

TITLE II: 21ST CENTURY WORKFORCE

HEARING
BEFORE THE
SUBCOMMITTEE ON ENERGY AND POWER
OF THE
COMMITTEE ON ENERGY AND
COMMERCE
HOUSE OF REPRESENTATIVES
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TITLE II: 21ST CENTURY WORKFORCE

THURSDAY, APRIL 23, 2015

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY AND POWER,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 10:05 a.m., in room 2123 of the Rayburn House Office Building, Hon. Ed Whitfield (chairman of the subcommittee) presiding.

Members present: Representatives Whitfield, Shimkus, Pitts, Latta, Harper, McKinley, Johnson, Long, Ellmers, Flores, Mullin, Hudson, Rush, McNerney, Green, Doyle, Castor, Sarbanes, and Loeb sack.

Staff present: Nick Abraham, Legislative Associate, Energy and Power; Gary Andres, Staff Director; Charlotte Baker, Deputy Communications Director; Will Batson, Legislative Clerk; Leighton Brown, Press Assistant; Allison Busbee, Policy Coordinator, Energy and Power; Patrick Currier, Counsel, Energy and Power; Tom Hassenboehler, Chief Counsel, Energy and Power; Brandon Moon ey, Professional Staff Member, Energy and Power; Caitlin Haberman, Democratic Professional Staff Member; Rick Kessler, Democratic Senior Advisor and Staff Director, Energy and Environ ment; and John Marshall, Democratic Policy Coordinator.

OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY

Mr. WHITFIELD. I would like to call the hearing to order this morning. Today we are having a hearing on a draft bill, Title II of the 21st Century Workforce, and we have a distinguished panel of witnesses with us this morning. And I am not going to introduce you now, but I am going to introduce you just prior to your 5-minute statement. But we do thank you for joining us this morning. And I would like to recognize myself for 5 minutes for an opening statement.

First, I want to thank Bobby Rush as well as Bill Flores, Gene Green, and Richard Hudson for sponsoring the bipartisan discussion draft that we will be talking about today entitled the 21st Century Workforce. This discussion draft will become part of our larger energy legislation that we will be rolling out in the weeks ahead. I have already complimented you, Bob, and thank you for coming.

As we all know, the domestic energy sector is undergoing dramatic changes. Thanks to American innovations, our decades of de-

clining oil and natural gas production have given way to tremendous increases in output. The Energy Information Administration recently projected that the United States will eliminate net energy imports by the year 2030. This abundant and affordable energy is sparking new manufacturing activity in the United States.

America's energy and manufacturing renaissance is also leading to a jobs renaissance. Energy and energy-related employment has been one of the few economic bright spots in recent years, everything from those employed discovering and producing energy to those constructing and operating the infrastructure to transport it, to the new factories that are powered by it.

But America's energy transformation has some problems because we are now finding that we need more trained workers in these areas, skilled workers. So there are many opportunities out there, and this is what this legislation is all about, trying to assist in the development of these new job opportunities.

As you know, we have also had a lot of people lose their job as we make this transformation in energy. Certainly, in the coal sector they have been hit very hard. And so we have a great opportunity here. I know the Department of Energy has already expressed an interest in developing a jobs program, but we feel like it is important to provide some guidance in that, and as I said earlier, Bobby Rush has been talking about this for some time, and actually, his draft was the basis for this Title II.

So we have a unique opportunity here in our broader energy bill to address this issue, and that is what we hope to do. And we hope that your testimony will provide us some insights on your thoughts on this important subject.

[The prepared statement of Mr. Whitfield follows:]

PREPARED STATEMENT OF HON. ED WHITFIELD

I would like to thank my good friend Bobby Rush as well as Bill Flores, Gene Green, and Richard Hudson, for sponsoring the bipartisan discussion draft that we will be talking about today, entitled 21st Century Workforce. This discussion draft will become part of our larger energy legislation that we will be rolling out in the weeks ahead. I also thank our witnesses for appearing before us today.

As we all know, the domestic energy sector is undergoing dramatic changes. Thanks to American innovations in hydraulic fracturing and horizontal drilling, decades of declining oil and natural gas production have given way to tremendous increases in output. The Energy Information Administration (EIA) recently projected that the U.S. will eliminate net energy imports by 2030. This abundant and affordable energy is sparking new manufacturing activity in the U.S.

America's energy and manufacturing renaissance is also leading to a jobs renaissance. Energy and energy-related employment has been one of the few economic bright spots in recent years—everything from those employed discovering and producing energy, to those constructing and operating the infrastructure to transport it, to the new factories that are powered by it.

But America's energy transformation has taken the job market by surprise. Many in need of work do not have the skills required to fill these high-paying opportunities, and the Department of Energy's job programs do not fully reflect current realities.

That is the problem the 21st Century Workforce discussion draft seeks to address. It updates DOE's energy training programs to better serve today's energy market and today's job seekers. Just as America's energy situation is changing, so is its workforce. We have growing numbers of minorities participating in labor markets, but these groups have been historically underrepresented in the energy sector. The 21st Century Workforce bill would strengthen the outreach to these potential energy workers. Our goal is nothing less than to have the best trained and most diverse energy industry in the world.

In addition, there are displaced workers, such as those once employed in the coal sector, who are now looking for new opportunities in energy. Of course, my hope is to get as many of these men and women employed again in the coal industry, but for the others the discussion draft has programs to help them transition into other energy careers.

The discussion draft does not create new programs out of whole cloth, but builds upon the base that already exists at DOE. And it applies to a wide variety of programs and partnerships with 4-year colleges, community and technical colleges, and high schools as well as other governmental and private institutions involved in energy.

Now, I know that on this subcommittee we don't always agree on which energy source is the best. We have proponents of wind and solar as well as proponents of fossil fuels and nuclear power. However, this discussion draft is fuel neutral—it does not seek to target any particular energy source, but rather gives DOE the flexibility to allocate its resources to wherever the job opportunities are. And the focus goes well beyond energy production to also include downstream opportunities such as those in infrastructure that were highlighted in DOE's recent Quadrennial Energy Review as well as those in the manufacturing sector that are made possible by affordable domestic energy.

Energy and energy-related jobs are critical to American economic growth in the years ahead. The career opportunities are many, and the 21st Century Workforce discussion draft will go a long way towards ensuring that we have qualified Americans to fill them.

Mr. WHITFIELD. And with that, at this time I would like to recognize the gentleman from Illinois for his opening statement.

OPENING STATEMENT OF HON. BOBBY L. RUSH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ILLINOIS

Mr. RUSH. I want to thank you, Mr. Chairman, for holding this important hearing, and I must commend you and your staff for working with my office on the 21st Century Workforce bill. That is the focus of what we will be discussing here today.

Mr. Chairman, I hope that the same spirit of goodwill and negotiations that the minority and the majority sides that have displayed in working on this discussion draft can be carried forth as we continue to work on the remaining sections of a broader bipartisan comprehensive energy bill. The Nation is in need, waiting for it, and a Nation in need deserves a comprehensive energy bill.

I am also optimistic knowing that both sides continue to work diligently at a good faith on hammering out some of the more contentious outstanding issues so that hopefully we can bring forth a bill that helps move our Nation's energy policy forward and restores this subcommittee's reputation as a true model of what bipartisanship can accomplish.

Mr. Chairman, the 21st Century Workforce legislation addresses an issue that is neither partisan nor bipartisan, but rather it is non-partisan because this is an issue that benefits communities, benefits industry, and benefits the overall American economy. This bill brings together government agencies including the National Labs, the energy and manufacturing industry, unions, schools, community colleges, and universities among others and promotes collaboration to make sure that we are tapping into a wealth of under-utilized talent and training and preparing workers for the energy and manufacturing jobs both presently and of our future also.

Mr. Chairman, this bill is important because it matches up the needs of an industry and a willingness and able workforce, and in the process it helps start new cycles of hope, new cycles of oppor-

tunity for groups who have in many cases been overlooked and underserved. In fact, Mr. Chairman, it is my hope, my sincere hope, that if and when this bill is enacted, it would be instrumental in helping to create individuals with similar stories so that those we hear from today, their stories will be repeated time and time and time again, stories I might add like Mr. Wilson's from the Englewood community that is located in my district in Chicago, Mr. Wilson, who beat the odds and turned his life into an inspirational profile that can serve as a motivation to this Nation and to this Nation's young men all across this Nation.

Mr. Chairman, this legislation can help to open new pathways to jobs, new pathways to careers, new pathways entrepreneurial opportunities for women, for minorities, and for our veterans while also helping to move our overall economy forward by promoting STEM education as well as developing educational guidelines for institutions at all levels, from elementary to post-graduate university programs. This bill would help to ensure that we are training individuals with the skills necessary to work in the energy and manufacturing-related jobs including energy efficiency, energy conservation, from blue-collar workers to managers to supervisors up to and including new entrepreneurs and business creators.

So Mr. Chairman, again, I applaud you for holding this hearing today as well as working with me to make this issue a priority in what we hope will be a broader bipartisan, non-partisan energy and infrastructure bill. I look forward to engaging the witnesses that we have here today, and I welcome the witnesses. And with that, I yield back the balance of my time.

Mr. WHITFIELD. Thank you. The gentleman yields back the balance of his time. Mr. Upton is not here. Does anyone on our side of the aisle, they would like to take any of his time. OK. I see the gentleman from Texas is recognized for an opening statement.

OPENING STATEMENT OF HON. GENE GREEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Mr. GREEN. Thank you, Mr. Chairman. I want to thank you and the ranking member for holding the hearing today, and I want to thank our witnesses for coming and testifying today. Specifically, I would like to acknowledge Dr. Ramanan Krishnamoorti, the Chief Energy Officer at the University of Houston. Being a graduate of University of Houston College of Business and going back there to law school, I can't say too many nice things about it because it gave me the education I have. And what Dr. Krishnamoorti and his colleagues are doing in the energy field are amazing. I stated before; we can't say it enough. Texas is leading the Nation producing results. This time it is our energy workforce development. Thanks to the University of Houston, San Jacinto Community College, ExxonMobil, and other stakeholders, Houston is launching a pad for efforts like these contained in this legislation today. The University of Houston partnered with the Energy Institute High School to engage high school students and get them interested in working in the energy field. The Texas Gulf Coast Community College Consortium is addressing the workforce need of our industries. The Community College Petrochemical Initiative is a public/private partnership that is unique to the industry. Through programs like

the University of Houston Partner, the TGCCCC and CPI, industry job opportunities become realities.

I look forward to working with my colleagues on this legislation to ensure that success that we have in East Harris County where I represent the refineries and chemical plants continues and is duplicated nationwide. And I yield back my time. Thank you, Mr. Chairman.

Mr. WHITFIELD. The gentleman yields back, and that concludes the opening statements. So now we will get to our panel of witnesses. Once again, thanks for being with us this morning. I will introduce you individually and give you each opportunity for 5 minutes for an opening statement.

So our first witness is Dr. Tracy Brundage who is the Vice President of the Workforce Development and Continuing Education at Pennsylvania College of Technology on behalf of Shale NET. So Dr. Brundage, you are recognized for 5 minutes, and the little red lights will come on when your 5 minutes is up. There are two little boxes on the desk, but we do look forward to your testimony. And thanks for being with us, and just be sure to turn the microphone on so we all can hear.

STATEMENTS OF TRACY BRUNDAGE, VICE PRESIDENT, WORKFORCE DEVELOPMENT AND CONTINUING EDUCATION, PENNSYLVANIA COLLEGE OF TECHNOLOGY, ON BEHALF OF SHALE NET; RICK JARVIS, VICE PRESIDENT OF FIELD CONSTRUCTION, MORROW-MEADOWS CORPORATION, ON BEHALF OF NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION; RAMANAN KRISHNAMOORTI, CHIEF ENERGY OFFICER, UNIVERSITY OF HOUSTON; MONICA MARTINEZ, PRESIDENT, HISPANICS IN ENERGY; AND CHARLES WILSON, SENIOR REACTOR OPERATOR TRAINER, MANAGING PARTNER, CW CONSULTING GROUP, LLC

STATEMENT OF TRACY BRUNDAGE

Ms. BRUNDAGE. Good morning. Thank you, subcommittee members, for the opportunity to speak about the need for workforce development and training in energy and related industries. My name is Tracy Brundage. I am the Vice President for Workforce Development at the Pennsylvania College of Technology, a special mission affiliate of Penn State committed to applied technology education.

My testimony today will focus on Shale NET, a partnership of training providers, economic development, the public workforce system and employers who responded to the call from the energy industry for a trained workforce.

When we ask executives in the gas and oil industry what keeps them up at night, many will respond by expressing their concerns regarding the great crew change. The energy industry is facing a mass exodus of talent and experience. In order for the industry to succeed in the 21st century, it must continue to recruit and retain talent from a more diverse labor pool. The industry must be prepared for the inevitable departure of a large number of workers who are retiring.

To address these challenges, industry, government, the public workforce investment system, economic development agencies, edu-

cation, and training providers must create the kind of educational infrastructure that will provide a qualified workforce the industry needs. Our work, through Shale NET, over the last several years, has focused on building this infrastructure.

In 2010 Penn College, Westmoreland County Community College in Pennsylvania, and 18 other training providers across Ohio, Pennsylvania, West Virginia, and New York came together to create Shale NET. We were awarded \$4.96 million from the U.S. Department of Labor's Community-Based Job Training Grant Initiative to develop and implement a 3-week training program that exposes students to expectations of the industry related to job readiness skills, safety, and technical awareness.

The curriculum was designed from input from industry, stressed consistency of content, and awarded competency-based in industry-recognized credentials. Though the program was open to all, special efforts were directed to recruit veterans, the unemployed, and underemployed. The results for Shale NET are stellar. Over 14,000 individuals explored the Talent Match Web site which provides realistic job profiles of energy occupations and information about the industry. Over 1,100 completed practical training, and almost 3,500 obtained job. The placement rate was 79 percent, and retention three quarters after placement was 82 percent.

In October 2012, Shale NET was awarded a U.S. Department of Labor Trade Adjustment Assistance in Community College and Career Training, known as TAACCCT, Round II grant for \$14.96 million which combines the short-term programming of the initial Shale NET grant with stackable college credit offerings.

Shale NET is a best-practice model that can be deployed and implemented in other areas because the curriculum is competency-based, developed with input from industry, consistent, easily replicated, and flexible, dependent upon industry needs. The success of Shale NET is a direct result of strong partnerships with employers and trade associations, workforce investment boards, one stops, economic development agencies such as the Pittsburgh-based Allegheny Conference on Community Development, and local governments who share a common desire to place qualified candidates with employers and family-sustaining careers.

