

NATIONAL COMMISSION ON
ENERGY POLICY'S

TASK FORCE ON AMERICA'S FUTURE ENERGY JOBS

EXECUTIVE SUMMARY AND POLICY RECOMMENDATIONS



Disclaimer

This report is a product of a Task Force with participants of diverse expertise and affiliations, addressing many complex and contentious topics. It is inevitable that arriving at a consensus document in these circumstances entailed compromises. Accordingly, it should not be assumed that every member is entirely satisfied with every formulation in this document, or even that all participants would agree with any given recommendation if it were taken in isolation. Rather, this group reached consensus on these recommendations as a package, which taken as a whole offers a balanced approach to the issue.

It is also important to note that this report is a product solely of the participants from the NCEP convened Task Force on America's Future Energy Jobs. The views expressed here do not necessarily reflect those of the National Commission on Energy Policy.

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POLICY CONTEXT

In 2009, the National Commission on Energy Policy (NCEP) convened a task force to explore the workforce needs of the U.S. energy sector and develop recommendations concerning how best to address the intertwined challenges of preserving American jobs and competitiveness, while also tackling energy security and climate change. NCEP's Task Force on America's Future Energy Jobs issued its first report in October 2009. Writing in the foreword to that report, Task Force co-chairs Norman Augustine and Senator Peter Domenici (retired) emphasized the urgency of energy workforce issues in the context of high unemployment and looming skill shortages in critical energy industries.



One year later, with the national unemployment rate still close to 10 percent (the unemployment rate in the construction sector is more than 20 percent) and with Congress deadlocked over energy and climate legislation, the case for a coherent, targeted national policy to meet evolving energy-sector workforce demands remains as compelling as ever.

This report revisits the Task Force recommendations and adds detail concerning the specific steps that should be taken to implement them. Specifically, we discuss concrete actions to improve workforce training programs, improve workforce data collection and management, develop industry credentials, provide funding for energy-related workforce training and education, strengthen basic math and science skills, and increase awareness of energy-sector career opportunities. We believe all of these steps are important as part of a comprehensive strategy for preparing U.S. workers to participate in and benefit from the job opportunities associated with transitioning to a low-carbon

economy. Most important, however, will be greater clarity and certainty about the future direction of energy and environmental policy in the United States more broadly. During the fall of 2009, Congress and the Administration appeared to be making progress in advancing a new long-term energy agenda for the nation through stimulus funding and House-passed energy and climate legislation. Indeed, the 2009 American Recovery and Reinvestment Act provided funding to begin addressing some of the specific needs highlighted in the Task Force report, such as funding for regional energy training partnerships. Broader energy and climate legislation, however, has since stalled in the Senate.

The current political stalemate perpetuates uncertainties that threaten to undermine efforts to prepare for the energy workforce needs of the future because it discourages the investment in the next generation of energy technologies and infrastructure that could ignite a wave of new job and career opportunities in the energy sector. Without some regulatory certainty,



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WITHOUT SOME REGULATORY CERTAINTY, THE ELECTRIC POWER SECTOR WILL CONTINUE TO DEFER MANY OF THE LARGE CAPITAL INVESTMENTS NEEDED TO BUILD NEW POWER PLANTS AND TRANSMISSION CAPACITY, LET ALONE WIND FARMS, SOLAR INSTALLATIONS, NUCLEAR PLANTS, AND OTHER LOW-CARBON TECHNOLOGIES.

particularly as regards to future carbon and renewable energy policies, the electric power sector will continue to defer many of the large capital investments needed to build new power plants and transmission capacity, let alone wind farms, solar installations, nuclear plants, and other low-carbon technologies. And without a sense of future investment patterns or a clear policy path forward, it is difficult to predict the types of skills that will be needed and when new kinds of job opportunities will become available. Interest in related training programs or professional degrees and opportunities to develop skills through apprenticeship programs will suffer accordingly. In sum, the lack of a long-term energy strategy for the United States is more than just a climate issue, a competitiveness issue or an energy security issue—it is a jobs issue. The longer Congress delays action on difficult but critical policy questions, the longer investments will be delayed, the less time there will be to prepare American workers, and the more likely it is that technologies will be imported and domestic job opportunities will be lost.

Of course, Task Force members recognize that some near-term workforce challenges, particularly in the electric sector, have shifted since we first met at the beginning of 2009. In particular, concerns about a lack of qualified applicants to replace retiring workers moved a little further away as employees postponed retirement in response to the economic crisis. Longer term, however, this issue is likely to re-emerge. As the economy begins to rebound and employee retirement savings recover, the industry could face an even larger wave of retirements (a “silver tsunami”) as some employees who postponed retirement leave the work force at the same time as those who are retiring on schedule.

The recommendations and specific implementation steps outlined in this follow-up Task Force report will help to ensure that the electric utility industry can find workers with the skills to fill these vacancies. More broadly, they aim to ensure that America’s workers are equipped to undertake—and benefit from—a technology revolution that must sooner or later transform our nation’s energy systems and the larger economy.





EXECUTIVE SUMMARY

In January of 2009, the National Commission on Energy Policy (NCEP) convened a group of stakeholders with expertise in the workforce of the U.S. electric power industry. The NCEP Task Force on America's Future Energy Jobs brought together representatives from labor, the electric power industry, and the training and educational sectors to explore—over a series of three meetings in six months—the existing demographic makeup and anticipated workforce needs of the electric power sector, along with the training institutions and programs that support this sector. This report summarizes the insights and conclusions resulting from this effort.



Broadly speaking, the Task Force believes the United States is facing a critical shortage of trained professionals to maintain the existing electric power system and design, build, and operate the future electric power system. The implications of this shortfall are wide-ranging and, in the view of the Task Force, of national significance. The ability to maintain a highly reliable, economically affordable electric power system while modernizing the nation's generating infrastructure to support an advanced, low-carbon technology portfolio is in serious jeopardy. This report highlights the main forces driving this situation and lays out a series of recommendations for addressing the dominant workforce challenges that will confront the electric power industry over the next several years. Ensuring the proper systems and institutions are in place to respond to these challenges is important, not only in terms of advancing critical public policy goals with respect to energy, the economy, and the environment, but because a substantial opportunity exists to create new high-skill, high-paying jobs in the energy sector at a time when growing numbers of Americans are

unemployed or underemployed and face the prospect of financial insecurity.

There have, of course, been significant changes in the political and economic landscape since the Task Force was formed. The Obama Administration is committed to an energy policy that aims to reduce the nation's consumption of fossil fuels and contribution to global greenhouse gas emissions. At the same time, an unprecedented economic crisis has crippled global financial markets, halted global economic growth, and led to massive job losses in the United States and elsewhere. Against this backdrop, the Task Force set about examining workforce supply and demand dynamics in the electric power industry. The American Recovery and Reinvestment Act (ARRA) passed in 2009 provided a near-term infusion of resources that have the potential to facilitate many of the actions recommended in this report. To ensure that these short-term investments build the long-term capacity needed to address multi-decade challenges like climate change, policymakers should consider the actions recommended in



