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A Workforce Development Maturity model to navigate the new era of load growth

Workforce development has risen in prominence over the past few years as employers face an increasingly tight labor market. Amid a growing gig economy, and robust job market, there may not be enough people to fill all open jobs in the country. Even if every unemployed person were to fill a job tomorrow, there would still be millions of unfilled jobs.[1]

For energy employers, the challenge in securing talent is exacerbated by unprecedented hiring demands within the sector: employers will need 17 million replacement workers and 15 million new workers over the next decade.[2]

These hiring demands reflect growth in power demand, a trend which is expected to accelerate. Moreover, the utility industry often competes for talent with the technology industry, which has the fastest growth in green skill demand.[3] The utility industry also competes with all other infrastructure-building industries for construction workers.   As power demand grows, these workforce trends will likely intensify. 2024 marked the end of a two-decade era of flat demand amid a data center and manufacturing infrastructure boom.[4] U.S. electricity consumption rose by 2% - a growth rate that is expected to hold in 2025 and in 2026 and primarily be met with increased generation from renewables.[5]

In 2025, the cleantech manufacturing, artificial intelligence (AI), and carbon industries will likely continue competing among themselves and other industrial customers to meet their infrastructural power demand at least in part with 24/7 clean energy.[6] Load growth from cleantech manufacturing plants, which could add 11 gigawatts (GW) of demand by 2030,[7] is an anticipated long-term trend due in part to supply chain reshoring to help meet domestic energy needs. Less anticipated may have been the pace and extent of data center load growth to power generative AI model training and use. Deloitte estimates data centers will drive approximately 44 GW of additional demand by 2030 (figure 1). The estimate draws on a range of 26 GW to 33 GW in 2024 to 60 GW to 80 GW by 2030.[8] Meanwhile, 2.7 GW in demand from direct air capture (DAC) plants may emerge by 2030.[9] This multipronged demand, totaling more than 57 GW by 2030, is currently outpacing supply. Renewables are in a race with other clean generation options to fill the resource gap.

