Special Recommendations Report:

OPPORTUNITIES FOR AMERICAN WORKERS IN ENERGY

July 9, 2025

Report from the 21st Century Energy Workforce Advisory Board (EWAB)

To Chris Wright, Secretary, U.S. Department of Energy (DOE)

The U.S. energy sector faces unique challenges of rising energy demand and variable prices.

The Energy Workforce Advisory Board has been tasked to develop a strategy for DOE to increase affordability & economic prosperity by creating employment opportunities for American workers, including drawing discouraged workers into the labor force*.

- DOE has a central role in addressing the energy sector's workforce needs. According to the 2024 U.S. Energy Employment Report:
  - 8.35 million people work in the energy sector, representing about 5.3% of all American jobs.
  - 76% of energy employers had at least some difficulty hiring as the energy workforce continued to grow.

- DOE can build on its strengths to grow new talent and implement ambitious energy policy.

**Delivering Emergency Price Relief for American Families and Defeating the Cost-of-Living Crisis - The White House*

DOE has unique assets to address the energy sector's workforce needs to unleash American Energy Dominance.

- STEM Education
- National Labs
- Bird's Eye View of Energy Changes
- Stakeholder Relationships
- Catalyst for Deployment & Commercialization
- International Role
- Credibility, Influence, Technical Expertise
- Research & Analysis

How can DOE lead a sector strategy to grow and sustain full employment in the energy sector?

1. Provide significant support to scale pathways for high-paying, high-quality energy careers, emphasizing apprenticeship and other earn-and-learn models, for new and incumbent workers.	→	*What is needed to equip American workers and training providers to deliver training at scale?*
2. Increase awareness and excitement of – and connections to – energy careers for career-ready adults and students, and their influencers.	→	*What is needed to raise the profile of energy careers and pathways to young learners and incumbent workers?*
3. Position DOE as the leader for innovative, effective, non-siloed solutions to support development of the workforce for 21st century energy needs, prioritizing place-based and industry sectoral strategies.	→	*How can DOE drive effective industry and place-based workforce solutions?*
4. Implement industry-specific strategies to grow and retain skills and fast-track workforce development for high-demand jobs while pursuing an all-of-the-above energy strategy.	→	*What do industries need to meet the Administration's energy goals to expand energy production, strengthen grid reliability and security, reinvigorate the nuclear industry, and advance critical minerals and materials competitiveness?*

Highlights
Cross-Cutting Recommendation 1

Provide significant support to scale pathways for high-paying, high-quality energy careers, emphasizing apprenticeship and other earn-and-learn models, for new and incumbent workers.

1. Establish **Energy Apprenticeship Centers of Excellence** to prioritize deployment of broadly accepted Registered Apprenticeship Programs in the sector that aim at:
   - Expediting RAP processes for new, emerging, and prioritized energy careers in partnership with DOL.
   - Developing RAP that offer portable credentials, especially for new and emerging occupations.
   - Convene partnerships to advance career-long learning to keep pace with technological advancements.
   - Skills mapping for evolving jobs and worker transition programs.
   - Increasing completion rates for apprenticeship programs, prioritizing early-stage apprentices and mentorships.
2. Assist **community colleges and other educations and training institutions** to secure equipment and instructors and develop career exploration and pre-apprenticeship/apprenticeship-readiness programs.
3. Call on the **National Laboratories** to create or expand technical training for in-demand jobs in their spaces of influence.
4. Modelled after the Khan Academy, create **a free Energy Academy** that offer widely accessible education resources.
5. Support talent development strategies for **rural and Tribal communities**.
6. Incentivize **employers** to **support work-based learning** and provide financial support.

Highlights
Cross-Cutting Recommendation 2

Increase awareness and excitement of – and connections to – energy careers for career-ready adults and students, and their career influencers.