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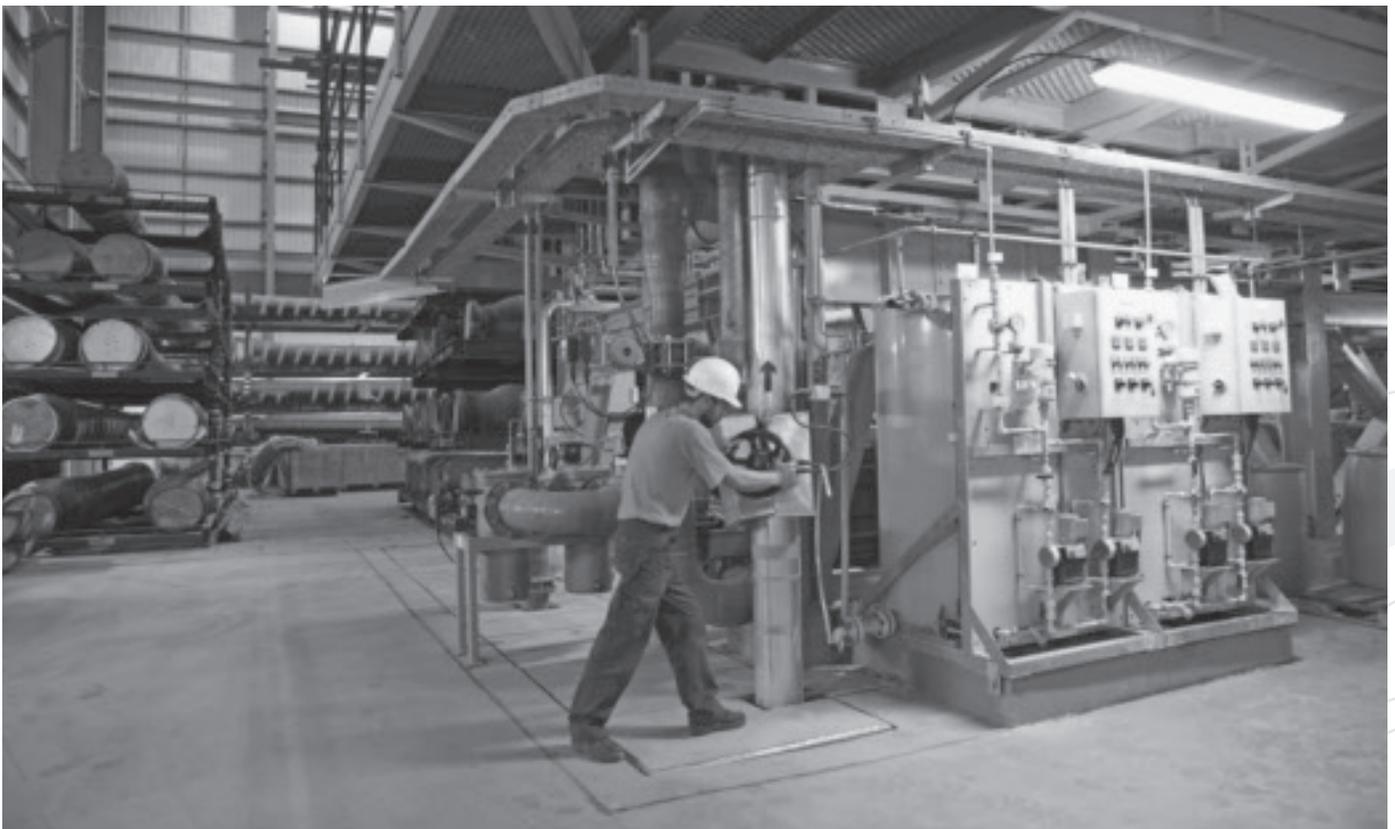
this report when reauthorizing the Workforce Investment Act (WIA) and crafting climate and energy legislation.

Data and Definitions

NCEP conducted significant background analytical work to better assess the challenges that are often reported anecdotally by concerned parties. One of the most important conclusions from this work is that data collection and measurement systems needed to gauge the state of our nation's energy workforce are woefully inadequate. For this reason, the NCEP team endeavored to commission new work and access available information to characterize the challenges. While the data collected and presented in this report represent a significant contribution to the debate, we believe that this assessment is best used as an illustrative guide to current workforce issues. We have

not attempted to develop a precise projection of future workforce needs. Additionally, our report is not intended to take the place of state and regional workforce assessments that can provide the insights needed to identify specific focus areas for individual training programs or education systems. As described further in the report, we believe that bringing together major stakeholder groups at a local or regional level is the best way to evaluate specific training needs.

A theme that seems to resonate broadly across the energy workforce debate is that “green jobs” are a positive outcome to be promoted. However, a universally accepted definition for what constitutes a green job does not exist. Organizations of all types tend to attach the “green” label when describing activities they support and promote, which highlights the ambiguity in using the term. While it is generally safe to assume that jobs directly involved in the deployment



of energy efficiency and renewable energy technologies would be considered “green,” a number of complexities quickly emerge as soon as one attempts to apply even this seemingly simple definition. For example, a lineworker building a transmission line that connects a wind farm to the electric grid would be viewed by most people as having a green job. If that same transmission line carries electricity generated from nearby coal-fired power plants, the “greenness” of that job may not be as clear. This example illustrates that the skills needed to perform what many think of as a green job are often the same as or very similar to traditional energy-related jobs.

The NCEP Task Force on America’s Future Energy Jobs believes debating the definition of green jobs may become a distraction. In fact, we do not use this term elsewhere in this report. Rather, because our effort is focused on workforce needs associated with building and supporting energy infrastructure for a future low-carbon energy system, we believe the term “future energy job” is more appropriate for our focus. It implies that all types of jobs that support an energy system consistent with a long-term goal of reducing greenhouse gas emissions should be seen in the same light. Some of the jobs related to the transition to a carbon constrained economy will be new and will require new skill sets. But many more will use skills that are already in demand today, such as those required for sheet metal workers, transmission lineworkers, and electricians.¹ In effect, if the underlying policy framework reflects the objectives embedded in the term “green job” then future energy jobs *are* green jobs.



Overarching Challenges

As a starting point, Task Force members shared a common recognition that the electric power sector faces near- and long-term workforce challenges. Its workforce is aging and will need to be replaced. Facing a wave of retirements over the next decade, the electric power industry will need to expand hiring and training programs just to maintain the level of qualified workers required to operate existing facilities. In fact, new workers will be needed to fill as many as one-third of the nation’s 400,000 current electric power jobs by 2013.² In the face of this surge in demand, companies are finding that applicants for open positions at electricity companies are not as prepared as they were in decades past. Companies are finding that U.S. students are not graduating at the same rates in the relevant fields and with the same qualifications as in the past. While the Task Force focused on direct electric power sector jobs, the Task Force members recognize that other economic sectors, such as the manufacturing sector, face similar demographic, education, and training challenges.



THE NCEP TASK FORCE ON AMERICA’S FUTURE ENERGY JOBS BELIEVES DEBATING THE DEFINITION OF GREEN JOBS MAY BECOME A DISTRACTION ... WE BELIEVE THE TERM “FUTURE ENERGY JOB” IS MORE APPROPRIATE FOR OUR FOCUS.

¹ Apollo Alliance and Green For All with Center for American Progress and Center on Wisconsin Strategy, “Green-Collar Jobs in America’s Cities: Building Pathways out of Poverty and Careers in the Clean Energy Economy.” 2008. Available <http://www.greenforall.org/resources/green-collar-jobs-in-america2019s-cities>.

² While the Task Force future scenarios focus on electric power generation, transmission, and distribution, we recognize that electric utilities are frequently integrated with natural gas utilities and that natural gas utilities face similar workforce pressures. According to the Bureau of Labor Statistics, natural gas utilities employ about 106,000 people. The CEWD data referenced in this report combine natural gas utility workforce estimates with the electric utility workforce estimates.



In the long-term, the deployment of new technologies and generating assets—including new energy efficiency, nuclear, renewable, advanced coal with carbon capture, and smart grid technologies—will require new design, construction, operation, and maintenance skills. This is an important opportunity for new job creation and economic growth. If too few individuals with the necessary expertise are available when they are needed, workforce bottlenecks could slow the transition to a low-carbon economy *regardless* of the commercial readiness of the

underlying technologies. If the result is to delay the efficient adoption of improved low-carbon alternatives, workforce shortages would represent more than a lost opportunity—they could impose substantial costs, both in terms of economic burden and environmental damages and could damage U.S. global competitiveness.

