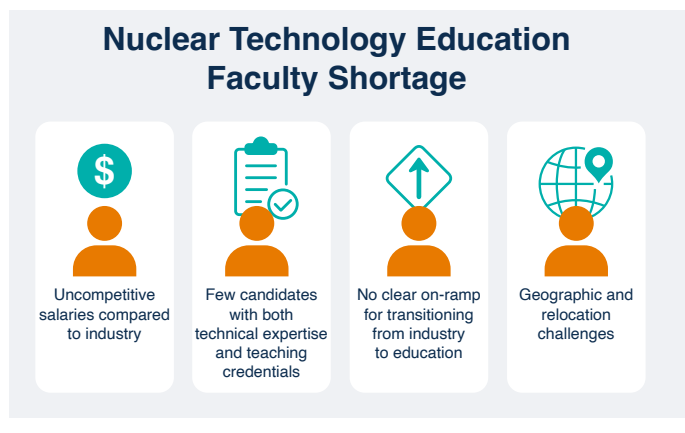
Vocational or technical schools and community colleges play a key role in developing the nuclear workforce, but face challenges that need addressing.

### 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.

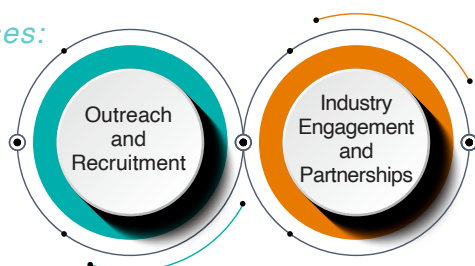
3. **Infrastructure and Equipment:** Access to specialized facilities and equipment is a significant barrier. Nuclear programs require industry-grade labs and safety infrastructure, which are costly to acquire and maintain. Without this, students cannot gain the hands-on experience necessary for safe 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

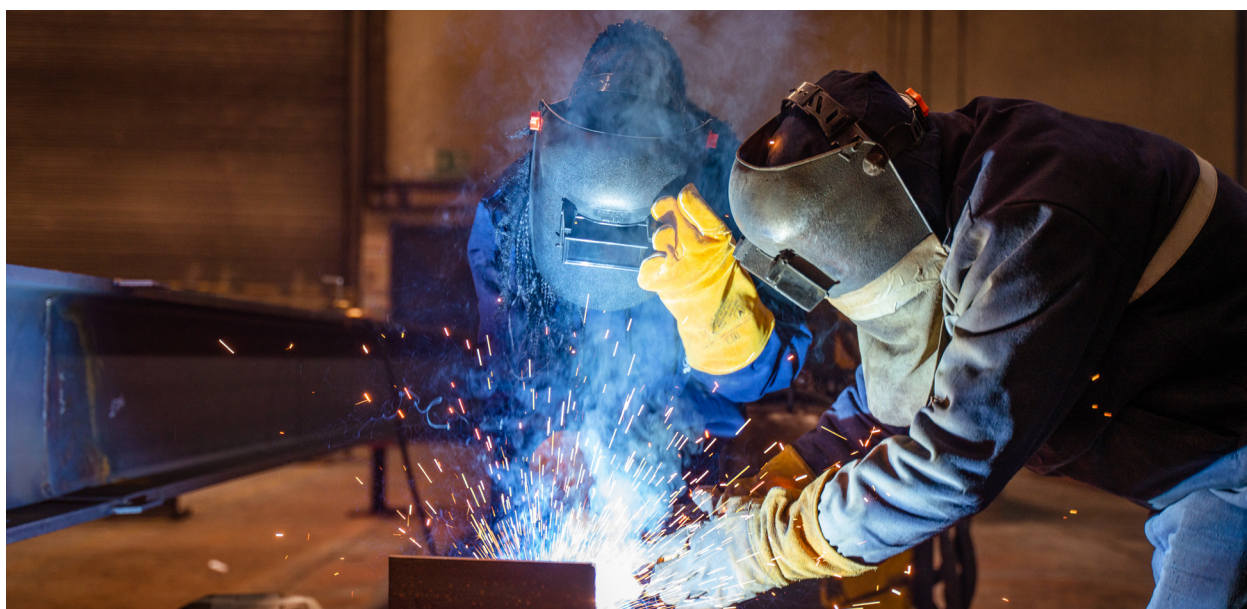
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### RECOMMENDATIONS:

- **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.

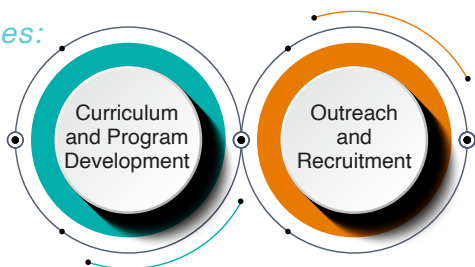
- **Create Interactive Career Pathway Tools:** Develop online platforms for students to explore nuclear careers, required skills, salary expectations, and testimonials from professionals.
- **Highlight a Range of Professional Journeys:** Showcase professionals with varied career paths and experiences 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

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### RECOMMENDATIONS:

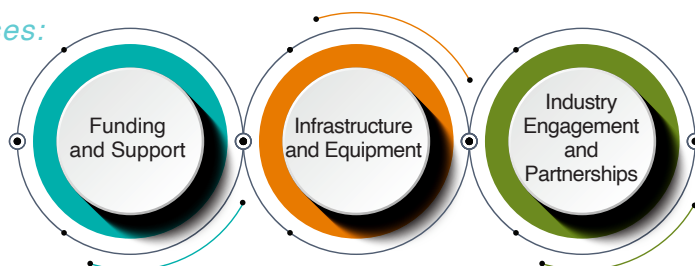
- **Expand Dual Enrollment and Early College Programs:** Partner with high schools to offer nuclear-related courses for vocational-technical school or college credit, building early interest and readiness. Develop nuclear-focused early programs, like summer institutes or career academies, to build awareness 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.



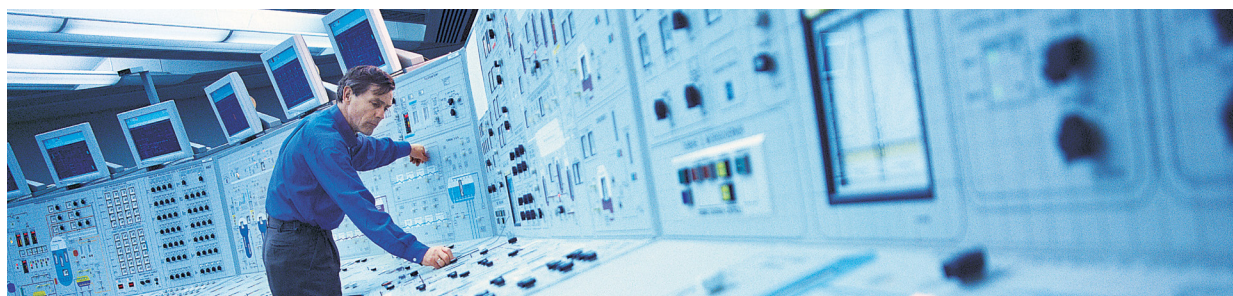
### Strategic Priority 3: Identifying Financial Support, Resources, and Programs

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.



