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Congress of the United States
U.S. House of Representatives
Committee on Small Business
2361 Rayburn House Office Building
Washington, DC 20515-0515

MEMORANDUM

TO:	Members, Subcommittee on Innovation and Workforce Development
FROM:	Jason Crow, Chairman
DATE:	October 29, 2019
RE:	Subcommittee on Innovation and Workforce Development hearing: "Creating the Clean Energy Workforce"

On Tuesday, October 29, 2019 at 10:00 a.m. in Room 2360 of the Rayburn House Office Building, the House Committee on Small Business Subcommittee on Innovation and Workforce Development will hold a hearing entitled, "Creating the Clean Energy Workforce."

Small businesses play a critical role in the clean energy economy. From producing biofuels to installing energy efficient equipment, manufacturing components of wind turbines, surveying land and auditing buildings, to providing the service to maintain green energy products small businesses play a crucial role in supporting the growing clean energy economy. However, with a tight labor market and a growing skills gap, small firms are having a hard time finding qualified workers in this new and emerging industry. The skills gap is limiting the ability of these companies to expand, and workforce development programs are needed to satisfy the needs of small businesses in the clean energy sector. This hearing will discuss the workforce needs and initiatives in several different clean energy sectors. Members will hear testimony from small businesses, labor unions, and training facility managers about how to create the workforce necessary as our nation to transitions to more renewable energy sources.

Witnesses:

- Mr. Mark Farrar Jackson, Vice President, Community Housing Partners dba CHP Energy Solutions, Christiansburg, VA
- Mr. Jason L. Wardrip, Business Manager, Colorado Building and Construction Trades Council, Aurora, CO
- Mr. Neil James, Vice President of Operations and Maintenance, Apex Clean Energy, Charlottesville, VA
- Mr. Ed Gilliland, Senior Director, The Solar Foundation, Washington, DC

Background

The clean energy workforce is comprised of roughly 3.2 million workers. This rapidly growing sector is expanding at a higher rate than traditional energy sources and provides labor-intensive operations resulting in good paying jobs here in the U.S. These jobs are needed as we transition our energy sources away from fossil fuels and toward carbon neutral power generation. From solar

panel installation on the roofs of residential and commercial buildings to retrofitting every building in America for energy efficiency, there is great potential for economic growth. Fossil fuels, such as coal, oil, and natural gas made up 63.5 percent of energy generation in the U.S. in 2018, while renewable sources, such as wind, solar, and hydroelectric, made up only 17.1 percent.[1] However, clean energy jobs outnumber fossil fuel jobs nearly three to one (3.26 million to 1.17 million).[2]

As our economy is rapidly transitioning away from fossil fuels to mitigate the detrimental economic and societal consequences of climate change, policy makers must consider targeted initiatives to train and build a workforce to fill the available positions in the clean energy economy. Through innovation and hard work, many small firms are bringing new clean energy technologies to market, creating economic growth, and supporting communities across the country. They are developing a broad range of technologies, including novel energy storage and microgrid solutions, lighter and stronger steel, more efficient fuel cells, low-impact hydropower, increased carbon sequestration, and much more. Even large-scale projects, such as wind and solar farms, create jobs and opportunities for small firms and suppliers that employ metal workers, machinists, truck drivers, and others.

Unfortunately, small businesses have the hardest time finding an adequate workforce to fill their growth potential. Whether it is addressing the skills gap or competing with the benefits packages and higher wages offered by larger employers, small businesses are struggling to find the workers they need to grow and expand. Many of the jobs they support are so-called "middle skill" jobs, that require more than a high school diploma, but less than a college degree. Through certification programs, apprenticeships, or certain community college courses, workers can become qualified to work in the field. These programs are offered by several different businesses, non-profits, labor unions, and schools throughout the country and can help the workforce obtain the skills needed. This hearing will give Members a chance to learn about these programs and determine how to bolster them as the transition to a clean energy economy accelerates.

Increasing Demand for Clean and Renewable Energy

The biggest job creator in the economy is meeting demand for new products and services that provide value to consumers. Demand for clean and renewable energy has been increasing over the past few years because of several factors. The first factor is purely economic – a sharp decrease in the price of wind and solar, as well as lithium ion batteries to store the energy and energy efficient technologies, compared to traditional fossil fuels makes sense to the bottom line. The second factor is social responsibility – corporations and individuals are increasingly taking responsibility for limiting their carbon footprint in the face of ecological collapse and climate catastrophe. The final factor is government incentives and tax credits, which drives demand for clean and renewable energy, creates jobs, and decreases the environmental impact of energy consumption.