Figure 1

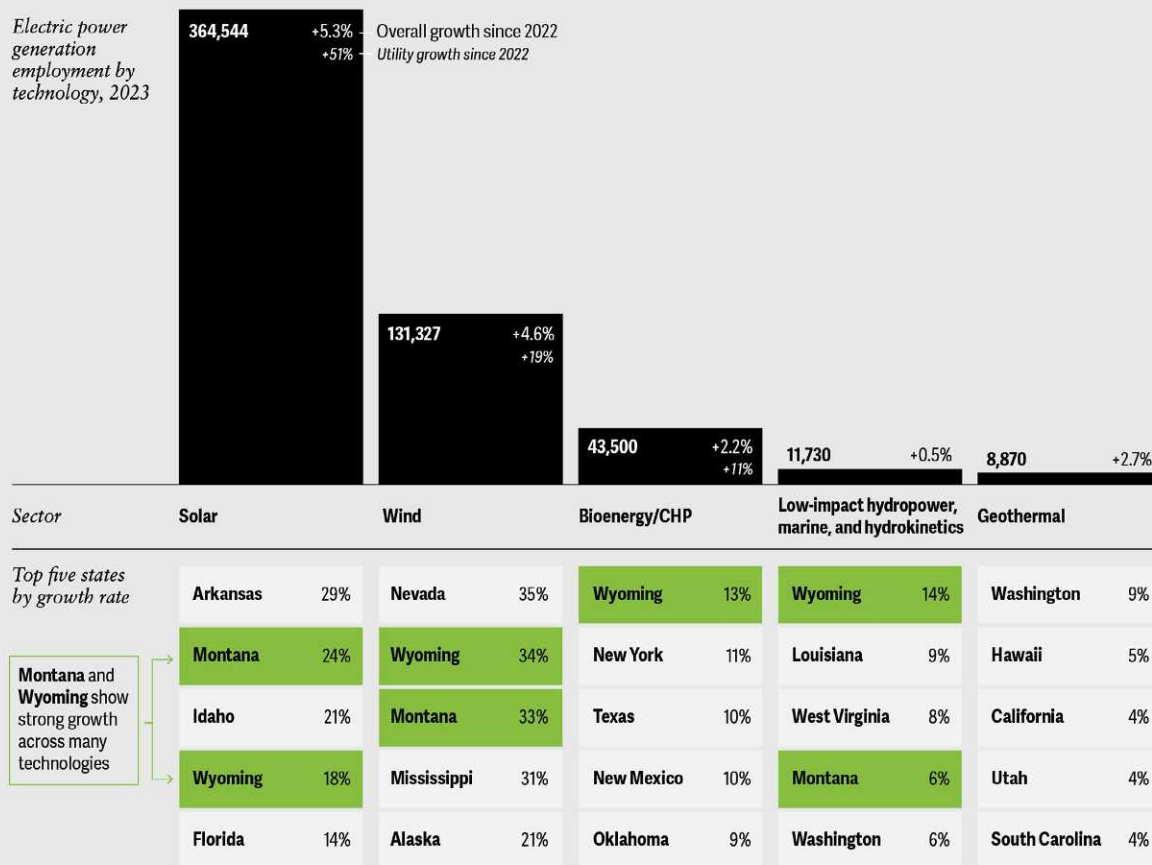### Cleantech, AI, and carbon markets to drive high renewable growth
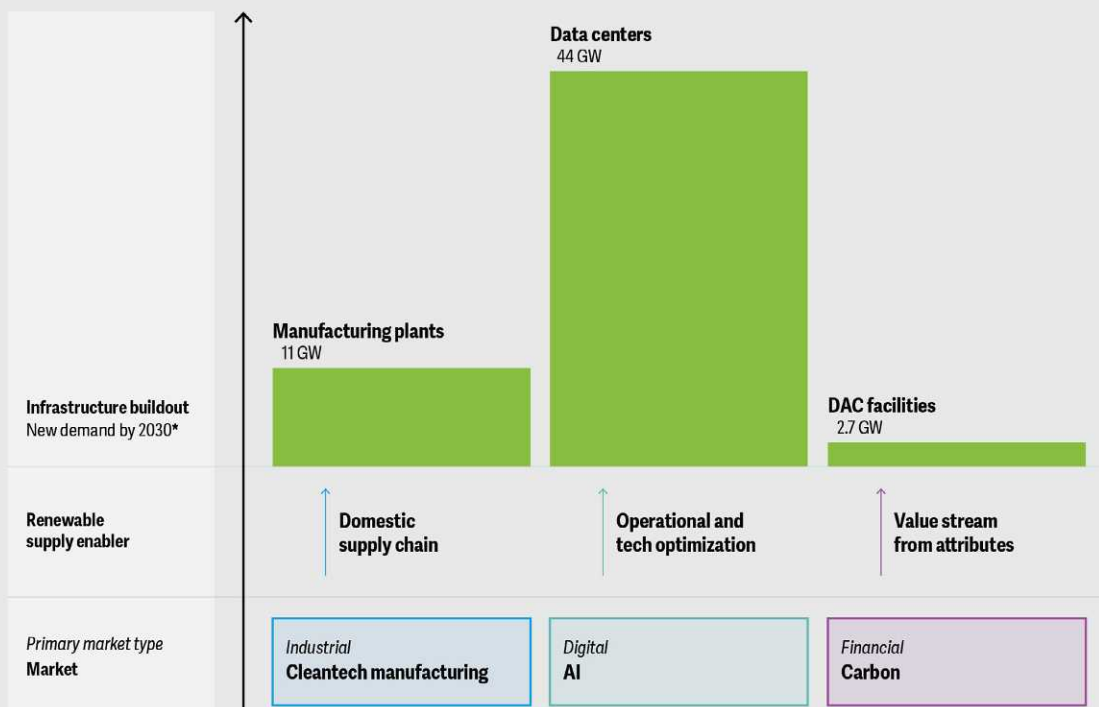
The acceleration of mature and emerging infrastructure buildout is reflected in employment growth. Clean energy jobs accounted for more than half of energy jobs created in 2023, and 79% of new electric power generation jobs; these jobs grew at twice the rate of jobs across the economy, while energy construction jobs grew at twice the rate of all construction jobs.[10] Hiring in renewables has grown to twice the level of hiring in fossil fuels.[11]