Several innovative strategies are being deployed by Shale NET to bring blended technical curriculum to remote areas, veterans, and underserved populations. One strategy uses state-of-the-art 3D immersive technology and artificial intelligence to assess and teach more advanced technical skills related to natural gas and oil production in a simulated environment. These methodologies create enormous cost savings for educational institutions, embrace leading edge technology honed by the U.S. Department of Defense to train and assess competencies and make capacity-building more feasible and efficient.

For future programs that are introduced to meet energy workforce needs, there are several factors that are imperative: to establish public/private partnerships that become the backbone of developing a broad array of training options across the geography of the United States; to target federal funding in promoting regional collaborations that align with industry's multi-state operations; and to

direct funding where the impact is greatest to support energy training initiatives that secure jobs for America's workforce.

Our job is not yet done. Thanks again for this opportunity to speak on Shale NET's behalf.

[The prepared statement of Ms. Brundage follows:]

**Summary of Testimony before the House Energy and Commerce Committee
Subcommittee on Energy and Power
"Title II: 21st Century Workforce"**

Tracy L. Brundage, Ph.D., Vice President of Workforce Development
Pennsylvania College of Technology
April 23, 2015

The focus of this testimony is ShaleNET, a successful partnership of training providers, economic development, the public workforce system, employers, and trade associations who responded to the call from the energy industry for a trained workforce.

As a direct response to industry demand, ShaleNET was created in 2010 with a \$4.96 million award from the US Department of Labor's Community-Based Job Training Grant initiative and a subsequent award of \$14.96 million in October 2012 from the US Department of Labor's Trade Adjustment Assistance Community College and Career Training (TAACCCT) Round II. This grant combines the short-term programming of the initial ShaleNET grant with college credit offerings in a stackable credential model to ensure that students secure jobs in the energy industry upon completion.

The ShaleNET Hubs include Penn College, Westmoreland County Community College in Pennsylvania, Stark State College in Ohio, Navarro College in Texas and Pierpont Community and Technical College in West Virginia (as an affiliate). ShaleNET reached out to industry, state and local government for funding to augment traditional financial aid and received commitments of over \$700,000 in public/private partnership funds for scholarships. This includes a \$460,000 pledge from Chevron and its Appalachian Partnership Initiative secured by the Allegheny Conference on Community Development, a key economic development partner in this initiative.

The most successful component of ShaleNET is the partnerships that have been developed and strengthened which have resulted in training opportunities for students who are now employed in jobs with family sustaining wages. This is a best practice model that can be deployed and implemented in other areas because it is competency based and can be easily replicated. For future programs intended to meet energy workforce needs, it is imperative to establish public/private partnerships that become the backbone of developing a broad array of training options across the United States. It is also imperative that funding be directed where the impact is greatest to support energy training initiatives that secure jobs for America's workforce.

Testimony before the House Energy and Commerce Committee
Subcommittee on Energy and Power
“Title II: 21st Century Workforce”

Tracy L. Brundage, Ph.D., Vice President of Workforce Development
Pennsylvania College of Technology
April 23, 2015

Thank you Subcommittee members for the opportunity to speak about the need for workforce development and training in energy and related industries.

My name is Tracy Brundage. I am the Vice President for Workforce Development at the Pennsylvania College of Technology (Penn College), a special mission affiliate of The Pennsylvania State University, committed to applied technology education. Penn College enrolls nearly 6,000 students in bachelor, associate and certificate programs relating to more than 100 different career areas and manages the state’s largest worker training program through its Workforce Development and Continuing Education unit.

My testimony will focus on ShaleNET, a partnership of training providers, economic development, the public workforce system, employers, and trade associations who responded to the call from the energy industry for a trained workforce.

At the onset of shale development in the Marcellus Shale Play, employers struggled to find workers with the necessary skills and specialized work ethic to be successful in the industry. While offering excellent wages, employers struggled with turnover rates of 90-100%, employees with the wrong skill sets and a lack of legacy knowledge regarding employer expectations. This caused

employers to publicly question the work ethic of our residents and a continued reliance on importing workers from areas outside of the Appalachian Basin.

As a direct response to industry demand, **ShaleNET** was created in 2010 with a \$4.96 million award from the US Department of Labor's Community-Based Job Training Grant initiative. A collaborative between industry, educators, economic development and the public workforce system, ShaleNET created an effective and efficient entry level training program for five high demand upstream occupations that could be scaled quickly across both urban and rural areas.

Pennsylvania College of Technology (Penn College), Westmoreland County Community College in Pennsylvania and 18 other training providers across Ohio, Pennsylvania, West Virginia and New York deployed a three-week, non-credit training program which exposed students to expectations of the industry related to job readiness skills, safety and technical awareness. The curriculum was designed and written with input from industry, stressed consistency of content and awarded competency-based and industry-recognized certifications. Though the program was open to all, special efforts were directed to recruit veterans, the unemployed and under employed. Veterans received priority of service in the ShaleNET program and they were able to use their educational benefits towards training costs.

The results for the first ShaleNET grant were stellar. Over 14,000 individuals explored the Talent Match website which provides realistic job profiles of energy occupations and information about

the industry; 1,177 completed practical training and 3,421 obtained jobs. The placement rate was 79% and retention, three quarters after placement, was 82%.

As the natural gas and oil industry in the northeast United States matures, occupational demand is growing to reflect a need for a workforce with increasingly more technical skills, concentrating not only on upstream, but mid and downstream jobs, as well.

In October 2012, ShaleNET was awarded a US Department of Labor Trade Adjustment Assistance Community College and Career Training (TAACCCT) Round II grant for \$14.96 million, which combines the short-term programming of the initial ShaleNET grant with college credit offerings. The Hubs of ShaleNET include Penn College, Westmoreland County Community College in Pennsylvania, Stark State College in Ohio, Navarro College in Texas and Pierpont Community and Technical College in West Virginia (as an affiliate). The Hubs are located in areas where the majority of large oil and gas exploration companies are involved in shale plays nationally and globally. The corporate partners and trade associations involved in ShaleNET include: Chevron, Anadarko Petroleum Corporation, Chesapeake Energy, Shell, XTO Energy, Marathon, Pennsylvania Independent Oil and Gas Association (PIOGA), and the Ohio Shale Coalition. These companies require a well-trained, safe and productive workforce adhering to common industry standards in all locations. The Allegheny Conference on Community Development, a key partner in the grant, serves as a critical liaison between these companies and the educational hubs.

With this grant, individuals are shown a career path using a stackable credential model where, for example, a roustabout could enroll in a one-year, credit-bearing certificate and then continue his/her education through an associate's degree in petroleum technology, mechatronics or industrial maintenance. Short term training produces a number of industry recognized credentials. The stackable credential model, along with credit for prior learning and articulation agreements among partner schools provides students with the essential tools for career mobility across multiple segments of the energy industry.

Several innovative strategies are being deployed by ShaleNET to bring blended, technical curriculum to remote areas and underserved populations. One strategy uses state-of-the art 3D immersive technology and artificial intelligence to assess and teach more advanced technical skills related to natural gas and oil production in a simulated environment. These methodologies create enormous cost savings for colleges (e.g. not having to build and equip their own technical labs), embrace leading edge technology honed by the US Department of Defense to train and assess competencies and make capacity building more feasible and efficient.

Building capacity within the Hub schools and across other shale plays remains a hallmark of the grant. Navarro College shared its two-year Petroleum Technology degree program as a best practice to the other Hubs. Stark State College developed curriculum for one-year certifications and a two-year Industrial Maintenance degree. With financial assistance from the State of Ohio, Stark State College opened a 7,000 square foot Well Site Training Center in downtown Canton. Westmoreland County Community College opened its Advanced Training Center and offers

Applied Industrial and STEM training for the natural gas and oil industry and related occupations. Pierpont Community and Technical College broke ground on a 20-acre natural gas and oil training site to blend classroom with hands-on instruction. Penn College has incorporated an energy curriculum into its advanced manufacturing programs and created a Mechatronics degree and short term training that has applications in energy and manufacturing industries. Penn College also secured a drilling rig trainer at its 5 acre, \$1.3 million Energy Technology Education Center that provides students with hands-on instruction mirroring what they would experience on the job. Additional discussions about replicating the ShaleNET instruction model were held with representatives from the states of Colorado, Kentucky, Illinois, Montana and countries including the United Kingdom, Ukraine, Mexico, Australia, Azerbaijan and Kenya.

Since covering the cost of tuition is not permitted with TAACCCT grant funds, ShaleNET has reached out to industry, state and local government for funding to augment traditional financial aid. Stark State College received \$50,000 from America's Natural Gas Alliance (ANGA) for entry level training. Underscoring the importance of having economic development as a key partner, ShaleNET, through the Allegheny Conference on Community Development in Pittsburgh, received a commitment of \$460,000 from Chevron and its Appalachian Partnership Initiative for both credit and short-term training. The Conference plays a critical role as liaison between ShaleNET and corporate drivers in the energy industry to foster effective public/private partnerships.

This public/private partnership has resulted in ShaleNET achieving the following metrics from October 2012 through December 2014 across four Hub schools:

- **948** unique participants served (86.5% of goal with one year remaining)
- **356** students have completed a ShaleNET program and earned a degree or certificate in that program of study
- **17,482** total credit hours completed by students
- **1,227** industry recognized credentials earned by students
- **239** students were employed (self-reported) after program of study completion

ShaleNET at Penn College secured additional funding from three neighboring county governments committing close to \$200,000 in Pennsylvania Act 13 Impact fees for short-term training for residents. From July 2013 through mid-March 2015, 110 students have been trained.

Of those trained:

- **94%** were placed in employment after training
- **79%** retained employment 12 months after placement
- **94%** were male
- **31%** were African American or Latino (US Census: Lycoming County, where Penn College is located, has a minority population of **4.7%**)
- Average wage was **\$16.15**
- **50%** were unemployed prior to training
- **19%** were veterans

A critical success measure for employers is retention in employment a year after placement which is demonstrated through participation in ShaleNET prior to hire. Employers value the return on investment of reduced onboarding costs knowing that a ShaleNET graduate has the hands-on technical awareness and safety training to bring him/her into production quicker. ShaleNET intervention before employment makes employees more likely to stay with that employer for a longer period time.

Many factors contribute to the success of ShaleNET. These successes are strengthened by the knowledge of many partners. ShaleNET has established strong partnerships with employers and their trade associations, Workforce Investment Boards and One-Stops, economic development agencies such as the Allegheny Conference on Community Development and local governments who share a common desire to place qualified candidates with employers in family-sustaining careers.

Many individual components of ShaleNET have contributed to the comprehensive success of the program. Short-term training programs have proven most successful when a robust selection and assessment process to evaluate student candidates is used. This process includes using industry criteria such as drug testing, criminal and driving background checks and physical capability assessments. ShaleNET uses a blended hands-on/classroom curriculum designed and written by industry and employs instructors that have years of oilfield experience and expertise. ShaleNET employs dedicated career counselors who are part of the onboarding team for industry. Their primary responsibilities are to work with employers to understand their needs, recruit and select good student candidates, shepherd these students through training, communicate with students on what is expected of them when working in this industry, coach students to get noticed when interviewing, assist with placement and follow-up with employers to ensure continuous improvement.

We are very proud of these accomplishments, but believe that ongoing evaluation and assessment of programs are critical components of continued success. In determining our future

direction, we look to the energy industry. When we ask executives what keeps them up at night, many will respond by expressing their concerns regarding “*The Great Crew Change*.” Over the next decade, almost 62% of the industry has the potential to retire or leave for other reasons.¹ Despite the well-reported reduction in the price of oil (\$63.45/barrel on April 20, 2015: Brent benchmark) and the effect this is having on capital expenditures and personnel, the energy industry is well aware that to succeed in the 21st century, it must continue to recruit and retain talent from a more diverse labor pool. The industry must be prepared for the inevitable departure of a large number of workers who are retiring.

To address this mass exodus of talent and prepare for the skill challenges that lie ahead, industry, government, the public workforce investment system, economic development agencies, education (secondary and post) and training providers must continue to collaborate toward comprehensive education and training programs that emphasize STEM concepts in the energy and manufacturing sectors of our economy. This can be accomplished by increasing funding specifically for these in-demand occupations using accredited schools with proven records of placing students in occupations for which they are trained. Additionally, in order to create a pipeline of workers to fill the jobs of the future we must continue outreach to K-12 students to make them aware of the opportunities that will exist within the energy industry.

¹ Center for Energy Workforce Development, Gaps in the Energy Workforce Pipeline, 2011 CWED Survey Results, Pg. 3.

The partners of ShaleNET are poised to meet these workforce challenges by deploying next generation technologies including 3D immersive and artificial intelligence science to assess skills and increase access of technical training to veterans, rural and/or underserved populations and secondary education focused on career and technical programming. ShaleNET will continue to develop one-year technical certifications and two-year technical degrees that apply to the oil and gas industry and to a broad industrial base including manufacturing, petrochemical, plastics, pharmaceuticals, food and beverage and water processing. Partnerships with employers and trade associations that represent mid and downstream segments of the energy industry are critical to future success. ShaleNET will foster energy by sharing what is learned with countries that are struggling with similar workforce issues.

With all the evidence presented, ShaleNET has and will continue to be a force in training for the natural gas and oil industry. The most successful component of ShaleNET is the partnerships that have been developed and strengthened that have resulted in training opportunities for students who are now employed in jobs with family sustaining wages. This is a best practice model that can be deployed and implemented in other areas because it is competency based and can be easily replicated. For future programs that are introduced to meet energy workforce needs, it is imperative to incorporate the need to establish partnerships that become the backbone of developing a broad array of training options across the geography of the United States. It is also imperative that funding be directed where the impact is greatest to support energy training initiatives that secure jobs for America's workforce.

Mr. WHITFIELD. Thank you, Dr. Brundage. And our next witness is Dr. Rick Jarvis, who is Vice President of Field Construction, Morrow-Meadows Corporation, on behalf of the National Electrical Contractors Association. So, Mr. Jarvis, you are recognized for 5 minutes.

STATEMENT OF RICK JARVIS

Mr. JARVIS. Thank you, Chairman Whitfield, Ranking Member Rush, and members of the subcommittee for inviting me here to testify today at this important hearing. On behalf of the National Electrical Contractors Association, the nationally recognized voice of the electrical construction industry, thank you for holding this important hearing regarding the workforce development needs of the energy and manufacturing sectors.

My name is Rick Jarvis, and I serve as Vice President of Field Construction for Morrow-Meadows Corporation, a premier electrical and data communications contractor on the West Coast. I am pleased to be here on behalf of the National Electrical Contractors Association, also known as NECA. NECA is comprised of over 60,000 electrical contracting firms employing over 750,000 electrical workers and producing an annual volume of over \$130 billion.