[1] U.S. Energy Info. Admin., What is U.S. Electricity Generation by Energy Source?, https://www.eia.gov/tools/faqs/faq.php?id=427&t=3, (last updated Mar. 1, 2019).
[2] NAT'L ASS'N OF STATE ENERGY OFFICIALS AND ENERGY FUTURES INITIATIVE, *2019 U.S. Energy and Employment Report* (last visited Aug. 28, 2019).

Falling Prices

The price of renewable energy has fallen dramatically in the past few decades. For instance, solar photovoltaic (PV) has dropped a remarkable 99 percent since 1977, when it cost $76.67 per watt.[3] In 2013, PV cost only $.74/watt or about 7 cents/kWh.[4] In 2018 alone, utility scale solar dropped in price by 26 percent, biofuels by 14 percent, onshore wind by 13 percent, and hydropower by 12 percent.[5] On average, the cheapest way to save on energy costs is through energy efficiency. ACEEE's research shows that energy efficiency programs cost utilities about 3.1 cents/kWh.[6] This means that the average cost of efficiency to utilities is still generally less than that of wind and utility-scale solar.[7] Energy efficiency investments since 1990 have helped us avoid the equivalent of 313 large power plants and delivered cumulative savings of nearly $790B to customers nationwide.[8]

Corporate Social Responsibility

Another large driver for demand is social responsibility. Over the past several years, the climate crisis has been elevated to a prominent international issue. On September 20, 2019, an estimated four million people took to the streets of their cities to demand action on climate. Due to lack of structural change at the governmental level, individuals and corporations are changing their behavior to limit their carbon footprint to demonstrate to customers and shareholders that they care about the environment. Not only can they save money on energy, but they can increase marketing appeal and customer loyalty. For instance, Apple has purchased enough renewable energy in 2018 to power 100 percent of its global facilities.[9] Facebook expects to power its global operations with 100 percent renewable energy by 2020.[10] Google reached 100 percent renewable energy in 2018 and Wal-Mart expects to be there by 2025.[11] Even Exxon purchased 575 Megawatts (MW) of solar and wind in Texas in 2018.[12]

Incentives and Tax Credits

There are several federal government standards, tax credits, grants, and loan programs for qualifying renewable energy and energy efficiency technologies and projects. There are also several grant and loan programs available from government agencies, including the U.S. Department of Agriculture (USDA), the U.S. Department of Energy (DOE), the U.S. Small Business Administration (SBA), the U.S. Environmental Protection Agency (EPA), and the U.S. Department of the Interior.

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[3] HJ Mai, *Renewable Energy Prices Keep Falling: When Do They Bottom Out?*, UTILITY DIVE, May 30, 2019, https://www.utilitydive.com/news/renewable-energy-prices-keep-falling-when-do-they-bottom-out/555822/ (last visited Oct. 17, 2019).

[4] *Id.*

[5] *Id.*

[6] Maggie Molina, *Renewables Are Getting Cheaper but Energy Efficiency, On Average, Still Costs Utilities Less*, ACEEE, Dec. 18, 2018 https://aceee.org/blog/2018/12/renewables-are-getting-cheaper-energy (last visited Oct. 17, 2019)

[7] *Id.*

[8] *Id.*

[9] Amy Vaden, *US Corporations Driving Up Demand For Renewable Energy*, SOUTHERN ALLIANCE FOR CLEAN ENERGY, Mar. 15, 2019 https://cleanenergy.org/blog/us-corporations-driving-up-demand-for-renewable-energy/ (last visited Oct. 17, 2019).

[10] *Id.*

[11] *Id.*

[12] *Id.*

Programs such as the renewable fuel standards (RFS) and the renewable electricity production tax credit help curb greenhouse gas emissions and help many local communities transition to different energy sources. The RFS is intended to expand the nation's renewable fuels sector while decreasing dependence on fossil fuels and supporting rural communities. The renewable electricity production tax credit is a powerful policy tool that has helped create hundreds of thousands of jobs and spurred billions of dollars in economic growth across the clean energy economy. Tax credits for clean energy technologies can help ensure American leadership in the clean energy economy and drive domestic manufacturing and the creation and maintenance of good American jobs in the next generation. Congress has been discussing energy storage, transportation, renewable energy and energy efficiency as part of larger pending legislation that modified the existing tax code.

Growth in Energy Efficiency and Renewable Energy

Falling prices and increased corporate and individual social responsibility have created increased demand for energy efficiency and renewable energy. The growth in these sectors has led to the creation of millions of jobs, many of which are created by small businesses. This high growth rate also employs more workers per unit of generation, requiring more certifications and worker training courses.