In 2023 and 2024, solar energy accounted for two-thirds of renewable jobs and wind accounted for a fifth (figure 2). While California and Texas continue to lead in terms of total renewable jobs and growth rates for emerging technologies, Wyoming and Montana have emerged as the fastest-growing regions, increasing renewable energy employment by 23% and 15%, respectively.[12]

Figure 2

Renewables job growth spreads across technologies and states

Electric power generation employment by technology, 2023

	Solar	Wind	Bioenergy/CHP	Low-impact hydropower, marine, and hydrokinetics	Geothermal
Overall growth since 2022 / *Utility growth since 2022*	364,544 +5.3% +51%	131,327 +4.6% +19%	43,500 +2.2% +11%	11,730 +0.5%	8,870 +2.7%

Sector	**Solar**		**Wind**		**Bioenergy/CHP**		**Low-impact hydropower, marine, and hydrokinetics**		**Geothermal**	
Top five states by growth rate	Arkansas	29%	Nevada	35%	Wyoming	13%	Wyoming	14%	Washington	9%
	Montana	24%	Wyoming	34%	New York	11%	Louisiana	9%	Hawaii	5%
	Idaho	21%	Montana	33%	Texas	10%	West Virginia	8%	California	4%
	Wyoming	18%	Mississippi	31%	New Mexico	10%	Montana	6%	Utah	4%
	Florida	14%	Alaska	21%	Oklahoma	9%	Washington	6%	South Carolina	4%

Montana and **Wyoming** show strong growth across many technologies

Source: Deloitte analysis of data from 2023 and 2024 US Energy and Employment Reports, US Department of Energy.
https://www2.deloitte.com/us/en/insights/research-centers/center-energy-industrials.html

Utilities and renewable developers could face challenges meeting their workforce needs amid growing demand across the supply chain (figure 3).[13] Challenges include securing a larger workforce, developing digital and project development skills, and hiring for completely new roles as they diversify their renewable portfolios.

Figure 3

Hiring difficulty amid renewables job growth and cleantech manufacturing job announcements

Renewables job growth
Percent change, 2022 to 2023

1.4%   3%   5%   7.5%   15%   >23%

Hiring difficulty
USEER employer survey, 2024

High ⟶ Highest

Clean tech manufacturing jobs announced
January 2023 to November 2024

0   500   1k   5k   10k   >20k

Sources: Deloitte analysis of data from 2023 and 2024 US Energy and Employment Reports, US Department of Energy, and Atlas Public Policy Clean Economy Tracker.

https://www2.deloitte.com/us/en/insights/research-centers/center-energy-industrials.html

Natural gas generation is also experiencing a resurgence in the wake of data center load growth. Utilities and investors are planning to add hundreds of new gas-fired units to the grid.[14] Meanwhile, some US oil and gas companies are entering the power business, including designing a gas power plant with carbon capture technology to directly supply data centers.[15] Fuels employers added 19,075 jobs in 2023.[16]

To meet this growing demand for workforce in the energy sector, the industry's workforce development needs to keep pace. Organizations should consider pursuing workforce development with a full, company-wide embrace driven by C-Suite leadership.

While many companies have committed to proactivity, they may have some challenges due in part to the absence of planning and benchmarking processes given limited expertise in workforce development. To help address this market gap, Deloitte worked with the Center for Energy Workforce Development (CEWD) to create a Workforce Development Maturity Model for the energy industry.

This tool addresses areas of workforce development focus and maturity differentiators in eight areas:

- Integrated workforce development strategy, structure, and governance

- Changing nature of skills

- External workforce cultivation

- Long-term external workforce development and planning

- External skill programming and development

- Policy and industry engagement

- Organizational culture and brand

- Internal training and development

As with other competencies assessed through such models, corporate strategists should assess baseline standings in each of the performance areas and identify where progression is most warranted for engagement with cross-disciplinary teams.