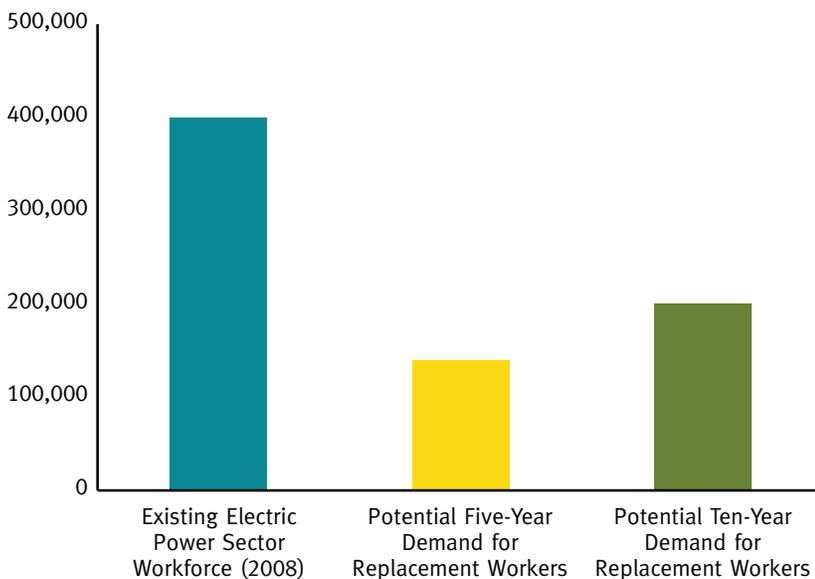
Task Force Approach

The Task Force focused on three broad categories of jobs:

- Jobs associated with operating and maintaining the existing electric power infrastructure;
- Jobs associated with designing and building new electric generation capacity to meet future low-carbon energy needs; and
- Jobs associated with operating and maintaining the electric power industry of the future.

The first chapter summarizes the Task Force’s findings on existing power industry labor markets. Rapid attrition due to retirements from an aging pool of workers is the primary concern. Chapter 2 examines what happens when an expected surge in demand for new low-carbon energy technologies is layered on top of this declining base. Comparing pending workforce requirements against the existing education and training pipeline is the focus of the third chapter. Chapter 4 presents suggested policy solutions and Task Force recommendations.

Figure 1. Comparison of the Workers Needed to Replace Workers Retiring or Leaving the Industry for Other Reasons to Existing Employment Levels



We summarize key insights from the original report along with our primary recommendations below. References for the data are included in the corresponding chapters.

Chapter 1 Critical Insights – Existing Electric Power Sector Workforce

- The electric power generation, transmission, and distribution industry employs about 400,000 people.
- A large fraction (30–40 percent) of electric power workers will be eligible for retirement or leave the industry for other reasons by 2013.
- Of the 120,000 to 160,000 electric power workers that will be eligible for retirement or leave the industry for other reasons by 2013, industry surveys suggest 58,200 will be skilled craft workers and another 11,200 will be engineers.

Table I. CEWD Survey Results by Job Category

Job Category	Estimated Number of Potential Replacements by 2013
Electric Power Skilled Craft	58,200
Technicians	20,300
Non-Nuclear Plant Operators	8,900
Pipefitters/Pipelayers	6,500
Lineworkers	22,500
Engineers	11,200

- While recent industry estimates anticipate that workers will delay retirement due to the current economic downturn, it is impossible to predict how long workers will extend employment. There is a concern in the industry that delayed retirement could lead to more acute worker shortages at some point in the future if many workers retire around the same time.

Chapter 2 Critical Insights – Potential Workforce Demand Surge under a Federal Climate Policy

- In addition to needing skilled workers to replace retiring workers, the industry will need skilled construction workers to design and construct new electric sector infrastructure. We estimate that in 2022, design and construction work for the electric sector will require about 150,000 professional and skilled craft workers from the construction sector. This construction workforce is about 40 percent the size of the existing electric power workforce.
- Demand for skilled workers to operate and maintain the electric generation systems of the future will increase steadily as new technologies come online. The number of additional workers that will be needed by 2030 is roughly 60,000—an increase of almost 15 percent.



A LARGE FRACTION (30–40 PERCENT) OF ELECTRIC POWER WORKERS WILL BE ELIGIBLE FOR RETIREMENT OR LEAVE THE INDUSTRY FOR OTHER REASONS BY 2013.

Table 2. Projected O&M Jobs in 2030 Given the Projected New Generation under the EPRI Prism Analysis

Job Category	Range of Expected Demand
Skilled Electric Power Craft Workers	35,000 to 70,000
Professional Staff	18,500 to 35,000
Total	53,500 to 105,000

- The deployment trajectory for new generation technologies directly impacts workforce demand. In scenarios with steady annual deployment of new generating assets, workforce demands will peak at a lower level and will be spread out over more years. In scenarios where construction is delayed and several generating assets are planned to come into operation in the same year, the workforce peak is higher and the demand is more concentrated around the peak year. This variability reinforces the need for local and regional

assessments of workforce demand as climate policy becomes clearer.

- The industry needs to prepare to meet a long-term, sustained need for training, beyond the retirement gap.

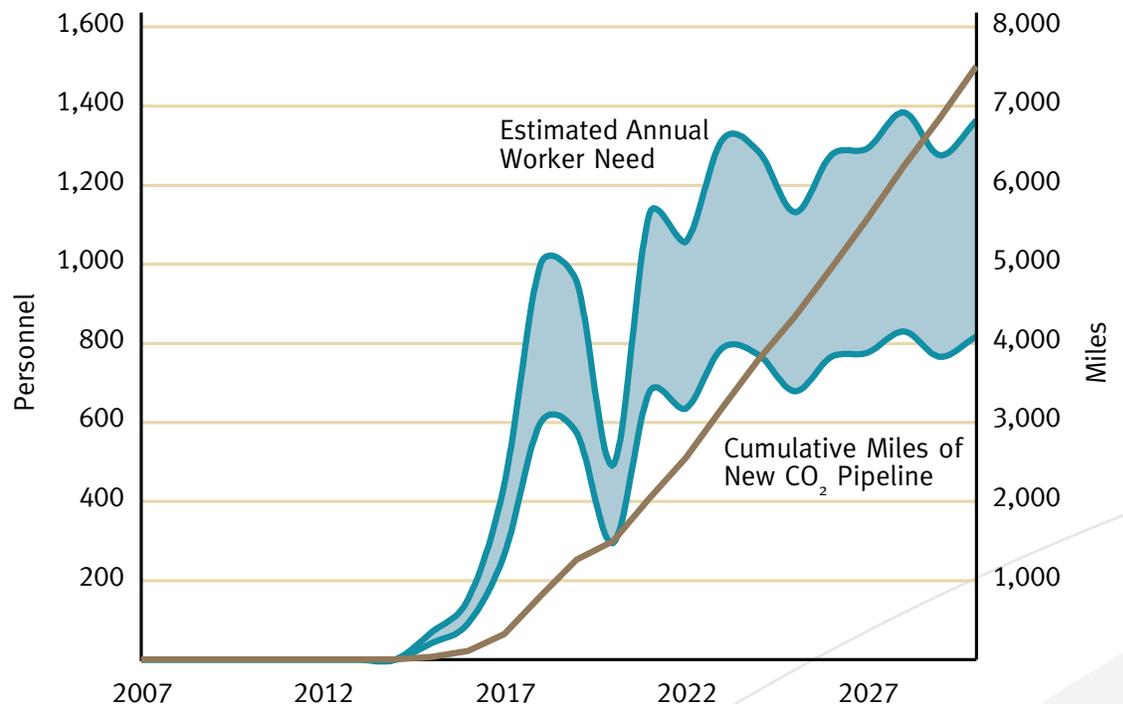
With respect to the design, construction, and operation and maintenance (O&M) of infrastructure and supporting technologies:

- Demand for construction labor to build new high-voltage transmission lines and substations is expected to spike, especially in light of the transmission investments anticipated under the recent economic stimulus package. We estimate the peak demand for construction labor and skilled crafts to be about 10,000 to 15,000. However, policy and regulatory delays have affected the construction timetable of a number of proposed transmission lines. These

delays increase the uncertainty around projections of future workforce demand.