Growth and diversification in the energy economy have created unprecedented opportunities for the electrical construction industry. A record 60 percent of electrical contractors are currently performing work on energy construction projects. Unfortunately, the availability of skilled labor and an aging workforce threatens our ability to continue to meet the demands of the market.

According to the Bureau of Labor Statistics, the anticipated number of job openings for electricians due to growth and retirement from 2012 to 2022 is roughly 224,000. Recruiting new talent to our apprenticeship training program is crucial to the success and future of our industry, and we are working hard to recruit new talent to join the trade.

For over 70 years, the electrical construction industry has been investing \$100 million annually in its successful privately funded apprenticeship and training program. This joint venture between NECA and the International Brotherhood of Electrical Workers, the IBW, which I am still a member, gives participants the opportunity to learn the electrical industry while getting paid and without a college education. We are proud of the opportunities offered by our apprenticeship training programs around the country.

I for one am an example of what an apprenticeship program can do for a person. After high school, I worked several different jobs before entering a 4-year IBW-NECA electrical apprenticeship program in 1982. During the course of my training, I earned college credits and learned the difference between a job and a career. After completing my apprenticeship, I rose from journeyman electrician to foreman, then to general foreman. In 1991 I was promoted to the general field superintendent for the Morrow-Meadows San Diego branch office. Four years later I was promoted again, this time to the general field superintendent of their corporate division in Los Angeles, California, where I now hold the position of Vice President of Field Construction.

The IBW–NECA apprenticeship program has trained over 375,000 electricians like myself including an increasing number of minorities, women, and veterans, a focus that we have today. Attracting young talent to this program and others like it is key to meeting workforce demands across the energy sectors.

NECA is proud to support this committee’s discussion draft and the committee’s efforts to address the workforce development needs of the energy industry. I hope my own experience in this apprenticeship program can serve as a testament to the opportunities for upward mobility that learning a skilled trade can present. We are hopeful that as the Federal Government works to address the workforce development needs on the energy and manufacturing sectors, it assists our industry by actively promoting apprenticeships as a well-paying career option.

We appreciate the committee’s interest in collaborating with electrical contractors as mentioned in the draft language. Our training programs are all about skill development for the 21st century workforce. I am happy to take any questions, and we look forward to continued work with this committee as it moves forward with this worthwhile process. Thank you.

[The prepared statement of Mr. Jarvis follows:]



Statement of Mr. Rick Jarvis
Vice President Field Operations, Morrow-
Meadows Corporation
on behalf of the
National Electrical Contractors Association
to the
Subcommittee on Energy and Power
Committee on Energy and Commerce
U.S. House of Representatives
for a hearing on
"Title II: 21st Century Workforce"
April 23, 2015

NECA is the voice of the \$130 billion electrical construction industry that brings power, light, and communication technology to buildings and communities across the U.S. NECA's national office and 119 local chapters advance the industry through advocacy, education, research and standards development.

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Statement of Mr. Rick Jarvis
Vice President of Field Operations, Morrow-Meadows Corporation
On behalf of the National Electrical Contractors Association (NECA)
Subcommittee on Energy and Power
Committee on Energy & Commerce
April 23, 2015

Thank you Chairman Whitfield, Ranking Member Rush, and members of the Subcommittee for inviting me to testify today at this important hearing. On behalf of the National Electrical Contractors Association (NECA), we greatly appreciate the opportunity to submit a statement for this hearing on "Title II: 21st Century Workforce". The committee is to be commended for holding this important discussion regarding employment in the energy industry and the ways to increase the number of skilled workers trained in energy and manufacturing fields.

My name is Rick Jarvis and I serve as Vice President of Field Construction for the Morrow-Meadows Corporation, a premier electrical and data communications contractor on the West Coast. Our company has been delivering quality electrical contracting solutions to customers for over 50 years and our customers count on us to evolve with market needs. Our energy services group offers a range of energy solutions for today's volatile energy environment, from energy efficiency to alternative energy to power plant design and construction.

Morrow-Meadows is a proud member of the National Electrical Contractors Association (NECA). NECA is the voice of the \$130 billion electrical construction industry that brings power, light, and communication technology to buildings and communities across the U.S. Comprised of over 4,500 electrical contracting firms, our organization has 119 local chapters across the country support the electrical contracting industry through advocacy, education, research, and standards development.

Growth and diversification in the energy economy has caused dramatic changes in electrical construction industry. According to recent *Profile of the Electrical Contractor* surveys, the number of electrical contractors performing work on energy construction projects has grown from 46 percent in 2007 to 60 percent today. Across the country, electrical contractors are the market-leading businesses that are providing electrical infrastructure and services to all sectors of the energy industry, including energy efficiency, pipelines, utilities oil and gas, and renewables.

The sophisticated nature of electrical construction requires a highly-skilled, well-rounded workforce. Considering the importance of energy to our national prosperity and security, it is critical that our nation has a workforce that is both sufficient in size and equipped with the skills and technical training necessary to address our nation's energy needs.

While increased energy production has created tremendous opportunities for the electrical industry, an aging workforce and lack of skilled labor threatens our ability to meet the needs of the market. In fact, the anticipated number of job openings for electricians due to growth and retirement from 2012-2022 is roughly 224,000, according to the Bureau of Labor Statistics. It takes five-years to train an electrician, which means we must ramp up our efforts to recruit new talent if we are to keep pace with demand.

We appreciate Congress' interest in addressing this skilled worker shortage and hope that the Department of Energy will consider the importance of apprenticeship training programs in addressing the needs of the energy workforce. Our electrical industry apprenticeship program, a joint labor/management venture between NECA and the International Brotherhood of Electrical Workers (IBEW) has given participants the opportunity to learn the electrical industry, get paid good wages, and receive health care and retirement benefits for over 70 years. Programs like this present tremendous opportunities for all Americans, including minorities and women. Actively promoting skilled trades is in the best interest of the government, industry and the economy.

Training workers with a valuable, skilled trade creates employment opportunities for the trainee. It also ensures that our nation has flexible workforce available to adapt to emerging trends. Energy work often requires additional training, but that training requires considerably less resources when building upon a highly skilled base. It is not necessary to train a new workforce when a new technology emerges—for example, an electrician is equipped to handle a solar installation. It is unnecessary and shortsighted to train someone in a single technology.

I, for one, am an example of what an Apprenticeship Program can do for a person and the opportunities for advancement it can provide.

After high school, I worked several different jobs before entering a four-year IBEW/NECA electrical apprenticeship program in 1982. During the course of my training, I earned college credits and learned the difference between a job and a career. After completing my apprenticeship, I rose from a Journeyman electrician to Foreman, then to General Foreman. In 1991, I was promoted to the General Field Superintendent for the Morrow Meadows' San Diego branch office. Four years later, I was promoted again, this time to the General Field Superintendent of their corporate division in Los Angeles, CA, where I now hold the position of Vice President of Field Construction.

During my apprenticeship, I served as the apprentice representative at the monthly meetings of our local Joint Apprenticeship Committee, the board of trustees charged with running the apprenticeship program. I have remained committed to serving the apprenticeship program as a management trustee Los Angeles Joint Apprenticeship and Training Committee I currently hold the position of Joint Chair and Secretary. I also serve as a management trustee on the IBEW/Local 40 Joint Apprenticeship Committee in Hollywood, CA and was recently appointed as a management trustee on the CA Statewide Joint Apprenticeship Training Committee.

About the Electrical Training ALLIANCE

The electrical training ALLIANCE (previously called NJATC) was created over 70 years ago as a joint training program between the National Electrical Contractors Association (NECA) and the International Brotherhood of Electrical Workers (IBEW). Today, the electrical training ALLIANCE has developed into the largest apprenticeship and training program of its kind, having trained over 350,000 apprentices to journeyman status through local affiliate programs.

The electrical training ALLIANCE aims to provide the electrical construction industry with the most highly trained workforce possible, and has developed a model for 21st Century workforce development in the process. It consists of 300 joint apprenticeship and training centers in the United States and Canada, over 100 electrical training centers, industry training partners and a vast network of public and private educational institutions from secondary school level to the university level. There is at least one training center in each state and each training centers offers courses uniquely designed for the location.

Apprentices receive at least 8,000 hours of on-the-job training and 900 hours of classroom time over a five-year period. They learn technical skills while training on the job, while trade-related classroom training produces competency in basic and specialized skills. The Alliance incorporates advanced technology into all aspects of training, including offering active learning, physical and virtual labs, and an online learning management system. This blended learning approach enables students to continue training remotely, bridging the gap between an apprenticeship and learning in the classroom.

The electrical training ALLIANCE provides students with both a solid foundation and flexibility. The core curriculum establishes the base skills needed to be an IBEW/NECA Journey-Level Worker while advanced studies courses provide greater latitude to local training centers to teach the applicable skills relevant to their market. Local training centers determine alternative training paths to customize its workforce to meet the specific market demands of contractors and customers. This approach facilitates a flexible workforce that is able to meet current needs and quickly learn emerging trends.

The electrical training ALLIANCE also develops and provides courses of study for upgrading journey-level worker skills so that the local JATCs can keep their Journey-Level Worker workforce up-to-date on the newest technologies. The electrical training ALLIANCE works directly with equipment manufacturers and technology developers of a variety of tools, equipment and supplies. Once a new training need has been identified, the electrical training ALLIANCE designs an appropriate training course, provides instructor training and distributes the training materials to share with their workforce.

Skills certifications can be mapped to career pathways throughout many sectors, transitioning workers who need to add new skills for new jobs, and current workers who need to upgrade skills in order to adapt to new technologies or business processes.

Addressing the Workforce Shortage

NECA and IBEW are actively working to address skilled workforce shortage issues. In addition to a hands on community recruitment approach, the Los Angeles NECA Chapter, like many local training programs around the country uses a variety of advertising and recruitment mechanisms to educate young adults and other interested individuals about the career opportunities that the electrical construction industry has to offer and encourage them to join the trades. Advertisements funded jointly by NECA and the IBEW, are placed in local newspapers, on social media and local television stations. The industry also recruits at local job fairs held in high schools, vocational colleges and throughout the local communities. NECA National has also hired a Director of Workforce Development to take a proactive approach on a national level.

SUPPORT FOR TITLE II: 21ST CENTURY WORKFORCE

NECA supports this title of the bill as well as the Committee's efforts to advance its comprehensive energy legislation.

Specifically, we appreciate the Committee's interest in increasing enrollment in training and apprenticeship programs. We look forward to working with the Department of Energy to raise awareness about our program promote apprenticeships as an important, viable career option.

CONCLUSION

Increasing the availability of skilled workers is crucial to the growth of the energy sector, and the apprenticeship infrastructure provided by the construction trades is a sure-fire bet for success. It is a wheel that does not need to be reinvented.

Thank you for the opportunity to testify at this very important hearing. NECA applauds the Committee's efforts to support the development of a highly skilled workforce.

Mr. WHITFIELD. Well, thank you, Mr. Jarvis. And our next witness is Dr. Ramanan Krishnamoorti who is the Chief Energy Officer at the University of Houston. And I am excited you all have a Chief Energy Officer down there at the University of Houston. But thanks for being with us, and you are recognized for 5 minutes for an opening statement.

STATEMENT OF RAMANAN KRISHNAMOORTI

Mr. KRISHNAMOORTI. Chairman Whitfield, Ranking Member Rush—

Mr. WHITFIELD. And be sure to bring the microphone up close there.

Mr. KRISHNAMOORTI. My name is Ramanan Krishnamoorti, as the chair recognized. I am the Acting Vice President and Vice Chancellor for Research and Technology Transfer and the Chief Energy Officer at the University of Houston. The University of Houston is a leading Tier 1 public research university that offers undergraduate and graduate programs on campus and online to more than 41,000 students. The University of Houston is a designated minority-serving institution, a Hispanic-serving institution and was rated the second-most racially and ethnically diverse university in the Nation by U.S. News & World Report in 2010.

UH takes full advantage of our location in Houston, the energy capital of the world, to offer undergraduate, graduate, and certificate programs in all facets of the energy industry. As the committee considers ways the Federal Government can foster education and training for energy and manufacturing jobs, I am pleased to speak with you today to share some of the innovative ways the University of Houston is working to train our workforce for high-skilled jobs in the energy industry.

The oil and gas industry in particular is experiencing a massive misalignment of workforce needs and student education. It is a significant challenge to recruit and retain a qualified, stable workforce. The technology and skill requirements are rapidly changing in the industry. It is estimated that the skills of oil and gas workers become obsolete after 3 to 5 years, and the much talked-about crew change of the baby boomers is happening now and it is significantly impacting the industry's workforce.

So what does this look like? Between now and 2017, there is a projected shortage of 75,000 mid-skill workers and 10,000 highly skilled workers, and these numbers are expected to double over the next 5 years. That is a shortage of 20,000 highly skilled workers. We need to rapidly upscale the mid-skill workers to meet this deficit.

The University of Houston has, over the last 7 years, embarked on a transformation to become the energy university in research, technology transfer, and most importantly, student education. We have already developed successful programs at the undergraduate level, like petroleum engineering, and at the graduate level, such as the Nation's first and only subsea engineering program.

Our success is due in large part by how we have engaged the industry, K through 12 education such as the Energy Institute High School in the Greater Houston area, and community college education including the nine community college systems in the Greater

Houston area. Through advisory boards and adjunct faculty, we have developed strategies to address actual workforce realities, to find quick wins for continued business engagement, and to recruit and retain women and minority students. One of these strategies is a focus on upscaling through certificates and stackable credentials.

So how does stackable credentials meet workforce needs? Two ways: speed. It accelerates skill enhancement of workers and their re-deployment in areas of critical need. Second, volume. The stackable format provides rapid portability and scalability of the program. Basically, it is more high-skilled workers in less time.

The stackable credential model has seen success in other areas of higher education, like healthcare. By stacking a series of certificates, a professional gains higher level credential or degree to advance their career. Our innovation is to apply this model to the energy industry's needs.

UH has developed stackable credentials that can quickly scale up energy workers to earn undergraduate degrees in organization, leadership, and supervision. This program is competency based and requires, one, the completion of two out of three certificate programs in advanced petroleum technology, advanced process technology, and advanced safety technology; and second, the completion of two certificate programs in project management and organizational leadership and supervision.

To launch this program, we thought creatively and strategically about what population to target. One of the most significant needs in the Greater Houston area is the scaling up of mid-skill workers in the process technology industry where over the next 3 years over \$120 billion of investment will take place to grow the infrastructure and adapt to the cheap availability of unconventional oil and gas. The first cohort in the advanced process technology certificate in Fall 2015 will demonstrate the scalability and portability of our upskilling program and will let the Energy University build on the significant achievement of the entire education pipeline including K-12 education and community college education.

