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CLOSING THE SKILLS GAP AND BOOSTING U.S. COMPETITIVENESS

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED FIFTEENTH CONGRESS

FIRST SESSION

MARCH 29, 2017

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED FIFTEENTH CONGRESS

FIRST SESSION

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CLOSING THE SKILLS GAP AND BOOSTING U.S. COMPETITIVENESS

WEDNESDAY, MARCH 29, 2017

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The committee met, pursuant to notice, at 10:05 a.m. in room SD–G50, Dirksen Senate Office Building, Hon. John Thune, Chairman of the Committee, presiding.

Present: Senators Thune [presiding], Fischer, Moran, Heller, Inhofe, Johnson, Capito, Gardner, Young, Nelson, Cantwell, Klobuchar, Blumenthal, Markey, Booker, Peters, Baldwin, Duckworth, Hassan, and Cortez Masto.

OPENING STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM SOUTH DAKOTA

The CHAIRMAN. Well, good morning. We are here today to discuss a very important issue for the U.S. economy, and that's the technical skills gap among our workforce.

According to multiple surveys, employers are actively looking for skilled workers to fill available, well-paying jobs and they simply can't find them. As we will hear in detail from our witnesses today, there are numerous reasons for this, including a decline of technical education programs in public high schools; an increase in the number of baby boomers approaching retirement; a negative perception of the manufacturing sector among some potential employees, especially among those in younger generations; and an increased emphasis on 4-year college enrollment to the possible detriment of more technical training.

These factors and others are creating a skills gap that is most pronounced in industries requiring a labor force with technical skills, like manufacturing, construction, and the energy sector. In South Dakota, having a skill and being able to work with your hands is common for most folks. But that mentality was formed from necessity. In rural America, oftentimes, you need to be able to fix things for yourself when they break.

Over time, this need has led to a natural respect for the men and women who focus their lives on those trades. In order for our country to remain competitive, we need to promote this perspective and work together to highlight the importance of the skilled trades to the very foundation and strength of our economy.

This hearing is intended to explore the causes of the skills gap but, just as importantly, highlight efforts by advocates and industry to address it. John Ratzenberger has put smiles on the faces

of children and adults alike from his work on Cheers and numerous animated Disney Pixar movies. But today, he is here because of his passionate belief that America's greatness is connected to our ability to manufacture and his recognition that we need skilled workers.

Getting young people interested in working with their hands and familiar with tools from a young age is an important first step. A focus on technical education is part of the solution. It is no surprise to me that a South Dakota institute, the Lake Area Technical Institute, is leading the pack in training students to fill these skilled jobs.

Lake Area Tech is the winner of the 2017 Aspen Prize for Community College Excellence, the Nation's foremost recognition of high achievement and improvement in America's community colleges. An overwhelming 99 percent of Lake Area Tech's graduates are employed after graduation. And once they enter the workforce, these graduates earn an average of 27 percent more than other new hires in the region.

It is wonderful to see the work that Lake Area Tech and other community colleges and career and technical education programs are doing to train students for jobs that are available and lucrative. I look forward to hearing more about Lake Area Tech's programs in Colonel Cartney's testimony.

In addition to education pathways, U.S. employers are leading the charge in addressing this issue. Many companies have started training programs or fostered partnerships with local community colleges to try to improve their workforce pipeline and mitigate the impact of the skills gap.

This engagement is not limited to college partnerships. Many companies looking for future employees are finding innovative ways to engage K–12 students in STEM education. I look forward to hearing from the panel on what is being done on this front, what types of programs or models are working well, and what challenges remain.

Finally, it should be noted that the Federal Government partners with state and local communities and organizations to fund education, apprenticeship, workforce, and manufacturing-related programs, including at the Department of Commerce and the Federal Aviation Administration. The issues we will explore today affect industries and agencies that span the Committee's broad jurisdiction.

Getting Americans back to work and in good-paying jobs is a key priority of the Committee and will remain an area of focus as we approach the legislative agenda ahead. I want to thank our panel of witnesses for being with us today and for taking part in that effort, and I look forward to hearing your testimony.

Senator Nelson?

STATEMENT OF HON. BILL NELSON,
U.S. SENATOR FROM FLORIDA

Senator NELSON. Thank you, Mr. Chairman.

During the height of the recession, when unemployment was hovering around 10 percent, we noticed something surprising, that the unemployment rate for recently separated veterans was consistently higher than the national average. This was unexpected, be-

cause folks coming out of the military are highly trained for technical jobs—air traffic controllers, combat medics, airplane mechanics—and technically trained professionals at the time were in high demand.

What was happening was that these veterans were receiving world-class training, but not the right civilian certification or credentials to be eligible for the same job that they once had in the military. There was a small gap in their education. So we fixed it. We introduced legislation, the Veterans Skills to Jobs Act, and the Department of Defense now helps service members get these credentials and certifications so that they are qualified to get a job as soon as they leave the military.

An abundance of technical jobs presents a big opportunity for civilians as well, but the skills gap for them is even wider. Companies today are having a hard time finding qualified job applicants for technical positions. As many as 13 million U.S. jobs require technical or STEM skills, but not a 4-year college degree.

On one hand, more Americans than ever are attending college, and many are graduating with crippling student loans. On the other hand, companies are desperate to fill well-paying technical jobs that require some training, but less than a bachelor's degree. It is clear there is a mismatch between our education system and industry's workforce needs.

This skills gap in the workforce affects the bottom line of big and small companies. On the Space Coast of Florida, small and large companies alike are working with community colleges to build a pipeline of technically trained employees so workers can hit the ground running on the very first day. These positions aren't what we normally think of as blue-collar. These folks are helping to build and launch NASA's new Space Launch System, the largest rocket ever built. Siemens, whose CEO is here, has similarly implemented apprenticeship programs across the country for machinists, welders, and other skilled positions.

Aggravating this problem is the stigma about blue-collar jobs. High school students choosing between university or technical training need to know that many manufacturing workers are well paid and highly sought after. We have to do a better job of changing attitudes when it comes to the perception of technical education and manufacturing jobs.

The bottom line here is that we—educators, industry, and all levels of government—must do everything we can to better prepare our workers for the job market of today and tomorrow. Failure, we cannot contemplate. We have to expand job opportunities for American workers and make sure that we have the skilled labor that we need.

Our witnesses, as you have already indicated, Mr. Chairman, are leaders in industry and workforce training, and I look forward to hearing them.

Thank you.

The CHAIRMAN. Thank you, Senator Nelson.

We'll turn to our panel now. We'll start on my left and your right. As I mentioned, John Ratzenberger is a carpenter, actor, director, and the founder of the American Museum of Manufacturing; Mr. Rory DeJohn is a Senior Vice President at the Turner Con-

struction Company; Colonel Michael Cartney, who is retired from the U.S. Air Force, is the President of the Lake Area Technical Institute in Watertown, South Dakota; Mr. Jay Neely is the Vice President of Law and Public Affairs at Gulfstream Aerospace; and Ms. Judith Marks is the Chief Executive Officer at Siemens USA.

So a great panel. We're delighted to have you here. We look forward to hearing from you. If you could confine your oral remarks to as close to 5 minutes as possible, we will keep the record open to include anything else that you want to have entered into the record, as that will maximize the opportunity for members of the Committee to ask questions.

So we'll start with Mr. Ratzenberger and proceed across the panel from there.

STATEMENT OF JOHN RATZENBERGER, ACTOR, DIRECTOR, AND FOUNDER, AMERICAN MUSEUM OF MANUFACTURING

Mr. RATZENBERGER. Thank you, Senator, and thank you for your interest in the problem that we're facing. I was a journeyman carpenter. I actually helped build the stage at Woodstock, so you can blame all the mess on me.

[Laughter.]

Mr. RATZENBERGER. This great country of ours, this land we call the United States of America, was founded and nurtured on two basic guiding principles: freedom and the ability to use that freedom to build the finest civilization yet seen on Earth. We built this nation guided by our imaginations and the skills we learned from our elders.

We cut our own timber from saws we made ourselves from the ore we mined using tools that we machined and honed on machines that we built from scratch with our own hands. We drew, measured, and shaped the tools we needed to build our homes, the villages, towns, and cities in which we lived.

We traveled from place to place in vehicles we built and maintained ourselves to harness the pulling power of the livestock given to our use and care. We used our hands to build the barns, fences, and corrals that kept our animals protected so that we could feed our families with food we grew ourselves in fields plowed with more tools that we designed and proudly crafted.

We were always a nation of builders, tinkerers, and craftsmen that met each and every task and challenge with hands-on skills that were passed from generation to generation. We built our own ships that gave birth to the United States Navy, the same ships that fought the Barbary pirates off the coast of North Africa when Thomas Jefferson was president.

We used the same time honored skills to construct the battleships and landing craft that were necessary for our victories on D-Day as we pushed the Nazi nightmare back and extinguished the flame of evil so that our children could live in peace. We made every one of the weapons carried by our brave men and women throughout our history to protect the place that we call home.

With our own hands, we designed and constructed a rocket ship that landed us on the Moon and launched the satellites that transmit our cell phone signals from one place to the next. We used our hands to construct medical equipment that has saved millions of

lives worldwide. Make no mistake. We are the peacekeepers of the world because of our manufacturing might. Manufacturing is to America what spinach is to Popeye.

While future generations might have to explain that analogy, we in the year 2017 understand that without tinkerers, builders, and manufacturing throughout the land, we are rendered spineless and helpless. Manufacturing is the backbone of Western Civilization. Everything we do every single day is reliant first on someone's ability to not only put a nut and a bolt together, but to make that nut and bolt in the first place.

I have always known these truths to be self-evident because I grew up in the once mighty industrial town of Bridgeport, Connecticut, surrounded by people who knew how to design, build, fashion, make, repair, and maintain anything you wanted. My uncles proudly boasted of their ability to hone a piece of metal down to one-five thousandths of an inch as though the fate of Western Civilization depended on it. As a 10-year-old, I thought it was funny.

But as I got older and a tad more sophisticated, I realized that my uncles were absolutely right. The fate of Western civilization rests entirely on our ability to make things. The world would get along just fine without actors, reality stars, musicians, and sports celebrities. Our loved ones would be sad, but the world would continue to hum along seamlessly.

Think, however, what would happen if all the skilled trade people from carpenters to plumbers to farmers and truck drivers decided not to show up for work tomorrow. We, the entire nation, would instantly grind to a halt, causing problems that would take generations to overcome. So why, then, have we stopped teaching our children the joys of crafting something out of nothing?

About 15 years ago, while visiting a number of factories and filming the different ways companies make things for my TV show, "John Ratzenberger's Made in America," I realized that there are hardly any workers under the age of 40 in any of the facilities. After talking with dozens of CEOs and plant foremen in every state, I was made aware of the fact that, nationwide, the manual arts, that is, wood shop, metal shop, auto repair shop, even home economics, were taken out of the middle and high school curriculums about 35 years ago. Not only did that result in a dropout rate back then of 30 percent instantly, but left us with a skilled essential workforce whose average age today is 58 years old.

There are close to a million jobs available right now in small businesses around the country that rely on people with mechanical common-sense skills that we stopped offering in our public schools two generations ago. The most repeated complaint today from potential employers is that it's impossible to train someone for any of the jobs available when they graduate from high school everywhere without the ability to even read inches and fractions from a simple ruler.

The big worrisome question then is this: How do we reinstate the necessary programs in our schools to give our children a familiarity of the tools that built and maintained our civilization and way of life? If the average age of the people that keep our Nation and the

nation's infrastructure working is 58 years old, then how long do we have before it all stops?

I also submit that we do away with the term, blue-collar worker, and replace it with essential worker, because that's exactly what they are. Once they're all retired, then no more ships, no more buildings, trains, planes, or automobiles, no more tractors, no more farms, no more food, unless we grow it ourselves in fields we plow with tools we've made with our own hands.

That's the way it has always been, and if we someday want to explore the universe, cure disease, and marvel at what awaits us at the ocean's depths, then we'd better get busy introducing our youngsters to the vital art of using tools and the joy of self-reliance.

Thank you.

[The prepared statement of Mr. Ratzenberger follows:]

PREPARED STATEMENT OF JOHN RATZENBERGER, ACTOR, DIRECTOR, AND FOUNDER, AMERICAN MUSEUM OF MANUFACTURING

This great country of ours, this land we call the United States of America was founded and nurtured on 2 basic guiding principles: Freedom and the Ability to use that freedom to build the finest civilization yet seen on earth.

We built this Nation guided by our imaginations and the skills we learned from our elders. We cut our own timber with saws we made ourselves from the ore we mined using tools that we machined and honed on machines that we built from scratch with our own hands. We drew, measured and shaped the tools we needed to build our homes and the villages towns and cities in which we lived. We travelled from place to place in vehicles we built and maintained ourselves to harness the pulling power of the livestock given to our use and care. We used our own hands to build the barns, fences, and corrals that kept our animals protected so that we could feed our families with food we grew ourselves in fields plowed with more tools that we designed and proudly crafted.

We were always a nation of builders, tinkerers and craftsman that met each and every task and challenge with hands-on skills that were passed from generation to generation. We built our own ships that gave birth to the United States Navy. The same ships that fought the Barbary pirates off the coast of North Africa when Thomas Jefferson was President. We used the same time honored skills to construct the battleships and landing craft that were necessary for our victories on D-Day as we pushed the Nazi nightmare back and extinguished the flame of evil so that our children could live in peace. We made every one of the weapons carried by our brave men and women throughout our history to protect the place we call home.

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row. We, the entire nation, would instantly grind to a halt causing problems that would take generations to overcome.

So why then have we stopped teaching our children the joys of crafting something out of nothing? About fifteen years ago while visiting a number of factories and filming the different ways companies make things for my TV show "John Ratzenberger's Made in America", I realized that there were hardly any workers under the age of forty in any of the facilities. After talking with dozens of CEOs and plant foremen in every state, I was made aware of the fact that nationwide, the manual arts, that is: wood shop, metal shop, auto repair shop and even home economics were taken out of the middle and high school curriculums about 35 years ago. Not only did that result in a dropout rate back then of 30 percent instantly but it left us with a skilled essential workforce whose average age today is 58 years old.

There are close to a million jobs available right now in small businesses around the country that rely on people with mechanical common sense skills that we've stopped offering in our public schools 2 generations ago. The most repeated complaint today from potential employers is that it's impossible to train someone for any of the jobs available when they graduate from high schools everywhere without the ability to even read inches and fractions from a simple ruler.

The big worrisome question then is this . . . How do we reinstate the necessary programs in our schools to give our children a familiarity of the tools that built and maintain our civilization and way of life? If the average age of the people that keep our Nation and the Nation's infrastructure working is 58 years old then how long do we have before it all stops?

I also submit that we do away with the term "blue collar worker" and replace it with "essential worker" because that's exactly what they are. Once they are all retired then no more ships, buildings, trains, planes, or automobiles. No more tractors, no more farms, no more food unless we grow it ourselves in fields we plow with tools we've made with our own hands. That's the way it's always been and if we someday want to explore the universe, cure disease and marvel at what awaits us in the oceans depths then we'd better get busy introducing our youngsters to the vital art of using tools and the joy of self reliance.

Thank you,

The CHAIRMAN. Thank you, Mr. Ratzenberger.

Mr. DeJohn?

STATEMENT OF RORY DEJOHN, SENIOR VICE PRESIDENT, TURNER CONSTRUCTION COMPANY

Mr. DEJOHN. Thank you for the opportunity to testify this morning about closing the skills gap in the construction industry to boost U.S. competitiveness. I'm Rory DeJohn, and I represent Turner Construction Company.

Turner will celebrate its 115th anniversary this year and is recognized as the largest building contractor in the United States. This year alone, we'll complete approximately $11 billion of construction on 1,500 projects in 35 states and 400 cities across the country. As the construction industry is called upon to deliver civil and urban infrastructure needs of our communities and our country, I would like to give you some insight on how the skills gap is being addressed and how we need to think differently and more strategically about developing a workforce prepared to take on these needs.

First, let me provide some perspective. Construction employment is now at the highest level since 2008. Today, 6.8 million people will show up to work on a construction project in every state and every city across the country. Together, they'll complete in excess of $1 trillion of construction this year. While impressive, there are approximately 100,000 fewer working in our industry than in 2007, the same year that we completed approximately the same amount of work.

Certainly, we're employing technology and improved processes to help drive efficiency. Yet across the country, we're seeing a real need for more skilled labor in the industry. With these needs as a backdrop, we're also seeing a shortage of education and training opportunities for the people our industry needs most. The stress caused by a shortage of workers will continue to increase as demands for construction of both private and public sector clients continues to climb.

I'd like to just start with the professional side of the industry. In 2011, there were 58,000 students pursuing civil engineering degrees. That number remains unchanged today, even as construction activity has grown 50 percent since 2011. As the United States is a world leader in economic power, it's imperative that we work to improve upon our education in STEM.