- The near-term deployment of smart grid technologies will require over 90,000 workers. However, smart grid deployment will result in about 25,000 electricity power industry workers looking to transition to new positions. This supply of workers highlights the need for training programs that retrain existing workers to take advantage of new opportunities within the industry.
- Construction and maintenance of CO₂ pipelines as part of a commitment to expanded carbon capture and storage (CCS) will marginally add to the demand for skilled workers. While not directly calculated as part of the NCEP Task Force estimates, additional workers will be needed to retrofit fossil fuel-fired power plants with carbon capture technologies.

Figure 2. Estimated Workforce to Design and Construct CO₂ Pipelines to Support EPRI Prism CCS Deployment



- Running energy efficiency programs requires people to design and administer programs and people to promote those programs and sign up new customers. We estimate that utility or other third-party managed energy efficiency programs in the United States will require all or part of the time of approximately 11,000 employees per year through 2030. Additionally, we expect the program managers to hire contractors to implement or deploy efficiency technologies. These contractors are expected to significantly outnumber the number of direct employees required to administer and promote customer-side efficiency programs and could number in the thousands for each program. While these jobs will be an important component of future energy jobs, the Task Force decided not to seek to quantify these jobs.

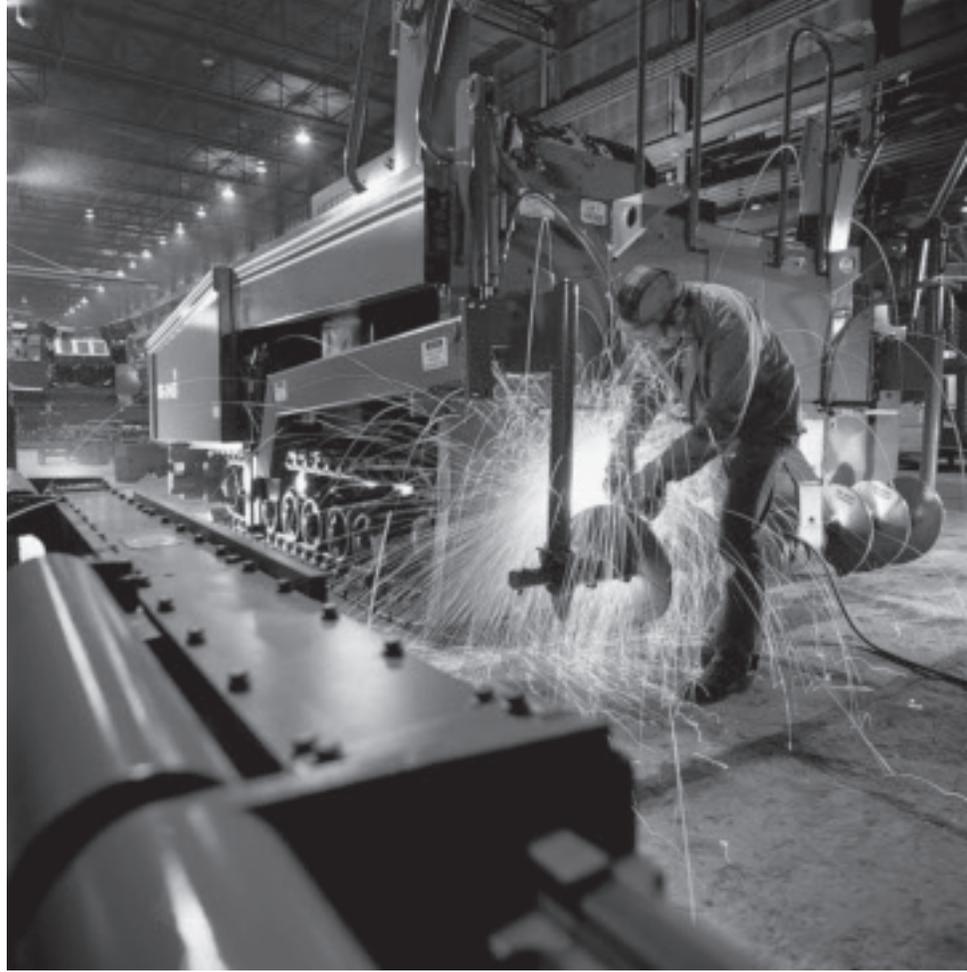
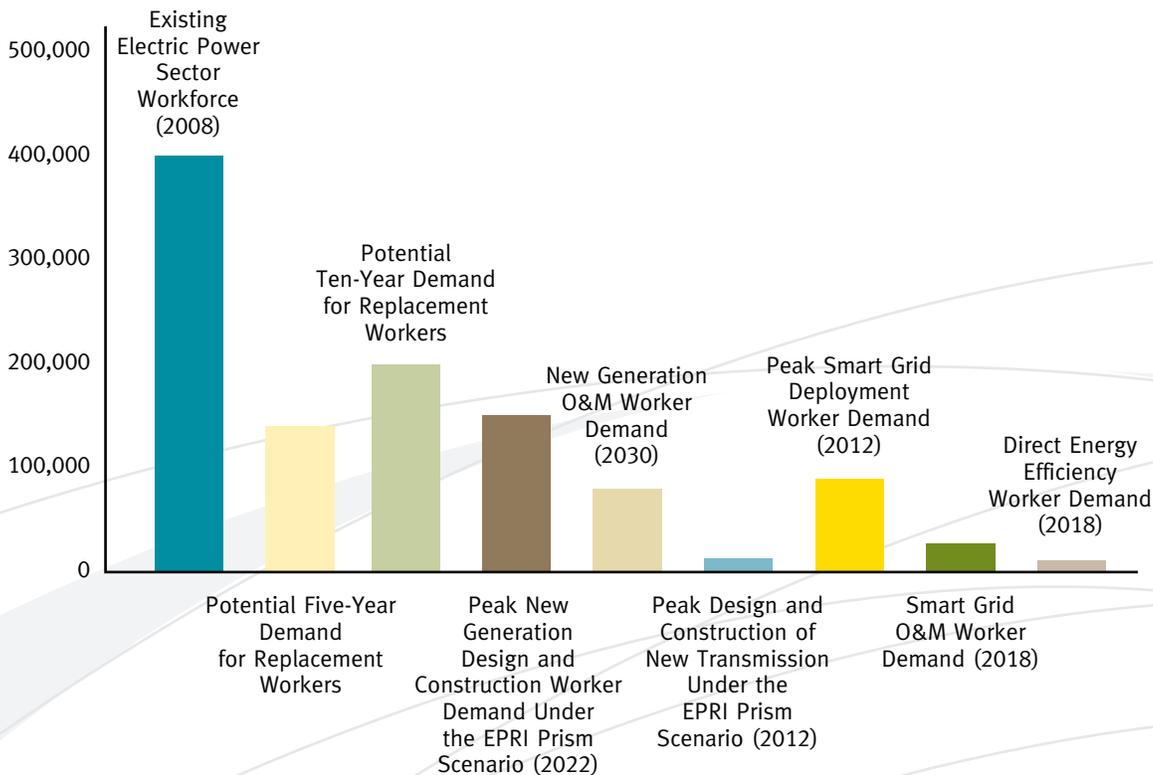


Figure 3. Comparison of Major Sources of Worker Demand to Existing Employment Levels



Chapter 3 Challenges – Training the Future Energy Workforce



NEW WORKERS WILL HAVE TO COME FROM A TRAINING SYSTEM THAT NEEDS TO BE REFOCUSED AND REINVIGORATED.

- Challenges to preparing students in grades K-12:
 - Low Graduation Rates. Of the approximately four million students who will begin high school this fall in the United States, less than three million are expected to complete high school.
 - Lack of Technical Skills. Of those who complete high school, many are ill-prepared to pursue a career that requires basic technical skills.
 - Lack of Industry-Specific Training for Educators. Teacher training and retraining is a key component of repairing our basic educational system.
- Challenges to training and educating skilled craft workers:
 - Individuals can acquire the technical skills and training to enter the skilled craft electric power or construction workforce from several types of institutions or programs, including:

- community colleges,
- community-based organizations (CBOs),
- apprenticeship programs,
- company-specific training programs, and
- worker retraining programs.