**Partnership for Nuclear Energy**

*Strengthening America's Global Leadership in Nuclear Energy*



Advancing the Journey:

# From Application to Higher Education

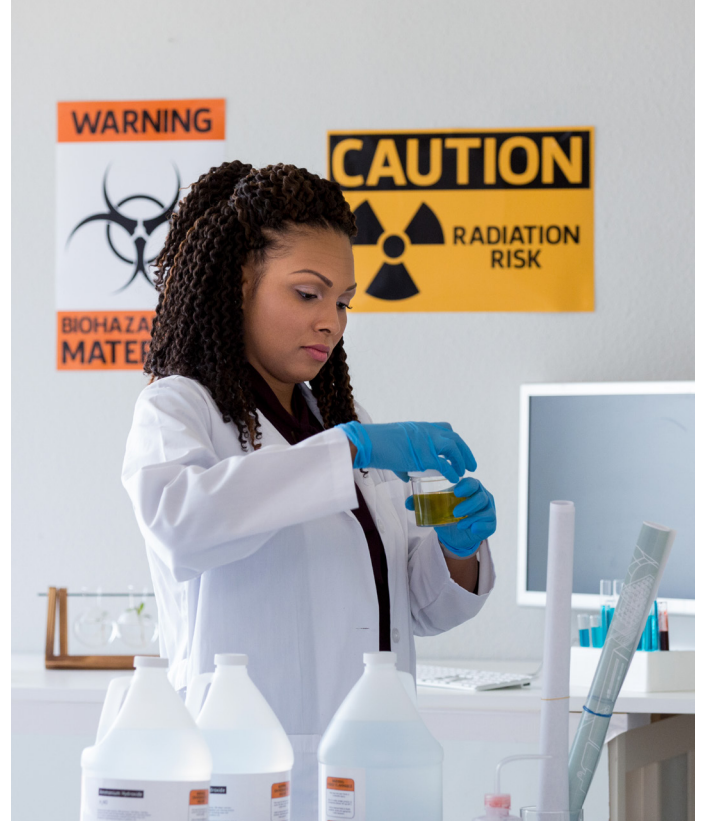
Many vocational school and community college graduates join the nuclear workforce, while others choose to continue their education at four-year institutions. This transition is key for future engineers, scientists, and technical leaders who will design next-generation reactors, innovate fuel cycle technologies, and guide the evolution of advanced nuclear systems.

Moving from vocational training or community college to a four-year university requires careful planning and coordination to ensure credits transfer smoothly and studies continue without interruption. Students with vocational training bring valuable hands-on experience, excelling in laboratory and research settings, but may need support in theoretical coursework and research methodologies, underscoring the importance of robust articulation agreements and transfer support services. Universities also attract students who discover nuclear science through varied academic routes, such as community college transfers or those who change majors mid-way their academic journey. These varied entry points enhance classroom dialogue, enrich learning environments, and create a more resilient talent pipeline.

As students advance in their undergraduate education, many start thinking about graduate studies. This transition is crucial for developing future leaders and innovators in the nuclear field, tackling challenges like advanced reactor design, AI integration, and sustainable fuel cycles. However, many undergraduates are unaware of graduate opportunities in nuclear engineering or doubt their readiness. Without clear guidance, talented students might choose other fields that have higher profiles or are better funded. To keep these students in the nuclear field, institutions need to offer mentorship, research opportunities, and clear paths to graduate funding.

Graduate programs also benefit from students in various disciplines like materials science, computer science, environmental engineering, and mechanical engineering, who bring new perspectives to nuclear challenges. Their interdisciplinary skills are especially valuable in areas like nuclear cybersecurity, digital twins, and hybrid energy systems.

Seamless transitions along the education pathway—from technical schools and community colleges to universities, and from undergraduate to graduate study—cultivate a vital, steady continuum of resilient, innovative, and future-ready nuclear talent.



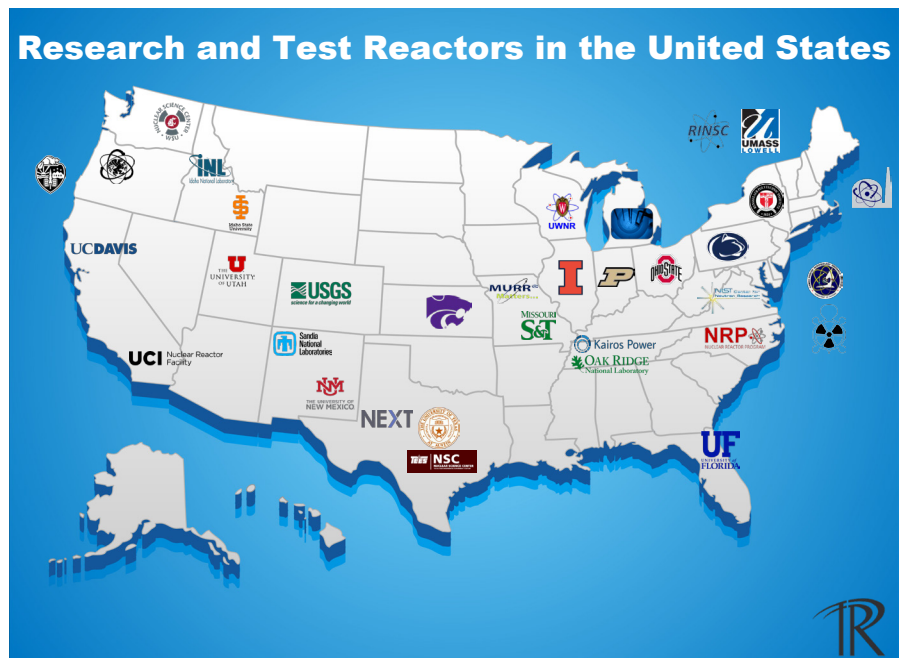
## THE ROLE OF UNIVERSITIES

Universities are central to developing the nuclear workforce, offering foundational education and advanced studies that prepare engineers and scientists to ensure the safety of existing plants and lead innovation in advanced reactors, fuel cycles, and digital technologies. Enrollment in nuclear higher education is not keeping pace with predicted demand for workers in the nuclear industry. According to the most recent ORISE *Nuclear Engineering Enrollments and Degrees Survey*, between 2012 and 2022 nuclear energy bachelor's degrees conferred dropped 25%.<sup>2</sup> In 2022, the number of master's degrees awarded showed promising growth, increasing by 20% compared to 2021.<sup>3</sup> Despite this progress, the graduation rate remains 16% below the levels seen in 2019.<sup>4</sup> Therefore, more work in career pipeline and pathway development must be done to improve enrollment and graduation rates. Strategic initiatives, such as awareness campaigns, industry-academic partnerships, and early exposure to nuclear topics, are needed to inspire students to pursue advanced degrees and long-term careers in the field.