Workforce development framework

#1 Integrated Workforce Development Strategy, Structure, and Governance

- Invest in workforce development as the primary means of meeting organizational skills needs

- Securing leadership recognition of importance of and investment priority in workforce development (paramount with safety, community investment and organization's commitment to equity and belonging)

- Establishing cross functional teams – beyond HR (including operations, community engagement, philanthropy, etc.) that prioritize development of a skilled, diverse talent pipeline

- Adhering to DOL/DOC Good Jobs Principles, or similar focus on job quality and equity

- Mitigating barriers to employment, including degree and certification requirements, arbitrary or non-published testing practices, language requirements, preferred vs. required skills on job descriptions, and restrictions on hiring from justice impacted communities (all where feasible)

- Assessing for proficiency level from pre-hire to retire (candidates to employees)

- Creating trusted partnership between recruiters and hiring managers

- Effective assessment and selection of talent through regular measurement or TA metrics (e.g., time to close, turnover)

- Engage the workforce with performance management (PM), rewards, and commitments to diversity, equity, and inclusion and wellbeing as part of workforce strategies

- Consider the impact of – and on – teams and workgroups when designing work

- Utilizing AI and machine learning to better qualify candidates and optimize sourcing channels

#2 Changing Nature of Skills

- Use a common, trusted language to define the skills and capabilities of the workforce and the expected proficiency

- Conduct skills gap analysis, including for new and evolving positions (e.g., digital fluency)

- Delivering a compelling candidate experience that is personalized and values-based (catching up with other industries!)

- Ensure short and long-term recruitment strategies for both frontline/technical and office workers

- Leveraging new technologies to augment human skills capabilities (e.g., Generative AI, drones, process accelerators)

- Analyzing data to understand workforce trends, forecast head count, and augment workforce planning

- Drawing from retirement-based knowledge transfer processes anticipating waves of retirement

- Utilizing AI in assessing near-term and future skill needs (e.g. smart grid, battery storage)

- Sourcing strategy that selects candidates by values, capabilities, skills, and work ethic

#3 External Workforce Cultivation

- Leverage the alternative workforce (e.g., contractors) to supplement organizational skills and capability to create a positive impact (e.g., identify skills which can be developed through institutional training)

- Messaging about industry careers, showcasing employment value propositions that resonate with various target populations

- Providing workplace adaptations for diverse employment groups to accommodate their unique needs. (e.g., flexible and part-time work for caregivers, seamless remote-to-physical workplaces to accommodate the formerly incarcerated, sensory rooms to accommodate neurodiverse talent, apprenticeships for people without degrees etc.)

- Engaging with K-8 educators, students, and their parents to expose learners to STEM disciplines, including green energy, decarbonization and innovation

- Offering college and/or trade school scholarships for promising students

- Providing (paid) job shadow experiences for high school students, interns and work-ready adults (e.g., adults returning to the workforce)

- Administering (paid) internship experiences to high school, post-secondary students and work-ready adults

- Hosting career events, mentoring programs, and career connection events for high school, post-secondary students and work-ready adults

#4 Long-term External Workforce Development and Planning

- Develop and maintain workforce strategy with measurable talent acquisition goals, targeted benefits and compensation with commitments to diversity, equity, and inclusion

- Partnering with community and industry-based organizations to understand labor market data including supply and demand across geographies, and develop employment programs that prepare individuals for energy careers and hiring opportunities

- Developing partnerships with other industry organizations to share in creation of training programs targeted for the external talent market / potential candidates

- Developing PLAs, CBAs, CBPs with provisions for inclusive, effective workforce development practices

#5 External Skill Programming and Development

- Modernized training that delivers learning through engaging and interactive skill modalities (e.g., virtual reality training, WalkMe step by step instruction overlay)

- Prioritizing skills identification and training for opening new career opportunities in the industry

- Developing proficiency guidelines to assess for desired levels of skills of candidates / talent market

- Ensure veteran talent can access and utilize transition service benefits for training

- Sponsoring U.S. Department of Labor Registered Apprenticeship Program

#6 Policy and Industry Engagement

- Monitor workforce development related legislation, including funding streams, in local, state and federal policy for potential engagement