- Understanding the Electric Power Sector Demand for Skilled Workers. A key challenge is aligning training programs with the demand for workers. This challenge is compounded by the current system used by the Bureau of Labor Statistics (BLS) to estimate future industry demand. That system relies on historical trends to project future industry growth and does not include estimates for replacing positions lost through retirements or other attrition.
- Lack of Communication among Stakeholder Groups. Compounding the assessment challenge noted above is the fact that better communication is needed among stakeholders—particularly between training institutions and the electric power sector.
- Lack of Credential Portability. A lack of standardized skill sets and curricula for some of the skilled crafts within the electric power sector presents a significant challenge for students, community colleges, and employers. This issue is specific to a subset of skilled crafts within the electric power sector—it does not apply to skilled crafts in the construction sector.
- Collecting and Tracking Skilled Workforce Data. Information on the number of people that pass through existing training systems and their ultimate employment is currently not well captured.
- Costs of Education. Even students who have adequate education in technical skills

Figure 4. U.S. High School Graduation Rate and Science Proficiency

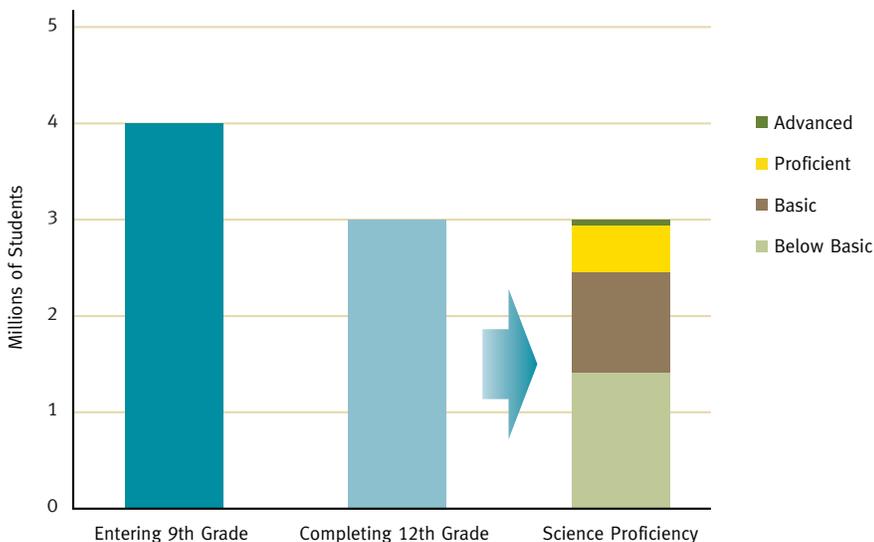
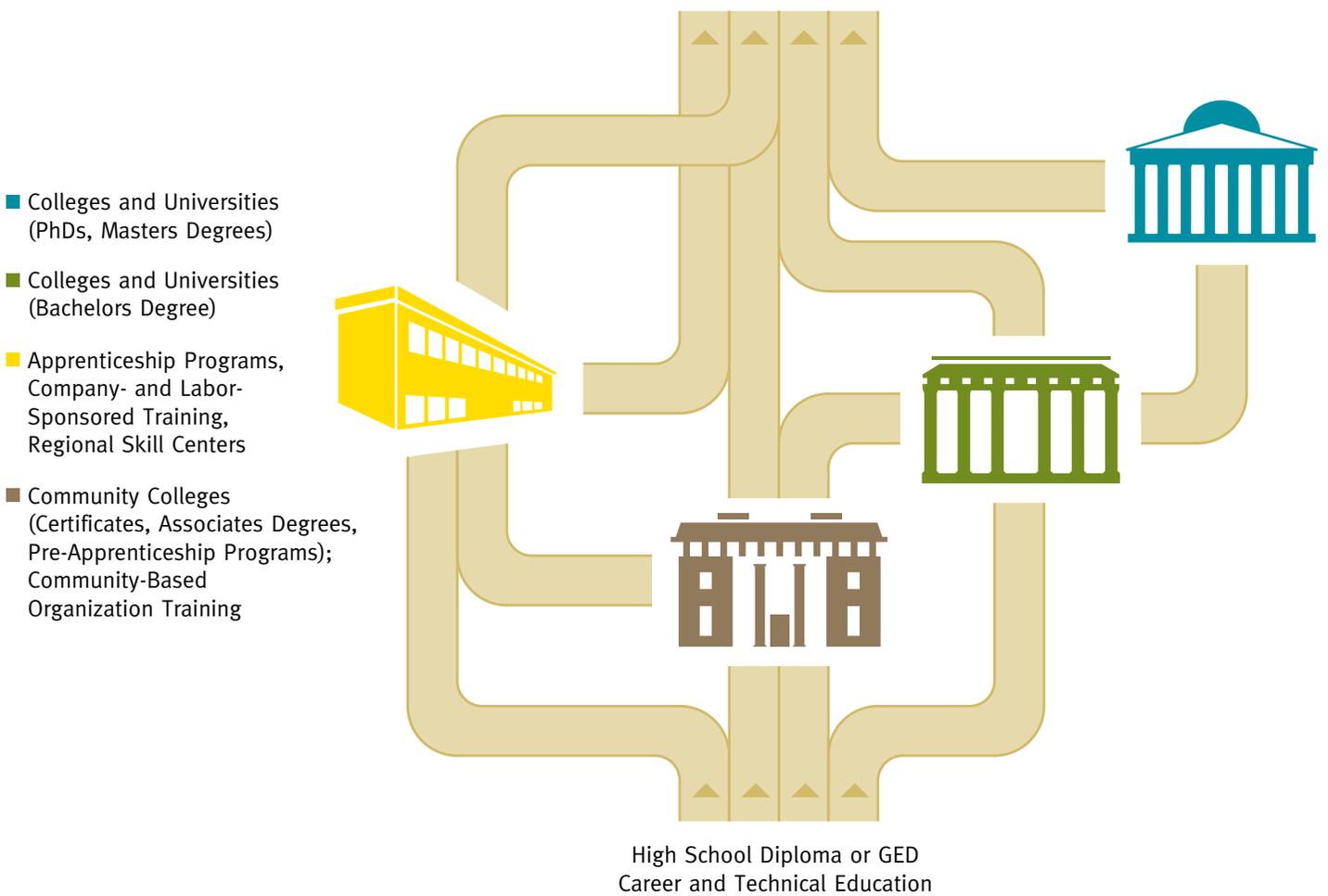


Figure 5. Energy Sector Workforce Pipeline

Future Energy Jobs



may have trouble paying for post-secondary education.

- Improving the Image of Electricity Industry Careers. Students and parents often do not view apprenticeship programs or other programs outside the four-year degree construct as providing similar or better opportunities for career and salary potential.
- Lack of Career Preparatory Skills within the Workforce. Because of a lack of technical skills among the potential workforce, introductory courses have become more prevalent at the community college level.
- Challenges to training and educating engineers:
 - Lack of math and science skills in the population of high school graduates.
 - Mobilizing the Research Community. Professional engineers are needed to develop, design and implement new, low-carbon technologies that produce electricity. There is a need for active and invigorated research programs in power engineering and related areas. To appropriately engage students, faculty need to be engaged through the development of research programs, including programs that are multi-disciplinary in their approach and thinking.
 - Encouraging Students to Work in the Electric Power Sector. In addition to stimulating research, it is important to foster mechanisms for pulling both research and students into the electric power sector.
 - Costs of Education. The cost of education in the United States is daunting and can be a barrier to entry.

TASK FORCE RECOMMENDATIONS

The workforce challenges identified by the Task Force are significant and addressing them will take a concerted and sustained effort by many stakeholders. To advance that process, the Task Force developed a set of five primary recommendations for federal policy. While these recommendations are specifically focused on the development of direct future energy jobs associated with design, construction, and operation of assets in the energy sector, many of the insights could be applied to job training associated with deploying energy efficiency and manufacturing the materials and equipment needed to build and operate the future energy system.