As we look to strengthen the talent pipeline and produce more engineers, we also look to build a more diverse and inclusive pipeline, one that better reflects the world we live in and the people we serve. Although the number of women and minorities involved in STEM has increased over the years, they are still well behind the averages of other industries—the fact is that 80 percent of the students pursuing engineering degrees today are male and 60 percent are white.

There are people, organizations, and companies making great efforts to increase the diversity of the talent pipeline. Their mission is the same: engage and enlighten a diverse population of middle and high school students to inspire them to pursue education, and then careers in architecture, engineering, and construction through mentoring and hands-on experience.

Now let me turn to the skilled labor side. The median annual wage for all construction occupations is higher than any median annual wage for all occupations. Plumbers, iron workers, and electricians had a median income of $50,000 in 2015. Over the past few years, we've seen wages in the construction industry increase at a higher rate than the overall economy.

Yet the facts are clear. Fewer young people are entering the building trades as more people in the building trades are approaching retirement age. We've seen the average age of a construction worker soar from 36 years old in 1985 to 43 years old today.

One thing we can do to address this is to provide increased support to industry trade groups and encourage them to develop teaching practices and a curriculum better suited to the millennial generation. High school educators and counselors should introduce more students to a wide range of occupations available to them in our industry, and then offer them pathways to receive the training they need. As technical high school expands, our country will enjoy the benefit and a more engaged high school population that will graduate with the skills they need to be successful.

In addition, we should also continue to support and encourage the transition of our military veterans from the armed services to rewarding careers in the construction industry. Our industry has a range of employment opportunities for veterans, and companies place high value on military experience.

The industry has the need and the capacity to absorb more people into our workforce and engage them into meaningful work with

a good wage. What we need is the collective commitment of the educators, trade organizations, and industry to work together to further strengthen the measures we have been taking. We must also work together to act strategically to prepare more people to enter the construction industry and to extend the careers of people working in our industry.

Thank you again for the opportunity to be here today.

[The prepared statement of Mr. DeJohn follows:]

PREPARED STATEMENT OF RORY DEJOHN, SENIOR VICE PRESIDENT, TURNER CONSTRUCTION COMPANY

Introduction

Thank you for the opportunity to testify this morning about closing the skills gap in the construction industry to boost U.S. competitiveness.

I am Rory DeJohn and I represent Turner Construction Company. Turner will celebrate its 115th anniversary this year and is recognized as the largest building contractor in the United States. This year alone, we will complete approximately $11 billion of construction on 1,500 projects located in 35 states and 400 cities across the country.

Today, I would like to provide some insight into the very real issue the construction industry is experiencing surrounding the availability of skilled labor to complete the work we have.

As the construction industry is called upon to deliver the civil and urban infrastructure needs of our communities and our country, I would also like to give you some insight into how the skill gap is being addressed and how we need to think differently, and more strategically, about developing a workforce prepared to take on these needs.

Construction Industry Impact on Employment and the Economy

First let me provide some perspective. Construction employment is now at its highest level since 2008. Today, 6.8 million people show up to work on a construction project—in every state and every city across the country. Together, they will complete in excess of $1 trillion of construction this year. While impressive, there are approximately 100,000 fewer people working in our industry today than in 2007 when we completed approximately the same amount of work.

Certainly we are employing technology and improved processes to help drive efficiency. Yet, across the country we are already seeing a real need for more skilled labor in the industry. The population trends in our country, a growing economy, and the changing needs within a wide range of industries and communities will result in continued demand for construction and construction jobs. With these needs as a backdrop, we are also seeing a shortage of education and training opportunities for the people our industry needs most. The stress caused by a shortage of workers will continue to increase as demand for construction by both private and public sector clients continues to climb.

Professional Skill Gap

I will start with the professional side of our industry. In 2011, there were 58,000 students pursuing civil engineering degrees. That number remains unchanged today even as construction activity has grown by nearly 50 percent since 2011. And, as technology occupies a growing role in our lives, nearly every business in every industry benefits from the skills taught in fields of science, technology, engineering and math (STEM).

Science, technology, engineering and mathematics professionals help create better things and better places to work and live. Therefore, it is important that we encourage students to pursue careers in STEM as they are the future leaders in important industries and disciplines.

In construction, we see firsthand the role that new technology and process innovations play in the planning, development, and construction of a building. And because construction is an industry that touches so many other industries, we also have a unique vantage point from which to understand how these technological advancements and process innovations are also driving positive changes for our clients as they plan, build, teach, heal, research and manufacture.

As the United States is a world leader and economic power, it's imperative that we work to improve upon our education in STEM. I believe the future of our students, as well as our collective future, is extremely bright, but only with our contin-

ued and increased support of their education beginning in elementary school and continuing through high school and into college.

We need to advance a strong message regarding the opportunities available to develop innovative solutions to significant global issues through education and careers in STEM. Many are drawn to the construction industry because of its enormous impact on so many different aspects of modern life. They read about the need to improve the infrastructure of a city, hear of the need for a healthcare facility in a rural area, or see an empty space a community center might fill. These are the kinds of challenges that can serve to inspire the next generation of engineers.

As we look to strengthen the talent pipeline and produce more engineers, we also look to build a more diverse and inclusive pipeline—one that better reflects the world we live in and the people we serve. Although the number of women and minorities involved in STEM has increased over the years, they are still well behind the averages of other industries. The fact is that 80 percent of the students pursuing engineering degrees today are male and 60 percent are white.

There are people, organizations, and companies making great efforts to increase the diversity of the talent pipeline. They serve as mentors, providing internships and scholarships and partnering with other institutions to support a larger and more diverse pool of people prepared to enter our industry. The Future City Competition, the ACE Mentor Program and Turner's own YouthForce 2020 program are just three programs that are addressing this. Their mission is the same: engage, excite and enlighten a diverse population of middle and high school students, to inspire them to pursue education and then careers in architecture, engineering, and construction through mentoring and hands-on experiences.

There are also organizations like the Society of American Military Engineers, which provides opportunities for training, education and professional development to veterans and helps them transition from the military to careers as project managers and leaders in the construction industry.

Labor Skill Gap

Now let me turn to the skilled labor side of our industry. The Bureau of Labor and Statistics reports that the median annual wage for all construction and extraction occupations was $42,280 in 2015, which was higher than the median annual wage of $36,200 for all occupations. Plumbers, ironworkers and electricians had a median wage of $50,000 in 2015. Over the past few years, we have seen wages in the construction industry increase at a higher rate than the overall economy.

Yet, the facts are clear: our labor force is aging. Fewer young people are entering the building trades as more people in the building trades are approaching retirement age. We have seen the average age of construction workers soar from 36 to 41.5 years old between 1985 and 2010. The average age is continuing to increase and now stands at 43.

The construction industry is being pinched on both sides of the labor pool, resulting in a depleting workforce in the industry. This means it may become increasingly more difficult to find the skilled labor our industry and our country needs.

One thing we can do to address this is to make the work environment more attractive to current and prospective tradespeople. With technology tools to facilitate prefabrication and modularization, we are continuously improving the safety and work environment for our labor force. Technology and a focus on improved methods enables us and our industry partners to work in a more favorable and comfortable way. This can both help extend careers of people in the industry and make it a more interesting industry for young people to join.

Another thing we can do is provide increased support to industry trade groups, and encourage them to develop teaching practices and a curriculum better suited to the millennial generation. High school educators and counselors should introduce more students to the wide range of occupations available to them in our industry, and then offer them pathways to receive the training they need. As technical high schools expand, our country will enjoy the benefit of a more engaged high school population that will graduate with skills to be successful.

In addition, we should also continue to support and encourage the transition of military veterans from the armed forces to the construction trades. Our industry has a range of employment opportunities for veterans, and companies place high value on military experience.

Conclusion

We know that the construction industry provides multiple pathways for people to find fulfillment, make a difference, and achieve success. We also know that the ability of the construction industry to serve the needs of private and public sector clients directly affects the strength and competitiveness of our country.

The industry has the need and the capacity to absorb more people into our workforce and engage them in meaningful work with a good wage. What we need is the collective commitment of educators, trade organizations and industry to work together to further strengthen the measures the industry and our partners have been taking. We must also work together and act strategically to prepare more people to enter the construction industry, and to extend the careers of the people working in our industry.

Thank you again for the opportunity to be with you today.

I would be happy to answer any questions you may have.

The CHAIRMAN. Thank you, Mr. DeJohn.

Colonel Cartney?

STATEMENT OF COLONEL MICHAEL CARTNEY, (USAF, RETIRED); PRESIDENT, LAKE AREA TECHNICAL INSTITUTE

Colonel CARTNEY. Chairman Thune, Ranking Member Nelson, and members of this Committee, thank you for your time today. I'm Mike Cartney, President of Lake Area Technical Institute in Watertown, South Dakota, this year's recipient of the Aspen Prize for Community College Excellence. I commend this Committee for taking on the topic of this national skills work gap and the potential solutions.

Community colleges and, specifically, technical colleges are often amongst the community's first responders for workforce and economic demands. Let me briefly introduce you to Lake Area Technical Institute.

We are a public 2-year college with a student population of nearly 2,500 students, offering 29 career-focused programs of study. Our graduation rate is nearly twice the national average, we place 99 percent of our graduates, and those graduates earn 27 percent more than other new starts in our region. Our student loan default is half that of the national average. We are extremely proud of every one of our student successes, and we cherish our industry and community ties.

The technical evolution of the workplace requires even entry-level employees to possess more education and training than ever before. But the U.S. approach and focus on postsecondary education does not align with the country's workforce needs. Eighty percent of the jobs in 2025 will require postsecondary education, and 80 percent of those jobs will require postsecondary credential short of a 4-year degree. Yet we continue to strongly value and push our students toward 4-year degrees, resulting in a mismatch between the education people are receiving and the workforce needs.

Simultaneously, there are great jobs available for those with the right skills. Trail King Industries, a South Dakota based manufacturer, had to turn down $20 million in contracts because they could not find welders. South Dakota businesses, such as Muth Electric, Sheehan-Mack, 3M, Avera HealthCare, Prairie Lakes Healthcare, Worthington Industries, and Big Stone Power, have been forced to turn away contracts, delay or forego expansion, or leave positions unfilled simply because they could not find properly skilled workers available.

Today, South Dakota could quadruple our welding, electrician, and licensed practical nursing capacities and still not meet the openings available just in our state. And this scenario repeats

across every state in the nation, predominately in the manufacturing, energy, healthcare, aerospace, and transportation industries.

Recently, South Dakota amended our constitution to recognize technical education. In addition to the traditional K12 and higher education system, we now have what I like to refer to as HIRE education—that's H-I-R-E—in our technical education system. South Dakota's technical institutes have partnered with industries and communities and the state government to take on the skills gap.

Over 300 businesses work with our program staff and students to provide a relevant educational experience that supports our state's workforce demands. These businesses consult on and oversee curriculum, provide internships, provide training aids and equipment, mentor our students, and, most importantly, they hire our students. They are heavily invested in their workforce pipeline.

Through the vision and generosity of T Denny Sanford and Governor Daugaard, many students receive full ride scholarships to South Dakota's technical institutes in return for working in South Dakota. Lake Area Technical Institute's Stretch-the-Million program further leverages those funds and adds another 30 percent of scholarship winners for those that are willing to work for a specific company.

Tightly knit student cohorts and a clearly defined graduation path with close connections to industry-trained instructors has been a formula for success in South Dakota's technical institutes for over 50 years. Our students' education also includes the soft skills needed to be successful in today's market. We view college as a pathway, not a destination, so we redefine success as placement, not graduation. And we know that for 40 percent of our students, college is a pathway out of poverty, so we focus on keeping college affordable so that a road that was previously less traveled now seems achievable and a journey worth taking.

In closing, the technical skills gap is not solely an industry problem. It is not solely a government problem. And it is not solely an education problem. It's a multifaceted problem that requires a multifaceted response.

First, we need to tighten our bonds between education and industry. We must re-image high demand occupations so they are highly valued by society. There are great jobs with great pay, great work environments with great people, and we need them. Early engagement with our middle schools and high schools must inform young minds and their parents of the great opportunities available.

Second, we must align postsecondary education with the emerging workforce demands and provide the infrastructure and tools to ensure our educational system is responsive to industry as well as individual needs. We need to merge and align our educational careers with our occupational careers by providing a just-in-time education system, and education must better value work experience.

Third, Federal, state, and local governments must look for innovative ways to be catalysts for workforce development. Possible solutions include development grants for critical needs, establishing programs like South Dakota's Build Dakota programs to make college achievable in exchange for work commitments, support for

low-income students, and assistance in building infrastructure and expanding workforce-targeted educational opportunities are also needed.

Finally, establishing Centers of Excellence for Career and Technical Education focused on generating and sustaining the technically skilled workforce in a scalable, proven, and cost-effective manner has to be on the table.

I again commend this Committee and thank you for going the extra mile to make our Nation the greatest place to live, work, and learn.

Thank you.

[The prepared statement of Colonel Cartney follows:]

PREPARED STATEMENT OF COLONEL MICHAEL CARTNEY, (USAF, RETIRED); PRESIDENT, LAKE AREA TECHNICAL INSTITUTE

Chairman Thune, Ranking Member Nelson, and Members of the Committee:

Thank you for your time today. I am Mike Cartney, President of Lake Area Technical Institute in Watertown, SD, this year's recipient of the Aspen Prize for Community College Excellence. I commend this committee for examining the Nation's workforce skills gap and potential solutions. Some have observed that community colleges, and specifically technical colleges, are often among a community's first responders for workforce and economic development.

Let me briefly introduce you to Lake Area Tech (see attachment 2 for additional information):

- We are a public, two-year degree-granting technical college with a student population of nearly 2,500, offering 29 programs of study.
- Our student success rates are perpetually at the top or near the top of all community colleges across the nation:
  - Graduation rate—67 percent (national average—39 percent)
  - Placement rate—99 percent
  - Lake Area Tech graduates earn 27 percent more than other new starts in the region.
  - Student loan default rate—6.1 percent (national average is 11.3 percent)
  - The South Dakota system of Technical Institutes, consisting of Lake Area Technical Institute, South East Technical Institute, Western Dakota Technical Institute, and Mitchell Technical Institute, was ranked number 1 in the country this year by Wallet Hub for best value..
- Lake Area Technical Institute was only the 93rd college in U.S. history (and we believe, the only technical college) to have a sitting President as our commencement speaker.
- LATI students and staff accomplished almost 80,000 hours of community service and community learning last year.

Goal and major points.

I am here to provide foundational information on the important role that community colleges and, more specifically technical colleges, play in enabling the vibrant and targeted growth of our workforce and economy. I'll be highlighting and providing specific best practices that we believe can enable the United States' educational and industrial entities to better fill the technical workforce gap. Today, I hope to raise awareness of these profound issues related to the local, state, and national Technical Skills Gap from a technical college standpoint. Other distinguished guests will address the topic from an industry perspective.

The problems.

The technological evolution of the workplace requires even entry level employees to possess more education and training than ever before. But the U.S. approach and focus on post-secondary education does not align with country's workforce needs. A commonly cited projection is that 80 percent of jobs in 2025 will require post-secondary education and 80 percent of those jobs will require a post-secondary credential short of a four-year degree. Yet, we as a society continue to strongly value and push our students toward four-year degrees, resulting in a mismatch between the

education people are receiving and workforce needs. It is also leaving a significant number of our youth with large student debt and no means of repaying it. To be clear, the need, value, and benefits of a four-year degree has not waned, but there is a realization that in many career paths, getting a four-year degree as a continuum of work/education, rather than prior to entering the workforce, better benefits both the employer and employees.

Simultaneously, the great jobs are available for those with the right skills. Trail King Industries, a South Dakota based manufacturer, had to turn down $20M in contracts because they could not find welders. South Dakota businesses such as Muth Electric, Sheehan-Mack, 3M, Avera HealthCare, Prairie Lakes Healthcare, and Big Stone power plants were being forced to turn away contracts, delay or forego expansion, or leave positions unfilled, not because there were not workers available, but because there are not properly skilled workers available. South Dakota could quadruple our welding, electrician and licensed practical nursing program capacities and still not fill the openings just in our state. These scenarios are repeated across the Nation in every state, predominately in the manufacturing, energy, healthcare, aerospace, and transportation industries.

Community colleges must also improve. Community colleges are unable to attract sufficient numbers and only graduate 39 percent of those attending. Further, only a small percentage of those colleges track students' employment statistics following graduation. Lake Area Technical Institute's graduation rate is 69 percent, we track all our students post-graduation, and our placement rate this year is 99 percent. It is our desire to share our best practices with other community colleges in order to bolster their graduation rates and contributions to the technical workforce through efforts like the Aspen Prize for Community College Excellence.

Across the nation, there are not enough skilled workers to fulfill critical workforce needs.

In South Dakota and across the nation, key industries do not have enough technically skilled employees to fill the workforce needs. The demand for jobs which require education beyond high school but not a four-year degree remains strong. Between 2014–2024, 49 percent of job openings in South Dakota will require less than a four-year degree. These jobs account for 55 percent of South Dakota's labor market, but only 49 percent of the state's workers are trained to this level. (*http://www.nationalskillscoalition.org/resources/publications/2017-middle-skills-fact-sheets/file/South-Dakota-MiddleSkills.pdf*).