The Committee's focus on workforce development in the energy sector is well placed. We are very proud of the initiatives the University of Houston has undertaken in our region and are encouraged by the Committee's efforts to consider ways to scale workforce development programs in the energy sector on a national basis. I thank you for the opportunity to provide testimony today and look forward to answering your questions.

[The prepared statement of Mr. Krishnamoorti follows:]

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Written Statement of

Ramanan Krishnamoorti

**Acting Vice President and Vice Chancellor for Research and Technology Transfer
Chief Energy Officer**

University of Houston

Before the

House Committee on Energy and Commerce

Subcommittee on Energy and Power

United States Congress

"Title II: 21st Century Workforce"

April 23, 2015

University of Houston

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Houston, TX 77004

713-743-4307

Chairman Whitfield, Ranking Member Rush, Members of the Committee. My name is Ramanan Krishnamoorti and I am the Acting **Vice President and Vice Chancellor for Research and Technology Transfer and the Chief Energy Officer at the University of Houston**. The University of Houston is a leading Tier 1 public research university that offers undergraduate and graduate programs on campus and on-line to more than 41,000 students. The University of Houston is designated a Minority Serving Institution (MSI), a Hispanic Serving Institution (HSI) and was rated the second most racially/ethnically diverse university in the nation by U.S. News & World Report in 2010.

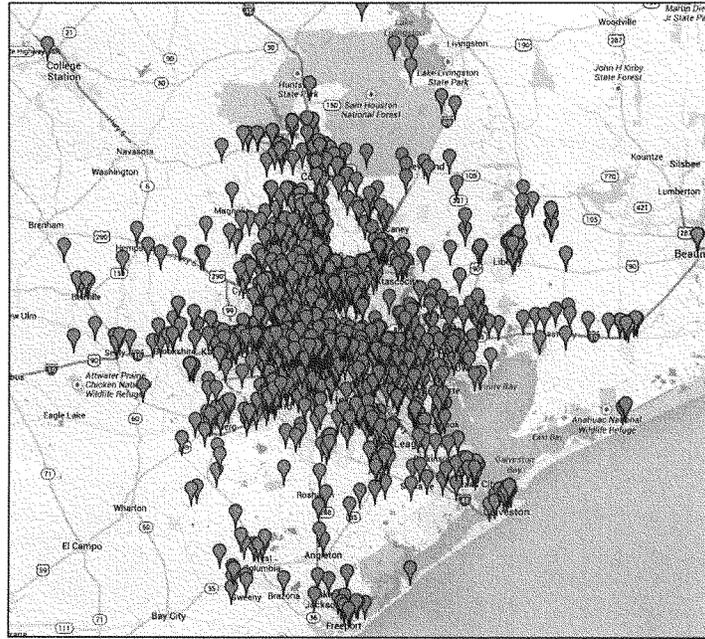
UH takes full advantage of our location in Houston, the energy capitol of the world, to offer undergraduate, graduate and certificate programs in all facets of the energy industry, with a major focus on training our students for jobs in the energy sector. As the Committee considers ways the federal government can foster education and training for energy and manufacturing jobs, I am pleased to speak with you today to share some of the innovative ways the University of Houston is working to train our workforce for high skilled jobs in the energy industry.

Background

Energy is a dominant part of the economy in the greater Houston area – 50% of Houston’s employment is in the energy sector; 10% of Houston’s employment is specifically in oil and gas. Houston has 3,700+ energy related businesses in the MSA and they continue to add jobs – 36,500 jobs have been created to the energy exploration and oil field services; a 46.2% increase since 2010. Houston employs one third of the entire nation’s oil and gas extraction workers.¹

¹ Greater Houston Partnership, “Talking Points,” 2015, <http://www.houston.org/pdf/research/quickview/Most_Current_Talking_Points.pdf>.

Energy Related Business in the Houston MSA



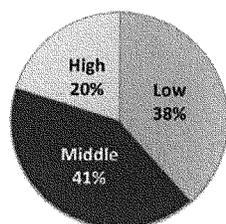
The recent price volatility and evolution of the types, quantities and geographical density of hydrocarbons and energy production over the last ten years has created a challenge in meeting the workforce demands of the energy industry. The energy industry is experiencing a massive misalignment of workforce needs and student education. It's a significant challenge for industry to recruit and retain a qualified, stable workforce.

The industry identifies a "skills gap" that exists between the skills that employers seek and the skills present in the workforce. The human resources consulting arm of Deloitte surveys employers annually and found that employers report that the gap has increased since

last year and that their own ability to address the issue has decreased.² Two dominant forces have been responsible for the “skills gap”: (i) Rapidly evolving technologies, and the consequent technological obsolescence coupled with the absence of dynamic training programs to close the gaps; and (ii) The crew change resulting from demographical shifts of workforce in the energy industry due to the retirement of baby boomers and the lack of stability of mid-career jobs resulting from price volatility.

Broadly, the Houston Metropolitan Statistical Area has 3.6 million jobs of which 1.4 million are in the middle skill sector.³

Distribution of Total Employment in Houston MSA by Broad Skill Level



A recent projection by the Greater Houston Partnership predicts that by 2017, there is likely to be a shortfall of 70,000 middle skill workers in Houston.⁴ A separate projection indicates that the energy industry (upstream, midstream, downstream and utilities), which employs over 500,000 people in greater Houston, will have overall shortages of 20,000 middle skill and 10,000 highly skilled workers by 2020. Currently US universities graduate 1,000 – 1,200 petroleum engineers annually⁵ and these represent only a small fraction of the needs of the energy industry nationally. There is a critical need to find ways to skill-up the mid-skill workers and retain the 35 to 50 year-old energy professionals in the industry.

² Agarwal, Bersin, Pelster, Schwartz, “Global Human Capital Trends 2015,” 2015, pg 4
<http://d2mtr37y39tpbu.cloudfront.net/wp-content/uploads/2015/02/DUP_GlobalHumanCapitalTrends2015.pdf>.

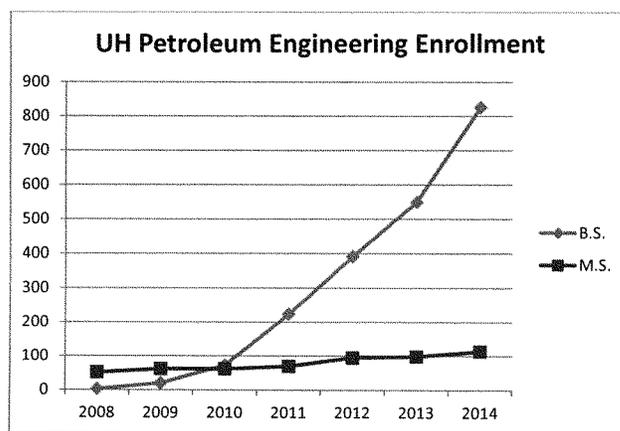
³ EMSI Complete Employment – 2013.2; TIP Strategies

⁴ EMSI Complete Employment, 2013.2, US Bureau of Labor Statistics, TIP Strategies, Inc.

⁵ American Society for Engineering Education, “Engineering by the Numbers,” 2012-2013, http://www.asee.org/papers-and-publications/publications/14_11-47.pdf.

University of Houston Academic Programs

The University of Houston has over the last seven years embarked on a transformation to become the Energy University in research, technology transfer, and most importantly in student education. We have already developed successful programs at the undergraduate level—like Petroleum Engineering—and the graduate level—such as the nation’s first Subsea Engineering program. The undergraduate program in petroleum engineering, which started six years ago, has grown rapidly to enroll more than 877 undergraduate students and an additional 112 masters students for Spring 2015 and has a remarkable 35+% of female students in the program.



Our success is due in large part to partnering with industry, K-12 and community colleges.

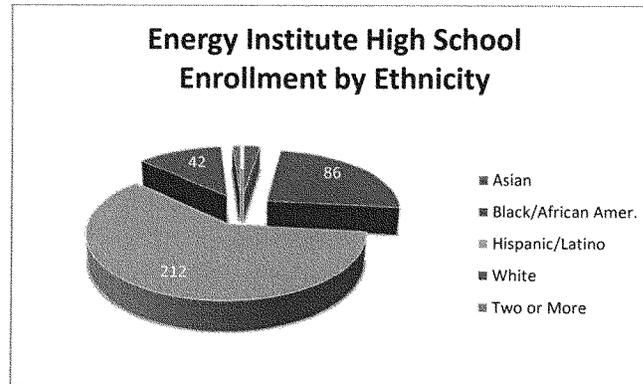
Partnership with Industry

Through advisory boards and adjunct faculty, we developed strategies to address actual workforce realities, to find “quick wins” for continued business engagement and to recruit and retain women and minority students. President Renu Khator instituted the university’s Energy

Advisory Board in 2011 and it is currently made up of 25 industry leaders who provide strategic guidance for UH's energy initiative. Further, they staff advisory sub-committees to help the university develop actionable plans in the areas of education, research and technology incubation. The input they provided about the industry's workforce needs led to the creation and development of the Upstream Energy Safety Certificate Program. Their desire for equipment and technology testing directed our pursuit of the recently awarded Texas Center of Excellence.

Partnership with K-12

We have partnered with an innovative school in Houston, the Energy Institute High School (EIHS), a one-of-a-kind magnet school in the Houston Independent School District (HISD) focused on the pursuit of knowledge in energy. Located less than a mile from UH, this school currently offers a unique education curriculum currently at the ninth and tenth grade levels (and expanding over the next two years to all high school grades) and a student body that is predominantly economically disadvantaged (221 students out of 352 are classified as economically disadvantaged), and also diverse - 27% of the students are female, and 60% are Hispanic/Latino and 24% are Black/African American.



UH has facilitated summer bridge camps for incoming Energy Institute High School freshman, connected UH graduate students with EIHS students needing tutoring, and, along

with the Independent Petroleum Association of America/Petroleum Equipment & Services Association (IPAA/PESA) Petroleum Academies Program, hosted the PetroChallenge at UH for EIHS students and other (HISD) schools. UH recognizes the responsibility to foster a solid foundation for the next generation of college students/energy workers.

Partnership with Community Colleges

A key feature of our partnership with community colleges is a focus on upskilling through certificates and stackable credentials for students who have completed an Associate's degree. UH partners with nine community colleges in the Greater Houston area and a pool of 60+ community colleges in the Gulf region.

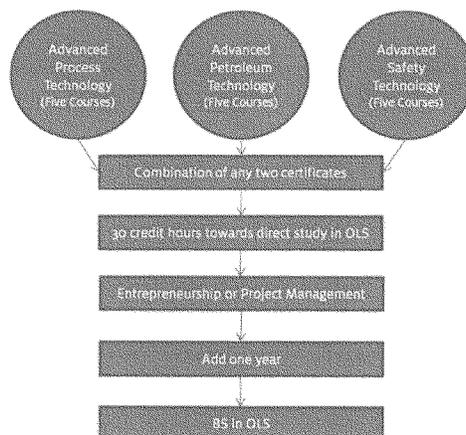
Stackable Certificates

Stackable credentials provide two necessary ingredients to successfully address workforce needs: 1) Speed - It accelerates skill enhancement of workers and their re-deployment in areas of critical need; and 2) Volume - The stackable format provides rapid portability and scalability of the program. Basically, it produces more high-skilled workers in less time.

The University of Houston's innovation with the stackable credentials model is the application to the energy industry. No one else has adapted stackable credentials for the workforce we're targeting, and we believe that this can serve as a model scalable solution that can impact the industry broadly and quickly up-skill energy workers to earn undergraduate degrees.

The University of Houston along with consortium partners of Houston Community College, Lee College, Lone Star Community College and San Jacinto College is developing training and educational programs to accelerate energy related workforce development in critical areas for the state of Texas. We will offer three undergraduate certificate programs in advanced petroleum technology, advanced process technology and advanced safety technology; and stackable credentials for students who successfully complete any two of these certificates towards an accelerated pathway (*i.e.*, less than one additional year) towards a BS degree in Organizational Leadership and Supervision program.

Taking Students from Certificate to BS Degree in Organizational Leadership and Supervision⁶



Key to the success of the partnership with community colleges is 1) the collaboration and articulation between consortium partners to seamlessly develop and deliver the certificate programs and transfer credits, and 2) a competency based survey to assess the effectiveness of the program.

The introductory courses for each certificate will be offered at the participating community colleges and the advanced courses will be offered at the University of Houston. Once developed and assessed, the proposed three certificate programs will be available for adoption with interested institutions across Texas.

University of Houston is strategically located in Houston to provide the workforce development opportunities that are essential to the Texas economy. The greater Houston area offers abundant employment opportunities in petroleum, chemical, petrochemical, power plants, refineries, food processing, and pharmaceuticals. There are more than 60 community

⁶ This pathway allows students to stack certificate credentials to lead to a B.S. degree in Organizational Leadership and Supervision. This program is competency-based and requires: 1) the completion of two out of three certificate programs either in advanced petroleum technology, advanced chemical technology or advanced safety technology; and 2) plus the completion of two certificate programs in project management, and organizational leadership and supervision.

colleges in Texas that offer associate degrees in either petroleum technology or process technology or safety technology. The majority of the graduates from these programs do not have an opportunity to pursue a higher degree within their disciplines.

To launch this program, we thought creatively and strategically about which population to target. One of the most significant needs in the Greater Houston area is in the skilling up of mid-skill workers in the process technology (downstream energy) industry where over the next three years over \$120 B are expected to be spent to grow the infrastructure and adapt to the cheap availability of unconventional oil and gas. This first cohort in the Advanced Process Technology certificate in the Fall of 2015 will demonstrate the scalability and portability of our upskilling program and will let the Energy University build on the significant achievement of the entire education pipeline including K-12 and Community College education in meeting the energy industry's needs rapidly.

The Committee's focus on workforce development in the energy sector is well placed. We are proud of the initiatives the University of Houston has undertaken in our region and are encouraged by the Committee's efforts to consider ways to scale workforce development programs in the energy sector on a national basis. I thank you for the opportunity to provide testimony today and look forward to answering your questions.

Mr. WHITFIELD. Thank you very much, Dr. Krishnamoorti. Our next witness is Monica Martinez who is the President of Hispanics in Energy. So thanks for being with us, and you are recognized for 5 minutes.

STATEMENT OF MONICA MARTINEZ

Ms. MARTINEZ. Thank you, Mr. Chairman Whitfield and Ranking Member Rush and members of the subcommittee. I want to thank you for the opportunity to testify today on Title II: 21st Century Workforce.

Mr. WHITFIELD. Would you mind just pulling the microphone a little bit closer?