Recommendation 1: Evaluate regional training needs and facilitate multi-stakeholder energy sector training programs across the country.

In addition to the work currently underway at DOL and DOE to address the workforce gaps associated with projected retirements and the initiatives in the American Recovery and Reinvestment Act of 2009, Congress should appropriate funds through existing funding mechanisms that allow DOL and DOE to work with existing state or regional energy workforce consortia or establish new state or regional energy workforce consortia, as appropriate. These consortia should be tasked with evaluating near- and long-term needs for a skilled workforce, including:

- Workforce gaps at existing facilities over the next ten years associated with workforce retirements;
- Workforce gaps over the next twenty years associated with
 - constructing new low-carbon generating assets and retrofitting existing generating assets,

- constructing the additional electric infrastructure needed to effectively use new and
- retrofitted generating assets (e.g. transmission lines, CO₂ pipelines, local distribution systems),
- operating and maintaining new and retrofitted generating assets and the accompanying infrastructure, and
- deploying energy efficiency in the retrofitting of the nation’s building stock and in Smart Grid technologies.

As a part of this evaluation, DOL, DOE, and each state or regional energy workforce consortium should highlight any policy uncertainties that are currently delaying or have the potential to delay the deployment of new generating assets, retrofit technologies, and infrastructure that are essential to the transition to a low carbon economy.

In regions of the country where workforce gaps have been identified, Congress should provide



MANY OF THESE INSIGHTS COULD BE APPLIED TO JOB TRAINING ASSOCIATED WITH DEPLOYING ENERGY EFFICIENCY AND MANUFACTURING THE MATERIALS AND EQUIPMENT NEEDED TO BUILD AND OPERATE THE FUTURE ENERGY SYSTEM.



financial resources and coordination assistance to support the development of targeted local or regional training programs for energy sector workers. DOL should award funding on a competitive basis through the Green Jobs Act, or other appropriate federal funding mechanisms, to training programs that meet the following criteria:

- Involve a wide range of stakeholders from industry, education, labor, professional organizations, and workforce development agencies or non-profit community groups that focus on workforce development in all stages of program development.
- Coordinate the use of resources at a regional level while recruiting and matching skills to jobs at a local level. For example,
 - Recruit prospective employees from local populations using local groups, such as community-based organizations or workforce investment boards, that have a deep knowledge of the community and a capacity to prepare prospective employees through education and training; and
 - Integrate regional employer needs into the curriculum development process.
- Build upon existing programs and infrastructure, including training and education programs run by community-based organizations,
- technical or community colleges, and stakeholder companies, and joint labor-management apprenticeship programs.
- Include curricula and course content that utilize industry skill standards and lead to industry-recognized credentials.
- Use best practices (identified under Recommendation 3) in developing training and education programs.
- Encourage development of accredited, credential-focused programs that put individuals on a long-term career track. Programs should allow transferability of credits throughout the industry and should develop skills that translate from one program to the next. Programs should issue 'stackable' credentials that allow individuals to develop the building blocks of a career in the energy sector.
- Develop innovative strategies to engage populations that have traditionally been underrepresented in the energy sector workforce, in particular communities of color, and to address the needs of lower-skilled, low-income workers to enable them to access career pathways into the energy sector workforce.
- Include a strategy for sustaining the program over the long term.

Implementation Steps

As part of implementing the above recommendations, any funding provided for energy sector workforce training through new or existing mechanisms should:

- Be distributed through a peer-review process that involves representatives from industry, the education community, and labor groups in developing solicitations and awarding grants, and
- Prioritize grant recipients that provide training towards industry-recognized credentials, and who also develop training materials and programs that can be replicated and readily shared (as described in Recommendation 3).

In addition, the criteria described as part of this set of recommendations should be used as a template for awarding funds through any new grant programs and through existing or reauthorized mechanisms, such as the Workforce Investment Act (WIA). Specifically, the Task



Force supports a number of modifications to WIA that have been proposed by the AFL-CIO, the American Association of Community Colleges, and the Association for Career and Technical Education and urges Congress to consider the following recommendations in the context of WIA reauthorization:

- Modify performance indicators to recognize skill attainment and allow for longer term training:
 - WIA performance indicators strongly influence the approach taken by local boards and One Stop Career Centers in providing the longer-term training that many workers, especially low-skilled workers, need. The current performance indicators, which put a heavy emphasis on job placement, retention and earnings, are “work first” measures. They should be modified to count interim and progressive indicators of skill attainment, including measures of “work readiness” for very low-skilled workers. Similarly, one of the “core indicators” in the WIA performance standards is “earnings received in unsubsidized employment.” The value of fringe benefits should be added to the calculation of earnings for this performance standard.
- Expand representation on workforce boards:
 - While it is important to keep Workforce Investment Boards (WIBs) to a manageable size to ensure effectiveness, strengthening connections between education, labor, business, and workforce groups requires a true partnership. Congress should continue efforts to bring together key stakeholders in states, regions and localities to plan effective workforce and economic development activities. At the state level, workforce boards should include representation from business, labor, education/training, and



IN REGIONS OF THE COUNTRY WHERE WORKFORCE GAPS HAVE BEEN IDENTIFIED, CONGRESS SHOULD PROVIDE FINANCIAL RESOURCES AND COORDINATION ASSISTANCE TO SUPPORT THE DEVELOPMENT OF TARGETED LOCAL OR REGIONAL TRAINING PROGRAMS FOR ENERGY SECTOR WORKERS.

government. In addition, at the local level, the workforce investment board should have a *minimum* level of representation from the following four sectors: business (15 percent), labor (15 percent), community (15 percent), and education (15 percent).

- Promote regional workforce investment areas:
 - Regional industry partnerships allow businesses, labor unions, educators, and the public workforce system to establish or expand industry or sector partnerships that help workers train for and advance in high-demand



and emerging industries. Sector strategies would identify skilled workforce needs within the targeted industry or sector, and develop training and educational strategies using career pathways to ensure that employers have the skilled workers to meet their needs. This coordinated approach would help more individuals access the education and training they need for successful careers. One implementation option would be to use the Secretary of Labor's challenge grants to provide incentives for WIBs to expand their geographic scope to encompass areas that correspond to regional labor markets, industry clusters, and commuting patterns.

- Strengthen Data sharing and common measures:
 - Failure to coordinate federal reporting requirements across programs can create burdens for WIA and other workforce-related initiatives. Sharing data across programs would make it easier for programs and providers to collect accountability information, and foster an environment of collaboration and efficiency in the workforce and education systems. Further efforts are needed to align data systems at the state and local levels and to reduce barriers to data sharing. Interpretations of the Family Educational Rights and Privacy Act of 1976 (FERPA) combined with prohibitions on sharing unemployment insurance wage data across states have contributed to these barriers. By contrast, Section 113(b)(2)(F) of the Carl D. Perkins Act gives programs flexibility to use “substantially similar information gathered for other state and federal programs” in measuring performance, but this language is rarely utilized. Similar language and more practical mechanisms to promote data sharing should be included in WIA.



- The use of common measures would facilitate collaboration and coordination across workforce programs and facilitate a greater alignment of their goals. Improvements that increase the efficiency of workforce programs such as WIA, Perkins, Trade Adjustment Assistance, and adult education and family literacy can benefit participants to the extent they lead to better coordination and targeting of services. The point is not to measure everything that is important to each program, but to concentrate on outcomes that are important for all workforce development programs and to leave room for adding new measures as required.
- Incentive grants should be structured to reward coordination. Under the current incentive grant program, states may apply for funds under Title I and Title II of the WIA. To be eligible for funds, states must exceed relevant performance targets. Grant recipients are encouraged to use these funds for activities that (a) promote coordination and collaboration among the agencies administering WIA Title I and Title II programs, (b) are innovative, and (c) are targeted to improve performance. The Task Force recommends continuing this grant program. Additionally, we believe Congress should consider providing further incentives to states that take concrete steps toward sharing data and using common measures.
- Utilize youth services to create strong skills training pathways for students:
 - Young people in the workforce development system have needs that are different from those of most adults and dislocated workers. To address them requires a separate funding stream targeted to providing activities and assessing accountability for the youth population. At the same time, better coordination is needed, especially across WIA and other federally funded programs. Both the education and workforce systems have a unique role to play in serving the youth population.
 - The current allocation of funds across in-school and out-of-school youth programs allows local WIBs to make spending decisions based on the unique needs of their communities and should be maintained. Programs that reach students during the summer and after the school day can play a critical role in reducing drop-out rates and preparing young people to become productive members of the community. Changes to the current allocation, on the other hand, could mean a cut in services to many at-risk students and reduced opportunities for coordination and reinforcement across different programs. Additionally, options to integrate WIB services, such as One Stop Career Centers, with campus career centers should also be explored.