- Engage with federal agencies on workforce development priorities that can impact your company and the industry

- Proactive engagement with workforce boards, including through volunteer leadership, leveraging their role as convenors, collaborators, and navigators of the public workforce ecosystem

- Engage with other energy businesses in your region and/or business type for collaborative action/sector strategies (e.g. training, career events, curriculum development, representation, policy education, identifying and addressing external entry barriers into the industry)

#7 Organizational Culture & Brand

- Foster a culture of innovation, challenging the norm (while continuing to prioritize safety), and rewarding growth and development

- Embrace a colleague-for-life mindset that recognizes an individual's current role as only one chapter in an ongoing story

- Use consistent onboarding experiences that reinforce the culture and establish ways of working

- Hold leaders accountable for demonstrating trust, transparency, and inclusivity every day

- Reinforce a collaborative culture that recognizes and enables productivity through technology that connects the workforce in the design of work

- Provide support, resources and accommodations for people of all identities, backgrounds and abilities and removing barriers for new workers such that all workers can feel like they belong

#8 Internal Learning & Development

- Prioritize training for new career opportunities within the company, rather than task training for specific jobs

- Enable workers to identify and build skills, assess proficiency levels and leverage technology to personalize their development

- Provide clear career pathing and advancement opportunities for all workers

- Accurately predict future skill needs and use skills-related data to inform workforce development decisions and investments

- Leverage relationships across talent and the business to inform both current skill and future skill needs, workforce development decisions and investments.

- Continue to evaluate how learning opportunities should be offered to match skills needs

- Highlight skills and capabilities to develop training for workforce to influence their career goals and aspirations

Progression of capabilities

Differentiating Practice	Level 1	Level 2	Level 3	Level 4
1. Integrated Workforce Development Strategy, Structure, and Governance	• Focus on managing current business needs and reactive to the changes impacting them, making it difficult to anticipate or respond to future business and workforce requirements. • There is no dedicated team, limited coordination among HR, hiring managers, and the business.	• Workforce-related data often fuels response to environment change and the workforce is seen as a vehicle to drive value. • Have a designated corporate team with accountability who have established some integration between hiring and the larger HR strategy and have developed influence with hiring managers.	• Adapting work to changes in the business, customer, and workforce environment - demonstrates agility and flexibility. • Organizational capabilities are advanced and reflect investment in analytics and AI as well as training and professional development. • There is a dedicated centralized team with a regional presence to better connect hiring and HR strategy to business needs.	• Disruptions are opportunities to map the course for a new future. • Constantly refine processes and focus on collaborating with the business functions to improve strategies, outcomes, and resource pools. • Integrated team with regional presence and local representation, ensuring hiring and HR strategies are lead by the needs of the business.
2. Changing Nature of Skills	• Responding to skill needs once a gap has demonstrated consequences. • The short and long-term hiring candidate experience is not always consistent with the values of the organization.	• Have began establishing a process to assess skill needs but limited alignment and communication prevent ability to be proactive. • The short-term hiring experience may be more strategic and better mirror the values of the organization while long-term candidate experience remains inconsistent with the values of the organization.	• Strategically use technologies and a broad ecosystem to better understand and anticipate workforce needs. • The hiring candidate experience (both short and long-term) is designed with an intentional focus on personalization; however, it may not yet be a full end to end process.	• Use advanced technologies to analyze workforce trends, forecast head count, and augment workforce planning consistently to better articulate and hire/develop current and evolving workforce skills. • Delivering a compelling hiring candidate experience that is personalized and values-based.
3. External Workforce Cultivation	• Leverage existing opportunities with external partners to communicate expectations, values and the workforce experience. • Participate in recruiting and hiring events based on immediate needs focusing on existing pipeline (e.g., former/active military, community colleges, trade schools).	• Creates new opportunities with external partners to communicate expectations, values and articulate the workforce experience. • Extends participation in career and hiring events to access expanding variety of populations (e.g., formerly incarcerated, neurodiverse, caregivers, without high school diplomas, workforce resettlement programs).	• Has begun to intentionally invest time and financial resources to provide experiences as a mechanism to communicate expectations, values, and the workforce experience (e.g., job shadowing, internships, scholarships, etc). • Continues participating and often hosts career events to a variety of populations (e.g., alternative workforce and high school students).	• Maintains a well-executed strategy to invest time and financial resources to provide experiences as a mechanism to communicate expectations, values, and the workforce experience (e.g., job shadowing, internships, scholarships, etc.). • Well known as a trend/example setter in hosting career events to a variety of populations (e.g., career switchers, neurodiverse and broad range of students).