One contributing factor to this problem is the aging workforce. Young people are not attaining the technical education needed to replace the retiring workforce. We need to get people into technical degree and credential programs and dispel the myth that we can do more with less. Today's technology is a force multiplier that enables people to do more. It often doesn't reduce the number of people to do it, as we need people to build, operate, and maintain the technology. And, we don't need workers to do what they did before; they need to perform different tasks. For example in today's manufacturing industry, jobs are more technical. We need workers who can maintain and operate the robots that raise the quality and throughput of the production line. Because technical workers in the U.S. perform job duties differently, there is often a wage disparity with foreign countries. Often, foreign countries employ workers at lower wages to perform tasks manually.

Career and Technical Education—A different approach to education:

Just this last year, South Dakotans amended our state constitution to recognize Technical Education as the third form of education—giving us the traditional K12 system, the traditional higher education, and what I like to refer to as "HIRE"—(that's H I R E) technical education system. The Technical Education system is focused on enabling South Dakota's economic development by growing our technical skilled workforce.

South Dakota's Technical Institutes have partnered with Industry, communities, and State Government to take on our skills gap head on. Over 300 businesses work with Lake Area Tech's program staff and students to provide a coherent and relevant educational experience that support our state's workforce demands. These businesses consult and oversee curriculum, provide internships and on-the-job experience for students, provide industry standard training aides and equipment for the students to learn with, mentor our students, and most importantly they hire our students—in short, they are heavily invested in their pipeline.

Through the vision and generosity of T Denny Sanford and Governor Dennis Daugaard, students receive full ride scholarships to South Dakota's technical institutes in return for working in South Dakota. Lake Area Tech's "Stretch-the-Million" program leveraged these funds with industry providing 33 percent more scholar-

ships to students willing to work for a specific employer at graduation. But the impact of the Build Dakota Scholarship reaches beyond just those students receiving scholarships. I believe the exposure and informational aspects of Build Dakota enabled the state's public two-year technical institutes to grow when nationally 2-year enrollment declined by 10 percent.

The core approach of tightly knit student cohorts with close connections to their industry trained instructors has been a formula for success in SD's technical institutes for over 50 years. Our students' education also includes the soft skills needed to succeed in today's modern workforce. We view college as pathway, not a destination. And we know for more than 40 percent of our students, college is the road out of poverty. As we aligned our programs with industry needs, we redefined success as placement not graduation because it makes college more relevant, we avoided labelling students because fitting in at college is already hard enough, we ensured students knew the paths to success with clear expectations, and we emphasized every employee had a role in student success. Then we wrapped those efforts in our Culture of Caring: It was these guidelines that makes a road that was previously perceived as less travelled, now seem achievable and a journey worth taking.

Even after 14 consecutive years of growth, Lake Area Tech needs to expand our capacity. Today, South Dakota could quadruple our welding, electrician and licensed practical nursing program capacities and still not fill the openings just in our state. So we have turned to even more innovative approaches. Online and dual credit programs are paying significant benefits. Our *Learn Where You Earn* concept encourages local companies to allow employees to up-skill in their home communities. We also encourage communities to *Grow Your Own* and we encourage businesses to promote employment opportunities in their communities by developing relationships with high school students, parents, and educators.

But there is much yet to do

Today, there is a disparity between the workers and the job openings. This gap will continue to grow. In South Dakota, our industries are pleading for more technically trained workers. Here are just a few examples of the critical need for employees that, in most cases, are causing financial and human resource hardships for the companies.

Deb Fischer-Clemens, RN, the Senior Vice President of Public Policy for Avera and a member of the Skilled Workforce Advocacy Council: Currently, there are 148 openings for licensed practical nurses (LPNs) across the system; some long-term care beds have been closed because of staffing shortages. In other facilities, traveling staff are used to cover the shortages. This causes other issues, as the average hourly pay rate for an LPN is $20.12, while a facility will pay, on average, $49 per hour for a traveling LPN; this salary is an unsustainable amount for facilities to pay based on current reimbursement rates.

Terry Sabers, Co-President, Muth Electric, Inc.: We believe strongly in the value of hiring educated apprentices from a technical institute in our area. During the recession there were about four companies attending the job fair recruiting the 30 or so graduating students. At the event in the last month there were 36 companies recruiting the 32 graduates. All construction and service based companies in the upper Midwest are at an extreme shortage of workers.

Trail King Industries, Mitchell, SD: In a period of approximately 16 months in 2013 and 2014, Trail King had to turn down $20 million of business because we did not have the skilled workers, specifically welders, to complete the business in the timeframe needed by the customer. Even though Trail King used a number of innovative and very generous recruiting methods and employed robotic welders where possible, there simply were not enough skilled welders available to fill the needs of the company.

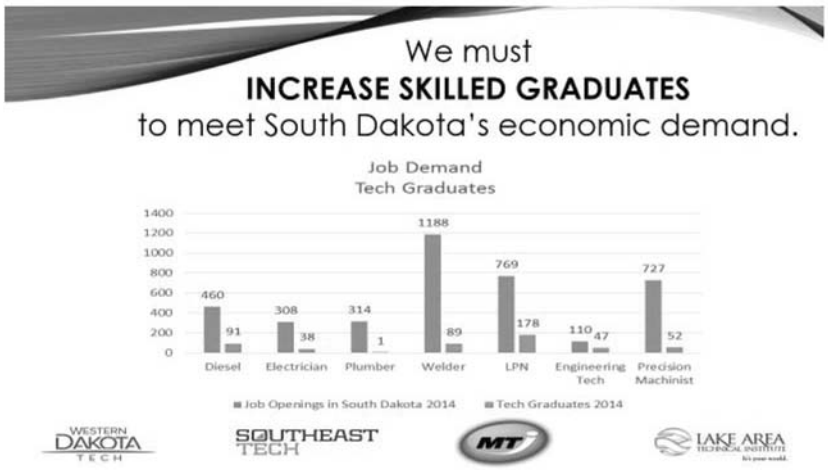
Gage Brothers, Sioux Falls, SD: This lack of skilled workers has cost the company approximately $5 million in sales each of the past three years. Additionally, we have sold between $2–6 million in work to a competitor in Minnesota in order to keep our production schedule on track.

Hancock Concrete, Sioux Falls, SD: The labor shortage affects our current employees as well. They are required to work longer hours to fulfill orders which in turn is an increased safety risk and also increases turnover. One other adverse effect of the items that I have described is increased product cost for the infrastructure projects which affects all tax payers.

Worthington Industries Engineered Cabs, Watertown, SD: At Worthington Industries Engineered Cabs, our business levels are at historic lows due to equipment markets in Agriculture, Mining, and Construction. Even with an extremely slow market we struggle to fill open positions for skilled labor especially welders and painters. Some of these positions have remained unfilled for 3–4 months before find-

ing a qualified candidate. We have a sister plant in Greeneville, TN that builds very similar products. One of the considerations on whether to build products in SD or TN is labor availability.

(see Attch 1 at the end of this document for complete South Dakota Industry Stories.)



South Dakota's Technical Education system could quadruple our program capacities in welding, licensed practical nursing, and manufacturing and still not fill the open positions just in our state.

Technical Skills Gap is exacerbated by multiple issues.

There are various issues contributing to the Technical Skills Gap problem. One of the major issues is at the ground level: *finding ways to attract students* (future employees) to enroll in technical education programs. In South Dakota, we know that some high school graduates have never been exposed to Career and Technical education in their K–12 experience. This is due to a number of factors including cuts in funding, graduation requirements, and a greater emphasis on four-year college attendance.

Overcoming negative perceptions about technical education is also a continuous struggle. Often people associate manufacturing/technical jobs with dirty, dark work environments. Nothing can be further from the truth! Today's state-of-the-art shops offer employees a bright working environment that is well-ventilated and clean. At Lake Area Technical Institute, we teach our students that taking pride in their work space is just as important as the work they perform on machines, engines, and robots.

Overcoming the emphasis on *"having to attend" a four-year college* by parents, students, and high school counsellors is also an issue. (Incidentally, high school counsellors and teachers are almost exclusively four-year degree holders who are helping our youth plan their futures.) The opinion of many is that students need to continue their post-high school education at a four-year college to make something of themselves. Often, the many benefits of technical education are not considered, partly because they're unknown to the person. On the other hand, there is the faction that believes technical education is 'for those who cannot go to college.' Again, the benefits of an education that enables a career AND allows for continued education are being overlooked by those subscribing to this attitude.

Finally, an issue of great significance regarding the Technical Skills Gap is the *lack of capacity for CTE education and training.* With our newly amended constitution in South Dakota, it will help shine the spotlight on the need for more available dollars for technical education and, ultimately, filling the workforce gap.

Lake Area Tech is making concerted efforts to decrease the Technical Skills Gap.

Three years ago, Lake Area Tech zeroed in on redefining student success. Redefining success as placement (employed or continuing their education), and making graduation (completion) a step along a student's journey affects not only the faculty and staff of the institution, but also students, parents, and industry that need a different perspective on their education. At the institutional level, the first step was

formally changing our mission statement to *"Lake Area Technical Institute: superior, comprehensive technical education that changes lives and launches careers"* to focus this initiative. This subtle adjustment changed the whole conversation and focus with potential and current students. Rather than discussing degrees, which is an abstract concept to many new students, we discuss what they want to be, what they want their future to be, and then laying out a path for them to get there. Instead of discussing "where can you go with a particular degree," we are discussing which degrees can get them where they want to go. Things become immediately more relevant. Going to class, doing homework, and passing tests—it's not just about completing a course, but rather, it's about learning what students need to know to be what they want to be!

The conversations with students and parents have changed to emphasize and explain that *college is a pathway, not a destination.* At Lake Area Tech, we provide students a pathway to graduation that allows them to begin not only their careers, but their experience as life-long learners who take advantage of all educational offerings that will allow them to advance throughout their time in their chosen field.

From recruiting to advising to completion, the conversation at Lake Area Tech is career-focused. Admissions reps guide students to examine their aptitude and career goals. *A detailed program graduation plan defines expectations;* placement data and salary information provide motivation; and experienced staff helps candidates make an informed career decision. Students are not accepted into LATI and then accepted into a major. Rather, career selection is required during the application process. Students whose chosen career program is at capacity, or they are otherwise unable to enter, often chose an alternate path or pursue their career choice elsewhere. And these conversations cannot be fruitful unless local and regional employers are involved in the system to provide real-world expectations, insights, support and guidance to the institution and its future employees.

Universities must also prepare to provide the same perspectives and guidance to those transferring to their programs. Transfer student success is defined, at a minimum, not as a successful transfer to a four-year school, but completion of that next degree. Extending the logic further, ultimately, baccalaureate completers should measure success by being employed in a job with family-sustaining wages. This process is affirming our belief that our consumer is not just the student, but their future employers as well. And it is enlightening us and industry to the importance of their role in our success.

At Lake Area Technical Institute, we are doing everything we can to *make college affordable.* If we are doing it right, technical education is more expensive due to the resources needed to train the graduates: advanced equipment, modern facilities/labs, and instructors who should be earning wages equal to those working in the field.

Recognizing cost as one of the biggest factors to attracting as well as retaining students, Lake Area Tech strives to make college affordable and minimize the financial barriers. LATI offers low-cost on-campus child care and works with students to qualify for state childcare assistance. By providing cafeteria services in-house and at-cost, we offer nutritious, affordable meals. Our bookstore also operates at a target margin of less than 10 percent. Bolstered by campus initiatives, instructors work diligently to keep costs of text books, tools, and technology in check while ensuring students have access to high-quality equipment needed to succeed. Over 65 percent of courses use the learning management system to provide resources to students compared to a 60 percent national average; therefore, reducing the overall cost of materials.

LATI developed a Prior Learning and Work Experience Model to assess the training experiences of veterans and students previously employed in the field to identify accelerated graduation paths. This enables students to accelerate degree completion time and save on the overall cost of their degree. Remarkably, even though technical education is more expensive than traditional forms of education, the last calculated default rate at Lake Area Tech, 6.1 percent, is nearly one-half the national average, 11.3 percent, on student loans.

Getting a good paying job after graduation is paramount in making college affordable. Six months after graduation, 81 percent of our graduates are employed, and another 17 percent are continuing their education, meaning 99 percent of our graduates are placed, a key factor in why LATI's student loan default rate is less than half the national average. Our latest placement report findings include:

- An increase from 7 programs earning $20 per hour or more (2015) to 8 programs (2016) with Agriculture joining the list of highest earners. The highest average salary is from our Energy Technology program, which is $25.93/hr. ($53,934.40).

- Increased placement percentage "in training field in South Dakota" from 80 percent (2015) to 84 percent (2016)
- 82.63 percent of graduates in this cohort were from South Dakota. 86 percent were employed in South Dakota six months after graduation for a net gain of 3.37 percent (*18 graduates*) to the South Dakota workforce pipeline

Culture of Caring. Student success at Lake Area Tech begins with our culture. We care about our students, and they know we care. We believe in our students, and they know we believe in them. And, we listen to our students, and they know we are listening. If we aren't talking about students' challenges, their goals and their vision for success, it can be translated into a belief that we as faculty and staff do not care about their individual success. Everyone, from administration to faculty, to staff takes personal responsibility for student success. The culture is something we've been working on for a number of years. We have older faculty who know who we are and how we have done these things over the course of years to benefit our population. We added a retention coordinator who did preemptive engagement and learning engagement and also hired some personnel to focus on diversity issues. So a part of our approach has been to make new investments, but largely, our biggest investment was time in changing our institutional philosophy.

Within our region, Lake Area Tech works closely with business and industry members. Workforce development through partners is at the heart of LATI's success and includes a wide spectrum of individuals, organizations, and businesses. With over 300 industry and community partners, our commitment to expand industry's role in student success may seem out of reach. But we enhanced our efforts with two business partner specialists, and the results have been astounding. For example, The State of South Dakota and T. Denny Sanford expanded access to college through the Build Dakota Scholarship Program, a $50 million investment to provide full-ride scholarships to students in high demand occupations. LATI partnered with businesses to expand the impact of Build Dakota through the Stretch the Million campaign, in which businesses pay 50 percent of the full-ride scholarship. The local and regional community encourages and appreciates the achievements of students by recognizing their economic impact and community service efforts.

Lake Area Technical Institute also promotes career opportunities within our community and surrounding communities. Our *Learn Where You Earn* concept encourages local companies to allow employees to up-skill through Lake Area Tech's online hybrid options or LATI Corporate Education to gain the skill sets employees in those communities need. We also encourage communities to *Grow Your Own.* We know that today's young people prefer to live and work close to home. To accommodate those that can, we encourage businesses to promote employment opportunities in their communities by developing relationships with high school students, parents, and educators.

At the state level, the South Dakota Office of Economic Development funded over $1 million in equipment to LATI annually to expand access to the latest technology without increasing the cost to students. The state also matched the $25 million private donation from T. Denny Sanford to create the *Build Dakota Scholarship* fund. LATI expanded the reach of the full-ride scholarships through the Stretch the Million program with over 20 partners initially pledging $175,000–$200,000. Beyond the Build Dakota Scholarship program, the LATI foundation is instrumental in expanding access to college through scholarships. Last year, the foundation awarded over 400 scholarships exceeding $300,000. Additional efforts to keep college affordable include participation in the national Free Application Week, Financial Aid Workshops, Financial Aid Literacy Program, and credit for corporate education and prior learning.

Lake Area Tech's recommendations.

In closing, I'll emphasize The Technical Skills Gap is not solely an industry problem. It is not solely a government problem. And, it is not solely an education problem. It is a mutli-faceted problem than requires a multi-faceted response.

First, we need to tighten the bonds between education and industry. Together we need to re-image high demand occupations to more highly valued to society. People understand these are great jobs with good pay, great work environments with great people, and that we need them! We need to be reaching into our middle schools and high schools to inform young minds, and their parents, about the great opportunities available in these industries. Additionally, technical education is more expensive than traditional academic environments, so we must find ways to share resources and control costs while keeping our schools updated and aligned with industry standards.

Second, we need to facilitate the alignment of post-secondary education with our emerging workforce skills demands, and find ways to ensure our educational system is responsive to industry as well as individual needs. We need to merge and align our educational careers with our occupational careers by providing 'just in time education' versus the current segregated models. In the same vain, education must better value work experience.

Third, Federal, state, and local governments must look for innovative ways to be the catalyst for workforce development. Workforce development grants where there were critical needs; establishing programs modelled after SD's Build Dakota scholarships to make college affordable in exchange for work commitments; financial support for students coming from the lower part of the economic spectrum; and assistance in building infrastructure and expanding workforce targeted educational opportunities. Finally, taking a look at some of the exceptional technical colleges across the country and establishing Centers of Excellence for Career and Technical Education focused today's and tomorrow's technical skilled workforce in a scalable, proven, and cost-effective manner.