Graduate education and research are vital for equipping students with specialized knowledge in reactor design, regulatory modernization, and sustainable fuel management. The supply of nuclear industry knowledge-workers, such as engineers and project managers, is highly constrained.<sup>5</sup> This supply is further eroded by competition from adjacent industries like renewable energy, aerospace, and cybersecurity that value skills in technical disciplines, safety, compliance, and problem-solving.<sup>6,7</sup>

Curriculum modernization is also essential. Efforts to modernize curricula must address emerging skills in nuclear cybersecurity, digital twins, and hybrid energy systems while integrating sociotechnical factors such as political, ethical, and environmental considerations. Flexible learning tools, including augmented reality and digital twins, will be key to engaging future nuclear professionals.

Financial constraints further limit advanced studies, underscoring the need for continued investment in graduate research, national laboratory collaborations, and standardized open-access curricula. The U.S. Department of Energy Office of Nuclear Energy has responded to this challenge by investing over one billion dollars in nuclear education and research, supporting university reactor upgrades and outreach to K-12 and vocational institutions to raise awareness of nuclear science and technology.<sup>8</sup> Sustained funding will be critical to meeting the growing demand for trained nuclear professionals.



**Graphic Credit:** National Organization of Test, Research and Training Reactors

# SUMMARY OF FINDINGS: UNIVERSITIES IN NUCLEAR WORKFORCE DEVELOPMENT

A robust nuclear workforce relies on a strong academic pipeline, from undergraduate to graduate studies. However, both levels face challenges that must be addressed through coordinated outreach, curriculum modernization, industry collaboration, and infrastructure investment.



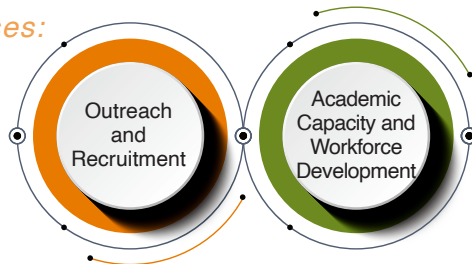
1. **Outreach and Talent Attraction:** Meeting the nation's nuclear workforce needs requires attracting future engineers and scientists—yet many students remain unfamiliar with the field. Proactive outreach to students, families, and educational influencers is key to building interest and growing a robust talent pipeline in the face of strong competition from other STEM disciplines, especially in the area of advanced studies.
2. **Academic Capacity and Workforce Development:** A continued shortage of faculty, expertise, and resources in undergraduate and graduate programs limits the supply of qualified professionals entering the nuclear field. Expanding access to education and promoting economic mobility—especially for students with limited opportunities—will help strengthen the talent pipeline and increase participation across the nuclear industry.
3. **Curriculum Relevance and Interdisciplinary Training:** Academic programs must be regularly reviewed and updated to align with evolving industry needs. This includes integrating emerging topics like nuclear cybersecurity, digital twins and hybrid energy systems, AI, data science, and materials science. Studies should also include interdisciplinary training to prepare graduates for sociotechnical challenges including political, ethical, financial, and environmental influences on the nuclear industry.
4. **Industry and National Laboratory Partnerships:** Strong partnerships with nuclear facilities, national laboratories, and industry stakeholders ensure academic programs remain relevant, offer practical experience, and meet accreditation standards. These collaborations also support faculty development through joint appointments, visiting scholar programs, and shared research infrastructure.
5. **Specialized Equipment and Facilities:** Nuclear programs require access to costly, specialized infrastructure such as training reactors, radiation and materials labs, and simulation software. Sustaining these investments amid competing institutional priorities can be challenging. Strategic funding, public-private partnerships, and access to shared facilities are necessary to maintain and expand these capabilities.
6. **Experiential and Flexible Learning:** Hands-on learning is important at all levels. Programs should incorporate augmented and virtual reality tools, digital simulations and virtual control rooms. Internships and co-op programs with structured pre- and post-engagement phases are also needed. Flexible learning options such as online and hybrid courses can also improve accessibility and attract a broader range of students to advanced nuclear studies.

# STRATEGIC RESPONSE: FROM ANALYSIS TO ACTION



## Strategic Priority 1: Enhancing Nuclear Career Awareness

Addresses:



## RECOMMENDATIONS:

- **Establish a Digital Hub:** Develop a centralized platform designed to facilitate outreach, career exploration, and access to educational resources. This hub will highlight nuclear careers across all levels, ranging from skilled trades to advanced degrees.
- **Develop Tiered Communication Strategies:** Launch targeted campaigns utilizing digital platforms, social media, and virtual reality to highlight nuclear career opportunities, compensation packages, and societal contributions. Tailor messaging for undergraduates and early-career professionals considering graduate studies.
- **Integrate Career Awareness into Curricula:** Incorporate nuclear career-related content into undergraduate general engineering and science courses to expose students from various disciplines to nuclear applications.
- **Promote Positive Perceptions of Nuclear Energy:** Implement consistent messaging across institutions to address misconceptions and highlight the role nuclear energy plays in providing a balanced energy portfolio and a reliable energy supply, addressing climate change, stimulating economic growth, and enhancing national security.
- **Showcase a Wide Spectrum of Career Role Models:** Develop outreach materials that feature modern nuclear professionals with varied journeys and skillsets to spark student interest and increase participation in the field.
- **Enhance Career Services and Mentorship Networks:** Expand university career services to include nuclear-specific job placement, internship and mentorship programs, and networking opportunities. Organize industry-led webinars and events to connect students with professionals.
- **Launch Ambassador and Mentorship Programs:** Recruit industry professionals and recent graduates to mentor students via school visits, webinars, and networking.

- **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.



## Strategic Priority 2: Supporting Pipeline and Pathway Development

Addresses:



### RECOMMENDATIONS:

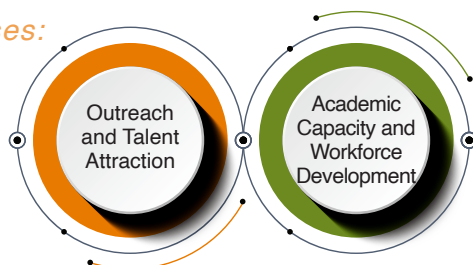
- **Create Stackable Credentials and Certificates:** Offer modular credentials for nuclear and non-nuclear students that apply toward degrees and demonstrate competencies in topics such as nuclear safety, safeguards and security, quality assurance, and risk management.
- **Expand Experiential Learning Opportunities:** Provide internships, co-ops, and lab-based learning to undergraduate and graduate students. Use XR tools to simulate nuclear environments and provide students with a practical understanding of various aspects of the nuclear energy industry.
- **Integrate Advanced Nuclear Technologies into Curriculum:** Revise educational programs to include the latest advancements in technology, reactor designs, and sustainable practice, ensuring alignment with the evolving nuclear industry.
- **Integrate Sociotechnical Competencies:** Include coursework on the political, ethical, environmental, and financial dimensions of the nuclear energy industry to better prepare students for real-world challenges.
- **Develop or Enhance Internship, Mentorship, and Alumni Networks:** Create structured internship and mentorship programs and provide networking opportunities with industry representatives.
- **Provide Research Placement Opportunities:** Establish research opportunities for faculty and students to work with academia and national laboratories such as DOE's Faculty and Student Teams (FaST) Program and expansion of the Nuclear Energy University Program (NEUP).
- **Develop Leadership-Focused Graduate Programs:** Create advanced programs that cultivate leadership through strategic thinking, communication, and innovation training.
- **Foster Academic Pathways and Transfers:** Build articulation agreements between two-year and four-year institutions to support seamless academic progression.