Ms. MARTINEZ. Oh, sure. I commend each of you for taking the time to focus on ensuring that America has a strong, diverse energy and manufacturing workforce. It is a privilege to be here today to support the bipartisan draft legislation that is aimed at accomplishing this critical priority.

I am Monica Martinez, President of Hispanics in Energy. Hispanics in Energy is a non-partisan, non-profit organization whose mission is to engage Hispanic and other diverse communities in our Nation's energy policy dialogue and workforce. And thank you, Congressman Flores, for being a continued supporter.

Our population is over 54 million, making people of Hispanic origin the Nation's largest ethnic or racial minority. At 11.9 million Hispanic households, we comprise roughly 10 percent of our Nation's total households.

For 2012, the median income of Hispanic households was \$39,000 whereas the median income of U.S. households was \$51,017. The poverty rate among Hispanics is roughly 25.6 percent, whereas the national poverty rate is at 15 percent.

I mention these figures to make sure I am illustrating the disparity that exists. But I also find them useful in the debate when we discuss jobs and economic opportunity. The best way to help alleviate poverty and to grow household income is to expand the outreach and availability of good paying jobs. And I believe that for Hispanics, African Americans, American Indians, women, and all Americans, access to economic opportunity in the energy field can be crucial for helping boost those earnings and bring about greater standards of living.

We have heard about the shale revolution and even more so even when we talk about green energy economy. We know that there are job opportunities available. Recent reports, even ones by IHS, project that there are up to 408,000 jobs available that can be held by African Americans and Hispanics by 2030 in the oil and gas sector. IHS estimates that 63 percent of all job opportunities will be blue collar jobs. This is a truly bipartisan and energy technology neutral opportunity. We know that even the green sector is growing, and they are moving as well. And I think we need to take advantage of it.

Hispanics in Energy over the last year has held community conversations across the country discussing this very opportunity. From that effort we have learned several things. General dissemination of energy opportunities to a variety of stakeholders is key.

Recent research indicates that the number one obstacle to women considering employment in the oil and gas industry is lack of awareness and understanding of the job opportunities and career development available. Just by outreaching and making sure we are sharing the message, we can overcome this obstacle.

Engagement of students at all levels from when they are young sprouts, early age in elementary and beyond, is critical to engaging them. When we think about it, of the 70,000 undergraduate engineers, only 12 percent represent all under-represented groups, and the pool of under-represented engineers gets even smaller at the graduate level. We must do something to change this.

We also need to expand the network of engagement by energy providers and companies to create a pipeline of prospective networks, and this includes working with various groups—veterans workforce development associations, other associations like our own—to create that partnership within that non-profit and public/private sector is key.

The fourth principle is really thinking about pathways that need to be developed for different demographic groups and segments of the population. I recognize the Center for Energy Workforce Development that can attest that the education and skills needed are the same for everyone, but the best way to prepare individuals may in fact be different. And this may include different wrap-around services or other items to help ensure their success.

The last principle I mention, and this is because I was a former regulator within the State of Michigan, and my question always was, we have to look at the data and analyze, just making sure everything that you do—and I know this is mentioned in the draft legislation—look at the analysis and create benchmarks. We need to assess the performance and also find and discover best practices so that what we are doing in one region can be replicated in other regions as appropriate. Those are key.

In closing, I just really want to thank the committee for their work. If we do not take action today to improve the opportunities for under-represented communities in the workforce, we will be only adding to the current disparity that exists between the energy industry and the community it serves. The energy industry can be more reflective of the characteristics of our population, and by doing so, our whole economy will benefit. Thank you.

[The prepared statement of Ms. Martinez follows:]



Testimony of
MONICA MARTINEZ
PRESIDENT, HISPANICS IN ENERGY
Before the U. S. House of Representatives
COMMITTEE ON NATURAL RESOURCES
Subcommittee on Energy and Power
Hearing on
"Title II: 21st Century Workforce"

April 23, 2015

Brief Summary:

- It is a privilege to be here to support the bi-partisan draft legislation that is aimed at creating a strong, diverse energy and manufacturing workforce.
- With median income of Hispanic households \$12,000 less than median U.S. households, and with poverty rates for Hispanics higher than the national average, access to economic opportunity in the energy field can be crucial for helping boost earnings and bring about greater standards of living.
- This is a truly bi-partisan and energy technology neutral opportunity. Median wages in both traditional energy jobs and the clean energy economy are relatively high median wages.
- Five principles can be utilized to help provide future job opportunities in energy: 1) general dissemination of energy opportunities; 2) student engagement at all levels – elementary through college; 3) expanding the network of engagement by energy providers and companies to create a pipeline of prospective workers; 4) developing programs and pathways for different demographic groups and segments of the population – including wrap around services like career coaching; 5) assessing outcomes by utilizing data, analysis, and benchmarks.
- Workforce transitions (retirements) and the modernized energy landscape that is growing jobs provide an opportunity we must capture to enable many Americans – women, Hispanics, veterans, etc. to live the American dream and find the economic opportunity that comes with it.



Testimony of
MONICA MARTINEZ
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Before the U. S. House of Representatives
COMMITTEE ON NATURAL RESOURCES
Subcommittee on Energy and Power
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"Title II: 21st Century Workforce"

April 23, 2015

Good morning Chairman Whitfield, Ranking Member Rush, and Members of the Subcommittee.

I want to thank you for the opportunity to testify on Title II: 21st Century Workforce. I commend each of you for taking the time to focus on ensuring that America has a strong, diverse energy and manufacturing workforce. It is a privilege to be here to support the bi-partisan draft legislation that is aimed at accomplishing this critical priority.

I am Monica Martinez, President of Hispanics in Energy. Hispanics in Energy is a non-partisan, non-profit organization whose mission is to engage Hispanic and other diverse communities in our nation's energy policy dialogue and workforce. I co-founded Hispanics in Energy after my experience as a commissioner on the Michigan Public Service Commission. During my more than six year tenure, which began in 2005, I was astonished to find that my appointment signaled the first "majority of women" on a state utility commission in the country; that across the country Latino/Latina commissioners were fewer than I can count on one hand and that remains so today; and that meetings with middle and upper management and executives on energy issues included too few, if any, women or underrepresented groups.

Last year, Hispanics in Energy focused our efforts on jobs in energy and bringing a "community conversation" on workforce preparedness to communities across the country. I hope to share with you



a few things we've learned from that endeavor. But first, let me share with you some key information on the Hispanic population in the United States. Today our population is over 54 million, making people of Hispanic origin the nation's largest ethnic or racial minority – 17 percent of the nation's total population. According to population projections for 2060, the Hispanic population will constitute 31 percent, or 128.8 million, of our nation's population. Today, Arizona, California, Colorado, Florida, Illinois, New Jersey, New York and Texas all have a population of 1 million or more Hispanic residents. And, believe it or not, in twenty-two states, Hispanics represent the largest minority group. At 11.9 million Hispanic family households, we comprise roughly 10 percent of our nation's total households.

For 2012, the median income of Hispanic households was \$39,005 whereas the median income of US households was \$51,017. The poverty rate among Hispanics is roughly 25.6 percent, whereas the national poverty rate is at 15 percent. I did not mention these figures to bring about a discussion of income inequality; rather, I find them useful in the debate when we discuss jobs and economic opportunity. I recognize the best way to help alleviate poverty and to grow household income is to expand the outreach and availability of good paying jobs. For Hispanics, African Americans, American Indians, women and all Americans, access to economic opportunity in the energy field can be crucial for helping boost earnings and bring about greater standards of living.

And, there are opportunities in the energy sector – which is growing due to the Shale Revolution and the Green Energy Movement. Let me share with you some findings from recent IHS reports.¹ In 2010, the US oil and gas industry and the petrochemical industry together employed a total of 1.2 million people. Roughly 8.2 percent were African American, 15.7 percent were Hispanic and women

¹March 2014 IHS Report, *Minority and Female Employment in the Oil & Gas and Petrochemical Industries*; and June 2014 IHS Report, *Minority and Female Employment: Regional Forecasts for the Oil & Gas and Petrochemical Industries*



accounted for 19 percent. IHS projects a total of nearly 1.3 million direct job opportunities over the 2010-2030 period, considering all types of job growth. Of these opportunities, they project that 32 percent, or 408,000 jobs, will be held by African Americans and Hispanics in 2030. IHS estimates that 63 percent of all job opportunities will be blue collar jobs.

In fact, this is a truly bi-partisan and energy technology neutral opportunity. There are not only job opportunities in the traditional energy sectors, but also in new energy sectors as well. A study from the Brookings Institution notes that the clean energy economy is found to offer higher median wages than the U. S. average, and many of these jobs (roughly 45 percent) don't require an advance degree. On top of this, the clean economy jobs are growing at a rapid pace. For example, the U. S. solar industry employed 173,807 solar workers as of November 2014. This represents a 21.8% growth over the prior year. All of this signals a tremendous opportunity. However, if we do not take action to improve the opportunities for underrepresented communities in the workforce, we will only be adding to the current disparity that exists between the energy industry and the community it serves. The energy industry can be more reflective of the characteristics of our population. And by doing so, our whole economy will benefit.

As I mentioned earlier, Hispanics in Energy engaged in "community conversations"² on this very topic. Together with the American Association of Blacks in Energy and in partnership with the U. S. Department of Energy, we initiated a national eight city community tour³ that brought the discussion of opportunities directly to our communities. Our intent was to increase awareness of the jobs that exist in the energy field. The local dialogues also encompassed a discussion with community leaders to assess

² <http://aabe-hieenergize.com/>

³ The eight city tour included Chicago, IL; Canton, OH; Bakersfield, CA; Philadelphia, PA; Detroit, MI; Denver, CO; Charlotte, NC; and Las Cruces, NM.



the current structures that exist within the community and to start a brainstorming session on what more we can do to address any challenges.

Through this effort, and Hispanics in Energy's previous work, we have found that five principles can be utilized to help our nation take the best advantage of existing and future job opportunities in energy. The five principles we have found are:

- 1) general dissemination of energy opportunities to educators, parents, community leaders and the general public;
- 2) student engagement at all levels – including elementary through high school, and technical and college level students;
- 3) expanding the network of engagement by energy providers and companies to create a pipeline of prospective workers;
- 4) developing programs and pathways for different demographic groups and segments of the population; and
- 5) assessing outcomes by utilizing data, analysis, and benchmarks.

General dissemination of energy opportunities to the entire community and the general public is critical. Not everyone grows up thinking they are going to have a career in energy. In fact, very few do. Because of the increasing job opportunities, we need to reach out to our community leaders and educators to share the story of the opportunity so that today and tomorrow's workforce can be prepared for a job in energy. Recent research⁴ indicates that the number one obstacle to women considering employment in the oil and natural gas industry is lack of awareness and understanding of

⁴ January 2015 American Viewpoint & Lake Research Partners, *Attitudes and Perceptions of Women About Seeking Employment in the Oil & Natural Gas Industry*



job opportunities and career development in the industry. This is an obstacle we can and should overcome. With greater outreach, education and engagement opportunities – we can work to increase the participation of women in the energy industry.

The second principle is focused on engaging our children sooner rather than later. Believe it or not, I do mean reaching out to our elementary and middle-school aged children, as well as, high school and college/technical level students. We must continue to emphasize the need for science, technology, engineering, and mathematics as a pathway to career opportunity. Of the 70,000 undergraduate engineers, only 12% represented all under-represented groups⁵. And, the pool of under-represented engineers gets even smaller at the graduate level.

We must also emphasize that a student's pathway might differ from college and may include a technical or skilled trade pathway. Sadly, with our focus on college and college preparation, the trades are often neglected. We often disconnect ourselves from unfortunate trends in high school and middle school drop-out rates. However, imagine if we helped to ensure a pathway for all students. Perhaps some students would stay in school. Looking for any job, including blue collar jobs in energy, can still require a high school diploma. However, the start of the pathway for all energy jobs is basic education. A recent survey⁶ found that only one out of five utility companies felt that students leaving high school or college were ready for an energy career. These companies reported that students didn't have the basic reading, writing and math skills needed to go to the next level of training. Let's ensure we are doing all we can to allow the door for opportunity to be open.

⁵ National Science Foundation 2006

⁶ Center for Energy Workforce Development annual member survey



The third principle involves the activity of energy companies and providers. These entities must continue to expand their networks and engagement to increase the pool of qualified applicants. Several energy companies have partnered with veterans workforce entities at the state level to ensure that job opportunities are made available for our very skilled and able veterans. This provides great opportunity for this segment of the population. Other efforts can be to continue partnership with organizations like Hispanics in Energy and the American Association of Blacks in Energy, along with other community partners, to help ensure that a diverse and qualified workforce is provided the opportunity of energy jobs. In business, we find we must constantly expand our reach and the same holds true for expanding the applicant pool for these energy jobs. Utilizing non-traditional networks can be the key to filling these positions.

The fourth principle is that programs and pathways need to be developed for different demographic groups and segments of the population. Partners, including the Center for Energy Workforce Development⁷, can attest that while the education and skills needed are the same for everyone, the best way to prepare individuals may differ. Transitioning workers, women, low-income adults and veterans are all workers, but the outreach and engagement might need to be tailored for each segment. For example, career coaching might be a key factor to success. Other program services, such as wrap around services to defray the cost of transportation or the provision of child care, can mean the difference between success and failure for those completing energy training programs.

The final principle is assessing the outcomes by utilizing data, analysis, and benchmarks. Perhaps I am fond of this one because as a former regulator and state economic and jobs policy advisor,

⁷ In 2006, electric and natural gas utilities and their trade associations – the Edison Electric Institute, American Gas Association, Nuclear Energy Institute, and Natural Rural Electric Cooperative Association – formed the nonprofit Center for Energy Workforce Development (CEWD)



I would always meet with businesses and companies that would tell their story of economic opportunity. And, my point was always the same – “show me.” I referenced the IHS report because I believe it is a good showing of data and analysis. I recommend that with any legislative proposal to include provisions to assess performance. For example, an analysis of how the energy industry moves in the direction of expanding jobs and filling those positions with the diverse communities discussed. A second component can include a compilation of best practices by industry sector and demographic segment. At the very least, we can create a goal to increase the underrepresented population’s involvement and monitor the trends in successfully achieving this outcome.

In closing, we know that job opportunities will be made available as the workforce transitions over the next decade with the retiring baby boomers. According to a 2014 study⁸, more than half of the utility workforce may turn over within the next decade. Ten percent of the utility industry could retire today and more than one-third of the skilled utility workforce may need to be replaced within five years. In addition, as the energy landscape modernizes and expands, this also increases the jobs available. We must continue to spread the message of the opportunity available in the energy field. Doing so, will enable many Americans to live the American dream and find the economic opportunity that comes with it.