In closing I what to again commend the Committee and thank you for going the extra mile to make our Nation the greatest place to Live, Work, and Learn.

Acknowledgements.

I acknowledge the outstanding support in developing this document on such short notice. Playing particularly key roles were: Karen Henricks, Lake Area Technical Institute; Tiffany Sanderson, SD Dept of Education; Dawn Dovre and Aaron Schiebe, SD Dept of Labor and Regulation; and Greg VonWald, SD Skilled Workforce Advocacy Council. Our industry partners were also invaluable in putting this document together.

Attachments:

1) South Dakota: Stories from Industry
2) Lake Area Technical Institute

ATTACHMENT 1: STORIES FROM INDUSTRY

South Dakota: Stories from Industry

Avera, the health ministry of the Benedictine and Presentation Sisters, is a regional partnership of health care professionals who share support services to provide excellent care at more than 300 locations in eastern South Dakota and surrounding states.

Deb Fischer—Clemens, RN, the Senior Vice President of Public Policy for Avera and a member of the Skilled Workforce Advocacy Council, shares several examples of health care workforce issues that Avera faces. Currently, there are 148 openings for licensed practical nurses (LPNs) across the system; some long-term care beds have been closed because of staffing shortages. In other facilities, traveling staff are used to cover the shortages. This causes other issues, as the average hourly pay rate for an LPN is $20.12, while a facility will pay, on average, $49 per hour for a traveling LPN; this salary is an unsustainable amount for facilities to pay based on current reimbursement rates.

In addition, Avera currently has 12 openings for surgical technicians across the system. Bonuses of between $1,000 and $4,000 being offered for these positions, but there are no surgical technicians applying. Medical laboratory technicians (MLTs) are also in short supply, resulting in travelers from others states being contracted at a rate of $38.64 per hour, while employed MLTs are earning $21 per hour on average.

Again, neither closing beds, nor paying wages to contracted traveling staff, is sustainable.

America has an increasing issue with a mismatch between the qualifications of its labor force and the skills required for open positions. Jobs go unfilled because unemployed citizens do not have the skills demanded. Two-year colleges can provide the focused education needed to fill these openings quickly. Enrollment in one and two year career programs must expand to meet projected workforce need. Since over 70 percent of the jobs require technical skills, society needs to acknowledge the value of this type of education. Lake Area Tech works extremely hard to communicate that these degrees are as vital to our country as any type of degree.

LATI has strong vital partnerships with businesses. Every program has an active Advisory Board which meets each semester to provide input on curriculum and relay industry trends which impact our instruction. Partners are asked to contribute time, talent, and financial resources.

Muth Electric, Inc.

The shortage of a skilled workforce has become steadily worse in the last few years. It was at a critical stage in 2007 but the recession slowed it somewhat. Now the problem is back and even worse.

We believe strongly in the value of hiring educated apprentices from a technical institute in our area. During the recession there were about 4 companies attending the job fair recruiting the 30 or so graduating students. At the event in the last month there were 36 companies recruiting the 32 graduates. All construction and service based companies in the upper Midwest are at an extreme shortage of workers.

What this means is that in the next 10 years there will be a critical situation in the battle for a sufficient skilled workforce. This workforce (in our case electricians) is the same team that will make sure that the hospitals' ever-growing electronic workplace gets the proper maintenance to protect its patients. This team of workers also makes sure our food processing plants get upgraded and maintained to produce the needed food for the population of the U.S. The list goes on and on of critical situations.

Even with the growing labor saving technology features available, there are still many needs for a trained workforce. We have instituted many efficiency aids in the construction field but there are still critical positions that need to be filled with humans. We need help in ensuring that there are people to fill those critical positions to serve the needs of the U.S.—Terry Sabers, Co-President, Muth Electric, Inc.

Trail King Industries, Mitchell, SD

Trail King Industries is a privately owned manufacturer of large scale specialty trailers employs approximately 700 employees and has manufacturing sites in Mitchell and Yankton, SD and Fargo, ND.

In a period of approximately 16 months in 2013 and 2014, Trail King had to turn down $20 million of business because we did not have the skilled workers, specifically welders, to complete the business in the time-frame needed by the customer. Even though Trail King used a number of innovative and very generous recruiting methods and employed robotic welders where possible, there simply were not enough skilled welders available to fill the needs of the company.

Trail King has invested heavily in the welding programs of the technical colleges in South and North Dakota in hopes of nurturing a consistent pipeline of qualified welders. It has also been instrumental in establishing the South Dakota Skilled Workforce Advocacy Council as proactive measures to grow the workforce. We believe, however, that a much broader national effort will be required to address the skills gap that has developed across the United States if this Nation is to be competitive in manufacturing.

Glacial Lakes Energy, LLC, Watertown, SD

We consistently incur higher costs (such as overtime) when we cannot easily and readily find qualified labor. In our production operation, the plant has to run and we are forced to pull in operations staff from other shifts to cover the vacancies that sometimes sit for months. This results in higher overtime costs and potential "burnout" of our existing team members.

Another frustrating aspect is the quality and quantity of applications we receive. Many times, we receive only a 1–3 applicants with less than desirable backgrounds for a position which gives us limited options in the selection process.—Jim Seurer, Chief Executive Officer, Glacial Lakes Energy, LLC

Gage Brothers, Sioux Falls, SD

Gage Brothers was founded by members of the Gage family in 1915 and has been employee-owned since 2008. Our company has struggled to maintain a full workforce for several years and regularly have anywhere between 10–40 job openings. These positions include but are not limited to: production workers, carpenters, welders and equipment operators.

This lack of skilled workers has cost the company approximately $5 million in sales each of the past three years. Additionally, we have sold between $2–6 million in work to a competitor in Minnesota in order to keep our production schedule on track.

Part of the solution lies in automation, which has transformed U.S. manufacturing. This will require us to ramp up job-training efforts because we will need workers who can operate, program and maintain the new computerized equipment. No matter how you slice it, we need the manufacturing industry and our education system to join forces to create a system to recruit, train and retain skilled workers. It is paramount to the future economic growth and prosperity of South Dakota.

Every dollar of manufacturing produces $1.41 for our state.—Terry Kelly, President, Gage Brothers, Sioux Falls, SD

Hancock Concrete, Sioux Falls, SD

At Hancock Concrete we are producers of precast concrete products for infrastructure projects across 4 states in the upper Midwest. Our Sioux Falls production facility supplies product for projects in eastern South Dakota and northwest Iowa. The months of March through November are the heaviest months of production and when we are most in need of workers.

In the past few years it has become increasingly difficult to find laborers to fill out all of the crews that we have in our Sioux Falls plant. We have found that the labor pool in the local area is just not consistent enough for the type of work we do. During the past few years we have had to go to extreme measures to ensure we had enough laborers to fulfill all of our orders. These extreme measures included bringing laborers in from outside the state from as far as Texas, just to make sure we could fill our crews with consistent workers. This was an increased financial burden for Hancock as we would house those out of state workers and need to perform additional training each year when we brought them in. Also, during that time of worker shortage, we had to look to our other plants in neighboring states for help to make product to fulfill our orders. At times we would back away from bidding on projects because we did not know if we would have enough workers to meet the delivery needs of the customers.

The labor shortage affects our current employees as well. They are required to work longer hours to fulfill orders which in turn is an increased safety risk and also increases turnover. One other adverse effect of the items that I have described is increased product cost for the infrastructure projects which affects all tax payers.

This area of the Midwest has a shortage of workers for performing specific technical trades as well as a lack of general laborers that have the desire to put in the work necessary to perform less skilled jobs that at times may be more physically demanding than working a department store or restaurant. We have hired many employees and looked at many different backgrounds and ethnicities but the consistency is just not there. We will continue to explore other options for our labor needs and help to grow our local workforce in any way we can.—Ray Pierson, Sales Territory Manager, Hancock Concrete, Sioux Falls, SD

Worthington Industries Engineered Cabs, Watertown, SD

At Worthington Industries Engineered Cabs, our business levels are at historic lows due to equipment markets in Agriculture, Mining, and Construction. Even with an extremely slow market we struggle to fill open positions for skilled labor especially welders and painters. Some of these positions have remained unfilled for 3–4 months before finding a qualified candidate. We have a sister plant in Greeneville, TN that builds very similar products. One of the considerations on whether to build products in SD or TN is labor availability. I want to keep all possible jobs in SD, but we also have to make the best business decisions for our business and our customers. Skilled workforce development and availability is a key factor in our ability to grow our business in SD.—Bruce Lear, Watertown Operations Manager, Worthington Industries, Watertown, SD

BX Civil & Construction, Inc.

The ability to grow a construction company is currently constrained by the available workforce and our ability to attract, train & retain that workforce. At the same time infrastructure is in major disrepair and needs a long-term investment to preserve and increase the value of our communities, states and nation.

As a highway construction company, we have shifted our mindset to managing our work load based upon available workforce hours. Our growth as a company is now based up how much we think we can reasonably grow our workforce. Companies in our industry grow incrementally by in-house recruitment and training people on the job. We knowingly or unknowingly "trade" or "steal" employees from each other on a seasonal basis. Some like us have embraced the immigrant workforce and have grown with that population. The reality is that none of that is sustainable as a stand-alone tactic. We work hard to attract and retain our scarce resource. We realize that all employees need an investment in skills, communication & leadership training. Gone are the days of the "farm boy" who grew up working along the side of his father. That boy not only learned work ethic by working from a very young age but also learned that he had the ability to learn and do new things every day with his hands. Those days brought people like my father to the construction industry in the 1960s. He learned by doing and out of necessity to support himself and his family. His learning was by watching, listening and doing. He learned not only to do, but also to think about how to do it better.

The initial building of the interstate system in the 60s, 70s and 80s was supported on the hard-working backs of people like my father and many other fathers. Growing up in the 70s and 80s and like most, if not all, of my peers, we were told to get a "college" education by our parents & teachers so that we didn't have to dig ditches or build bridges. Many of us did. Now, we face a dilemma as we push our children out of the nest. How do we change the image and mindset of the influencers? The educators and parents are the influencers. They don't realize how "good" our jobs are.

We need to invest in changing their perspective. At construction industry gatherings in the 90s, we started hearing that we had a looming demographic problem. People were leaving the industry at a much faster pace than they were entering the industry. This proved to be fact. Add on top of that the great recession of 2008–2009 when unemployment increased and at alarming pace in our overall economy. It was significantly worse in the construction industry. That event made what was already and downward employment trend in our industry worse. Generally, the people that were unemployed by our industry never returned to the industry when the industry entered recovery. They had either moved on to other industries or retired out.

Fast forward . . . it is now 2017. We have a collision occurring. Infrastructure investment is recognized to be Critical Need both locally and nationally and our citizens are willing to reinvest. At the same time, the skilled Construction worker force is in scarce supply and largely untrained.

How do we do the first without addressing the second? The reality is that the industry will rise with innovation and efficiency, but the need for a trained & skilled workforce will not go away. The technology and efficiency improvements will require people with specific skills. People like:

- Diesel Mechanics
- Service Technicians
- Electronics Technicians
- GPS Specialists
- 3 and 4D modeling specialists
- Scheduling Experts
- Project Managers
- Engineers

There will continue to be the need for skilled laborers, skilled trades people & skilled equipment operators. What are those skill needs?

- Concrete Finishers
- Carpenters
- Electricians
- Plumbers
- Welders
- HVAC Specialists
- Equipment operators who have basic operational skills & understand technology
- Truck Drivers

As opposed to the 1960s and 1970s, close to 100 percent of our American workforce comes to us having never: changed the oil in their own car; driven anything but an automatic transmission vehicle; scooped their own snow let alone dirt or gravel; fixed anything that was broken; built even a bookshelf; wired their own light switch; etc. All those things and many more, my dad and yours probably came to the workforce having done. Not only do we as infrastructure contractors build projects, we train every single worker to do even the simplest tasks. We aren't backing down. We are up for the TASK! If you visit any contractor who is in this "gig" for the long haul, you will see they are:

- Training hands-on trade skills
- Training to keep their workers safe
- Training soft skills including work ethic, interpersonal skills and leadership skills
- Investing in Technology to make them more efficient

Not only are they training, they are providing good solid jobs that pay well and provide a multitude of perks and benefits. We need HELP! This training and invest-

ment takes time and money. Please support investing in programs that enhance and support the great jobs that our industry offers.—Kari Karst, President, BX Civil & Construction, Inc. Dell Rapids, SD

Glacial Lakes Energy, LLC

I can say that we consistently incur higher costs (such as overtime) when we cannot easily and readily find qualified labor. In our production operation, the plant has to run and we are forced to pull in operations staff from other shifts to cover the vacancies that sometimes sit for months. This results in higher overtime costs and potential "burn-out" of our existing team members.

Another frustrating aspect is the quality and quantity of applications we receive. Many times, we receive only a 1–3 applicants with less than desirable backgrounds for a position which gives us limited options in the selection process.—James A. Seurer, Chief Executive Officer, Glacial Lakes Energy, LLC, Watertown, SD 57201

Sheehan Mack Sales and Equipment

In the past 20 years or ever since the DOT COM boom is seems that nationwide we have had a decline in the amount of qualified individuals entering the workforce with a skilled trade (technicians). In the same time machines, trucks and equipment have all become more complex and more difficult to repair. The demands on our Technicians are greater now than they have ever been in the past while the supply of qualified individuals has only shrunken. With the combination of these two factors companies like ours have felt the pain of the shrinking workforce in the form of increased cost, lost revenue and customer satisfaction.

Limited skilled labor in the workforce has

- Increase wages at alarming rates
- Increased the burden of training on us
- Hurt our ability to respond to customers quickly and efficiently
- Created a labor market where there is more demand for skilled labor than supply (this has helped to lower loyalty and increased the likelihood of techs job hopping)

Let's look at what the shortage of trained individuals costs us

- Hiring, sign on bonus' are common place now (Between $2,000 and $5,000)
- Wages have increased to more than 17 percent over median income for State of SD
- Training costs have skyrocketed to about $100,000 per technician to reach required levels of training once they are hired

Now, let's look at the indirect costs of not having trained skilled labor

- Loss income from supporting products we sell—less work completed
- Increase in customer downtime—less production
- Loss in New Machine and Truck Sales—customer are more concerned now than ever with support after the sale
- Increased lead time to begin repairs, longer repair times

I have calculated that that these direct and indirect costs to my business are in the hundreds of thousands if not more than a million dollars per year. Moving into our busy construction season I am afraid that the lack of trained individuals may be at CRISIS Levels.

Building our labor force with skilled labor is more important now than ever before! We need high school programs, post-secondary programs and technical institutes geared up and adding top talent into our workforce. We need High School Counselors to see and understand the need for Skilled Labor in our workforce. We need Parents and Students to know and understand the great earning potential that is available to them after attending a trade school and incurring very little school debt. We need technicians that are great in math, science and have people skills. We need to change the mindset or perception on skilled labor. Skilled labor jobs pay well and these jobs are out there right now needing top candidates. These skilled worker once in the field are our next Service Managers, General Managers, Fleet Managers and leaders of our industry.—Mike Sheehan, President, Sheehan Mack Sales and Equipment, Sioux Falls, Aberdeen, Rapid City, SD

ATTACMENT 2: AN OVERVIEW OF LAKE AREA TECHNICAL INSTITUTE

LAKE AREA TECHNICAL INSTITUTE

2017 Recipient of the Aspen Prize for Community College Excellence

This point paper is a brief overview of the high points for Lake Area Technical Institute since our 2015. Much of the press and national level engagement stems from our Aspen Prize recognition.

New Mission Statement reflects new definition of success: Lake Area Technical Institute: superior, comprehensive technical education that changes lives and launches careers.

Philosophy: What is different about Lake Area Tech? Some things we believe:

- Success is defined as placement rather than graduation.
  - College is a pathway, not a destination.
  - It about what a student wants to be. Changes the conversation, the motivation, and the connection.
  - We do not place students, we give them the skills (soft and hard) and opportunities to be placed.
- Connections are key to student success
  - Every job is important to student success. Faculty are student advisors, guiding them through college and into their career. Staff in all positions mentors students.
  - Lake Area Tech fosters a culture of caring. Statistically it is more important for students to make a meaningful connection on campus than any other student success factor.
  - We tell every student "Be around people who care about you and care about those around you, and you will both succeed".
  - The community and industry play key roles in student desire and confidence.
  - LATI new Scholar Stone connections current students with Alumni and heritage.
- Lake Area Tech is committed to a participatory management approach and a continuous planning process.
- Community/Industry connections, support, and oversight are crucial to LATI's culture and success.
  - Efforts to engage industry in student success.
  - Added two Business Partnership Specialist position to further enhance industry's understanding of their role in student success.
  - LATI Community and Business "Learn where you Earn" pilot projects underway.