- **Support Nontraditional Students and Career Transitions:** Provide outreach and academic support to individuals pursuing nuclear careers through alternative pathways—such as adult learners career changers and first-generation students—through partnerships with veteran initiatives and regional colleges.
- **Promote Faculty Exchanges and Industry Internships:** Enable faculty to stay current with industry trends through exchanges and internships, enhancing teaching and research relevance.
- **Establish Tri-Party Advisory Boards:** Form boards with representatives from academia, government, and industry to review and update curricula based on emerging technologies and workforce needs.
- **Implement Data Collection Program:** Collect data on educational outcomes, student outcomes, employment rates, and student/employer satisfaction to guide and refine program strategies.



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

*Addresses:*



#### RECOMMENDATIONS:

- **Create Centralized Funding Portal:** Develop a national platform that lists scholarships, grants, internships, and fellowships specifically for nuclear education.
- **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.
- **Secure Long-Term Funding Commitments:** Develop strategic plans to ensure the continuity of funding through stakeholder engagement and adaptive planning.
- **Support Educator Development:** Provide externships and professional development funding for faculty to enhance instructional quality and industry alignment.
- **Pursue Collaborative Grant Opportunities:** Encourage joint funding proposals that link colleges, industry, and government to workforce development initiatives.



## 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.
- **Host Curriculum Innovation Summits:** Facilitate regular gatherings for educators to co-create content, share advancements, and pilot new instructional tools.
- **Establish Academic Consortia:** Form university consortia (e.g., ORAU University Partners Nuclear Innovation Cluster) to jointly develop and share online courses, lab simulations, and curriculum materials.
- **Create an Open Educational Resource Repository:** Fund and centralize access to adaptable, high-quality nuclear education content for institutional use.
- **Standardize Introductory Courses:** Develop open-source foundational courses to ensure consistent knowledge across institutions.
- **Establish Industry Advisory Boards:** Form advisory boards with industry representatives to review and update curricula based on emerging technologies and workforce needs.
- **Leverage Federal Reactor Sharing and Training Programs:** Expand the use of programs like Modeling, Experimentation and Validation (MeV) Summer School, Small Modular Advanced Reactor Training (SMART), and DOE Reactor Sharing to provide hands-on reactor training.
- **Develop Train-the-Trainer and Pedagogical Programs:** Provide faculty and graduate students with teaching skills and digital tools (e.g., digital twins, simulators) to improve instruction.
- **Establish Institutional Mentorship Networks:** Connect emerging programs with established institutions to assist with curriculum development and resource planning.
- **Foster a Culture of Continuous Learning:** Promote professional development through workshops, seminars, and adaptive learning strategies.





**Partnership for Nuclear Energy**

*Strengthening America's Global Leadership in Nuclear Energy*



The Final Ascent:

# From Academic Excellence to Professional Success

Transitioning from academia to professional practice is the climax of the educational journey where theoretical knowledge, research experience, and practical skills merge to create effective nuclear professionals. This stage also marks the beginning of life-long learning that is needed due to the ever-evolving nature of the nuclear industry.

New graduates bring fresh knowledge and perspectives but often lack the practical experience and institutional knowledge that comes only through professional practice. Conversely, seasoned professionals have valuable operational insight but may need help staying updated with technological advances. This dynamic creates opportunities for mutual learning and knowledge transfer within the nuclear workforce.

With many experienced workers nearing retirement, transferring knowledge and planning for succession are crucial to maintain industry standards. Professional development must therefore focus on integrating new talent while preserving institutional knowledge, creating a continuous cycle of learning to strengthen the industry.



## THE ROLE OF PROFESSIONAL DEVELOPMENT

The nuclear energy sector faces growing challenges in retaining skilled professionals due to competition from other STEM industries that may offer more flexible work environments and broader career options. This challenge is further compounded by an aging workforce and the growing demand for nuclear expertise as the industry expands to meet clean energy goals.

Professional development is essential for career advancement, skill enhancement, and maintaining competitiveness in a rapidly evolving job market. Continuous learning through specialized training and certifications helps individuals stay current with new technologies and best practices, while also boosting job satisfaction and career mobility.

For professionals transitioning from other fields, tailored programs are necessary to enhance their knowledge, bridge skill gaps, and provide hands-on experience. Collaboration between industry, academia, and government is crucial to support these transitions.

As the industry evolves, training programs must be regularly updated to reflect advancements in reactor technology, safety protocols, and digital tools, ensuring that the workforce remains agile and well-prepared.

# SUMMARY OF FINDINGS:

## PROFESSIONAL DEVELOPMENT IN NUCLEAR WORKFORCE DEVELOPMENT

1. **Mentorship Programs:** There is a lack of structured mentorship for early career professionals and new hires, resulting in inadequate support for onboarding and knowledge transfer. The absence of clear goals, regular check-ins, and feedback mechanisms in these programs exacerbates the issue.
2. **Leadership Development:** Mid-career and high-performing employees are not receiving sufficient leadership training, which hampers their ability to advance in their careers. Employees should be trained to effectively communicate, make decisions, engage stakeholders, and manage risks.
3. **Flexible Learning Platforms:** Access to e-learning platforms and modular training programs is needed for all workforce segments, especially those balancing work and education. Expanded access should include interactive content, mobile accessibility, and integration with certification pathways.
4. **Competency-Based Training Aligned with SAT:** Competency-based training should be aligned with the Systematic Approach to Training (SAT) to ensure consistent development of competencies for technical staff and operations personnel. This includes job task analysis, performance-based assessments, and periodic requalification.
5. **Career Pathways and Succession Planning:** Transparent career pathways that outline progression opportunities, required skills, and training milestones should be made available to all employees with an emphasis on retention and advancement. Succession planning should identify and prepare future leaders through targeted development plans and rotational assignments.
6. **Expanding the Talent Pool:** To strengthen the future workforce and drive innovation, recruitment strategies should target individuals across various fields and geographical areas. Key outreach partnerships may include veteran initiatives, career transition services, and minority-serving institutions.