Recommendation 2: Improve energy sector workforce data collection and performance measurement metrics and tools. Improve the collection, management, and availability of workforce data for the energy sector to facilitate the measurement of progress in addressing identified needs and to enable more effective identification of future needs. Workforce data should include people entering energy sector-specific training

programs and/or the energy workforce; these data should be measured against the workforce targets identified by the state energy workforce consortia in Recommendation 1.

BLS should be provided with the resources to accurately assess workforce needs in the energy industry and to incorporate industry input on growth and staffing patterns. This will allow for improved forecasts of future demand for different types of skills, including emerging skills associated with the build out of low-carbon energy infrastructure.

Implementation Steps

Federal agencies should work to improve existing systems for collecting, managing, and disseminating workforce data relevant to the energy sector. This would facilitate efforts to measure progress toward addressing identified workforce needs while also enabling more effective identification of future needs. In addition, it is essential to understand how proposed legislative initiatives, such as an energy or climate bill, will impact the energy-sector workforce. To implement this recommendation, the Task Force believes that Congress should:

- Direct the Department of Education (ED) to lead a multi-stakeholder task force to standardize CIP (Classification of Instructional Program) codes for the energy industry. Such a task force should:
 - Organize CIP codes by industry / career cluster
 - Develop a process for tracking the number of individuals who complete programs at private institutions, apprenticeship programs, and non-credit bearing programs to more accurately reflect the potential supply of talent

- Direct the BLS to track data on the demand for skilled workers in the energy sector. BLS should:
 - Modify energy-related Standard Occupational Classification System (SOC) codes to more accurately reflect groupings of skill requirements. These changes should be made prior to the next scheduled SOC codes revision in 2018. BLS should seek industry input on any revisions.
 - Reconcile differences in codes to allow for comprehensive data collection and to more accurately reflect future demand for different types of skills, including emerging skills associated with the build out of low-carbon energy infrastructure.
 - Develop a mechanism to facilitate industry input to BLS forecasts with the aim of incorporating industry projections of growth and staffing patterns and accurately assessing future energy workforce needs. State forecasts should incorporate input from state energy workforce consortia to improve assessments of future needs at the state level.
 - Build capability for developing workforce scenarios and projections as a tool for analyzing the impacts of proposed legislation, including especially legislation concerning energy, climate change, and related issues.
- Direct DOE, ED, and DOL to create a national longitudinal data collection system, in coordination with the repository described in Recommendation 3, to track student progress from secondary through post-secondary education and employment.

Recommendation 3: Identify training standards and best practices for energy sector jobs. DOL in consultation with industry, labor, and education stakeholders, including ED and DOE, should develop a repository of best practices for electric power sector job training that is widely accessible, transparently managed, and maintained by a public entity. This repository should include existing skill standards and registered apprenticeship programs for electric power sector jobs. Examples of best practices can be found at energy career academies at the secondary level, and at pre-apprenticeship, certificate, associate degree, apprenticeship, and community-based training programs at the post-secondary level.

The purpose of the repository should be three-fold: (1) it should be a resource for employers to evaluate training programs and potential employees, (2) it should be a resource for individuals to evaluate training options as they move through a career, and (3) it should be a resource for educators as they develop courses and curricula.

As a part of this initiative, this group should identify skill areas where best practices or training standards do not exist or should be expanded, and work to fill such gaps.

Implementation Steps

To promote the development and use of industry-recognized credentials, Congress should direct DOL to work with DOE and ED to organize and monitor the development of such credentials and appropriate funds as necessary to support these efforts. Specifically, the agencies should:



AS A PART OF THIS INITIATIVE, THIS GROUP SHOULD IDENTIFY SKILL AREAS WHERE BEST PRACTICES OR TRAINING STANDARDS DO NOT EXIST OR SHOULD BE EXPANDED, AND WORK TO FILL SUCH GAPS.



- Identify existing industry-recognized credentials,
- Support (through grants or other funding mechanisms) the development of new industry-recognized credentials where there are gaps, and
- Create a central repository for these credentials.

Since the publication of the Task Force report, the Center for Energy Workforce Development (an Advisor to the Task Force), has been working with stakeholders to develop industry-recognized credentials for the energy sector. Based on this work, the Task Force offers the following recommendations concerning the development of an industry-recognized credential repository:

- All energy credentials should follow the definitions used by the American National Standards Institute (ANSI).³
 - Credentials for utility technicians and non-nuclear plant operators should be issued consistent with the American National Standard, ASTM 2659 – Standard Practice for Certificate Programs.
 - Credentials for lineworkers *may* be issued through a certificate or certification that would meet the accreditation requirements of the American National Standards Institute.
- DOE should use the repository of validated industry-recognized credentials for grant making, curriculum development, and training programs, such as certified apprenticeship programs.
- Credentials or certifications for positions outside the nuclear industry should be developed by a neutral third-party and should include input from subject matter experts to identify relevant competencies, design skill assessments, if needed, and develop effective curricula. Credentials for positions in the nuclear industry comply with Nuclear Regulatory Commission regulations, but are typically developed based on consensus standards and detailed job task analyses.
- Industry credentials should be embedded in a pathway that is linked to a job or series of jobs or to specialized skill(s) associated with a job. Some jobs may require multiple credentials. In those cases, required credentials should build on one another and should not necessitate investments of money and time in duplicative education or training programs.

³ The nuclear industry works through INPO and that National Academy of Nuclear Training and adheres to Nuclear Regulatory Commission regulations for training plant operators and technicians.

Credentialing in the Energy Sector

Credentialing is becoming more important in many industries, including the energy industry. It is increasingly being tied to education programs, both secondary and post-secondary, to grants from the Department of Labor and other sources, Perkins funding, and employment. As the need for credentialing grows, so does the misunderstanding of what the term “credentialing” means. For example, the term “certification” is often understood as having the same meaning as credentialing, even when it really means simply getting a certificate or occupational license. This confusion is common not only among the general public, but in the education and business worlds, and even within credentialing organizations.

The American National Standards Institute (ANSI) accredits developers of standards as well as certification bodies and certificate issuers; it is thus a leading authority on the development and differentiation of standards for various credentials. ANSI defines different forms of credentials as follows:

Certificates

- Generally associated with education and training – educational process
- Indicates that the content has been learned in an educational event
- May or may not have an assessment
- Course/training is generally designed by an instructor or group of experts
- Generally good for life – no renewal period
- Owned by the individual – “cannot be taken away” by the educational institution

Certification

- Focus is on the “job”, “occupation” or “practice”
- Determining the competencies to successfully practice – job/practice analysis
- Results from an assessment process (examination or demonstration of skills)
- Is a third party, independent judgment regarding whether competencies have been achieved
- Time limited – must re-certify within a designated period of time
- Certification does not belong to the individual – can be taken away

Licensure

- Generally associated with “State” Licensure but there are federal licenses, e.g. FAA, EPA (although they call their examinations “certification”)
- State Licensure
 - Legal right to practice in a job/occupation/profession
 - Scope of practice is determined by the state legislature
 - Sometimes based on a national “Certification”
 - Time limited – must re-license within a designated period of time
 - Professions are licensed to “protect the public”
 - Examinations are often created by “Federations”

Degrees and diplomas are also considered credentials, but both industry and the public have a common understanding of these credentials.