Success Indicators:

- *Enrollment:* 13 consecutive years of enrollment growth; the student population is at the level projected for 2033.
- *Retention:* 83 percent, highest in the Nation. WalletHub cites LATI #1 graduation rates as 20 times that of some community colleges.
- *Placement:* Increased from 98 percent to 99.12 percent employed or continuing education. Two programs had average graduate salaries over $50,000 per year six months after graduation.
- *Native American:* Graduation rate increased to 68.75 percent. Placement of 100 percent. Average salary after graduation higher than their peers.
- *Low-income students:* Retention is up. 8 percent gap in graduation from their peers has been removed, in fact last year low-income students outperformed their peers in graduation rate (84 percent to 79 percent).
- *Dual Credit:* Our high school dual credit program has doubled. This semester we are providing over 1,000 credit hours of dual credit to area HS students.
- *Build Dakota Scholarship program:* Key success factor to keeping college affordable. Couple with Governor's buy down of $10/credit on student tuition.

- *Overwhelming Community Support:*
- *K–14 System:* Lake Area Tech and the Watertown School District are uniquely a true K–14 system. In Fall 2014, high school students across the state are enrolled in over 1,000 dual credits.
- *Community Embrace:* The Watertown community embraces our students and our mission.
- *Industry Advisory Boards:* Each program engages industry advisory boards to ensure our graduates meet the need of industry. Over 500 business and industry partners participate in educating and employing our students.
- *Addressing our growth needs:* Seeing LATI need for future growth and the potential lack of state funding, the community has stepped forward and formed the "Creative Finance Advisory Committee" focused on providing funding options for LATI (recent endeavor).
- *Build Dakota Scholarships (BDS).* T. Denny Sanford and Governor Daugaard contributed $50 million to fund full-ride scholarships in high-demand workforce programs starting in Fall 2015. Industry partners added $185,000 through the Stretch the Million program that matches the industry contribution of 50 percent of the full-ride scholarship with Build Dakota funding.
- *Amendment R.* The voters of the state passed an amendment to South Dakota's constitution recognizing the technical institutes and solidifying our workforce development mission.
- *House Bill 1182:* The legislature passed a sales tax to, in part, help SD technical institutes offer industry competitive salary adjustments to recruit/retain instructors.

President Barack Obama, 2015 Lake Area Tech Commencement Address (93rd such address in U.S. history by a sitting President)

(EXCERPT from White House release)

"Well, the reason is because I believe that in a fast-paced, hyper-connected, constantly changing world, there are few institutions that are more important to America's economic future than community colleges. And there are few community colleges that are as important as Lake Area Tech. This school is leading the way.

Compared with other community colleges, the graduation rate at Lake Area is more than three times the national average. Three times. (Applause.) Within six months, 98 percent of those graduates—you—are either employed or continuing your education. The average Lake Area graduate who enters the workforce earns nearly 50 percent more than other new hires in this region. And as has already been noted, since 2011, there has been an award for excellence called the "Aspen Prize." It's basically the Oscars for great community colleges. Only two community colleges in the country made the top 10 every year the prize has been awarded—and one of them is Lake Area Tech. (Applause.)

This is not an accident. It's the result of a relentless focus on teaching real-world skills that lead directly to a job. In your time here, you've done hands-on work with companies across the upper Midwest. Employers even help design the curriculum. You work direct with the tools and the technology that you'll encounter in the workforce—from car engines to welding equipment to your new MakerSpace, with 3D printers that were actually built by Lake Area students. And your instructors haven't just taught you new skills—they've helped place you in new careers.

And you might think all this attention on job training comes at the expense of great teaching—but if anything, the opposite is true. This is the kind of place where students are on a first-name basis with their instructors. If you call at 10 p.m., they'll answer your call—although I hope you don't do that, because folks need their sleep. If you don't make it to morning classes, they'll check up on you and make sure you're okay. I heard one student who skipped school to go hunting found that out the hard way that somebody was going to check up on you. (Laughter.) One of today's graduates, Colin Blume—where's Colin? Raise your hand. (Applause.) Stand up, Colin, just so you—hey, that's Colin. Colin is a big guy, by the way. So Colin—I'm going to quote Colin on this. He said, "You're family, and they'll do anything to help you along the way.""

International press story on LATI: Prompted by Aspen notoriety, LATI was featured in *"The TakeAway",* which is daily news show out of New York City, but broadcast nationally, the title of article is: *What's the secret to a nation full of successful community colleges? South Dakota may have the answer.* They highlight LATI's ThinkBIG program. The Takeaway is an award-winning daily news show

produced by WNYC in partnership with The New York Times and Public Radio International. The show airs across the country on more than 200 stations, reaching upwards of 2 million listeners nationwide. Their goals include deepening public understanding of the role of community colleges in driving economic growth and expanding social mobility in America. "*The TakeAway*" featured LATI in two stories:

Story 1: *http://www.wnyc.org/story/introducing-lake-area-technical-institute/*

Story 2: *http://www.pri.org/stories/2015–11–18/whats-secret-nation-full-successful-community-colleges-south-dakota-may-have* (The audio interview is what is actually airing.)

PBS Documentary features LATI. The series "Dropping back in" is a documentary produced by Kentucky Education TV, and was about 14 months in the making. LATI is featured in the fourth episode, highlighting our commitment to student success of underprivileged students. The LATI segment in the bottom left-hand side segment (titled *Lake Area Technical Institute*) on the linked page: *http://www.droppingbackin.org/the-stories/*

Other Stories of our Success:

- Only college in the Nation to finish the Aspen Prize competition as a Finalist with Distinction all three times.
- Participated in the Championing Completion of Low Income Students strategy session with Dr. King, the U.S. Secretary of the Department of Education, as one of only two community colleges represented.
- Selected to author a case study for the Aspen Institute's leadership curriculum. This curriculum for Aspen's Presidential Fellowship program demonstrates LATI's unique approach to problem solving and student success.
- Invited by the White House to participate in the College Promise/Heads Up, It's on Us, & College Affordability campaigns.
- Low Income Student Success: LATI was featured in an Aspen Institute publication "Structural Equity: Big-Picture Thinking & Partnerships That Improve Community College Student Outcomes" for improving the graduation rate of Pell Grant recipients from 8 percentage points behind non-Pell students to surpassing the average graduation rate for all students.
- Hosted the White House Administration for a session on the College Promise Campaign at the annual Western Interstate Commission for Higher Education annual conference.

Highlighted National Accolades:

- Aspen Finalist with Distinction (2011, 2013, 2015)
- Presidents Community Service Honor Roll—seven times named Honor Roll designations, over 80,000 hours of community service and community learning annually
- Military Friendly Designation—seven years
- Marcom National Marketing Awards—Platinum Award winner for marketing (twice) and Gold awardees multiple times
- Digital Community Colleges—Top 10 in the Nation two years in a row
- Great Colleges to Work For—7 years with Honor Roll distinction
- Numerous online awards: WalletHub, Niche, etc.

Lake Area Tech 2016 Placement Report

LAKE AREA TECHNICAL INSTITUTE
It's your world.

P. O. Box 730
Watertown, SD 57201
www.lakeareatech.edu

Lake Area Technical Institute 2015-16 Placement Report by Clusters

Clusters	Programs	CIP Code	Graduates	Number Responding	Number in South Dakota	Continuing Ed / Military	Not in Labor Market	Still Seeking	Total Employable	Total Employed	Employed in Field	Employed in SD	Employed in Field in SD	% Employed	% Employed in Field	Avg Hourly Salary
Agriculture, Food & Natural Resources	Agriculture (AAS)*	01.0101	136	138	117	15	1	0	122	122	116	101	95	100%	95%	$21.83
Agriculture, Food & Natural Resources	Environmental Tech (AAS/Diploma)	03.0104	4	4	1	2	0	1	2	1	1	0	0	50%	50%	$14.00
Architecture & Construction	Building Trades (AAS)	46.0201	7	6	6	1	0	0	5	5	5	5	5	100%	100%	$16.08
Architecture & Construction	Heavy Equipment Operations (AAS/ Diploma)	49.0202	15	14	11	3	0	0	11	11	11	8	8	100%	100%	$19.90
Finance	Financial Services (AAS)	52.0803	16	15	13	0	0	0	15	15	13	13	11	100%	87%	$13.97
Health Science	Dental Assisting (AAS/Diploma)	51.0601	38	37	32	3	0	0	34	34	33	29	28	100%	97%	$16.71
Health Science	Medical Assisting (AAS/Diploma)	51.0801	15	15	15	0	0	0	15	15	15	15	15	100%	100%	$12.92
Health Science	Medical Lab Tech (AAS)	51.1004	9	9	7	0	0	1	9	8	8	6	6	89%	89%	$18.14
Health Science	Occupational Therapy Asst (AAS)	51.0803	21	21	13	2	1	1	18	17	15	11	9	94%	83%	$20.96
Health Science	Physical Therapist Asst (AAS)	51.0806	23	23	15	0	0	2	23	21	18	13	11	91%	78%	$19.27
Health Science	Practical Nursing (Diploma)	51.3901	57	57	49	24	0	1	33	32	32	26	26	97%	97%	$17.49
Human Services	Cosmetology (Diploma)	12.0401	29	28	27	2	0	0	26	26	24	25	23	100%	92%	
Human Services	Human Services Tech (AAS/Diploma)	44.0000	43	43	39	26	0	0	17	17	11	16	11	100%	65%	$10.73
Information Technology	Computer Systems (AAS)	11.0701	12	11	10	1	0	0	10	10	9	9	8	100%	90%	$17.12
Law, Public Safety, Corrections & Security	Law Enforcement (AAS)	43.0107	12	12	11	0	0	0	12	12	10	11	10	100%	83%	$19.72
Law, Public Safety, Corrections & Security	Medi/Fire Rescue (AAS)	51.0904	3	3	2	0	0	0	3	3	3	2	2	100%	100%	$22.26
Manufacturing	Energy Operations (AAS)	15.0613	5	5	4	1	0	1	4	3	3	2	2	75%	75%	$20.18
Manufacturing	Energy Technology (AAS)	15.1001	9	9	8	1	0	0	8	8	5	7	5	100%	63%	$25.93
Manufacturing	Precision Machining (AAS/Diploma)	48.0501	25	25	24	2	0	0	23	23	22	22	21	100%	96%	$22.86
Manufacturing	Electronics/Robotics (AAS)	15.0405	12	12	11	2	0	0	10	10	9	9	8	100%	90%	$22.01
Manufacturing	Welding Technology (AAS/Diploma)	48.0508	48	48	45	24	0	0	24	24	20	21	17	100%	83%	$16.90
Marketing	Business Associate/Entrepreneurship (AAS/Diploma)	52.1401	35	34	30	5	1	0	28	28	25	25	22	100%	89%	$13.53
Transportation Distribution & Logistics	Automotive (AAS)	47.0604	21	20	19	1	0	0	19	19	18	19	17	100%	95%	$17.15
Transportation Distribution & Logistics	Aviation Maintenance (AAS/Diploma)	47.0608	11	11	4	2	1	0	8	8	7	2	1	100%	88%	$19.26
Transportation Distribution & Logistics	Custom Paint & Fabrication Technology	47.0603	20	20	19	2	0	1	18	17	14	16	13	94%	78%	$15.76
Transportation Distribution & Logistics	Diesel Technology (AAS)	47.0605	73	73	65	2	0	2	71	69	65	61	57	97%	92%	$20.58
Transportation Distribution & Logistics	High Performance Engine Machinging (AAS/Diploma)	47.0615	7	7	6	0	0	0	7	7	7	6	6	100%	100%	$17.44
	TOTALS		708	700	603	121	4	10	575	565	519	480	437	98%	90%	

* Wage figures do not necessarily include bonuses, overtime, or the earnings of graduates who are self employed farmers.
**Cosmetology salaries are heavily comprised of commission, tips, and retail sales so accurate salary data is not available.

2015-2016 LATI Graduates

Graduates	708		
Graduates Responding	700	99% of Total Graduates	Graduates in South Dakota: 603 86% of Responding
Graduates Not in the Labor Market*	4	1% of Graduates Responding	
Graduates in the US Armed Forces	2	0% of Graduates Responding	
Total Seeking Placement (Grads Responding - Not in Labor Market - Military)	694	99% of Total Graduates Responding	
Graduates Reporting Continuing Education	119	17.15% of Graduates Seeking Placement	
Graduates Employed	565	81.41% of Graduates Seeking Placement	
- Graduates employed in South Dakota	480	85% of Total Graduates Employed	
- Graduates employed in a training-related field	519	92% of Total Graduates Employed	
- Graduates employed in a training-related field in South Dakota	437	84% of Total Graduates Employed in training-related field	
Graduates Seeking Employment	10	<1.4% of Graduates Seeking Placement	

OVERALL GRADUATE PLACEMENT RATE (Employed or Continuing Education) = 98.56%

*"Not in Labor Market" is self-reported status and includes such cases as chronic illness, raising families, or severe injury

The CHAIRMAN. Thank you, Colonel Cartney.
Mr. Neely?

STATEMENT OF JOHN J. NEELY III, VICE PRESIDENT, LAW AND PUBLIC AFFAIRS, GULFSTREAM AEROSPACE (A GENERAL DYNAMICS COMPANY)

Mr. NEELY. Mr. Chairman, Ranking Member Nelson, members of the Committee, on behalf of Gulfstream's 15,000 employees, I'm honored to be here to talk to you about this very timely and important subject. It's important to industry, absolutely, but, quite frankly, it is much, much more important for the individuals in this country whose talents are going untapped. That's just a shame.

As context for my remarks, Gulfstream's business—we design, manufacture, and provide maintenance services on business aircraft. Our headquarters and largest manufacturing facilities as well as our largest maintenance base is in Savannah, Georgia, where we have approximately 10,000 of our total 15,000 employees. We also do business in six other states.

Very significantly, I think, for this Committee and the competitiveness issue that we're facing—not just competitive within the U.S. but certainly competitive internationally—all of Gulfstream's key competitors are international. We have Bombardier in Canada, Dassault in France, and Embraer in Brazil. Also significant in terms of balance of trade, 50 percent of Gulfstream's sales are international. In previous years, that has been an even higher percentage.

Very significantly, if you go back and look at approximately the last 20 years, that international component has grown to what, previously, I like to say from the Wright brothers through the early 2000s, was pretty consistently about 20 percent international. Since the mid-2000s, we've seen that anywhere from 50 percent to as high as 70 percent in one given year. So this is very important to competitiveness and balance of trade.

I think it's fair and clear to say that in any company, the most valuable asset that company has is its people, and that is particularly true at Gulfstream, given the nature of our advanced manufacturing and very high-tech maintenance work that we do. With that in mind, over the last several years—and, frankly, the last 10 years, in particular, as we've experienced significant growth—we've evolved a multifaceted strategy for dealing with the issues that we're here addressing today.

That strategy has four focal points, and they are: first, elementary, middle, and high school; second, technical school engagement and recruiting; third, military engagement and recruiting; and fourth, of course, universities for our engineering and other related skills that require, indeed, 4-year degrees.

I'll make an important aside here to pick up on a comment that Senator Nelson made in terms of the quality of skills and leadership coming out of the U.S. military. He is absolutely right, and I'm very proud to say that as a direct result of that, nearly 30 percent of Gulfstream's U.S. employees are U.S. veterans, and that's not a coincidence. That's the case because we find that the U.S. military does an excellent job training in technical skills, avionics, mechanics, any number of other hands-on skill sets, and they also come

out of the military, of course, with a strong work ethic and an understanding of what leadership means and how to operate in a complex environment.

So, Senator, you could not be more accurate in that regard.

Back to our strategy, a cornerstone to this all-of-the-above, this multifaceted approach that I just described—a cornerstone of that is something that's been front and center in the comments that everybody in this room has made so far today, and that's awareness. By far, the biggest problem that we face in this area is awareness that these opportunities exist, awareness that these jobs are excellent jobs, awareness that in addition to being excellent jobs they can be personally rewarding and they can be very financially rewarding.

An airplane mechanic coming in making six figures is absolutely reality, and that career path can take you off the shop floor into other areas, and that's something that we really have to struggle to get across. And getting it across is, of course, important to the students, but, frankly, probably more importantly is getting it across to the parents and the teachers, not to have a kid come home and say, "I was at Gulfstream and I saw this great job being an airplane mechanic, and Mom and Dad, that's what I want to do," and have the parent look at the child and say, "My God, the kid's a failure—doesn't want to go to 4-year college." That's a tragedy.

There is good news, and this is an important point. Without exception, in every state in the union where we do business, awareness amongst local, state, and Federal leaders is high and getting higher. Now, we do have a lot of work to be done to close this gap, but I'm thrilled to be able to report, certainly from our perspective, that we're on the right track. Momentum is building, but let's please keep that momentum going.

Thank you for your time.

[The prepared statement of Mr. Neely follows:]

PREPARED STATEMENT OF JOHN J. NEELY III, VICE PRESIDENT, LAW AND PUBLIC AFFAIRS, GULFSTREAM AEROSPACE (A GENERAL DYNAMICS COMPANY)

Mr. Chairman, Ranking Member Nelson, and members of the Committee, thank you for the opportunity to appear before you today.