7. **Training Continuous Improvement:** Training and human resources professionals should use data analytics to evaluate training effectiveness, identify skill gaps, and guide continuous improvement. Metrics should include learner performance, retention rates, and post-training job performance.
8. **Cross-Disciplinary and Cross-Industry Exchanges:** Encouraging exchanges for mid- to senior-level professionals and technical specialists with other industries like aerospace, defense, and digital tech can bring new perspectives and innovative practices to nuclear training. These exchanges can include temporary assignments, joint training sessions, and collaborative projects.

## COLLABORATION MODELS TO SUPPORT PROFESSIONAL DEVELOPMENT

To support professional development, several collaboration models should be established. Examples include:

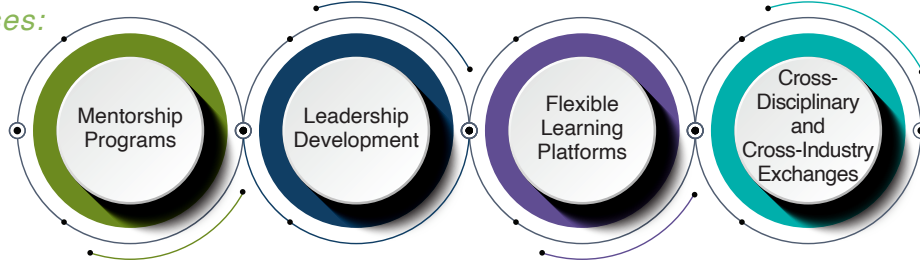
- **Industry-Academia Partnerships:** Collaborate with universities and technical colleges to co-develop curricula, offer joint certifications, and provide access to research facilities.
- **Government-Industry Initiatives:** Leverage federal and state programs to fund workforce development, such as DOE grants or apprenticeship programs.
- **Public-Private Consortia:** Form consortia that bring together utilities, vendors, regulators, and educators to align training standards, share resources, and coordinate outreach.
- **Cross-Sector Learning Networks:**  
Establish learning networks that include professionals from healthcare, cybersecurity, and manufacturing to share best practices in safety, digital transformation, and workforce resilience.





## Strategic Priority 1: Enhancing Nuclear Career Awareness

*Addresses:*



### RECOMMENDATIONS:

- **Implement Targeted Communication Strategies:** Use e-newsletters, digital portals, and social media to promote training, certifications, and advancement opportunities. Tailor messaging to different career stages and roles.
- **Establish Comprehensive Career Services:** Provide career counseling, mentoring, and transition support to help workers identify advancement paths, retrain, or shift roles within the industry.
- **Develop Centralized Digital Platforms:** Expand platforms like NuclearWorks.org to include interactive tools (e.g., career maps, assessments, success stories) that guide users through career options and educational pathways.
- **Foster Membership in the Partnership for Nuclear Energy (PNE) Advisory Council:** The PNE Advisory Council will be comprised of representatives from academia, government agencies, and industry leaders to address issues impacting the industry, including professional development.





## Strategic Priority 2: Supporting Pipeline and Pathway Development

Addresses:



### RECOMMENDATIONS:

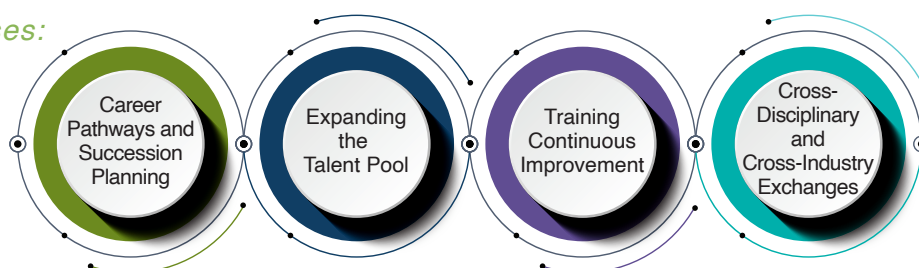
- **Expand Nuclear-focused Training Access:** Create flexible, regionally accessible training pathways tailored to a broad pool of learners, including career-changers, adult learners, and others entering the nuclear industry through nontraditional pathways, to welcome emerging talent and build workforce capacity across the region. Use regional hubs for local deployment of solutions.
- **Develop Stackable Credentials:** Create modular certification programs that allow workers to build expertise progressively and demonstrate competencies at each career stage.
- **Establish Regional Training Hubs:** Develop regional centers of excellence for nuclear training, equipped with specialized facilities and resources shared across to multiple organizations.
- **Update Training Curriculum Regularly:** Collaborate with industry to ensure training content reflects current technologies, regulatory changes, and operational needs.
- **Integrate Sociotechnical Competencies:** Include training on the political, ethical, environmental, and financial dimensions of the nuclear energy industry to prepare workers for career advancement.
- **Create Career Mapping Tools:** Design interactive digital guides that help workers visualize career paths, required skills, and advancement opportunities.
- **Expand Experiential Learning:** Include hands-on activities, simulations, real-world projects, and mentorship opportunities into training opportunities.
- **Formalize Mentorship and Peer Learning:** Establish structured mentorship programs and peer learning forums to facilitate knowledge transfer and professional growth.
- **Support Career Transitions:** Establish Department of Labor-certified pre-apprenticeship and apprenticeship programs to help workers transition into or advance within the nuclear field.
- **Offer Detail Assignments and Rotational Programs:** Offer opportunities for temporary assignments, cross-training, and job rotations so workers can gain hands-on experience in different roles and departments.
- **Leverage Veteran Experts:** Launch outreach and mentorship programs that highlight the valuable, transferable skills of veterans and seasoned professionals, enriching the nuclear talent pipeline.

- **Integrate Advanced Learning Technologies:** Use XR and simulation-based modules to enhance training effectiveness and provide immersive, risk-free learning environments.
- **Track Outcomes and Share Success:** Monitor participation, completion, and career progression; use feedback to refine programs and publicize success stories to inspire new entrants.



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

*Addresses:*



### RECOMMENDATIONS:

- **Advocate for Dedicated Funding Streams:** Work with policymakers and stakeholders to secure long-term funding for outreach, education, and workforce development initiatives.
- **Centralize Funding Information:** Create a user-friendly portal listing scholarships, grants, and internship opportunities specific to nuclear education and training.
- **Offer Financially Supportive Programs:** Provide tuition reimbursement, paid training leave, and certification support to encourage upskilling without financial burden.
- **Develop a Strategic Sustainability Plan:** Outline long-term goals, identify funding gaps, and implement strategies to maintain and grow financial support for workforce initiatives.
- **Leverage Career Centers and Online Resources:** Partner with educational institutions and workforce centers to expand access to job boards, resume workshops, and career planning tools.
- **Encourage Professional Association Memberships:** Reimburse membership fees for nuclear professionals to access training, networking, and industry-specific resources.