Energy Efficiency

The biggest job creator in the energy space is centered around energy efficiency. Energy efficiency includes both the production and installation of energy-saving products, as well as services that reduce energy consumptions. This can include manufacturing or installation of energy-efficient equipment and appliances, electric or hybrid vehicles, products and services that improve the energy efficiency of buildings and homes, and the efficiency of energy storage and distribution, such as Smart Grid technologies.[13]

The 2019 U.S. Energy and Employment Report states that 2,324,866 people work in the United State energy efficiency sector, many of them as part of small businesses.[14] This sector has experienced rapid growth. In 2018, the energy efficiency sector had the highest growth rate of any energy sector in the country at 5.37%.[15] These jobs are spread across a variety of industries including construction, manufacturing, sales and distribution, and professional services. Demand for efficient technologies and buildings has driven expansion across many industries, including construction, manufacturing, building materials, lighting, and other energy-saving goods and services.

Energy efficient products and technologies provide opportunities for small businesses, including manufacturers, local contractors who build or upgrade homes and commercial buildings, and tech startups that analyze energy use information. Small firms are engaged in nearly every aspect of this sector, from innovation to production to construction and installation. Of the 7.29 million total jobs in construction in the United States, about 18 percent involve work in support of the energy efficiency sector.[16] Another critical industry is the manufacturing sector and the assembly of

[13] NAT'L ASS'N OF ST. ENERGY OFFICIALS AND ENERGY FUTURES INITIATIVE, 2019 U.S. ENERGY AND EMPLOYMENT REPORT (2019).
[14] *Id.*
[15] *Id.*
[16] *Id.*

energy efficiency appliances, including ENERGY STAR appliances and equipment. Manufacturing of energy efficiency appliances, building materials, lighting, heating and cooling equipment, and other equipment accounts for 321,581 jobs.[17]

The jobs in energy efficiency are largely created by small businesses as well. There are currently 361,329 energy efficiency businesses in the US and 97 percent employ fewer than 100 employees. 45 percent of these businesses have only between one and five employees. These are local jobs, with 99.7 percent of U.S. Counties having energy efficiency jobs.

Renewable Energy

Renewable energy is derived from resources that can be produced or replenished naturally. These resources include biomass, sunlight, water, wind, and geothermal. Currently, none of these resources alone can meet all the nation's energy needs; however, they can reduce dependence on fossil fuels, decrease greenhouse gas emissions and pollution, and lead to overall savings, efficiency, and enhanced energy security.

1. Wind Energy

The wind is always blowing and therefore there is an opportunity for constant energy generation. From the plains of Kansas, where 40 percent of their energy is generated by wind turbines, to the top of the West Virginia mountains, where coal jobs are disappearing, utilizing wind provides the opportunity to decrease energy costs and create a sustainable source of energy. Every state in the country has either a wind project or wind-related manufacturing facility. Over 114,000 Americans have direct jobs in the wind industry, and there are over 500 wind-related manufacturing facilities in the country that support over 24,000 job making components for the wind industry.

2. Solar Energy

The sun is the world's most abundant energy source, and solar energy production has seen rapid growth in recent years. Since 2010, the number of jobs has nearly tripled to more than 242,000 Americans working in solar industry jobs across all 50 states.[18] Solar panels are being installed on neighborhood rooftops, retail stores, and community solar project by those looking to reduce their energy costs. Solar can supply electricity for a single home or business or form large arrays that supply electricity to thousands of electricity consumers. There are approximately 2 million solar installations across America, double the number from only three years ago and this is only projected to increase.[19] Not only are businesses installing solar as a way to reduce energy costs in the long-term, but there are a number of small businesses that manufacture, design, install, distribute, and service residential and commercial solar systems. According to the Bureau of Labor Statistics, solar photovoltaic installers will be one of the fastest growing occupations between 2016 and 2026.[20]

While solar only represents 2.4 percent of U.S. electricity generation, it employs twice as many people as the coal industry and five times as many as nuclear.[21] This industry is fueling a boom

[17] *Id.*
[18] THE SOLAR FOUND., NATIONAL SOLAR JOBS CENSUS (2018).
[19] SOLAR ENERGY INDUS. ASS'N., U.S. SOLAR MARKET INSIGHT REPORT 2019 Q2, (2019).
[20] U.S. BUREAU OF LAB. STAT., EMPLOYMENT PROJECTIONS: FASTEST GROWING OCCUPATIONS (2016).
[21] Solar Foundation, s*upra* note 18.

for small businesses. In fact, 77.2 percent of businesses in the solar industry have fewer than 50 employees.[22] Almost 30 percent have between one and five employees, almost 14 percent have six to ten employees, 15 percent have 11 to 24 employees, and 18 percent have 25 to 49 employees.[23]