I am honored to be here representing the 15,000 women and men of Gulfstream Aerospace. The issues being addressed here are critically important, and timely. They are important to advanced manufacturing companies like Gulfstream, and even more important to the individuals in this country who are missing great opportunities because their talent is left untapped.

The most valuable asset of any company is its employees, and that is particularly true at Gulfstream. With that in mind, we have evolved a workforce development strategy for the many technical skills required in our business. Although this effort is very much a work in progress, Gulfstream is honored to share our experience with this Committee.

1. Gulfstream Operations Overview

As context for my remarks, it is important to understand Gulfstream's operations. We have two distinct but very interrelated lines of business. First, we design, manufacture and sell business aircraft. The second distinct area is our Gulfstream aircraft maintenance, repair and overhaul ("MRO") business, which we refer to as Product Support.

Our current production models include the G280, G550 and G650/G650ER, all of which are currently in-service with customers, plus the G500 and G600 that both are in flight test working towards Federal Aviation Administration ("FAA") Certification.

Although the majority of our aircraft are used in traditional business aircraft roles, we have a strong and growing business with Special Mission configurations. This business is well illustrated by our highly successful SIGINT programs with Israel—the SEMA and CAEW Programs—and a similar configuration currently competing for the USAF JSTARS and Compass Call programs.

Our business is very international from both competition and sales standpoints. All of our key competitors are located outside of the United States: Bombardier in Canada, Dassault in France and Embraer in Brazil. With sales, approximately fifty percent (50 percent) of our new aircraft sales are in the United States and approximately fifty percent (50 percent) are international. From a balance of trade perspective, it is instructive to note that the percentage of our international sales has grown over the last fifteen (15) to twenty (20) years from roughly twenty percent (20 percent) to fifty percent (50 percent).

Gulfstream's corporate headquarters, largest manufacturing site and largest MRO base are in Savannah, Georgia, where approximately ten thousand (10,000) of our fifteen thousand (15,000) person workforce is based. Our operations also include the following facilities:

- Locations with both Manufacturing and MRO Operations
  - Long Beach, California
  - Dallas, Texas
  - Appleton, Wisconsin
- Locations with MRO Operations
  - West Palm Beach, Florida
  - Brunswick, Georgia
  - Westfield, Massachusetts
  - Las Vegas, Nevada

2. Gulfstream's Workforce Development Strategy

Over the past ten (10) years, Gulfstream has become increasingly proactive in nurturing and recruiting new talent for our technical jobs. We have done so by focusing on four areas:

- Elementary, Middle School and High School Student Engagement
- Technical School Engagement and Recruiting
- Military Engagement and Recruiting
- University Engagement and Recruiting

This work also is supplemented by our post-hire internal training programs, which include initial training and advanced training using our own employees and, for advanced maintenance and pilot training, FlightSafety International.

A foundational point underpinning this strategy is that our younger generations need help understanding what great opportunities are available in technical fields, and how to take advantage of those opportunities. This awareness work must include students and, likely more importantly, their parents and teachers. So, our approach is to start with young students to build awareness, build desire and, through mentoring and other resources, guide them down the path towards those goals.

We continue this same basic approach for Technical Colleges, Military and Universities, but with a more direct connection between the individual and a specific job at Gulfstream for which that person is suited.

3. External Workforce Development Resources

Although we indeed do have a technical skills gap in this country, there is a good news side to this story. As evidenced by this hearing itself, there is a growing understanding of the problem and a corresponding application of resources to address it. Gulfstream's experience, in every state in which we do business, is that local, state and Federal organizations are investing in new ideas and approaches for changing the paradigm.

Gulfstream's workforce development strategy relies very heavily on these external resources. Indeed, you will hear several examples as I review Gulfstream's specific activities.

On this point, I want to thank the Committee for including in the Senate-passed FAA Reauthorization bill last year a section regarding safety workforce training for the FAA. This section focuses on knowledge sharing opportunities between the FAA and industry in new technologies, best practices, and other areas of interest related to safety oversight. It also fosters an inspector and engineer workforce at the FAA

that can implement successful risk-based approaches to safety. Gulfstream strongly supports this initiative and the entire certification title. We hope Congress can pass the entire package of certification reforms this year to benefit safety, competitiveness, and job growth in the industry. Fully utilizing ODA authorities, and facilitating validation and acceptance of FAA safety standards and product approvals globally, is critical and time-sensitive. Continued progress on workforce training and these reforms will leave U.S. industry in a much strengthened competitive position.

4. Elementary, Middle and High Schools

Gulfstream engages younger students because, in our view, building awareness and excitement early on helps guide students in their academic decisions, and other life choices, during those formative years. For example, a ninth grader who is excited about a career as an aviation mechanic will have a very different perspective on his or her math and science courses than a classmate with no particular career in mind.

Our younger student engagement falls into two categories: targeted individual student engagement and awareness activities. These two sets of activities work well together by raising awareness across a large population while, through the targeted engagements, providing in-depth substance that validates the message with real world successes.

a. Targeted Student Engagement

Youth Apprentice Program ("YAP")

Gulfstream's YAP, which we operate in partnership with local High Schools, allows students to earn High School credits while earning money working part time during the school year at Gulfstream. This provides real world experience to students, and hands-on mentoring by their direct supervisors and co-workers, which they use to identify and further their personal career paths.

Our 2016–17 YAP has approximately seventy (70) High School Juniors and Seniors in Georgia, California and Texas. They are working in thirty-seven (37) different job functions, including aircraft assembly, cabinet shop, quality control, accounting, aircraft maintenance operations, engineering and our Advanced Aircraft Integrated Test Facility. Just like a potential full-time employee, students fill out applications, apply for specific jobs using the same computer-based system used for full time employees and are interviewed in person by their hiring manager. Once hired as apprentices, they work fifteen (15) to twenty five (25) hours per week, are paid ten dollars ($10) per hour and earn High School Credits for their work.

An important aspect of this program is its ability to correlate students' academic study with future job prospects. An apprentice can see first-hand that math and writing skills, for example, are necessary for their future success and not simply abstract concepts without any connection to their future success.

Technical/Vocational High Schools

The increase in High Schools with specific technical curricula is an effective tool in this area as well. By incorporating courses directed at specific technical careers, these schools bring technical career opportunities quite literally directly into the classroom.

Gulfstream supports a number of these schools with funding, equipment and mentors, and we encourage others to do so. Technical High schools with which we are involved include Woodville-Tompkins Technical and Career High School (Aviation, Manufacturing—Georgia), Westfield Vocational School (Aviation—Massachusetts), West Michigan Aviation Academy (Aviation—Michigan) and Effingham County College and Career Academy (Engineering—Georgia).

Dual High School and Technical College Enrollment

An example of another program with similar impact is Georgia's Dual Enrollment Program. This allows High School students with an interest in technical jobs to take courses at one of the State's Technical Colleges and simultaneously earn credits toward both High School graduation and a Technical College Degree.

Programs like this get High School students actively engaged in making career choices while also expediting their entry into the workforce, and financial independence. We encourage support for programs such as this, and are interested in exploring a combination of this type of program with apprenticeships.

Student Leadership Program ("SLP")

In addition to the gap in technical skills themselves, many young students also lack the needed soft life-skills and ability to make an informed decision about their own careers. To address this issue, Gulfstream started SLP in 2008 as a means to mentor at-risk High School students and help them develop life skills, explore the

many available career paths and, by their Senior year, develop and implement post-graduation career plan for themselves. Since then, Gulfstream has expanded SLP to Brunswick, Georgia and Appleton, Wisconsin.

SLP in Savannah, for example, is a four (4) year program that begins in the students' Freshman year. Mentoring sessions are facilitated by a professional team retained by Gulfstream, and volunteer mentors drawn from Gulfstream and approximately forty (40) other area businesses. Of the 1,500 applications typically received each year, one hundred fifty (150) students are selected for the incoming Freshman class. Once selected, the students who remain with the program stay together throughout their four (4) years of High School.

Freshman year is focused on developing students' soft skills such as appropriate work attire, etiquette and interview skills. Throughout the remaining three years, students explore available career opportunities in detail—*e.g.,* trades and Technical Schools, military, four-year degree programs—select their desired path, develop a specific plan for doing so and execute that plan so that they graduate and step right into the next phase of their life.

Approximately ninety-six percent (96 percent) of the enrolled students since inception remained in the program through graduation. In light of the significantly lower graduation rates for these schools, Gulfstream is proud if this program's success.

b. Awareness Activities

Gulfstream, like many companies, engages in a wide range of activities to raise awareness among students, parents and teachers. Here are a few examples of our activities in this area.

Job Shadow Programs

Our Westfield, Massachusetts, and Dallas, Texas, facilities both have successful job shadow programs. In Westfield, we partner with the Westfield Vocational Technical High School, which has a robust aviation program, to bring students into our MRO facility and shadow our aircraft maintenance technicians during their work day. This effort is part of the FAA's "Walk In My Boots" initiative aimed at exposing students to the benefit of an aviation maintenance career.

Similarly, in Dallas, we partner with local High Schools and host students for two days of aviation job experiences. Activities include wiring the avionics for an aircraft, working with sheet metal, making a sales pitch and visiting Dallas Love Field's control tower.

GAMA/Build A Plane Aviation Design Challenge

Gulfstream also supports the General Aviation Manufacturer's Association ("GAMA")/Build A Plane Design Challenge, which started in 2013 as a way to introduce High School students to aviation careers. For this competition, schools receive student and teacher copies of the Fly to Learn curriculum and software powered by X-Plane. Over the course of six weeks, they learn about topics such as the four forces of flight, aspect ratio, and even advanced subjects such as supersonic flight. They then compete in a fly-off that requires them to modify a virtual airplane to fly a specific tasked mission in a simulator. GAMA takes into account the score from this flyoff, as well as a checklist of the steps they took to complete the flight, a summary of the design changes they made to the airplane, and three videos submitted throughout the competition on what they learned.

Weyauwega-Fremont High School in Weyauwega, Wisconsin is the winner of the 2016 GAMA/Build A Plane Aviation Design Challenge. As the prize, four students, one teacher, and one chaperone traveled to Glasair Aviation in Arlington, Washington, to build a Glasair Sportsman aircraft. For the winning team, the hands-on experience working side-by-side with experts as they build a real airplane is phenomenal.

STARBASE

Gulfstream partners with the U.S. Department of Defense to sponsor week-long camps for fifth-grade students at Hunter Army Airfield in Savannah, Georgia. The program offers "hands-on, mind-on" activities meant to spark student interest in STEM programs. Students interact with military personnel by working on computers, flying aircraft simulators and participating in other hands-on activities.

5. Technical Colleges

In Gulfstream's business, Technical Colleges are a critical pipeline for developing tradesmen and craftsmen for work in our manufacturing and MRO operations. Although these schools' existing, standard programs provide a solid skills development base, our most valuable work with them has been in situations where we have helped develop the curricula.

Georgia's High Demand Career Initiative is an excellent example of this approach. This initiative recognizes that manufacturing and other technologies are changing so rapidly that it is difficult, if not impossible, for schools to keep their curricula aligned with companies' needs. That is true with current needs, but even more so for what industry will need in three (3), five (5) or ten (10) years. To solve this problem, this initiative seeks to bring companies into the schools to help plan and develop course content. Significantly, this can be part of a full degree program or simply for a Certificate program in which a student need only invest a number of weeks or months to earn a Certificate that demonstrates that they have specific skills for a specific job.

This joint development can range from simply including industry on Advisory Boards, to the other end of the spectrum where a business co-develops and even co-teaches a course. Several examples from Gulfstream's experience, we believe, will give the Committee insight.

Example: A&P School

Gulfstream's MRO operations are an important, and growing, part of our business across the country. FAA regulations require that aircraft maintenance technicians have an FAA-issued Airframe and Powerplant license (an "A&P License"). Given our need for qualified A&P technicians, we partnered with the A&P School of the Savannah Technical College, which is part of the Technical College System of Georgia, to ensure that its courses aligned with our needs.

The school appointed our experts to the Advisory Board. Gulfstream donated equipment to the school to provide the students with real-world equipment, including a complete Gulfstream aircraft—a model G100 that had reached the end of its useful life. By being an active participant in the A&P School's curriculum development, and ongoing class work, we are able to help the faculty stay aligned with the latest industry techniques and get to know the students.

Example: Advanced Cabinet Maker Course

As an excellent example of the in-depth approach, a number of years ago Gulfstream was having difficulty finding skilled cabinet makers to build furniture for our aircraft interiors. To address this issue, Gulfstream partnered with Savannah Technical College. In doing so, we learned that other area businesses in the boat and home construction industries were having similar issues.

Gulfstream paired our cabinet shop master craftsmen with the school to develop a course. We also provided a master craftsman to co-teach the course with the school's faculty. This provided the double-benefit of ensuring that instruction matched our requirements and it allowed our instructor to identify the top students for recruitment to Gulfstream.

Example: Basic Skills Course

Gulfstream has difficulty finding qualified entry-level candidates for our manufacturing operations. Illustrating the breadth of the skills gap in some areas, one candidate for sheet metal work—whose resume suggested that he had basic skills—was asked in a shop setting to bring the instructor a Phillips head screwdriver. His response was to ask the instructor whether that is the one that looks like a "plus sign" or a "minus sign." Clearly, that person did not come with the necessary basic skills to enter Gulfstream's manufacturing workforce.

To help address this, we are partnering with the local Technical College to develop a basic skills Certificate course. Although still in development, the most likely approach is to develop a set of specific skills tests and a course for teaching those skills. Candidates who believe that they already have the necessary skills would take the hands-on tests, and by passing obtain their Certificate without taking the full course. Candidates without those skills coming in, of course, would go through the full course.

Example: Manufacturing Technology Transition Training

Gulfstream's G650, which first entered customer service in 2012, is built using significantly different manufacturing techniques than aircraft produced previously. Consequently, ramp up of that production line necessitated transition training for our existing employees moving from other aircraft to the G650.

To assist, we enlisted the help of Georgia's Quick Start Program. Quick Start, which is a part of the Technical College System of Georgia, offers tailored employee training services to qualified companies. Quick Start instructors paired with our team to develop transition training programs for specific, proprietary manufacturing techniques used for the G650. Because the program's mandate allows it to enter into Proprietary Information Agreements with its customers, Gulfstream was able to use this resource without jeopardizing our valuable trade secrets.

6. Military

Recruiting from U.S. Military Veterans is a vital part of Gulfstream's strategy for finding employees with the necessary technical skills. As direct evidence of that fact, nearly thirty percent (30 percent) of Gulfstream's domestic employees are U.S. Military Veterans. This high percentage is a testament to the quality of training within our Armed Services, and to the cultural fit between them and Gulfstream.

Gulfstream recruits veterans heavily because of the combination of technical skills, disciplined work ethic and leadership skills that they so consistently demonstrate. Aircraft maintenance and avionics technicians, for example, come to Gulfstream with skills and experience that enable them to quickly integrate into our operations.

To recruit Veterans, we use a proactive, comprehensive approach that includes extensive in-person outreach to military bases—including participation in Transition Assistance Program Classes at those bases—customized Veteran recruitment advertising, and active participation in a number of Veterans organizations.

7. Engineering Universities

Our engagement with Universities relies heavily on our intern and co-op programs with those schools. Also, in keeping with the High Demand Career Initiative concepts discussed above, we are becoming increasingly active in providing input on specific skills-needs and engaging students in for-credit research projects that complement their skills development and our research needs.

Like many companies, we have intern and full co-op programs in our engineering department. Interns and co-ops are hired through a competitive selection process. While working, they are paid a competitive hourly wage and receive 401k and life insurance benefits. Gulfstream also provides housing for students who do not live in the local area. In 2016, we had one hundred eighty seven (187) interns and one hundred sixty two (162) co-ops.

Interns typically work during their summer breaks. Co-ops alternate between a semester of school and a semester at Gulfstream, and must complete three (3) semesters at Gulfstream.

These programs provide an excellent resource for hiring students with the right skills, and as importantly the right cultural fit, for Gulfstream. Students work alongside our full-time engineers our various programs. They also rotate between departments within engineering, so that they and we can find the best fit.

The success of these programs is demonstrated by the hiring. Over ninety percent (90 percent) of Gulfstream's entry-level engineering positions are filled through our intern and co-op programs.

In keeping with the High Demand Career Initiative, we have developed and continue to mature our partnership agreements with Universities. These agreements include both formal and informal arrangements for research projects, mini-sabbatical opportunities for faculty to work at Gulfstream and Gulfstream participation in Advisory Boards.

Mr. Chairman, Members of the Committee, I thank you for the opportunity to share Gulfstream's experience in this critically important area of skilled, technical workforce development.

The CHAIRMAN. Thank you, Mr. Neely.

Ms. Marks?

STATEMENT OF JUDITH MARKS, CHIEF EXECUTIVE OFFICER, SIEMENS USA

Ms. MARKS. Thank you, Mr. Chairman, Ranking Member Nelson, and members of the Committee. It's an absolute privilege to testify here today.