## Strategic Priority 4: Optimizing Academic Resources Through Collaboration

*Addresses:*



### RECOMMENDATIONS:

- **Strengthen Academic-Industry Partnerships:** Build coalitions between educational institutions, government, and industry to co-develop curricula, share facilities, and align training with workforce needs.
- **Create an Open Educational Resource Repository:** Develop a centralized platform for sharing adaptable, high-quality nuclear education materials across institutions.
- **Establish a Consortium for Online Learning:** Collaborate across organizations to create and distribute online courses and lab simulations, ensuring consistent access to advanced training.
- **Promote a Culture of Continuous Learning:** Encourage ongoing professional development through mentorship, cross-functional collaboration, and self-directed learning supported by flexible digital tools.
- **Develop Introductory and Open-Source Courses:** Standardize beginner-level modules and make them freely available to broaden access and support early engagement.
- **Incorporate Experiential and Immersive Learning:** Use XR-enhanced courses and digital learning environments to simulate real-world scenarios and improve skill retention.
- **Institutionalize Mentorship Programs:** Create adaptable mentorship frameworks that align with organizational culture, include training for mentors, and measure program effectiveness.



# 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.

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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 /<br>Community<br>College | University | Professional<br>Development | Local /<br>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 /<br>Community<br>College | University | Professional<br>Development | Local /<br>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 /<br>Community<br>College | University | Professional<br>Development | Local /<br>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 /<br>Community<br>College | University | Professional<br>Development | Local /<br>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 /<br>Community<br>College | University | Professional<br>Development | Local /<br>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 /<br>Community<br>College | University | Professional<br>Development | Local /<br>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 /<br>Community<br>College | University | Professional<br>Development | Local /<br>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<br>VO-TECH / CC<br>University | <ul style="list-style-type: none"> <li>• Collaborate with non-governmental organizations (e.g., NEI, ANS, EPRI, ORAU PNE) and academic partners to standardize messaging</li> <li>• Develop a national branding campaign to promote the benefits and career pathways of nuclear energy</li> <li>• Develop and distribute informational materials (e.g., brochures, videos, digital content) tailored for diverse audiences</li> <li>• Ensure all outreach materials highlight current and emerging career opportunities in the nuclear sector</li> <li>• Share resources with schools, community organizations, and workforce partners nationwide</li> <li>• Host career fairs, webinars, and information sessions for students, families, and community members</li> </ul> | <ul style="list-style-type: none"> <li>• Nuclear industry websites               <ul style="list-style-type: none"> <li>- American Nuclear Society (ANS): <a href="https://www.ans.org/">https://www.ans.org/</a></li> <li>- Nuclear Energy Institute (NEI): <a href="https://nei.org/">https://nei.org/</a></li> <li>- World Nuclear Association: <a href="https://world-nuclear.org/">https://world-nuclear.org/</a></li> <li>- International Atomic Energy Agency (IAEA): <a href="https://www.iaea.org/">https://www.iaea.org/</a></li> <li>- Nuclear Regulatory Commission (NRC): <a href="https://www.nrc.gov/">https://www.nrc.gov/</a></li> <li>- Nuclear Innovation Alliance: <a href="https://nuclearinnovationalliance.org/">https://nuclearinnovationalliance.org/</a></li> </ul> </li> <li>• Educational curricula and learning resources               <ul style="list-style-type: none"> <li>- ANS Navigating Nuclear Curriculum</li> </ul> </li> <li>• National Energy Education Development curriculum</li> <li>• Virtual nuclear reactor tours (video or 3D)</li> <li>• Digital media and communication platforms               <ul style="list-style-type: none"> <li>- Social media platforms (e.g., LinkedIn, X, Instagram, TikTok)</li> <li>- Video hosting platforms (e.g., YouTube, Vimeo)</li> <li>- Podcasts focused on science, technology, and energy</li> <li>- Online webinar platforms (e.g., Zoom, Microsoft Teams)</li> </ul> </li> <li>• Public engagement opportunities               <ul style="list-style-type: none"> <li>- National Science Week and other STEM-focused public events</li> <li>- Virtual or in-person outreach sessions for schools and community groups</li> </ul> </li> </ul> |

Strategic Priority 1: Enhance Career Awareness, continued

**Recommendation:** Highlight a Range of Professional Journeys

| Groups                             | Implementation Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tools & Resources                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12<br>VO-TECH / CC<br>University | <ul style="list-style-type: none"> <li>• Create video interviews and written profiles of professionals from varied backgrounds</li> <li>• Share stories through university, industry, and social media channels</li> <li>• Hold community events and school visits highlighting the benefits of a diverse workforce</li> <li>• Partner with professional societies for outreach events</li> <li>• Partner with institutions and schools serving a wide range of students</li> </ul> | <ul style="list-style-type: none"> <li>• Online platforms for hosting webinars (e.g., Zoom)</li> <li>• Social media platforms</li> <li>• Video hosting platforms (e.g., YouTube)</li> <li>• Industry conference</li> <li>• School-sponsored events</li> <li>• Nuclear Science Week</li> <li>• Boy and Girl Scouts merit badge workshops</li> </ul> |

**Recommendation:** Integrate Nuclear Energy Awareness into Broader STEM initiatives

| Groups | Implementation Strategies                                                                                                                                                                                                        | Tools & Resources                                                                                                                                                                                                                                                                                                                                                      |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12   | <ul style="list-style-type: none"> <li>• Partner with STEM organizations to create and incorporate nuclear energy modules</li> <li>• Develop nuclear energy-focused workshops and activities at STEM fairs and events</li> </ul> | <ul style="list-style-type: none"> <li>• 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)</li> <li>• STEM curricula providers</li> <li>• STEM fair organizers</li> <li>• Online learning platforms</li> <li>• National Science Week toolkits</li> </ul> |

## Strategic Priority 1: Enhance Career Awareness, continued

### Recommendation: Provide or Enhance Career Counseling and Support Services

| Groups                                     | Implementation Strategies                                                                                                                                                                                                                                                                                                                                                                                                     | Tools & Resources                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Establish formal career counseling and mentoring programs</li> <li>• Offer resume workshops and interview coaching</li> <li>• Host career fairs and information sessions</li> <li>• Maintain a job/internship board specific to nuclear careers</li> <li>• Assign dedicated career counselors</li> <li>• Establish mentorship programs tied to professional organizations</li> </ul> | <ul style="list-style-type: none"> <li>• Career offices and staff</li> <li>• American Nuclear Society: <a href="http://ans.org">ans.org</a></li> <li>• Nuclear Energy Institute: <a href="http://NuclearWorks.org">NuclearWorks.org</a></li> <li>• Center for Energy Workforce Development: <a href="http://cewd.org/resources">cewd.org/resources</a>, <a href="http://getintoenergy.org">getintoenergy.org</a></li> <li>• Nukeworker.com/job</li> </ul> |