Once again, thank you for the opportunity to provide remarks on this important issue. As a nation of energy users, we must ensure that we promote and carry the message of the job opportunities in energy to everyone.

⁸ 2014, State of Energy Workforce: Skilled Utility Technicians and Engineers by the Center for Energy Workforce Development

Mr. WHITFIELD. Thank you, and our next witness is Mr. Charles Wilson who is the Senior Reactor Operator Trainer and Managing Partner of CW Consulting Group. Thanks for being with us, and Mr. Wilson, you are recognized for 5 minutes as well.

STATEMENT OF CHARLES WILSON

Mr. WILSON. Mr. Chairman, Ranking Member Rush, and the other members of the committee, my deepest gratitude.

I am a 36-year-old black man who was raised in the South Side Englewood neighborhood of Chicago. I was born to a single, teenage mother, Elizabeth Wilson, and have two younger siblings, Natasha and Tabitha Wilson. My mother's parents died while she was in her teens. My father played no role in our lives. Today I don't know if he is dead or alive.

We were poor. My family received SNAP benefits, and a small amount of money that my mother received afforded us a very humble apartment during a period in Chicago where the murder rate was nearly twice the rate it is today. Despite my impoverished circumstances, I matriculated through the Chicago Public School System and graduated from Lindblom Technical High School. In 1996, my joy of having survived to the age of 17 and graduating high school displaced my need to put together a long-term life strategy and plan of execution. That lack of having specific goals contributed to me becoming a teenage husband and father, ready to repeat the cycle that is commonplace amongst those in communities similar to mine. The walls of hopelessness and poverty waited to trap yet another tenant and disrupt the generational foundation necessary to break this destructive cycle.

The birth of my firstborn, Erin Wilson, provided me an opportunity to be a man whose values and principles would be the polar opposite of the man responsible for my birth. That opportunity came in the form of a career serving in the U.S. Navy as a nuclear operator and submariner. My 6-year career provided me the base knowledge and unique skill set that was attractive and needed by the commercial nuclear industry.

Exelon Nuclear gave me my first opportunity as an IBEW union chemistry technician and instructor. That opportunity set a trajectory which allowed me to obtain my senior reactor operator certification for training in December 2013. Since Exelon, I have worked at various commercial sites. Every job I have had in the industry has provided me with at least \$100,000 annual income. The new awareness of this life-changing career path inspired me to partner with my best friend, Dion Clark, of TCI Solutions, also a Navy nuclear operator and senior reactor operator certified trainer. Though Dion served as part of the Navy surface fleet, we won't hold that against him. Dion, a product of Chicago's South Side Robbins neighborhood, and I decide that we wanted to share the opportunity we had been given with our community, the under-represented, disadvantaged, and underserved. Our philosophy was simple: If we could make it, so could they.

And here is how: We created the Legacy Initiative, a program that is rooted in the concept of teaching young people how to think critically. Our youth span from elementary through high school, and we challenge them to take a moment and ask, with this deci-

sion, is what I am about to gain worth what I might lose? We incentivize this intrinsic behavioral change by using ourselves as muses, making them aware of the opportunity and educating them on how to attain these opportunities.

From 2008 until now, we have taught our character development and logic curriculum to more than 4,000 youth in Chicagoland, Arizona, and Pennsylvania. We have partnered with the Center for Energy and Workforce Development. We are now implementing the second phase of our strategy to pipeline these young people to those post-secondary institutions that have 2- and 4-year STEM degrees. These individuals in turn will become the qualified, skilled workforce that the energy and manufacturing industries need.

This bill would make what were a series of chance encounters and good timing for me into a template for deliberate, rewarding strategies for those demographics I represent and more. As evidence, I offer that my daughter, who graduates in June from Kenwood Academy in Chicago, will be entering the historically black university, Howard, majoring in nuclear engineering. My oldest son, Willie Hampton, graduates next year and intends on obtaining his 2-year technology degree, getting a job as a nuclear operator, taking courses while he is utilizing his company's tuition reimbursement benefit, and then graduate with his undergraduate degree at the same time as his high school classmates. But he will have 2 years of work experience, having enjoyed a six-figure income and having no debt.

Our paths like the ones funded and supported by this bill ensures that my 5-year-old son, Charles Wilson II, and others in his generation don't have to experience poverty and can start to build the generational wealth and opportunity that evaded the generations before them. Thank you.

[The prepared statement of Mr. Wilson follows:]

**Testimony of Charles Wilson
Managing Partner of CW Consulting Group, LLC
Before the U.S. House of Representatives
Committee on Energy and Commerce, Subcommittee on Energy and Power
Hearing on "Title II: 21st Century Workforce"
April 23, 2015**

Summary

1. There is a need that exists between those who are recognized as the underrepresented and disadvantaged, and those entities that make up the energy and manufacturing industries. This 21st Century Workforce bill provides the jumpstart to establishing the conduit between the two groups.
2. With awareness, educational access and willingness, the workforce development needs of the energy and manufacturing industries can be met by those from the underrepresented and disadvantaged populations.
3. Success can come in unexpected and unplanned manners. That success is hinged upon thinking critically and having specific, attainable goals to provide the navigation to that success.
4. My success in energy has allowed me to take my blueprint to thousands spanning from elementary to high school. It has provided the framework for my own children to map out careers in the energy industry, establishing a generational bridge between the industry and future workforce.

A sense of hopelessness is the most pervasive feeling that permeates disadvantaged, underrepresented communities. Each day feels like an eternity in a dark abyss, with no route of escape. All one generally has to hold on to are fantasies and dreams. Rarely do we see tangible, realistic examples of people who found a reproducible, sustainable pathway out of these environments and into lifestyles that seem made only for movies or televisions. I am not talking about ultra-rich, excessive lifestyles - but simply where the most stressful decision within the household is choosing between public or private school for our children. Instead, the decisions are often between payment of the electric or gas bill.

There are two main groups that have needs: the energy and manufacturing industries and disadvantaged populations. The two industries have what the disadvantaged populations need and the disadvantaged populations can meet the needs of the two industries. This is a classic case of "win-win." What is missing is the bridge between them. For those of us who represent the disadvantaged group, the gap consists of awareness and educational access. For those of us who represent these two industries, the gap consists of awareness and willingness to help.

As a person who represented the disadvantaged as a youth, I was unaware that careers in energy and manufacturing existed. There was no one who lived in my neighborhood or who came to my schools to expose me to the opportunities that were offered by the energy and manufacturing industries. Though I knew what energy was from a physics standpoint, I would not have been able to name the types of jobs I could attain upon graduation from high school. The only job I can remember correlating with manufacturing was work within an auto assembly line. My awareness of the vastness of other variations of energy and manufacturing would have altered every decision and process that I executed. I would have known that I had something to look forward to and live for. I would have known that there was a way out. I would have found hope.

My newfound hope for these careers would have helped me establish specific goals. Along with those established goals would have come a roadmap on how to attain them and the educational requirements that I would have needed to pursue those careers. The question would have become, as it is for those in this same situation today: where do I get the education and how?

Educational access encompasses both of those questions. There exists those who want the education, but lack the resources to see that education come to fruition. If one cannot obtain an adequate food supply, proper shelter and clothing, education will not be accessible. If one cannot obtain the financial resources to pay for the education, education will not be accessible. The awareness and educational access is what this bill can impact and bridge for those underrepresented and disadvantaged groups.

The energy and manufacturing industries have had a "golden era" of highly skilled, seasoned and loyal workers that have made up the workforce for the last thirty years. Most are now retiring and exiting the workforce or coming back as contractors at a high cost to the companies. There exists and has been a wellspring of talent that has the ability to fill these occupations, but they lack the knowledge and skills. The scope of the industry has been narrowed to the same colleges and universities that are used by other industries that have need for certain skills, but offer the perception of better quality of life and workplaces. They eventually win most of the talent and leave the energy and manufacturing industries to fight over a shrunken pool.

With few representatives of the disadvantaged having a "seat at the table" and their lack of representation in these industries, they are marginalized and overlooked.

A willingness by energy and manufacturing industries to recognize these underrepresented and disadvantaged groups as having the talent and abilities to meet their workforce needs has to exist. If this willingness exists and receives "buy-in" throughout the organization amongst the key decision makers, then resources will be allocated to harness that talent through outreach and education. An open sharing

of the knowledge and skills required for employment within the member companies will exist between themselves, educational institutions and workforce development entities. An ecosystem will be established where the investment into the talent will produce a workforce that is tailor-made for meeting the industries' needs, while providing reproducible, sustainable pathways out of the low- or non-wage, depressed communities that many of the disadvantaged originate from or reside in. This bill provides an incentive for that investment by the industries and those disadvantaged groups by showing that our governmental leaders recognize this self-sustaining model. It shows that our government is willing to provide the "starting current" to kick off this relationship, which has latent impacts to position the U.S. as the most competitive and talented nation in energy and manufacturing.

I embody every aspect of this argument. It began with my awareness. Unfortunately, mine came after a series of youthful misjudgments and missteps. I was unaware of the necessity in having specific goals laid out. Those goals would have incentivized my behavioral decision-making. I was raised in an environment that was rooted in love by my mother, who bore me as a teen. She had severely limited SNAP resources and raised me and my younger sisters in the Englewood neighborhood of the south side of Chicago. My home was fatherless and gangs surrounded me on every block. The streets were littered with gunshots, homicides and robberies. The murder totals were nearly twice as high as they are today. Downtown Chicago seemed like a distant city that I would never have an opportunity to live in or enjoy.

I became a teenage husband and father at the age of seventeen. I had a friend, who also became a teenage father and husband, join the U.S. Navy. He easily convinced me that I should join, as well. It was in the U.S. Navy that I became aware of the opportunities that existed, not only outside of Chicago, but in the energy industry. I was trained over a twenty-month period as a Nuclear Operator and Engineering Laboratory Technician, serving aboard two nuclear-powered submarines. This newly acquired skillset provided me the qualifications I needed to pursue a career in the commercial nuclear energy industry upon completion of my enlistment.

After my six year enlistment, I worked as a Nuclear Chemistry Technician, Nuclear Chemistry Trainer, and Senior Reactor Operator Certified Trainer.

I have since had two additional children. My oldest is attending Howard University, a Historically Black University, majoring in Nuclear Engineering on a full academic scholarship. My second oldest graduates in 2016 and is preparing to obtain at least a two-year degree so he can begin his career in the nuclear energy industry as a Nuclear Operator. He will likely obtain several academic scholarship offerings, but he has his goals clearly set as his contingency and it inspires his actions and continued academic excellence. My youngest son is only a toddler, but will have three examples of success laid out before him and will only know these lifestyles as his norm.

I decided shortly after being hired in the commercial industry that it was my responsibility to be the person that I wished had been in my neighborhood or school. I created a critical thinking curriculum with another minority U.S Navy nuclear operations veteran whose roots were in Chicago, as well. We facilitated this Legacy Character Development and Logic curriculum, bringing awareness and education to more than four thousand Chicagoland, Arizona and Pennsylvania youth between 4th through 12th grades. The philosophy is simply: if we could make it, so could you; and here is how.

With the support of the Department of Energy and entities such as the Center for Energy and Workforce Development, the American Association of Blacks in Energy, Hispanics in Energy, Estrella Mountain Community College, Linn State, Joliet Junior College, Luzerne Community College, etc., we can ensure that we establish a pipeline of highly skilled, well-grounded, knowledgeable leaders to the energy and manufacturing workforce. This collaboration will not only meet the needs of today, but will help bring recognition to the United States as the world leader in energy and manufacturing and job creation. I fully support the establishment and passing of this innovative "Title II: 21st Century Workforce" bill. I am prepared to continue to assist in the creation of New Legacies of Success.

Mr. WHITFIELD. Thank you, Mr. Wilson, and I thank all of you very much for your testimony. I will recognize myself for 5 minutes of questions, and then we will give everyone up here an opportunity.

Many of you have talked about programs that are already in existence, and Ms. Brundage, with Shale NET and Mr. Jarvis with the NECA labor union apprenticeship programs in which you all are doing at the University of Houston. And I was wondering, on the Hispanics in Energy, do you all have a training program or a program that is helping workers get into the energy sector?

Ms. MARTINEZ. We don't have a training program, but we are doing the outreach. And what we found from our tour across the country last year was that in many ways, many of these programs are operating but they are not interconnected.

Mr. WHITFIELD. They are not interconnected?

Ms. MARTINEZ. Right. So when we think about the engagement of many things, we know that there are different groups that are out there working and trying to aim towards this goal, but a lot of times the agencies and the entities are not communicating. And so, by part of this legislation, I do believe, is to make sure that you have that efficiency and that collaboration, because with that collaboration you can achieve better success.

Mr. WHITFIELD. Yes.

Ms. MARTINEZ. So many groups work within their own silos. And so our goal is to try to help bring those things together and make those connections.

Mr. WHITFIELD. And Mr. Wilson, you and Mr. Clark, in your program, do you all have training programs or is it more of a mentoring or how does it exactly—

Mr. WILSON. Combination of both, Mr. Chairman. What we found in our time was that we have to change the behavioral process and thinking of the young people in some of these communities. We can't put them in front of an employer and they don't know how to make better decisions for themselves. So we wanted to instill things like self-concept and self-respect, accountability. And then with that, we can instill leadership. So that is the first part, is to change that behavioral attitude and decision making.

Secondly, yes, we do want to then train them with those stackable credentials that the doctor mentioned and also the wrap-around services that Ms. Martinez also spoke to. So there is a collaborative aspect that has to come with this. So there is the training, not only with the mentoring but also with the skills that they need to—into the energy sector.

Mr. WHITFIELD. So do all of you agree that this type of legislation would really be beneficial or does anyone have any suggestions on ways we could improve it? I am assuming all of you have read it.

Mr. JARVIS. Mr. Chairman, if I could, our apprenticeship program addresses the exact things the other panel members are talking about today with our outreach programs. We have many programs where we reach into the communities for the underserved and undereducated and offer these career opportunities. And so we think this legislation speaks exactly to that, and we look for your support.

Mr. WHITFIELD. OK. Dr. Krishnamoorti?

Mr. KRISHNAMOORTI. Thank you. We agree with that observation. There is no silver bullet. It has to be a combination strategy. We need to look at apprenticeship programs. We need to look at stackable credentials. We need to look at mentorship programs. And clearly, these programs have to be scalable, but in the end are individually focused.

Mr. WHITFIELD. I think Ms. Martinez touched on a good point because it is awful easy to kind of be isolated out there and not have interconnection. So that is one. I am sorry, Dr. Brundage, did you want to make a comment?