As the CEO of Siemens here in the U.S., I'm proud to represent our over 50,000 U.S. employees who are located in all U.S. states and Puerto Rico. We have over 60 U.S. manufacturing sites, and we're actually a net exporter. We've reported revenue last year here in the U.S. of $23.7 billion, and $5.5 billion of that revenue came from products that were made at our U.S. plants and shipped around the world.

So even though we are a global company, we're proud to say we are U.S. local, and the U.S. is Siemens' largest market in the world. Our U.S. customers rely on Siemens to add value to their operations. Today, they're turning to Siemens to deploy software, hardware, and digital technologies so that they get the competitive advantage they need to retain and create high-paying manufacturing jobs here in the U.S.

This new technology requires workers to have new skills that simply weren't necessary in yesterday's manufacturing environment. Today, workers need new skills, rooted in the STEM fields, and they need education beyond high school. The nation's training and education systems weren't initially ready for this advanced manufacturing environment, and the skills gap is the result.

At Siemens, we're now working to close this gap through what we call industrial reskilling. We invest approximately $50 million annually for the training and continuing education of our U.S. workforce, and we have also made a strong effort to hire veterans. In the past few years, we've hired 2,500 veterans, training them on the technical skills they need to work in our business.

We've also focused on broader workforce development goals around three initiatives. First, we are adapting the proven German style apprenticeship model to the U.S. market, where we provide on-the-job training, working with our community college partners to train workers. We started in Charlotte, North Carolina, and we've since expanded it to three more states.

But we also wanted to encourage other companies to replicate these efforts in the United States nationwide. So we worked with Alcoa, Dow, the National Association of Manufacturers, and the Department of Labor to develop a playbook for other employers and manufacturers seeking to launch similar programs.

Second, we're committed to helping students gain experience working with the software and digital tools they will encounter in advanced manufacturing. Earlier this month, we invested three-quarters of a million dollars to help the University of Central Florida open a new lab where students will learn how to run a digital grid. UCF is one of many institutions in the U.S. where, in just the past few years, Siemens has granted a total of over $3 billion worth of our industrial software to incorporate into the curriculums.

And, third, our Siemens Foundation, which I chair, is shining a spotlight on the opportunities for young adults in what we call STEM middle skill careers and on training models that work. As part of that effort, we are a proud supporter of the Aspen Prize that recognized the remarkable work of Colonel Cartney and the faculty at Lake Area Technical Institute in South Dakota. So as you can see, Siemens is eager to form partnerships that serve to both close the skills gap and boost U.S. competitiveness.

I want to close by sharing with the Committee our additional commitments recently made to building a skilled U.S. workforce. We're going to double the size of our apprenticeship program here in the U.S., we're going to hire an additional 1,000 new veterans over the next three years, and we're going to grant an additional $2 billion worth of our industrial software to academic and training institutions. This software is already used by 140,000 companies globally.

I thank you again for the invitation to testify and I look forward to your questions.

[The prepared statement of Ms. Marks follows:]

PREPARED STATEMENT OF JUDITH MARKS, CHIEF EXECUTIVE OFFICER, SIEMENS USA

Chairman Thune, Ranking Member Nelson, and Members of the Committee, thank you for inviting me to testify and share information about how Siemens is working to close the skills gap and boost U.S. competitiveness.

Siemens is a global technology company that stands for engineering excellence, innovation, quality, and reliability. The company is using its global leadership in engineering and technology innovation to meet America's toughest challenges. From efficient power generation to digital factories, from wellhead to thermostat, and from medical diagnostics to locomotives and light rail vehicles, Siemens in the United States delivers solutions for industry, hospitals, utilities, cities and manufacturers. Siemens' next-generation software is used in every phase of product development, enabling manufacturers to optimize and customize equipment that touches American lives every day.

Siemens has been in the U.S. for more than 160 years. The U.S. is now the company's largest market. In the past 15 years, Siemens has invested approximately $35 billion in America, successfully strengthening our U.S. presence while creating an even larger economic ripple effect. Today, more than 800,000 U.S. jobs are linked to Siemens' global business operations. We continue to invest in America; most recently, Siemens announced its plan to expand its digital industrial leadership with the acquisition of Oregon-based software company, Mentor Graphics.

In the U.S. in Siemens' Fiscal Year 2016, the company reported revenue of $23.7 billion, including approximately $5.5 billion in exports. We directly employ approximately 50,000 people throughout all 50 states and Puerto Rico. With more than 60 Siemens manufacturing sites, the U.S. is an extremely vital production location. It's one of our most important research centers where we invest more than $1 billion in R&D annually and a key base from which Siemens exports globally.

At Siemens, we pride ourselves on conducting business locally, especially here in the United States. At our core, we are a company that combines innovation with social responsibility. We believe our mission extends beyond our customers, our employees, and our shareholders. We also believe we must deliver lasting value to the communities we serve.

In the U.S., one way we deliver this value is through our commitment to helping the U.S. establish a new era of advanced manufacturing, central to which are our efforts to build a skilled workforce. Advanced manufacturing is core to our Nation's strengths in research and development, in digital technologies, and in software development. It enables the U.S. to focus on producing high-value goods that support high-paying jobs. The skill requirements, however, have become much more rigorous, and Siemens has both a business need and a responsibility to help workers acquire these new, advanced skills. Therefore, Siemens' workforce development efforts are addressing the jobs of today as well as tomorrow. Our strategy is focused on workers at all stages of their careers, from new entrants into the workforce to dislocated workers seeking to re-enter, to current employees in need of re-skilling. We call this industrial reskilling.

We invest approximately $50 million annually for the training and continuing education of our own U.S. workforce. Additionally, we are helping to build a new ecosystem of public and private sector partnerships that forge pathways to 21st century manufacturing skills and to economic security.

Siemens' technology supports dozens of industries and hundreds of thousands of companies worldwide, and we understand the skills required to operate the technology. This knowledge is enabling Siemens to work closely with academic and training institutions to create a new and successful formula to address the skills gap.

21st Century Manufacturing Skills

In the days since the Great Recession, manufacturing jobs have started to come back. What has also come back is a national appreciation for the critical role our manufacturing sector plays in supporting the American dream. There is universal support for creating and retaining U.S. manufacturing jobs.

Former skill requirements for manufacturing and industry were primarily the willingness to work hard in physically demanding environments and learn repetitive tasks. In the 21st century, strong work ethic is only part of what is required. Today workers need to have technical skills earned through training and knowledge in

science, technology, engineering, and mathematics—or STEM—earned through education beyond high school. A high school diploma alone is no longer a viable ticket to a manufacturing career, reflecting larger changes throughout our new, digital economy.

As evidence of this, during the Great Recession, 80 percent of workers who lost their jobs had only a high school diploma. As jobs came back, workers with at least some college education filled more than 95 percent of new positions created.[i] Now, as we look ahead to 2020, two out of three jobs will require some postsecondary education, when, in the 1970s, three out of four jobs required a high school education or less.[ii]

The skills gap is a reflection of this new reality. According to a Business Roundtable survey that Siemens participated in, 97 percent of member CEOs said that the skills shortage is a problem.[iii] Two-thirds of the companies were struggling to find qualified applicants for jobs requiring advanced computer knowledge. Forty-one percent of companies had a hard time filling jobs requiring advanced quantitative knowledge, while 38 percent said at least half of entry-level applicants lacked basic STEM literacy.

These numbers reflect our experience at Siemens, as well. Three-quarters of our current 2,000 job openings in the U.S. require post-secondary education in the STEM fields. Therefore, here are examples of how Siemens is addressing the training gap.

Scaling up apprenticeships

When Siemens first expanded its advanced manufacturing facility, the Charlotte Energy Hub, in Charlotte, North Carolina, the company had a hard time finding people with the right skill sets to fill new positions. This is when Siemens turned to its German roots—specifically, the German-style apprenticeship model—as a guide to creating public, academic and corporate partnerships to train workers.

In North Carolina, Siemens partnered with Central Piedmont Community College on its four-year apprenticeship program. Students attend classes at Central Piedmont Community College while getting paid for hands on, on-the-job training. They will graduate with an associate's degree in Computer Integrated Machining or Mechatronics, will receive a Journeyman certificate from the state of North Carolina, which is reciprocated by all 50 states and recognized by the U.S. Department of Labor, and, in the end, a career at Siemens. In other words, they get an international industry certification, a degree, an apprenticeship completion certificate, and no debt. They also get to enter into the workforce with a starting salary of around $55,000 a year with a guaranteed job at Siemens upon completion of their apprenticeship.

Based on the success of the apprenticeship model in Charlotte, Siemens is creating similar programs around the country.

In Alpharetta, Georgia, the Siemens Testing Technician Apprenticeship began in January 2015. The academic partner for this program is Lanier Tech Community College. Plans are underway to start a new Siemens Apprenticeship Program focusing on Manufacturing Engineering & Quality, expected to launch in 2018.

In Sacramento, California, the Robotic Welding Apprenticeship began in September 2015. Siemens, the Sacramento Employment & Training Agency (SETA), and Los Rios Community College, have partnered to offer a Welding Boot Camp to up-skill the local Sacramento population and veterans, providing the necessary skills required to apply for a job as a welder. Siemens also partnered with Los Rios Community College for the American Apprenticeship Initiative, a multimillion dollar Federal grant from the U.S. Department of Labor, which the college received to work through public and private partnerships to expand registered apprenticeships in the U.S.

We are now expanding the program in Fort Payne, Alabama, where Siemens recently began an apprenticeship program for machinists at its electrical component manufacturing plant.

Siemens also serves as an Apprenticeship USA LEADER, and is working with the U.S. Department of Labor to expand apprenticeship programs through revamped recruitment strategies and the registration of additional programs.

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[i] *https://cew.georgetown.edu/cew-reports/americas-divided-recovery/*

[ii] *Ibid.*

[iii] Business Roundtable survey: *http://businessroundtable.org/issue-hub/closing-the-skills-gap*

Additionally, Siemens worked with Alcoa and Dow to develop a playbook for other manufacturing employers seeking to build apprenticeship programs.[iv] We wanted to share our best practices in order to encourage other companies to join us in this mission and make it easier for them to launch similar programs.

Hands-on software training

Industry can help educators understand the skill sets needed to operate their technology to ensure that classroom experiences are relevant, but we have taken it a step further. Siemens is committed to helping students' gain vital hands-on learning with real-world tools and equipment while students are still attending educational institutions.

Siemens is doing this today through Siemens PLM Software's Global Opportunities in PLM program, which we call GO PLM. In just the past few years, GO PLM has provided over $3 billion of in-kind software grants. As a result, students have access to the same PLM software used by more than 140,000 companies throughout the global manufacturing industry to design, develop and manufacture some of the world's most sophisticated products in a variety of industries, including aerospace, automotive, medical devices, machinery, shipbuilding and high-tech electronics. GO PLM provides technology to more than one million students annually at more than 12,000 global institutions. It is used at every academic level, from grade schools to graduate engineering research programs.

Additionally, through the Siemens Cooperates with Education initiative (SCE), community colleges are offering leading-edge industrial technologies in their classrooms, research projects and workforce development programs. SCE provides support through donating equipment, granting software, and providing instructor training and technical guidance. Hundreds of colleges and universities are actively participating and have Siemens technologies deployed in their classrooms.

Siemens is also expanding knowledge and capability in mechatronic training in colleges and high schools throughout the U.S. and around the globe. Through the Siemens Mechatronic System Certification Program, operated out of Siemens AG's Digital Factory operations, Siemens offers a tested, pre-packaged program to schools who want to prepare their students for the advanced manufacturing jobs of the 21st century. We've partnered with more than a dozen community colleges in the U.S.

The STEM Middle-Skills Initiative

What many Americans traditionally think of as blue-collar jobs now go by different names—*technical or middle-skills.* While many STEM jobs require a bachelor's degree, a large percentage of these positions, half by some counts, are obtainable by earning an associate's degree, completing an apprenticeship program or completing training programs at community colleges. This can be done inexpensively without adding to the $1.3 trillion in student debt now shared by 42 million Americans.

In order to help advance opportunities for young adults in STEM middle-skill careers, the Siemens Foundation, which I chair, launched a workforce development program, the STEM Middle-Skill Initiative in 2015 to leverage the experience and expertise of Siemens as an industry leader and pioneer in workforce development. The Initiative addresses three clear objectives—elevating the economic opportunity available in STEM technical careers in the national dialogue; rebranding the image of these jobs and educational pathways to one of prestige, and accelerating training models that work.

To shine a light on exemplary young adults in STEM programs at top community colleges and promote the real story of opportunity available in STEM middle-skill careers, the Siemens Foundation created the Siemens Technical Scholars project in partnership with Aspen's College Excellence Program. The Siemens Foundation is also a proud supporter of the Aspen Prize for Community College Excellence, a recognition won this year by Lake Area Technical Institute in the Chairman's home state of South Dakota.

The Siemens Foundation is also working with the National Governors Association's Center for Best Practices on scaling work-based learning in states to expand the use of effective training models for young adults in STEM fields. Through this partnership, Siemens and the NGA are working with Indiana, Iowa, Montana, New Hampshire, Utah and Washington to make effective work-based learning models for STEM an integrated part of their education and training systems. To support development, implementation, and assessment of the project plan, each state received a

[iv] The Playbook is available in the appendix. LINK TO PLAYBOOK—*http://www.themanufacturinginstitute.org/~/media/53456D700856463091B62D1A3DA262F4/Full_Apprenticeship_Playbook.pdf*

grant of $100,000 and intensive technical assistance, including participation in national meetings and a cross-state peer learning network, and access to national experts, regular coaching calls and site visits.

The Siemens Foundation also partnered with NGA and the U.S. Department of Labor in the American Apprenticeship Initiative in order to scale registered apprenticeships, and the public—private partnerships that support them. We see strong ecosystems for apprenticeships in countries like Germany and Switzerland, and the Foundation is working with its partners to build and strengthen similar ecosystems here in the U.S.

Recently, the Siemens Foundation, the JP Morgan Chase Foundation, and NGA hosted a six-day trip to Switzerland and Germany for three governors—Governors Daugaard (SD), Fallin (OK), and Bevin (KY)—joined by top state policy, education and business leaders to experience the apprenticeship and career and technical education system first hand. This is another initiative that will serve as a catalyst for new workforce development initiatives in their home states.

In another project to help rebrand the image of STEM middle-skill career opportunities, the Foundation partnered with Advance CTE, a leading career and technical education organization, to help states utilize proven messaging to attract more high school students, and their parents, to STEM career and technical education (CTE) pathways. Four states—Indiana, Maryland, New Jersey, and Washington—will pilot strategies this year and help us identify best practices for the rest of the country.

Conclusion

In conclusion, I hope I have made clear that Siemens is committed to proactively cultivating talent in our largest, most important market—the U.S. In fact, recently Siemens announced additional commitments to building the U.S. workforce in three critical areas:

- Doubling Siemens' industry-leading apprenticeship program;
- Hiring at least 300 new veterans per year for the next three years up to at least an additional 1,000;
- And by providing an additional $2 billion worth of in-kind grants of our industrial software package to academic and training institutions.

We are eager to continue to work with public and private partners across government, economic development organizations, schools and others to continue building a 21st century workforce and enhancing opportunities in America.

The CHAIRMAN. Thank you, Ms. Marks.

Thank you all. Great testimony. I want to ask some questions and give members of the Committee a chance to ask some questions.

Mr. Ratzenberger, I'm well aware of the work that you have done for some time in trying to impress upon Americans today the importance of teaching hands-on skills at an early age, and I know that for many of us up here—probably from an earlier generation, when I was in high school, shop and industrial arts were a required course. We had to take a mower apart and put it back together and learn other things like that, and today, I don't think those courses are even options for a lot of people.

So tell me why you think it's important that we expose young people today, children at an early age, to that kind of hands-on learning.

Mr. RATZENBERGER. As we know, the brain is formed between the ages of zero and 5 years old, and throughout history, all the great tinkerers that have moved mankind forward, from Da Vinci, Thomas Edison, Gutenberg, Steve Jobs, Benjamin Franklin—they all tinkered as children. They didn't go to school—Thomas Edison didn't go to school and say, "I'm going to learn how to make a light bulb." He, in fact, only had 3 months of formal education. Most of his time was hanging around a shipyard in Lake Erie learning how to tinker, learning how to form things, shape things, fix things, in-

vent things. Same thing with Steve Jobs. I actually had this conversation before he passed away, and he liked working on cars with his dad.

So the more interested you get people into using their hands—Leonardo Da Vinci was an illegitimate child, who was ignored throughout his childhood. He hung around a farm. That's where he became Leonardo Da Vinci. So by the time they get to be 18 years old and graduate from wherever they're graduating from, if they don't have the seed planted in them of using their hands and shaping and forming things—and we can also eliminate those trophies, the high self-esteem trophies that we're so fond of giving out.

High self-esteem comes from making things. You make something from scratch. You draw it, you shape it, you build it. That's self-esteem, because you can look at it 30 years later—I always do when I show my kids who are grown now—and since they were little, I'd point out a roof of a building that I'd put up during one particularly gruesome New England winter, and every time we'd drive by, I'd say, "Yes, I put the roof on that." And when they were younger, they'd say, "Oh, gee, Dad, that's great, that's great." Well, once they got older, they went, "Yes, we know. You put the roof on."