### Recommendation: Provide Research Placement Opportunities

| Groups     | Implementation Strategies                                                                                                                                                                                                                                                                                                | Tools & Resources                                                                                                               |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| University | <ul style="list-style-type: none"> <li>• Establish formal agreements for student research placements</li> <li>• Create joint research projects and internships</li> <li>• Establish summer research internships at national labs</li> <li>• Promote student participation in DOE/NEUP and NRC-funded projects</li> </ul> | <ul style="list-style-type: none"> <li>• Existing legal and partnership frameworks</li> <li>• Placement coordinators</li> </ul> |

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

| Groups                                     | Implementation Strategies                                                                                                                                                                                                                                                                                                                                            | Tools & Resources                                                                                                                                                                                         |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Partner with veterans' organizations and develop veteran-specific outreach and transition programs</li> <li>• Highlight transferable skills in recruitment activities</li> <li>• Offer scholarships and transition support (e.g., targeted transition workshops)</li> <li>• Offer credit for military experience</li> </ul> | <ul style="list-style-type: none"> <li>• Veterans Affairs offices – liaison staff</li> <li>• Transition program guides</li> <li>• Partnerships with Veteran groups</li> <li>• Industry mentors</li> </ul> |

## Strategic Priority 2: Support Pipeline and Pathway Development

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

| Groups                                             | Implementation Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                  | Tools & Resources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12<br>VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Partner with organizations that have created internship, mentorship, and summer programs for students</li> <li>• Integrate AR/VR modules in education and training</li> <li>• Host virtual reality tours and simulations</li> <li>• Integrate industry site visits, hands-on labs, and facility tours into curriculum</li> <li>• Partner with industry to obtain case studies for use in the classroom</li> </ul> | <ul style="list-style-type: none"> <li>• Existing experiential learning frameworks (e.g., Kolb's Experiential Learning Cycle)</li> <li>• Immersive learning tools (e.g., GE Hitachi Virtual Reality Solution, AR Deni)</li> <li>• Online learning platforms (e.g., Riipen.com)</li> <li>• Educational websites and databases (e.g., IAEA's Nuclear Energy Education Resource Hub, ScienceEducation.gov)</li> <li>• Simulations and interactive tools (e.g., PhET Interactive Simulations)</li> <li>• Virtual nuclear reactor tours (video or 3D)</li> </ul> |

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

| Groups                     | Implementation Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Tools & Resources                                                                                                                                                                                                                                                                                                               |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VO-TECH / CC<br>University | <ul style="list-style-type: none"> <li>• Expand partnerships with companies for internship and co-op placements</li> <li>• Develop formal mentorship networks</li> <li>• Establish a phased internship program with pre-and post-internship activities to better prepare and retain students</li> <li>• Formalize and establish a communication plan for mentorship programs</li> <li>• Encourage graduate students to act as mentors</li> <li>• Organize peer learning forums and technical exchanges</li> </ul> | <ul style="list-style-type: none"> <li>• University career services and alumni associations</li> <li>• Professional organizations (e.g., ANS)</li> <li>• Government agencies and programs (e.g., NRC, DOE)</li> <li>• Online platforms and software (e.g., Engage2Serve, Pathways to Career Success, Zintellect.com)</li> </ul> |

## Strategic Priority 2: Support Pipeline and Pathway Development

### Recommendation: Develop Stackable Credential Programs and Certificates

| Groups                                     | Implementation Strategies                                                                                                                                                                                                                        | Tools & Resources                                                                                                                                                                                                                                                           |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Partner with academic institutions, trade unions, and workforce boards</li> <li>• Develop curriculum and certification standards</li> <li>• Advertise availability of programs/ certificates</li> </ul> | <ul style="list-style-type: none"> <li>• “Stackable Credentials Tool Kit- Mapping Upward”, Center for Occupational Research and Development, April 2018</li> <li>• Apprenticeship program templates</li> <li>• Certification bodies</li> <li>• Industry trainers</li> </ul> |

### Recommendation: Provide Research Placement Opportunities

| Groups     | Implementation Strategies                                                                                                                                                                                                                                                                                                | Tools & Resources                                                                                                                                                                                                   |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| University | <ul style="list-style-type: none"> <li>• Establish formal agreements for student research placements</li> <li>• Create joint research projects and internships</li> <li>• Establish summer research internships at national labs</li> <li>• Promote student participation in DOE/NEUP and NRC-funded projects</li> </ul> | <ul style="list-style-type: none"> <li>• Existing legal and partnership frameworks</li> <li>• Placement coordinators</li> <li>• Utilize existing resources like the DOE ORISE Program and Zintellect.com</li> </ul> |

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

| Groups                                     | Implementation Strategies                                                                                                                                                                                                                                                                | Tools & Resources                                                                                                                                                                                                                       |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Contact nuclear organizations (e.g., NEI, ANS), to identify subject matter experts from industry and academia</li> <li>• Partner with subject matter experts and create modules to be used in established courses or summer programs</li> </ul> | <ul style="list-style-type: none"> <li>• NRC training materials</li> <li>• EPRI programs</li> <li>• Online DOE STEM Resources</li> <li>• Workshops (e.g., DOE/NNSA and Gateway for Accelerated Innovation in Nuclear (GAIN))</li> </ul> |

## Strategic Priority 2: Support Pipeline and Pathway Development

### Recommendation: Establish Industry Advisory Boards

| Groups                  | Implementation Strategies                                                                                                                                                                                                                                                                                         | Tools & Resources                                                                                                                                                                                                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VO-TECH / CC University | <ul style="list-style-type: none"><li>• Define purpose and scope of the board</li><li>• Work with professional organizations to identify and recruit members</li><li>• Establish clear expectations and structure</li><li>• Create an onboarding process</li><li>• Manage board activities and outcomes</li></ul> | <ul style="list-style-type: none"><li>• Existing advisory boards and committees (e.g., TN Nuclear Energy Advisory Council, Advisory Committee on Reactor Safeguards, PNE Advisory Council)</li><li>• Federal Advisory Committee Act</li><li>• NRC Best Practices and Guidelines Reports to Congress</li></ul> |

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

**Recommendation:** Develop a Centralized Funding Portal

| Groups                                             | Implementation Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Tools & Resources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12<br>VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Coordinate with industry and government agencies to collect information on funding opportunities</li> <li>• Contact nongovernmental agencies or not-for-profit organizations to determine who would manage and maintain the database and set up its functionality</li> <li>• Create and launch a database listing scholarships, grants, and internship opportunities</li> <li>• Regularly update and promote funding opportunities to students and educators</li> <li>• Offer application workshops to students</li> </ul> | <ul style="list-style-type: none"> <li>• Development frameworks</li> <li>• Management software</li> <li>• Funding discovery and tracking tools</li> <li>• Web analytics</li> <li>• Social media management</li> <li>• Generative AI</li> <li>• NSF – Advanced Technical Education - Mentoring services for grant writing:               <ul style="list-style-type: none"> <li>- Mentor Connect:<br/><a href="http://mentor-connect.org">http://mentor-connect.org</a></li> <li>- Mentor Links:<br/><a href="http://www.aacc.nche.edu/programs/mentorlinks/">http://www.aacc.nche.edu/programs/mentorlinks/</a></li> <li>- Mentor Up:<br/><a href="https://atementorup.org">https://atementorup.org</a></li> </ul> </li> </ul> |