Differentiating Practice	Level 1	Level 2	Level 3	Level 4
4. Long-term External Workforce Development and Planning	• The workforce strategy tends to be reactive towards immediate talent acquisition needs of the organization. • Exploring how community-based and industry-based organizations can meet longer-term needs, but may not yet have built into their strategy.	• The workforce strategy remains somewhat reactive towards immediate talent acquisition needs, however the organization is beginning to build measurable talent acquisition goals and is cognizant of building a workforce that is representative of the communities they serve. • Has begun to partner with community-based and industry-based organizations to understand labor markets including supply and demand across geographies.	• Has begun to develop a workforce strategy that leads with measurable talent acquisition goals, and accountability for reaching a diverse talent pool. • Developing provisions for inclusive, effective workforce development practices. • Commonly partners with community-based and industry organizations to address labor supply and demand challenges.	• Develop and maintain a workforce strategy driven by measurable talent acquisition goals, and accountability for sourcing a diverse talent pool and establishing equitable recruiting processes. • The strategy is aligned to government programs. • Regularly partners with community-based and industry organizations to address labor supply and demand challenges at a geographic and industry level.
5. External Skill Programming and Development	• External training programs are generally focused on regulatory or safety initiatives. • Training is primarily delivered through classroom or e-learning programs. • Skills-based development strategy emphasizes the immediate needs of the business.	• Experimenting with more modern modalities of learning to deliver external training. • Acknowledges the necessity of external training programs and a skills-based strategy to meet future needs in a well-rounded strategy, yet may still be working to fully execute this strategy.	• Modern modalities to deliver external training are more commonplace and align with the internal learning strategy. • Beginning to develop partnerships to share and create training programs for broad use and values programs launched through local, state, and federal government agencies. • The identification of skills and subsequent training ready the workforce for the future and open new career opportunities.	• Builds and continuously executes modern external learning experiences through engaging and interactive modalities. • Develops and maintains an ecosystem with other regional industry organizations, educators and government agencies to share in development of training programs • Prioritizes skills identification and training for opening new career opportunities, rather than task training for specific jobs.
6. Policy and Industry Engagement	• Monitors workforce development related legislation. • Occasionally engages with workforce boards and other energy businesses.	• Monitors workforce development related legislation and has begun building relationships with government agencies as a means to proactively respond. • Engages with workforce boards and maintains ongoing dialogue with other energy businesses.	• Strives to anticipate and prepare for workforce development related legislation and engages with government agencies to build priorities (e.g., applying for grants to develop registered apprenticeships). • Works to collaborate with workforce boards (often through leadership positions) and other energy businesses.	• Recognizes changes that are needed early and drives collaboration with government agencies to define workforce development expectations and priorities for the industry. • Proactively collaborates with workforce boards (often through leadership positions) and other energy businesses.