THE WORKFORCE TRAINING PIPELINE FOR THE ENERGY SECTOR INCLUDES A VARIETY OF PROGRAMS AND INSTITUTIONS. THESE SHOULD BE REVIEWED TO DETERMINE IF THERE ARE BARRIERS TO FUNDING FOR TRAINING AND EDUCATION, ESPECIALLY FOR SKILLED CRAFT WORKERS IN THE ELECTRIC SECTOR.

Recommendation 4: Provide funding support to individuals seeking energy sector related training and education.

The Task Force recommends that financial support, targeted to those most in need, be provided to individuals pursuing energy-related technical and professional training (or retraining) and to students pursuing post-secondary degrees in engineering and other energy-related technical fields. Using existing funding mechanisms as appropriate, Congress should consider:

- Developing a program that provides financial support through educational scholarships or grants to individuals,
- Providing worker training tax credits to energy companies who support apprenticeships and internships, and
- Clarifying and streamlining support for apprenticeships, technical certifications, and on-the-job training for veterans by combining the benefits of the Post-9/11 GI Bill and the Montgomery GI Bill into one program.

Implementation Steps

Financial support for energy-sector training and education can be provided by modifying and expanding existing programs. Specifically, the Task Force recommends the following actions:

- Reconcile differences between the Montgomery GI Bill and the Post 9/11 GI Bill. These are the two programs currently being used to provide GI benefits. While the Post-9/11 GI Bill expanded and streamlined benefits for service members who wished to pursue higher education, it did not do the same for service members who wished to pursue apprenticeship and on-the-job training opportunities. This is significant because of the disparity in

benefits between the Montgomery and Post 9/11 Bills and the enrollment process for the Montgomery GI Bill. With respect to benefits, the Post-9/11 GI Bill includes college tuition payments for the service member or a family member, as well as a housing allowance and a book allowance. By contrast, the Montgomery GI Bill provides support in the form of a monthly stipend, which is set annually and is the same throughout the country. Given this disparity, it is unlikely that a service member would choose to apply for support under the Montgomery GI Bill instead of the Post-9/11 GI Bill unless he or she were interested in apprenticeship or job training, which is not covered by the Post-9/11 GI Bill. Differences in the enrollment process for the two programs further disadvantage funding support for apprenticeships and on-the-job training. To use the Montgomery GI program, service members must enroll at the time of enlistment and agree to pay \$100 per month for the first year of enlistment. This means that service members interested in pursuing apprenticeship or job training not only have access to less generous benefits, they must know their plans, decide what type of program to pursue, and begin paying fees much earlier. This creates a significant disparity in favor of veterans choosing college rather than apprenticeship and job training.

Senator Daniel Akaka, Chairman of the Senate Committee on Veterans' Affairs, recently introduced a bill (S. 3447) with two cosponsors, Senators Mark Begich and Debbie Stabenow, that begins to address many of these disparities. Most significantly, the proposed legislation would provide benefits through the Post-9/11 GI Bill to veterans pursuing on-the-job training and apprenticeship programs. While S. 3447 is still working its way through Congress, the Task Force supports Senator Akaka's efforts.



- Increase the tax deduction for employees who receive education assistance from their employer. Section 127 of the tax code allows taxpayers to exclude up to \$5,250 per year in employer-provided educational assistance when figuring their gross income for tax purposes. The amount of this deduction has not changed since 1986. The Task Force recommends that it be increased to at least \$10,000 for employees seeking their first undergraduate degree or for employees seeking less than a bachelor's degree. In addition, current IRS policy limits the tax deduction to employees who intend to remain in their current jobs. The Task Force recommends that the deduction be expanded to include employees who wish to pursue further education to qualify for a new job.
- Review existing educational grant programs for opportunities to promote energy-sector workforce training. As discussed in the Task Force report, the workforce training pipeline for the energy sector includes a variety of programs and institutions. These should be reviewed to determine if there are barriers to funding for training and education, especially for skilled craft workers in the electric sector. For example:
 - Pell Grants are an important source of support for training. In 2007–2008, this program provided grants ranging from \$400 to \$4,310 to more than 5.5 million; overall funding provided through Pell Grants totaled nearly \$15 billion. Current rules limit Pell Grants for career and technical training to those programs that “prepare students for gainful employment in a recognized occupation.” The problem is that those terms are not currently well-defined. The Task Force supports efforts by the Department of Education to clarify this requirement so that more support can be provided for career and technical training.
 - Grants authorized by the Carl D. Perkins Career and Technical Education Act represent the largest source of federal funding for secondary schools and the primary source of federal funding for education programs that provide individuals with the knowledge and skills to compete in the



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workforce. The Task Force supports efforts to increase funding for Perkins Grants. At a minimum, funding for Perkins Grants should be indexed to inflation.

Recommendation 5: Aggressively focus on revitalizing the math and science skills, education, and career counseling of individuals who have the interest and skills to work in the energy sector. Enhance preparatory skill training for technically rigorous careers by:

- Improving and expanding contextual education in science, technology, engineering, math, and environmental literacy for students in all grades from kindergarten through 12th grade,
- Expanding the use of instructional technology at all levels to provide access to computerized and on-line educational resources and information about science, technology, engineering and math,

- Integrating lessons in applied math and science into the foundational curriculum for all students, with a particular emphasis on early (K–4) education,
- Expanding educational opportunities that include reading, writing, and applied math and science for adults who wish to enter the energy workforce,
- Providing opportunities for teachers and instructors to learn about the energy sector and greenhouse gas emissions through off-site programs organized by local colleges, universities, and industry partners,
- Ensuring that students are at or above grade level in math,
- Developing energy-related, contextual modules for math and science teacher training carried out at colleges and universities, including historically black colleges and universities or other minority institutions,
- Developing robust programs to train and retrain our teachers in math and science,
- Engaging retired professionals and helping them transition from a career in energy to the education system, and
- Creating seamless pathways from K–12 through post-secondary education.

Engage the next generation of energy scientists and engineers by following through on and expanding commitments to U.S.-based research and development efforts. This should include:

- Finishing the ten-year doubling⁴ of the budgets for the National Science Foundation (NSF), DOE Office of Science, and the National Institutes of Standards and Technology (NIST),



with a special emphasis on (1) encouraging high-risk, high-return research; (2) supporting researchers at the beginning of their careers; and (3) research focused on low-carbon energy sources and technologies.

- Investing in sustained research programs and academic tracks that support advanced energy systems.

Increase awareness of opportunities in the energy sector by:

- Creating targeted career awareness material that addresses specific audiences including youth, adults, minority populations, veterans, government officials, and educators,
- Developing messaging materials that (1) highlight how critically important technically educated individuals are for addressing our long-term energy and environmental challenges and (2) address a lack of public awareness about the security, pay, and job satisfaction associated with careers in the electric sector,
- Supporting community-based organizations that help to match potential job seekers and employers,
- Informing career counselors and educators about job opportunities and experiences in the energy sector, and
- Communicating that skilled trades are a vital component of the American economy and should be viewed as desirable options for individuals seeking career training.



Implementation Steps

A number of initiatives to improve education and increase awareness of energy-sector jobs are currently underway at the Department of Labor and at other federal agencies. To augment these ongoing efforts, Congress should reauthorize the America COMPETES Act, which was originally passed in response to the *Rising Above the Gathering Storm* report. The America COMPETES Act provides for investments in STEM education; sets budgets for science research agencies (such as NIST, NSF, and the DOE Office of Science) on a path to doubling; and continues support for the new Advanced Research projects Agency for Energy (ARPA-E).⁵

⁴ White House Office of Management and Budget. "A New Era of Responsibility: Renewing America's Promise (FY2010 Budget). February 26, 2009. Available at www.whitehouse.gov/omb/assets/fy2010_new_era/a_new_era_of_responsibility2.pdf

⁵ ARPA-E was created to pursue advances in high-risk, high-reward energy technologies.

Notes

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