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

| Groups                             | Implementation Strategies                                                                                                                                                                                                                                                    | Tools & Resources                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12<br>VO-TECH / CC<br>University | <ul style="list-style-type: none"> <li>• Partner with industry to provide in-kind and financial support of nuclear education programs and resources</li> <li>• Partner with government agencies for financial support of nuclear education programs and resources</li> </ul> | <ul style="list-style-type: none"> <li>• Requests for Information</li> <li>• Industry days</li> <li>• One-on-one meetings</li> <li>• Industry and government association meetings</li> <li>• Trade groups</li> <li>• Conferences</li> <li>• NSF-ATE Business and Industry Leadership Team:<br/><a href="https://connectedtech.org/business-industry-leadership-team/">https://connectedtech.org/business-industry-leadership-team/</a></li> </ul> |

### 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<br>VO-TECH / CC<br>University | <ul style="list-style-type: none"> <li>• Increase university and industry-sponsored scholarships</li> <li>• Apply for federal and state grants</li> </ul> | <ul style="list-style-type: none"> <li>• Promote and expand federal and state financial aid programs</li> <li>• Institutional scholarships and grants</li> <li>• Tuition assistance programs</li> <li>• Employer and Union assistance programs</li> <li>• Online scholarship databases (e.g., scholarships.com, financialaidtoolkit.ed.gov)</li> </ul> |

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

| Groups                                             | Implementation Strategies                                                                                                                                                         | Tools & Resources                                                                                                                                                     |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12<br>VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Develop long-term funding strategies</li> <li>• Advocate for government and industry investment</li> <li>• Seek grant funding</li> </ul> | <ul style="list-style-type: none"> <li>• Building partnerships and collaborations</li> <li>• Online courses and workshops</li> <li>• Guidance from experts</li> </ul> |

#### Recommendation: Support Educator Development

| Groups                             | Implementation Strategies                                                                                                                                                                                                       | Tools & Resources                                                                                                                                                                                                                                                          |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12<br>VO-TECH / CC<br>University | <ul style="list-style-type: none"> <li>• Establish partnerships across academic institutions and identify educator needs</li> <li>• Create summer externships</li> <li>• Create research opportunities for educators</li> </ul> | <ul style="list-style-type: none"> <li>• Online learning platforms and courses</li> <li>• Professional development organizations, such as ORAU K-12 STEM Educator Programs</li> <li>• Conferences, workshops, bootcamps</li> <li>• Collaboration and mentorship</li> </ul> |

## Strategic Priority 4: Optimize Academic Resources Through Collaboration

### Recommendation: Create an Open Educational Resource Repository

| Groups                                             | Implementation Strategies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Tools & Resources                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12<br>VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Determine which non-governmental or not-for-profit organization will create, manage, and maintain repository</li> <li>• Evaluate existing open educational platforms and perform a gap analysis to identify unmet needs</li> <li>• Collaborate with industry and government agencies to collect, curate, and develop high-quality curriculum materials</li> <li>• Develop a searchable online database</li> <li>• Promote and communicate availability of resource repository to educators, institutions, and stakeholders</li> </ul> | <ul style="list-style-type: none"> <li>• Existing open educational resource platforms such as:               <ul style="list-style-type: none"> <li>- IAEA's e-learning platform</li> <li>- IAEA NUCLEUS information resource portal</li> <li>- DOE Fundamentals Handbook</li> <li>- Open Educational Resource: oercommons.org</li> <li>- Open.edu/openlearncreate</li> <li>- MIT OpenCourseWare</li> <li>- DOE's website: <a href="https://energy.gov/doe-stem">energy.gov/doe-stem</a></li> <li>- NRC's website: <a href="https://www.nrc.gov/reading-rm/">https://www.nrc.gov/reading-rm/</a></li> <li>- ANS's website: <a href="https://nuclearconnect.org">nuclearconnect.org</a></li> <li>- Nuclearscienceweek.org</li> <li>- Idaho National Laboratory (INL) Education Resources: <a href="https://inl.gov/education">inl.gov/education</a></li> <li>- NSF-ATE Regional Center for Nuclear Education &amp; Training: <a href="https://gonuke.org/">https://gonuke.org/</a></li> <li>- ORAU K-12 STEM Education Lesson Plans: <a href="https://orau.org/k12/educator/lesson-plans.html">https://orau.org/k12/educator/lesson-plans.html</a></li> </ul> </li> </ul> |

### Recommendation: Develop Standardized Introductory Courses

| Groups                                     | Implementation Strategies                                                                                                                                                                                                                                                                                                                | Tools & Resources                                                                                                                                                                      |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"> <li>• Establish a partnership with representatives from academia, industry, and government</li> <li>• Perform foundational planning</li> <li>• Develop course content and learning activities</li> <li>• Establish a peer review process</li> <li>• Collect feedback and make improvements</li> </ul> | <ul style="list-style-type: none"> <li>• Existing open educational resource platforms</li> <li>• Existing introductory courses from selected universities and organizations</li> </ul> |

#### Strategic Priority 4: Optimize Academic Resources Through Collaboration

##### **Recommendation:** Foster/Promote a Culture of Continuous Learning

| Groups                                             | Implementation Strategies                                                                                                                                                                                                                      | Tools & Resources                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K-12<br>VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"><li>• Offer micro-credentials</li><li>• Host regular professional development seminars</li><li>• Encourage attendance at conferences and seminars</li><li>• Encourage lifelong learning incentives</li></ul> | <ul style="list-style-type: none"><li>• Existing technology including online learning platforms, VR/AR, data analytics, mentorship programs</li><li>• In-house workshops, seminars, and on-the-job training</li><li>• Government and industry specialized training (e.g., Westinghouse Nuclear)</li></ul> |

##### **Recommendation:** Establish and Institutionalize Faculty Mentorship Networks

| Groups                                     | Implementation Strategies                                                                                                                                                                                                                                                                                                                                                                                                              | Tools & Resources                                                                                                                                                      |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VO-TECH / CC<br>University<br>Prof. Devel. | <ul style="list-style-type: none"><li>• Evaluate and expand existing mentorship programs and networks to support new training initiatives</li><li>• Facilitate knowledge transfer between institutions through formal or informal agreements</li><li>• Pair emerging programs with experienced mentors to guide curriculum and workforce alignment</li><li>• Provide guidance on program development based on best practices</li></ul> | <ul style="list-style-type: none"><li>• Mentorship guides and handbooks</li><li>• Mentorship programs and models (e.g., National Research Mentoring Network)</li></ul> |