These jobs are high paying and local jobs. A typical field crew may be made up of some experienced management and field workers permanently employed in conjunction with temporary employees from the local community. But, in rural areas where the local labor pool is small, most of the workforce will travel to the site, often staying and working onsite for three to nine months.[24] When utility-scale and individual installation projects are set up in a new location, they employ people that are mostly in-state and within the region.[25] Entry level jobs pay a national median wage of $18.12 for all solar occupations.[26] This includes an average of $18.92 to entry level non-electrician solar panel installers. [27]

Clean Energy & Workforce Development Programs

Workforce development is a broad term, but it generally means helping individuals – including youth, unemployed, underemployed, or low-skilled adults; and members of the incumbent workforce – by preparing them for employment or career advancement. It is typically a multi-pronged strategy that encompasses workforce training, job placement, and job access. They provide a pipeline for skilled workers to enter the workforce in local industries where they are needed. They are often needed to address the skills gap, or the gap between the skills workers have and the skills employers need. Generally, they are programs and courses that train "middle skills," or skills that require more than a high school diploma, but less than a four-year college degree. They are more common in trades such as construction, plumbing, electrical work, technology, and manufacturing.

In energy efficiency, employment by industry sector is mostly in construction (1.27M), professional/business services (450K), manufacturing (316K), and wholesale, distribution, and trade (167K).[28] Already, 80 percent of energy efficiency employers report difficulty in finding qualified job applicants to fill positions.[29] This is true across all energy efficiency jobs, where the leading reasons for lack of hiring are lack of experience, training, or technical skills. Technicians, technical support, and installation workers are the most difficult positions to fill, because they generally require the most training.[30]

Similarly, solar employs many people from the demand side sector, such as installation and project development, wholesale trade and distribution. This provides nearly 76 percent of overall solar industry employment and requires job training. 82 percent of employers report difficulty hiring, with installation and project development being the hardest sector to hire for. Furthermore, hiring

[22] *Id.*
[23] *Id.*
[24] *Id.*
[25] *Id.*
[26] *Id.*
[27] *Id.*
[28] Energy and Employment Report, s*upra* note 13.
[29] *Id.*
[30] Id.

difficulties disproportionately affect small businesses, which make up many of the employers in the clean energy industry.

This underscores the need to continue expanding workforce development programs and providing an adequate pipeline to many small businesses and employers in the clean energy industry. The skills gap, workforce shortage, and growing number of retiring baby boomers inhibits the growth of many of these businesses and hinders the ability to quickly transform our energy sources.

Policy Proposals

There are several policy proposals at the federal level related to the clean energy workforce. These policy proposals outline labor standards, invest in job training, and empower underrepresented populations to benefit from growth in the industry.

H.R. 1315 – Blue Collar to Green Collar Jobs Development Act of 2019

This legislation introduced by Rep. Bobby Rush amends Title II of the Department of Energy Organization Act to reauthorize an office within the Department of Energy, to direct the Secretary of Energy to establish and carry out a comprehensive, nationwide energy related industries jobs program. It would use that office to improve education and job training programs in the energy-related industries, including manufacturing, engineering, construction, and retrofitting jobs, in order to increase the number of skilled workers. It would also encourage traditionally underrepresented groups, including religious and ethnic minorities, women, veterans, and individuals with disabilities to enter the STEM fields.

H.R. 4148 – Green Jobs and Opportunity Act of 2019

This legislation introduced by Rep. Antonio Delgado instructs the Secretary of Labor to submit a report on current and future trends and shortages in the clean energy technology industry to achieve a clean energy economy. It also provides grants to establish and enhance training programs for any occupation or field of work for which a shortage is identified.

S. 2185, Good Jobs for 21st Century Energy Act

This legislation introduced by Senators Jeff Merkley and Mazie Hirono which establishes labor standards for projects in the clean energy sector by setting clear employment and safety standards through the Project Labor Agreement Process. It also creates a 10% tax credit for qualifying clean energy generation facilities, carbon capture technologies, and extends and increases tax credits for energy efficiency products. It also codifies and expands the Clean Energy Manufacturing Initiative. Lastly, it would work to convene unions, employers, and industry to ensure adequate workforce development in the clean energy space.

Conclusion

Whether it is retrofitting households and businesses, providing technical service massive wind turbines, or installing solar panels throughout the country, education and workforce development will be needed to fill the ever-growing demand for positions in the clean energy economy. Through both public and private investment, taking responsibility for the environment, and innovating for cheaper and more effective energy saving technology, demand and therefore jobs will be created. Small businesses can benefit from this booming industry and empower Americans across the country to create economic growth by decreasing carbon emissions and helping the environment.

However, this can only be done if the proper workforce is in place, therefore we should continue to strengthen and expand our job training programs in the relevant sectors such as engineering, construction, electricity, and manufacturing, along with supporting small firms that want to be a part of the growing clean energy economy.