Ms. BRUNDAGE. Yes. Thank you. No, I agree with you, and I think, one of the things that I tried to reference in my verbal testimony was to try to target some of that federal funding in promoting those regional collaborations. And in the example of Shale NET, we set up a lot of hubs in areas where there is a lot of activity, and it began in the upstream side. But as we moved forward realized that there are more opportunities to spread that out into scale in the midstream and downstream. So it is taking that successful model and those stackable credentials and trying to build that continuum and that pathway for people to continue in being able to move into those types of career opportunities.

Mr. WHITFIELD. Yes.

Mr. WILSON. Mr. Chairman?

Mr. WHITFIELD. Yes.

Mr. WILSON. To also ask you the question about other areas, there are two other areas that I think that we should concentrate on as well and that is the wrap-around service aspect. Groups like the United Way, if we can utilize those non-profits that will take care of the things that children have to consider or youth have to consider, if you are wondering about eating, you are not going to concentrate on your math and physics. So if we have those things that sort of take those concerns off the table, I believe that will help strengthen that pipeline.

Secondly, when they get to these schools, do they have adequate housing? That is something that I had one of my youth contact me about and say though he can get into the school, which was Linn State, he didn't know where he was going to live. So that is another concern is when they get there, how do we make sure they are taken care of when they get to these collegiate levels?

Mr. WHITFIELD. Thank you very much, Mr. Wilson, and my time has expired. So Mr. Rush, you are recognized for 5 minutes.

Mr. RUSH. Again, I want to thank you, Mr. Chairman. This has been so far a very exciting hearing for me. Mr. Wilson, as I read your testimony and listened to your testimony, I couldn't help but be moved by your story which is a story that has been shared thousands and thousands of times among youth across the Nation. It reminded me also of my own life story, and I was also raised by a single mom with five children on the South and West Sides of Chicago. And I am a high school dropout. I dropped out of high school, but now I have two bachelor's degrees. So overcoming the odds is something that I am real familiar with. And so your story reflects and is parallel not only to my story but to others.

I applaud you for not settling for the life that was right around you, the life that you observed day by day, getting up in the morn-

ing and going outside and seeing the negativism that is around you, and somehow you had to dream bigger and dream further and dream the impossible. And so I applaud you for not only dreaming the impossible but you believed in the impossible and believed that you can overcome the odds and make the impossible possible. So I really congratulate you. I know the path and the steps that you have gone through.

And I just want to take a moment. Ms. Martinez, it is so good seeing you again. We were on the same panel some months back, and welcome. But Mr. Wilson, in your testimony you stated that success came from unexpected and unplanned manners. Tell me what did you mean by that? Explain that more. How do you think that provisions of this bill can help other young men and young women through real-life conditions and help them to realize that similarly evasive but real nearby American dream if we only had the courage to step out? How do you think this bill will assist in that manner?

Mr. WILSON. For me, it is important for me to think about the fact that there is more, there is more to it. And sometimes it is just a matter of exposure. When I was in Chicago and those neighborhoods, I wasn't exposed to anything. I could only see what was in front of me, and I didn't have many role models around for me to see what was possible. So when I speak to the unexpected, I didn't script this. I spoke to my mother the other day, and I said who would have thought in this small bedroom on 56th and Hermitage that I would be sitting here in front of Members of Congress? That is what I mean. It is not about where you are from. It is are you going to use it as a crutch or are you going to use it as fuel? And once you are exposed, once you have access, I believe that these young people that we are talking about, they will see what they need to become. We will incentivize that behavioral change. We will see that there is something to lose. And when you feel like there is something to lose, it changes your behaviors.

So for me, that is what did it. I looked at my daughter, and I did not want her to have to repeat the cycles of not having a father in her life. He became, my father became, my fuel. If I do the opposite of what he does, he has given me my blueprint for me to be successful and hopefully raise successful children. And I want to speak to a legacy. This is what it is about for me. My children saw me and how I did what I did, and now their efforts are deliberate. They are planning it. It is not happenstance, which is what happened for me. If I didn't have a friend, Brady Fox, that went to the Navy and said, hey, do you want to come? I looked around. Why not join the Navy? And with that, I was selected to be a part of the Navy Nuclear Propulsion Program, and I am able to now say that that gave me the foundation that I have right now. And with these institutions, these educational opportunities we have now, this can now again be another pathway that wasn't expected and now exists. And I believe this bill will allow more of these type of stories to again be delivered.

Mr. RUSH. In a similar way, I dropped out, and I was 17 years old on my next birthday which was about 3 months later. I pleaded with my mother to sign. Let me go into the service. Three of my friends from the neighborhood, two of them went to the Marines

and I went to the Army. And that is what gave me the wherewithal and to turn my life around. So again, parallel circumstances.

Thank you so very much. I yield back, Mr. Chairman.

Mr. WHITFIELD. At this time I recognize the gentleman from Pennsylvania, Mr. Pitts, for 5 minutes.

Mr. PITTS. Thank you, Mr. Chairman. Let me continue with you, Mr. Wilson. You have a compelling story. I really appreciate hearing it. And you went in the Navy, and that was the key. What were your skills before you went in and how was the Navy effective in changing your skill level?

Mr. WILSON. My skills from an educational standpoint came from Lindblom High School. It was a technical high school. And it was very rigorous in the sciences and the math. I was unaware that I would need to use algebra or understanding what velocity and force and anything meant. And it is funny. There is an exam that is required once you take what they call the ASVAB for the military. I was then selected to take this nuclear entrance exam. I recall one of the questions talking about speed, and it happened to be something I paid attention to with my teacher, Mr. Robinson, in physics. I needed a 50 to pass, and I had a 52. And there were five of us that took it, and I was the only one that actually passed. And when I looked around, they took me into a room and they said, we want to talk to you, Charles. I said, what is that? You are the only one that passed. And I looked at people who were college educated around me. They were speaking about this nuclear program as if it was something that they knew that they were going to get. I looked around and I was the only one that passed.

So I would say that that time in high school, that education, that math and science focus, is what gave me the foundation. Any other skills came from just truly survival, being in Chicago. And I was a pizza delivery guy. I don't know if that had anything to do with it.

Mr. PITTS. What were the key components? You have a real compelling story. I want to drill down a little bit. What are the key components to your behavioral change?

Mr. WILSON. My mother first. Elizabeth Wilson represents fortitude, strength, and more importantly resiliency. You have to understand, a teenage mother having three children and not planning her life to be that way and not having her own parents to fall back on because both of them died while she was a teen.

And so she literally was trying to write the book as she was moving forward. She inspired me. She gave me the belief in myself as well. She encouraged me to be free. I used to enjoy bringing As home to her because she smiled, and that inspired me to want to do that more.

When I got to high school, my classmates, watching how they got up every day to come to school, despite the odds, gunshots, three or four different gang neighborhoods that we would walk through, and I saw them come every day. And there was a joy to come to school with everyone from Lindblom. Those things, that relationship, is what caused me to say I want to do more. I want to do better than what I am seeing.

Mr. PITTS. Now, in talking about working with people who need a second chance, how do you teach and how do they emphasize the

right character qualities for behavioral change to get them so they do show up on time, you know, that they are the type of employee that employers want to hire. Would you develop that a little bit?

Mr. WILSON. I believe the first thing is we have to be transparent and honest about what opportunities exist. Very many times we speak very vaguely about what an opportunity is. So someone from let's say my neighborhood, when I would go speak to the young people that we had in Chicago and other places, I would literally take them my paycheck, and I would pass it around and I would tell them to look at the number on my paycheck and let them see me tangibly and give my story and say I am nothing but you. There is no magic pill except focus and having specific goals because after you have these specific goals, the map to get there will lay itself out.

So I think when you are honest and transparent—the other thing is you have to be very transparent about your errors. We typically try to gloss over the errors and only get to those good things about us. So being transparent is what allowed me to now have people that trusted me, and when I give them now these suggestions, they will take it for face value initially, and then when they see the results, they are bought in. So it actually becomes intrinsic because I first show them that it is possible, and then secondly, here is what it takes to get there and then they will believe it.

I think that is what it is. All people need is an opportunity, and if they see that it is possible and they see someone in front of them that looks like them that can speak to and articulate a message for them that is palatable, I think they will get it from there.

Mr. PITTS. And you are obviously teaching that to your children so you can replicate success.

Mr. WILSON. That is correct.

Mr. PITTS. You are a real inspiration. Thank you very much. My time—

Mr. WILSON. Thank you, Mr. Pitts.

Mr. PITTS [continuing]. Has expired.

Mr. WHITFIELD. I wanted to make an announcement that we anticipate that there will be votes on the floor at about 11:15 or 11:20. And of course, we have 15 or 17 minutes to get over there. I think if we break for these votes, a lot of people will end up not coming back. So would you all object if everyone was given 3 minutes for questions? That way we would have maybe an opportunity for everyone to ask questions. Is that suitable with everybody? OK. Then Mr. McNerney of California will be recognized for 3 minutes.

Mr. MCNERNEY. I enjoy being the first one with 3 minutes, Mr. Chairman. No, I want to thank the chairman and the ranking member for their work on this and the panelists. They have very good testimony. We have the Labor Statistics' unemployment rate for African Americans at 10 percent, more than twice that for whites. Hispanics, almost as bad, some of the statistics that Ms. Martinez raised. And then on the other hand, we have all these opportunities in the energy industry. Solar industry grew 86 percent since 2010. Wind industry, 73,000 full-time workers. Energy efficiency, 1.3 to 1.9 million new jobs by 2050. So we have it and we have opportunity. What are we going to do about it? Well, we have some ideas up here on the panel. I thank you very much for that.

Dr. Brundage, I am very excited by Shale NET. I haven't heard anything about it before. I am going to ask my staff to get a copy of a description of that, see how applicable that would be. Could you give me some idea how Shale NET is funded?

Ms. BRUNDAGE. Yes, absolutely. Right now I mentioned in the verbal testimony it was funded by the Department of Labor. a TAACCCT Round II grant, which was a capacity-building grant to help with infrastructure. This particular grant does not pay for tuition. On the short-term workforce side, we have these 3-week programs, sort of like boot camps, and we have active case managers that help the students understand the expectations and the culture, the work environment. We start classes early, we end later, so that they have a feel for what the expectations are, and we have been able to raise local dollars through Pennsylvania's Act 13 and to help with scholarships and also through corporate engagement. Chevron has pledged \$460,000 for the initiative over the next several years. And so we are trying to help offset some of that tuition because unemployed and underemployed folks, you know, if they don't have access to those dollars, it is difficult.

Mr. MCNERNEY. OK. Thank you. Mr. Jarvis, you said the government should promote apprenticeships. Do you have any ideas on how that should be done?

Mr. JARVIS. By supporting apprenticeship programs through the different grants that are available, and by supporting our trade groups, it allows us to do more outreach into the community. I am also moved by Mr. Wilson's story. I have many employees that work under me that have come up through our programs, outreach programs, and some of the other questions about what does it take to make people understand these opportunities and what skills. We teach life skills, things as simple as you have to get to work on time, you have to show up every day. Our outreach programs teach those things first, which makes these people, as they come into our apprenticeship programs, successful in the program. If you can't do those things—

Mr. MCNERNEY. Well, I have been to the YouthBuild program in my district, and IBW is there promoting apprenticeships. So that is good. I would like to ask Mr. Wilson a question, but I have run out of time. So I will yield back.

Mr. WHITFIELD. Well, thank you, and they called this vote a lot earlier than we thought. They have already called the vote, but at this time right now, the gentleman from Mississippi, Mr. Harper, for 3 minutes.

Mr. HARPER. Thank you, Mr. Chairman. Thanks to each of you for being here on a very important topic, and I, too, would like to say, Mr. Wilson, thank you for the inspiring story. And I am not one who wants to brag on my academic accomplishments, but I did graduate in the top 100 percent of my class. So I wanted to go ahead and throw that out. It was close, too, by the way.

Mr. Jarvis, you talked about the importance of having a flexible workforce available to adapt to emerging trends. Can you give me an example of what you mean when you say it is unnecessary and short-sighted to train someone in a single technology?

Mr. JARVIS. Yes. Thank you. We train electricians to be able to do all sectors in the electrical industry so a very common example

today is the solar industry. There are groups that believe that we should be training a solar worker which is just one small piece of being able to do electrical work. Our 5-year apprenticeship program teaches a career opportunity. Markets change. The solar industry will change. Our training program trains a person for a lifelong career to be able to earn not only top wages but top benefits as well. So you need to have a diverse training that takes a lot more than just one sector in the energy industry in our opinion.

Mr. HARPER. And if you do that, whether we call it cross-training or giving them the different options here, what does that do as far as the additional time needed for the training program?

Mr. JARVIS. Well, the training program that we have is a 5-year program, but you work as you—

Mr. HARPER. Within that curriculum for the 5 years, OK.

Mr. JARVIS. Correct.

Mr. HARPER. Great. Thanks. I will yield back in the interest of time, Mr. Chairman.

Mr. JARVIS. Thank you.

Mr. WHITFIELD. Thank you, Mr. Harper. Mr. Loeb sack, you are recognized for 3 minutes.

Mr. LOEBSACK. Thank you, Mr. Chair, and our ranking member. This really is a really great opportunity to hear from you folks. It has been kind of an eclectic panel I think to say the least, a lot of different things that have been mentioned here.

I might ask just one question. I do want to just make some comments about workforce development more generally, and I do want to kind of throw a question at you folks that may be unfair and probably should be directed more at my colleagues and as we work through this bill and do what we can to make it better eventually. But I was on the Education in the Workforce Committee for 8 years, and we dealt with a lot of these issues on that committee. We passed the Workforce Innovation Opportunity Act last year which was the reauthorization of the Workforce Investment Act. There is a huge overlap between what we are talking about today here with respect to the Department of Energy and the various things that have been talked about today and what the Department of Labor does. And I know the Administration is trying to interface some of the agencies and what they do.

And again, Mr. Chair and Ranking Member, this is something I would like to be working with you folks on down the road, sort of how can we get some of these agencies to talk to one another and work together and streamline some of these programs, maybe combine some of the efforts if possible? But I do want to ask, and it is kind of an unfair question, I admit, to all of you, because you are nodding. If you will, Doctor, any thoughts about how we might be able to do that instead of reinventing the wheel every time, having one department do something, have another department do something that might be similar to what that department is doing. Any thoughts about that at all? I know it is throwing you folks for a loop here, and maybe I am doing the same thing to my colleagues.

Mr. WILSON. Is there a way to make effectively a liaison within each department that is meant to sort of see what the overlaps are—

Mr. LOEBSACK. I think that would be a great idea.

Mr. WILSON [continuing]. With the Department of Commerce, with the Department of Labor, where there is a person that looks and sees, OK, what active efforts do you have?

Mr. LOEBSACK. Right. And the Department of Energy perhaps—

Mr. WILSON. Exactly.