1. Launch **communications campaigns** that lead individuals to tools that help identify career paths, training opportunities, and job access.
2. Educate **career influencers (workforce boards, educators and parents, etc.)** to encourage prioritization of energy industry careers.
3. Prioritize energy sector employment for **transitioning service members**, in partnership with DOD.
4. Establish **career navigation services** to energy training and employment opportunities for job seekers.
5. Strategize **K-12 energy and STEM education** to increase youth awareness and exposure, ensuring resources for educators, including:
   - Establish broad energy curriculum adoption strategy using the new Energy and Natural Resources Career Cluster for CTE, targeting Middle School+ students and educators to incorporate them in classrooms.
   - Incentivize industry to standardize competencies, training frameworks, and develop certifications that can complement classroom curriculum.
   - Encourage developing energy-focused youth apprenticeship programs.
6. Make available **scholarships in high-need fields** like nuclear, mining engineering and metallurgy for higher enrollment.

Highlights
Cross-Cutting Recommendation 3

Position DOE as the leader for innovation, effective, non-siloed solutions to support development of the workforce for the 21st century energy needs, prioritizing place-based and industry sectoral strategies.

1. Establish **clear energy strategy** to enable effective workforce planning and development by:
   - Addressing energy workforce in all DOE investments.
   - Establishing plans for workforce training and development to meet increasing energy demands and address supply chain challenges.
   - Prioritize siting, permitting, and equipment needs across industries expected to expand quickly and fast-track workers.
   - Earmark WIOA funding for critical, in-demand jobs in energy.
   - Position DOE as energy workforce data hub to inform industry with efficient workforce planning.
2. Competitively fund **intermediaries (trade associations, unions, non-profits, etc.) to implement DOE's sectoral workforce strategies** e.g., convene industry to identify/address industry needs, implement earn-and-learn programs, etc.
3. Convene **regional tiger-teams** to address workforce priorities, lead regional workforce development, and support communities impacted by evolving energy production needs, and respond quickly to moving workforce needs.
4. Prioritize removing barriers and creating pathways for **discouraged and displaced workers** through target employer engagement, industry partnership, and place-based strategy, focusing on:
   - Eliminating and minimizing workforce impediments like lack of family care, transportation, and internet access for training.
   - Incentivizing employers to hire individuals with criminal records.
   - Supporting income-based tuition scholarship for high-need disciplines.

Industry-Specific Recommendations

NUCLEAR

Demand for nuclear workforce is expected to triple by 2050.

DOE needs to remove barriers that impact nuclear employers' abilities to deploy new nuclear technologies, including: 1) an aging workforce, 2) high retirement rates, 3) a shortage of skilled professionals entering the industry, and 4) lack of training infrastructure to prepare individuals for highly technical positions.

ELECTRIC GRID (incl. AI infrastructure)

Global electricity demand will increase by about one-third by 2050 and growing AI infrastructure load growth will double or triple by 2028. A resilient, distributed, and intelligent grid is paramount for daily living and national security.

DOE must prepare a workforce that can build, maintain, and improve the grid for to face the anticipated growth in energy demand, especially from AI infrastructure expansion.

OIL, GAS, GEOTHERMAL

More than 1/4 of the workers in the US Oil, Gas and Mining Industry are 55 years of age or older with too few workers ready to replace those who are retiring, highlighting the looming loss of institutional knowledge as experienced workers retire and too few workers enter to replace this workforce.

DOE needs to prioritize retaining institutional knowledge and support workers with transferable skills across industries.

CRITICAL MINERALS & MATERIALS

Demand for workers is surging across the CMM supply chain, but more than half of the current workforce will retire by 2029 and interest in mining careers remains low.

DOE needs a broad approach to increase awareness and dispel misperceptions about careers in CMM and dispel misperceptions to build and retain the workforce that can advance American competitiveness in CMM.