Differentiating Practice	Level 1	Level 2	Level 3	Level 4
7. Organizational Culture & Brand	• The external employer brand of the organization exists organically, without clear articulation and is not often intentionally aligned to the internal culture of the organization. • Culture is driven by reactions to the immediate needs of the business an regulatory requirements and isn't always linked to innovation, development, and inclusivity-especially if those appear to conflict with short term goals of the organization.	• The organization has developed and is marketing an external employer brand, yet it may still be disconnected from the internal culture of the organization. • Culture is beginning to see a shift towards the aspirations of innovation, development, and inclusivity with the vision that these are more closely tied to the notion that workforce outcomes may affect business outcomes.	• The external employer brand and internal culture are almost fully aligned, and the organization "lives its values". • Leveraging data showing the connection between workforce outcomes to overall business outcomes, leaders are beginning to be held accountable for enabling a culture that supports innovation and development and demonstrates humanistic tenets of trust, transparency, and inclusivity.	• The external employer brand is synonymous with the internal culture, lead with innovation and a development mindset. • The culture is grounded in humanistic tenets of trust, transparency, and inclusivity, driven by leaders who value business needs and workforce outcomes equally.
8. Internal Learning & Development	• There may not yet be a dedicated learning department – or dedicated trainers, learning happens more organically. • Training is typically ad hoc, meant to address an individual's need in relation to a specific task or role. • Significant learning impact can happen at this level, but success is difficult to ensure or assess consistently.	• Training's value is not programmatic; it is now treated as a thing to be managed, created, assigned, delivered and measured. • While these organizations can have very refined content development and delivery processes, they are also prone to creating large, well designed, highly engaging programs (read – "expensive") that can be overkill, considering the business need.	• The lines of communication between learning and development and the business have reopened, and the training is becoming more strategic and more business-driven. • Learning and development is still primarily downstream of WD processes; its role is to fulfill on the outcomes. They do not consistently use the intelligence gathered through these processes to inform planning and prioritization processes.	• Learning and development is engrained into the culture and well-built into the ecosystem. They are as comfortable with culture-forward, macro-level learning enablement as they are with traditional, formal programs. • Learning & Development ensures that the organization has the human capabilities which it needs to be successful, and it provides the organization's leadership with the leverage to drive and respond to change.

Endnotes

1 US Chamber of Commerce Understanding America's Labor Shortage: The Most Impacted Industries | U.S. Chamber of Commerce

2 CEWD_Workforce-Primer-November-2023.pdf

3 LinkedIn, "Global green skills report 2024".

4 Marlene Motyka, Thomas Keefe, Kate Hardin, and Carolyn Amon, "2025 Renewable Energy Industry Outlook" Deloitte, December 2024, p.3.

5 EIA, January 2025.

6 Marlene Motyka, Thomas Keefe, Kate Hardin, and Carolyn Amon, "2025 Renewable Energy Industry Outlook" Deloitte, December 2024, p.3.

7 Deloitte analysis of Chris Seiple, "Gridlock: The demand dilemma facing the US power industry," Wood Mackenzie, October 2024; and T. Bruce Tsuchida et al., "Electricity demand growth and forecasting in a time of change," Brattle, May 2024.

8 Deloitte analysis of EPRI's "Powering intelligence: Analyzing artificial intelligence and data center energy consumption," May 28, 2024; and S&P's "2024 US datacenters and energy report," May 2024, "Datacenters and energy 101: Powering through renewable intermittency," October 2024.

9 Deloitte analysis of Whitney Jones et al., "The landscape of carbon dioxide removal and US policies to scale solutions".

10 Deloitte analysis of DOE's "United States Energy and Employment report 2024," Oct. 1, 2024.

11 LinkedIn, "Global green skills report 2024," accessed Dec. 4, 2024.

12 Deloitte analysis of DOE's "United States Energy and Employment report 2024" (USEER).

13 Deloitte analysis of data from USEER and the Atlas Public Policy Clean Economy Tracker. Electric power generation employment includes utilities, construction, manufacturing, wholesale trade, professional businesses and services and other services jobs. Hiring difficulty chart is based on normalized composite scores of weighted response categories from USEER's 2024 state public survey data covering electric power generation, energy efficiency, fuels, motor vehicles, and transmission, distribution, and storage. Cleantech manufacturing jobs data includes original production, processing, manufacturing, assembly, and recycling in the battery, electric vehicle, solar and wind energy, transmission and grid, hydrogen, minerals, and heat pump sectors.

14 Darrell Proctor, "Hundreds of new gas-fired power units planned as U.S. gas output soars," December 10, 2024.

15 Rebeca F. Elliott, "Exxon plans to sell electricity to Data centers," December 11, 2024.

16 USEER

Deloitte.