Mr. LOEBSACK [continuing]. In the states.

Mr. WILSON. Then they all just effectively maybe do like a sit-down once a month or whatever any new legislation that comes out specifically for their groups.

Mr. LOEBSACK. Right.

Mr. WILSON. Is there a way to have maybe a liaison or person—

Mr. LOEBSACK. That is a real possibility.

Mr. WILSON [continuing]. To reach out—

Mr. LOEBSACK. Thank you, Mr. Wilson. I appreciate that because again, there are going to be a lot of things. Yes, Doctor?

Mr. KRISHNAMOORTI. I would like to add there are modes of operations where there are collaborations between agencies, inter-agency collaboration. Interior and Energy collaborate, for instance—

Mr. LOEBSACK. Right.

Mr. KRISHNAMOORTI [continuing]. In the off-shore space. And that makes a big difference in being able to double-up training programs for off-shore workers. Similar things can be done with Labor. They have the data. Energy needs the data in order to actually bridge that skill gap.

Mr. LOEBSACK. Right. I think that is great. We have a lot of community colleges in Iowa, and we have got a lot of connections between the community colleges and the wind energy program for example, too, and we can do more with populations who are under-represented in these areas. I have no doubt about that.

And so I am going to look forward to trying to find a way to interface these different departments and the different programs so we can move forward on these issues. And my time is up. Thank you, Mr. Chairman. I yield back.

Mr. WHITFIELD. The chair recognizes the gentleman from West Virginia, Mr. McKinley, for 3 minutes.

Mr. MCKINLEY. Thank you, Mr. Chairman. I had probably 5 minutes of questioning. We are going to try to cut it back down to three. The first observation I had about this whole issue—I was really looking forward to be educated about this, and I think some of you have touched on it. But the primary issue is about rural America. I think we struggle. Coming from West Virginia in a small community is how do we have an educated workforce, ready for manufacturing, energy, when we don't have a critical mass? So I am applauding—what we did last year in the last Congress, we introduced a bill. It was 3524 that tried to focus funds going into economically deprived communities to help out, to plus them up some in the grants and programs for education. I think we ought to be looking at that as well. I don't know whether any of you are familiar with that bill that was introduced last year, but I know that Tracy, you got something going at Penn College that is also

at Pierpont where we have a training program there for Shale NET.

Ms. BRUNDAGE. Correct.

Mr. MCKINLEY. Can you explain some of the advantages of how that has helped out? Because there at Fairmont is a small community that is struggling. So this program may be helpful. Can you share a little bit about some of the advantages and how we might be able to spread that broader for other rural communities?

Ms. BRUNDAGE. That is an excellent question. We have had a lot of discussion about that within the consortium. Pierpont recently became an affiliate of Shale NET. So they are kind of a newcomer to the scene, and they are beginning to offer training there because of our relationship with Chevron wanted to have a hub in West Virginia to be able to have this consistent training so that people, you can have that consistency flexible program to meet industry needs.

Your question about—I think it is important to be able to scale these, and I think I talked a little bit about the stackable credential model and how that model is mobile and can be moved to other locations depending upon the geography. If they didn't want to do the training in the upstream side, you can target it to other sectors of the energy industry. The model with the stackable credentials and the various pathways and continuums really work to make sure that you have that consistent career pathway for individuals to move into.

So I don't know if that answered your question, specifically?

Mr. MCKINLEY. Well, as much as how we just need to keep going, are you familiar at all with the bill that was providing grants for economically depressed areas? Were you familiar with that last year?

Ms. BRUNDAGE. No.

Mr. MCKINLEY. I would like to get your feedback from that, from an academic standpoint or so, how that might work. It was 3524 during the last Congress. And see whether or not there are some advantages of us being able to focus on economically deprived areas, particularly those in rural America. Thank you very much.

Mr. WHITFIELD. Maybe you could look at that, and then Mr. McKinley's staff could be back in touch with you—

Ms. BRUNDAGE. Absolutely.

Mr. WHITFIELD [continuing]. To get your views. At this time I would like to recognize the gentleman from Texas, Mr. Green, for 3 minutes.

Mr. GREEN. Thank you, Mr. Chairman, and I want to thank our panel again. In fact, Ms. Brundage, our Natural Gas Caucus a couple of years ago had a hearing in Williamsport, Pennsylvania, at the facility there, talked about it. And coming from Houston, I was surprised to see the technology in the middle of Pennsylvania that we are actually doing at the University of Houston in East Harris County, our community college. So thank you.

Ms. BRUNDAGE. I remember you said a few words. I was in the audience when you were there.

Mr. GREEN. Yes, great facility.

Ms. BRUNDAGE. Thank you.

Mr. GREEN. Dr. Krishnamoorti, as I stated earlier, I feel like Texas and Pennsylvania are doing a lot of things in the energy industry, but what steps has the University of Houston taken to create the outreach and provide access to the different communities to provide information about energy jobs? I have the College of Engineering in our district, and our district is 70 percent Hispanic, Mexican American. You have to reach out to those high schools in those communities there to provide that training.

Mr. KRISHNAMOORTI. Thank you so much, Congressman Green. The Energy Institute High School is a new high school close to the university, within a mile from the university. Seventy percent of the students there are Hispanic, 15 percent of them are African American, and we have got an active collaboration with them. We work with them developing curriculum. We share with them labs at the University of Houston with them. But also we are able to send our students, our undergraduate students and graduate students as peer instructors in that school. And that makes the biggest difference for them, having role models who can come into the schools, show them by example. As Mr. Wilson mentioned, examples of people who have succeeded, who have learned and developed.

We have also taken the same strategy, worked with the whole range of community colleges, nine community college systems in the Greater Houston area, 60-plus community colleges across the State of Texas, all of them focused on taking these stackable credentials, finding ways of actually scaling them and deploying them.

Mr. GREEN. I only have a few seconds left. Can you tell us how can this bill and the Department of Energy further the goals of the universities and the colleges and community colleges that are already engaged in these projects? Is there anything we could do that would make this bill better?

Mr. KRISHNAMOORTI. I think the bill is right on the mark in terms of helping the universities work with community colleges and K through 12 education. I think getting that pipeline set up is the critical piece, and this bill addresses that in a big way. Thank you.

Mr. GREEN. Thank you, Mr. Chairman.

Mr. WHITFIELD. The gentleman from Ohio is recognized 3 minutes.

Mr. JOHNSON. Thank you, Mr. Chairman. Dr. Brundage, thanks largely to the oil and gas industry, coupled with programs like Shale NET that is in our state there at State College, unemployment in shale counties in my district in Eastern and Southeastern Ohio has fallen 66 percent since 2010. In fact, these shale counties are the economic impacts, the positive economic impacts. So the shale plays—that is what is driving the unemployment rate down for our entire state.

And because of this, we have got to continually look for opportunities like Shale NET to prepare our students for the jobs that are here today and that are coming tomorrow.

Quick question. If the goal of Shale NET is to increase capacity in terms of qualified workforce to meet the needs of the industry, how successful in your view has Shale NET been? Can you give us some specifics?

Ms. BRUNDAGE. Absolutely. I think many factors contribute to the success of Shale NET, and I think the successes are strengthened by the knowledge of partners. It is the strong partnerships to place these qualified candidates with employers and families sustaining careers. But we have the robust selection, assessment process in place, evaluating student candidates—all of these things can be transferred to other areas, other institutions.

When we look at a success measure for employers is the retention in employment a year after placement, which is demonstrated by participation in Shale NET. And with that return on investment, we almost take on some of the role of on-boarding because we are helping to vet those people and have them understand the expectations and give them the appropriate skill sets so that they know what to expect as they move into those jobs, hopefully retaining and allowing them to have greater career mobility.

Mr. JOHNSON. Great. Well, I appreciate that. I am going to be respectful, Mr. Chairman, and yield back the remainder of my time.

Mr. WHITFIELD. Thank you very much. Mr. Sarbanes, you are recognized for 3 minutes.

Mr. SARBANES. Thank you, Mr. Chairman. I want to thank all of you for your testimony. Ms. Martinez and Mr. Wilson, I wanted to ask this question. Obviously in the STEM arena we want to make sure that the academic curriculum that is offered in the classroom for young people in that K-12 space is as rigorous and holistic as it can possibly be. But I am also interested in the opportunities to connect young people with the experiences outside the classroom, in a sense, get them out of the classroom in various ways so maybe their horizons are broadened and they can see the connection to that pipeline opportunity that exists.

So if each of you could just very briefly comment on that idea of how we get young people in the K-12 space out of the classroom and connected to these career horizons, that would be helpful.

Ms. MARTINEZ. Absolutely. And that was an excellent question. In Michigan, there are certainly some schools that work and partner with various companies, especially in the Detroit region, and in those areas they do have mentorship and sort of on-the-job activities that are happening. Part of that is they are getting the students out of the high schools and out of the middle schools and doing sort of a 1-day job shadowing, job mentoring so that they actually can see what is happening. DTE Energy, Marathon Oil, others are taking part in that opportunity, so kids are able to see that real hands-on opportunity and actually get that job shadowing while they are in school, and they are also able to see that just as you can say it, really who that person is and who they are. And it gives them a real goal to achieve.

Mr. SARBANES. Thank you.

Ms. MARTINEZ. We find those have been successful.

Mr. SARBANES. OK.

Mr. WILSON. For example, specifically in Phoenix, we have created a program called Legacy I-3, and its purpose is to partner with these community colleges and some of these apprenticeship programs and such. There is a specific partnership that is created with APS in Palo Verde Nuclear Generating Station, and they have created an ambassador program. So what they do is they actually

come to the client schools that we have in Phoenix, in the Phoenix Union District, and takes the students from the class to different job sites so that they are exposed to seeing that this is really what we are telling you theoretically in the classroom. So I think that is an example. If you partner with these member companies, they will have volunteers and those within their organizations that would love to come and then bring those students to their worksite.

Mr. SARBANES. Great. Thank you. I yield back.

Mr. WHITFIELD. Thank you. At this time I recognize the gentleman from Texas, Mr. Flores.

Mr. FLORES. Thank you, Mr. Chairman. I want to thank you and also Ranking Member Rush for hosting this hearing today. I also want to thank each of you for your testimony. Given the timing and how little time we have left to vote, I am going to commend each of you for the jobs that you have done. I commend you for the quality of your testimony. Mr. Wilson, all I can say is wow. What an awesome piece of testimony. Ms. Martinez, thank you for what you are doing.

I think given the lack of time we have, I will just submit my questions in writing. Thank you.

Mr. WHITFIELD. Well, thank you very much, and I am sorry we were interrupted by these votes, but I think everyone had an opportunity to ask some questions. And thank you all for being with us, and we look forward to working with you as we try to put this package together in an effective way. We will keep the record open for 10 days for any additional submissions, and thank you once again. And we will adjourn today's hearing.

[Whereupon, at 11:20 a.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

PREPARED STATEMENT OF HON. FRED UPTON

I am very excited about the "Title II: 21st Century Workforce" discussion draft that we will be examining at this hearing. I am even more excited about the bipartisan process that led to it as well as the other titles in the new energy bill that this subcommittee is working on. I want to particularly thank Bobby Rush, Gene Green, Bill Flores and Richard Hudson for their efforts to collaborate on a positive energy agenda on which I hope we can all agree.

Creating jobs remains my number one priority as it does for most of us, and America's energy boom offers a major opportunity to do so. The good news is that the energy sector continues to create a wide variety of jobs, and even if the drop in oil prices has temporarily reduced some types of upstream positions, there are still many others like those in manufacturing that benefit from affordable domestic energy prices. Manufacturing is making a comeback in Michigan and across the country, and skilled workers are now in high demand.

The energy and energy-related jobs are there to be filled, but job training has struggled to keep pace. There is often a disconnect between the young men and women ready to launch their careers and the skills necessary to take advantage of the opportunities in energy.

The 21st Century Workforce bridges the gap. It takes the existing Department of Energy job training programs and redirects them towards the market needs of today and the future. One important component of this discussion draft is to make sure that more women and minorities can acquire the skills needed to participate in America's energy and manufacturing boom.

Affordable and plentiful supplies of American energy offer long term employment opportunities for millions seeking well-paying careers, and the 21st Century Workforce discussion draft helps make sure that these opportunities are available for all who seek them.

PREPARED STATEMENT OF HON. BILL FLORES

Mr. Chairman,

Thank you for holding today's legislative hearing on the 21st Century Workforce. I strongly support promoting this important issue along with Mr. Hudson, Ranking Member Rush, Mr. Green, and the rest of my colleagues on the committee. Our domestic energy security greatly improved as a result of the American energy revolution; and we now lead the world in oil and gas production. Increased American energy security translates in to improvement in our own economic and national security. The Energy Information Administration forecasts increased energy production through 2020, and that will result in increased demand in the workforce. Meeting these growing needs in all aspects of the energy industry, including oil and gas, nuclear, coal, and renewables provides hardworking Americans significant opportunities for well paying jobs.

This bill ensures that we have the skilled workers to continue to fuel our American energy revolution for years to come.

PREPARED STATEMENT OF HON. JOE BARTON

Mr. Chairman:

I am pleased that we are beginning our discussions with an area I believe we can all embrace and that is jobs and the economy. My colleagues Mr. Flores, Mr. Green, Mr. Hudson, and Mr. Rush have worked in a bipartisan manner to bring this issue to the forefront.

Earlier this week it was reported in a Wall Street Journal blog that while the US economy continued to add jobs last month, states that rely heavily on the oil industry experienced significant cuts.

- Texas has lost 25,400 jobs
- Oklahoma has lost 12,900.
- North Dakota has lost 3,000.
- All told, 31 states and Washington, D.C., saw a drop in employment in March, and only 18 states saw employment rising.

Michael Feroli, the chief U.S. economist for J.P. Morgan Chase JPM, said Monday that the scale of job losses in Texas is so large that the state may be in recession.

The purpose of the bill before us is to direct the Secretary of Energy to establish and carry out a comprehensive program to improve education and training for energy and manufacturing-related jobs in order to increase the number of skilled workers trained in energy and manufacturing fields. That is a great goal.

Of particular interest to me are the provisions creating a clearinghouse because this could potentially streamline the process for those seeking training and help eliminate duplication. In light of the recent downturn in my home state, I also strongly support the provision that directs the Secretary to give special consideration to increasing outreach to unemployed energy workers.

Although it is not the subject of this hearing, I do believe a have part of the solution to the downturn in jobs. I have proposed legislation to get rid of the ban on crude oil exports. I believe that simple act alone could greatly help our producers reverse the trend of job loss. I'm happy to discuss this with anyone who would like to.

Again, I appreciate all the work that has gone into this draft legislation and I look forward to working on the entire package of the Architecture of Abundance.