Industry-Specific Recommendation: NUCLEAR

1. Provide clarity on policy support and **new reactor deployment timelines** to address talent pipeline development needs.
2. Complete **ARDP**, validating that demonstration reactors are essential to catalyzing targeted workforce development.
3. Explore a DOE-supported **traveling nuclear talent pool** to address needs for critical knowledge positions required for ST assignments.
4. Fast-track **training programs** in high-demand fields and increase financial support e.g., scholarships, tuition reimbursements.
5. Prioritize revitalization of **NUCP** to support programs vital to the nuclear workforce pipeline.
6. Support **regional nuclear workforce hubs** e.g., Nuclear Innovation Hub, TVA Nuclear Energy Workforce Center, UW Nuclear Energy Research Center.
7. Support the **enhancement of DOE's NEUP-funded academic programs** by allocating resources for hands-on nuclear training.
8. Prioritize NEUP-aligned partnerships that create **apprenticeships and cooperative education** in specialized fields.
9. Encourage states to sponsor training programs and fast-track certification programs, specifically for **ex-Navy nuclear personnel**.
10. Establish a pilot program to support **workers from coal plants** that are closing or being phased out into nuclear energy jobs in their communities.

Industry-Specific Recommendation: ELECTRIC GRID

1. Request funds under **Title III of the National Defense Production Act** to accelerate the manufacture of products that are currently compromising delivery of safe, cost-effective, reliable energy, including transformers and electric steel.
2. Invest in programs to train and recruit workers to meet the increasing demand on grid systems with the **anticipated expansion of AI infrastructure**.
3. Strengthen **regional coordination for "sharing workers"** during mutual assistance requirements as catastrophic events are increasing.
4. Utilize research within the Department, such as that from the Office of Electricity, that addresses **grid vulnerabilities and modernization requirements** and identify related talent needs and ensure proactive workforce strategies.
5. Invest in research to understand how **to use AI effectively to make better informed choices about grid control** and management of distributed energy resources and identify associated workforce competencies. Similarly, identify where and how AI tools can be used to enhance human skills e.g., virtual power plants where automation is needed for non-critical decision-making.

Industry-Specific Recommendation: OIL, GAS, GEOTHERMAL

1. Encourage the development of programs that help **retain aging workers as mentors** and trainers to support this critical juncture of knowledge transfer and those to better capture the unwritten knowledge of workers.
2. Evaluate which jobs are most likely subject to **AI-induced displacement**, and plan workforce resilience/transition accordingly.
3. Establish **Geothermal Centers of Excellence** to train oil and gas workers for geothermal jobs, replicating existing oil and gas training programs in geographies where geothermal energy plants exist. Establish partnerships between current training providers in the oil and gas industry with technology developers in the geothermal industry.
4. Promote **policy-certainty and tech-neutral incentives**. Ensure that energy policy does no harm to domestic producers and upstream sectors.
5. Facilitate interstate energy transport and market access to maintain a **resilient supply chain**.

Industry-Specific Recommendation: CRITICAL MINERALS AND MATERIALS

1. Expand upon DOE investments in **regional CMM initiatives (e.g., the CORE-CM)** to develop regional workforce ecosystems that will move from company-specific hiring to broader industry-wide approaches for workforce management and retention across all aspects of the CMM supply chain.
2. Support industry in identifying **solutions for project lifecycle coordination** to improve management of workforce development and project phase needs.
3. Enhance **nation-wide research and innovation capacity**, building upon DOE programs like the CMI Hub and METALLIC.
4. Provide **resources to US colleges and universities** to reinvigorate U.S. leadership in REE and CMM technologies.
5. Work with Congress to **enhance DOE's ability to stack grants and loans** with other federal support to better enable capital formation for projects and improve project viability, across the REE and CMM supply chain.
6. Collaborate with other Federal agencies on the design of **targeted and time-based tariffs and trade agreements** to ensure that international strategies complement domestic investments and enable U.S. manufacturing production capacity to scale, while countering malign actors and FEOC.
7. Create a **long-term, systems-based workforce strategy** by avoiding fragmented, grant-based approaches, mapping the full supply chain and filling gaps systematically.

THANK YOU

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