But, still, it's something you can point at. It's self-esteem, and that's where it comes from. It never comes from handing out a trophy for coming in 11th. You have to put your hand to something useful, and that's what brought us to the dance. So dance with the one who brought you, and it wasn't theory that brought us here. It's somebody who knew how to use tools.

The CHAIRMAN. Thank you.

Colonel Cartney, you spoke about the fact that technology is a force multiplier, which does not decrease the number of people that are needed, but instead enables people to do more. Could you discuss in a bit more detail the impact that new technology is having on the skills gap and how Lake Area Tech is working to ensure that its students are prepared for this workplace environment?

Colonel CARTNEY. Yes, sir. In almost any field that you look at, technology is having a great impact. But even if you look at, for example, manufacturing, when they put a robot in the line, typically, that robot isn't put in the line to make the same number of items they've made previously when a person was there. It's put in line because it does it more effectively and does it faster and with higher quality. But as soon as you replace that person on the line with a robot, now you need somebody that can maintain the robot, that can program the robot, and, in addition, back in another plant, has to build that robot.

So there has been concerns that we're going to technology—and, technology is going to allow us to do more with less, and my response to that is always; you never do more with less, but you do more with something different, and that's what technology is doing. But it's not reducing the number of workers that we need. It's changing the types of workers that we need.

The CHAIRMAN. You sort of got at this—and a number of you did—that the whole notion that kids nowadays come up with this idea that they have to have a four-year degree, and sometimes there's a stigma attached to not doing that. How do you deal in stu-

dent recruitment for Lake Area Tech, for example, with that? It seems to me at least one of the big bubbles we're going to face in the future is a student loan debt bubble, because more and more kids today are taking on so much debt, and it's going to be very, very hard and take a really long time to pay it back.

So is there an argument to be made, not only that there are really good-paying jobs out there—and your placement rate, as I pointed out earlier, is 99 percent, which is really remarkable—but also an argument to be made that you can get good jobs in the economy that pay higher than average wages and also come out without a huge amount of student debt that you might otherwise have if you went to a four-year institution. How do you deal with that perception out there, that people think—at least, some people think that they need to have that four-year degree?

Colonel CARTNEY. Yes, sir. Well, in fact, we have a great group of recruiters, first and foremost. They get into the high schools. They even get into the middle schools and talk to the students, and talk to the parents. But some of the big things that people need to realize is when you talk about the averages, and you look at what you're going to make with a four-year degree, say as a business major, and then you look at what the average welder makes, there probably will be a slight edge for the person getting the business degree.

The problem is if your natural skills are to be a welder, you're going to be a great welder, and you're going to have an income that's extremely high, where maybe you'd be a mediocre business person, and you would be on the lower end of that scale. So a lot of times, people need to understand that they need to really look at what it is they want to do in life, and where their skills are at, before they decide that pathway. That's why we focus on placement rather than graduation. When our students are coming in, we talk about what do you want to be, not what degree do you want, because for a high school student, that's rather abstract for them.

So we combat it in a number of ways. The biggest thing that we're now working on is we need assistance from industry, because a lot of perception is that the jobs that people are preparing for—they have an image of what those industries were 30 or 40 years ago. So now with the new workplaces we need to re-image these occupations, because the manufacturing environment isn't what it was 30 years ago.

The CHAIRMAN. Senator Nelson?

Senator NELSON. Thanks, Mr. Chairman.

Mr. Ratzenberger, I certainly agree with you. For a kid putting together something, there's a real sense of accomplishment.

Colonel Cartney, tell us what you think government should do to help get more students into these fields?

Colonel CARTNEY. The biggest thing is what we're doing today is an outstanding start in having people come forward and talk about it. We found out that with Build Dakota, for example; where, with industry, the state put up funds for students to have full ride scholarships; what we found was the conversations that that evolved as we were out talking about Build Dakota and the great jobs that were out there; we've seen an impact on Lake Area Tech and our

enrollment that outweighs the number of scholarships that we award.

So first and foremost is looking for ways to be a catalyst for workforce development and a catalyst for the conversation. That's probably the biggest things that I think the government could do, along with some grant dollars. And also the Centers of Excellence that I mentioned.

Senator NELSON. Ms. Marks, we are now seeing the solar energy workforce increase by 25 percent and wind increase by 32 percent. For the first time, these jobs have surpassed some of the traditional fossil fuel jobs. How has this market changed or impacted your business strategy, and what investments is Siemens making to prepare this workforce for these new jobs?

Ms. MARKS. Well, thank you, Senator, for asking. We are seeing a shift in the energy view and the energy independence here in this country. But we think it's a mixed view in terms of renewables versus some of our other offerings, if you will. What we are doing to prepare is we've taken the model on that was developed over the last 100 years in Germany, the apprenticeship model.

In 2010, we expanded our factory in Charlotte, North Carolina, and we needed 800 new employees. We actually closed the facility in Canada and expanded here. We call it our Charlotte energy hub, where we build gas turbines and generators. And as most of you know, North Carolina was more of a textile-driven state, and we needed technicians who had mechatronics, mechanical aptitude, electronics aptitude.

So we worked together with Central Piedmont Community College, because we do believe apprenticeships are local. We helped with the curriculum. We brought over programs from Germany, and we're proud to say our apprentice program, which we've now replicated in three other states, offers to these students the ability, as they leave high school or come back in the workforce—the ability to work for us in a 4-year program, get paid—we pay for their academic institution so they graduate from the program with no debt, a guaranteed job, and a journeyman's certification from North Carolina, which has the ability to be used in any state from a reciprocity. So for us, it's a business imperative to develop skills, and we're taking it on with our apprenticeship model.

Senator NELSON. Mr. Neely, it's impressive that 30 percent of your workforce at Gulfstream, the old Grumman Corporation, is veterans. We already talked about trying to ease the certificate problem. What more can the Federal Government do to let those special skills of military personnel, once they get into the private sector, to be utilized?

Mr. NEELY. Well, this is part of the good news story, quite frankly. The easing of the certification transfer burden—a lot of progress on that. The Department of Defense has quite a number of excellent transition programs, for example, programs serving veterans in the last 180 days of their service that engage in transition services so that—transition training so that they are able to come right out of their active duty service and right into a business, and we very much encourage those kinds of programs.

It's a bit of a theme, I think, from the comments Ms. Marks made about apprenticeships, that whether it's in a military context

or other context, where you can have some transition period where you're blending that transfer of training and transfer of culture, whether it's military or out of other environments. That's important, and to the extent that programs within DOD or elsewhere can help facilitate that—I think there are opportunities that are already being realized, by the way, to blend that kind of activity between the armed forces and the technical college networks that are around the state. Those are good examples.

Senator NELSON. You know some of the problems veterans have when they get out on their own. Is your company specifically trying to meet some of those problems, for example, on PTSD, trying to spot it and get the veteran help?

Mr. NEELY. We are. Yes, sir.

Senator NELSON. What do you do?

Mr. NEELY. Well, I think a core and obvious fact is that we have such a large percentage of employees that are, indeed, veterans. There's a natural network. They look after each other, and they know how to spot—of course, our H.R. people are very attuned to that, particularly the ones that are entering most recently, having done tours in Iraq and Afghanistan, et cetera. So it's an awareness. It's a connection between our resources that I just described and the local facilities as part of the military operations and other local hospitals, treatment centers, et cetera.

Senator NELSON. Thank you.

The CHAIRMAN. Thank you, Senator Nelson.

Senator Baldwin is up next.

STATEMENT OF HON. TAMMY BALDWIN,
U.S. SENATOR FROM WISCONSIN

Senator BALDWIN. Thank you, Mr. Chairman.

What a great panel. This is really a wonderful opportunity to hear from you. I represent a state, Wisconsin, which is still one of the lead manufacturing states as a percent of our workforce, close to 20 percent, and like you, Mr. Ratzenberger, I get a chance to visit a lot of those manufacturing sites. I know that's something you featured on your TV show, "Made in America."

I want to get feedback on a number of the issues that you have brought up during this panel, and I wanted to start with this image issue. I think about—I appreciate the fact that you shared your story of growing up and where you learned to tinker, et cetera. All my hobbies are hobbies that—you know, whether it's carpentry or sewing or whatever—where I get to be hands-on and see the outcome of my endeavor quickly, unlike the day job as a Senator, where sometimes the products of your labor take a little bit longer.

But I'm working right now on a legislative proposal to establish a grant program to help launch and scale registered apprenticeships in targeted industries, like advanced manufacturing, construction, energy, and more, and I hope I can create a program that breaks through the stigma that employers may encounter when recruiting workers to manufacturing. As the co-founder of the Nuts, Bolts, and Thingamajigs Foundation to help individuals discover their passion for making things, I would like to ask you what you think we can do to structure our apprenticeship programs to create

a new image of manufacturing and certainly to create incentives for young people to choose careers that involve making things with their hands.

Mr. RATZENBERGER. Thank you for that question, because it's something I've put a lot of thought into, especially, you know, coming from the Hollywood—the media, and that has a big effect, because since the 1960s, anybody who worked with their hands was denigrated on film or television. They were made to look stupid. So why would a child growing up watching those images want to be that?

We all know how powerful that the images coming out of Hollywood are. Whether it's a big feature film or a sitcom or a Saturday morning cartoon show, they insist on denigrating anybody that works with their hands—the plumber, the carpenter, the bricklayer. And to turn it all around simply, if I could get Taylor Swift to sing a song that she likes guys that know how to use tools—done. We'd have no problem.

[Laughter.]

Mr. RATZENBERGER. Every kid out there would be rushing to Home Depot and tooling up and learning how to use them, because that's really where it comes from. It comes from the media. Before that, before the 1960s, you were honored if you knew how to do something, if you actually knew how to function. That's really self-esteem, as I was saying before. But I think that's where much of it comes from, is Hollywood's image.

Senator BALDWIN. So really focusing on the branding is going to be a huge piece of this.

Mr. RATZENBERGER. I think so, especially where the parents are concerned. I was on a radio show, and I got a call from a lady whose husband was a stone mason, and she had six kids, and the eldest one wanted to be a stone mason like his dad, and she was worried. And I said, "Well, what are you worried about? The kid obviously loves his father and wants to follow in his footsteps." She said, "Well, I don't want the neighbors to think my son is stupid." I wanted to crawl into that microphone and just—you know.

But that's the problem. To say, "Wait a minute. My son is a plumber," that doesn't mean he's stupid. I mean, I know a plumber who owns four apartment buildings. He probably paid for them in cash. But, specifically, you have to know—again, if you teach children how to use tools and form things, whether it's wood or metal, not only are they learning how to make things and getting real self-esteem, but they're learning the fundamentals of algebra, fractions, equations, geometry. That's what has to be used—a 90-degree angle, a 45-degree angle. But that's the basis of all construction, and they're learning that before they know what they're learning. So when they get into high school, and the teacher draws something on the board—well, they understand what that means.

So there's a lot of work to be done, and I'll be around for a few more years, so just let me know what you need.

Senator BALDWIN. Excellent. Thank you.

The CHAIRMAN. Thank you, Senator Baldwin.

Senator Capito?

STATEMENT OF HON. SHELLEY MOORE CAPITO,
U.S. SENATOR FROM WEST VIRGINIA

Senator CAPITO. Thank you, Mr. Chairman.

Thank all of you. I agree with Senator Baldwin. This has been an excellent hearing.

Just by way of introduction, I represent a state, West Virginia, that has a lot of great and highly skilled workers in our state. Some of them are not working. I want to get—that's my second question.

My first comment would be we're talking a lot about the impetus of people who are feeling that they need to tell their kids they have to get a four-year degree. There's still a vast amount of people in this country who feel that even reaching a two-year degree is too high a stretch for them, and that's why I think programs such as Ms. Marks talked about at Siemens and also the one that we have—we have one in West Virginia with Bridge Valley Community and Technical College with Toyota—gives those folks the opportunity that are getting out of high school, and they can't afford to go to college, they don't think they can go to college. It's a stretch for them. Nobody in their family ever went to college.

But by combining the ability to be paid while they're being trained and then, hopefully, have a job at the end of those 2 years or—usually, it's a 2-year program—I think is really a good way to catch their eye and realize that this is not too big a stretch. So there are folks on the other end of the spectrum who think this is too tough a leap for us.

So I would like to say, also, I've seen a couple of things in the elementary school that I think are going to be very helpful to tinkering and getting people interested, and that's these robotics programs that you're seeing in second, third, and fourth grade, where they're realizing that they can build things, they can make them move, and the excitement that you see on the faces in the elementary schools. I think they're really good.

I'm curious to know if any of your private companies are involved in any kind of the robotics programs in the elementary school. Does anybody have a comment on that?

Mr. RATZENBERGER. Yes. There's a company out of Pittsburg, Kansas, called Pitsco, and they supply most of the STEM equipment nationwide. I think they're also the lead distributor for Lego. But you can Google that, Pitsco, P-i-t-s-c-o.

Senator CAPITO. Good. Yes. Ms. Marks?

Ms. MARKS. Thank you, Senator. Yes, we are involved in that as an advanced manufacturing company. What we find is that so much of this is local, and our employees feel so committed to the communities in which they live that that's where they actually become the coaches. We do the Siemens Science Days, K through 12, but it is important that these skills and the awareness happens very young.

Senator CAPITO. Mr. Neely, in terms of aerospace, we have had a downturn in our coal industry, and we have a lot of out of work coal miners who have magnificent skills. We've been working to try to identify where the retraining opportunities are for them in and around their area. They don't want to move to California. They

want to stay in West Virginia, Kentucky, Ohio, where their families are. But they have great value here.

I believe that a retrained coal miner can really move into the aerospace industry quite seamlessly. Do you have any—you know, with their metalworking and welding skills and all those kinds of talents.

Mr. NEELY. Senator, I couldn't agree more. At the end of the day, the point which my fellow speakers have made is that understanding of how to use your hands and how to use your brain along with your hands and apply those together. And whether you're in a coal mine—and I confess I've never been in a coal mine—but whether you're in a coal mine or you're maintaining the equipment in a coal mine—and from what I know, there's a lot of very sophisticated equipment in there—all those skills are excellent foundations for what it would take to come in and build airplanes at Gulfstream.

Senator CAPITO. Well, I'd like to have a further conversation with you kind of off the grid here to talk about how we can work with rebuilding, and I think that comes within your industrial reskilling kind of terminology.

The other thing I was thinking—you know, if we're talking about how do you get younger people to think manufacturing is cool, I was sort of over here thinking maybe we don't call it manufacturing anymore. Obviously, advanced manufacturing is a terminology to try to make it sound a little better. I don't—maybe we could get Taylor Swift to come up with some kind of song title on that. That's just sort of something I was thinking.

I got to meet some of the original women advanced manufacturers the other day when Rosie the Riveters came in to see me. They're now in their 90s—amazing work they did in the service of our country with the skills they never thought they had. They probably—in West Virginia, they all went to Akron, Ohio, and filled the factories and built most of our aerospace—our weapons, but our airplanes as well.

So I would like to put a pitch in to this generation of women. The President just signed the Inspire Women Act and Promoting Women in Entrepreneurship. We've got to get whatever we are, the 15 to 20 percent that is into the STEM fields—we need to increase that, because that's where I think the viability and the ability to raise your families is. For women, I think, it's a skill you can go in and out of the workforce if you need to do that. So any way we can join together on that—I know, Ms. Marks, you've been working on that as well. So thank you all very much.

The CHAIRMAN. Thank you, Senator Capito. That was a great generation. My mom was a Weapons Inspector during that period.

But in South Dakota, we have a really low unemployment rate, and when we can't get people to fill the jobs, if Colonel Cartney and the other Tech Ed schools aren't producing enough employees to fill some of those jobs, we recruit hard from our neighbor in Minnesota, so we're trying to bring their folks to South Dakota.

Senator KLOBUCHAR. Oh, here we go.

The CHAIRMAN. So, Senator Klobuchar?

STATEMENT OF HON. AMY KLOBUCHAR,
U.S. SENATOR FROM MINNESOTA

Senator KLOBUCHAR. Thank you very much, Senator Thune, and I first want to welcome my friends from the Minnesota Workforce Council Association. They're there in the back. Look at them waving. They've been taking photos of Senator Thune. You're a star now—very exciting.

They're here because just like in South Dakota, as the Chairman mentioned, we have very low unemployment in Minnesota, something like 3 percent to 3.5 percent, yet we have a lot of manufacturing, and especially in greater Minnesota. Our friends from Detroit Lakes are here. It's hard to get people to fill the jobs.

I so appreciate, Mr. Ratzenberger, your work and your show and the fact that you have featured—ready—Red Wing Boots from Minnesota, the Diamond Match Company from Cloquet, snow blowers from Toro in Windom, Scotch Tape from 3M, and, of course, Hormel's Spam, where they actually have a museum which is called the Spam Museum, or as we like to call it, the Guggenham. So thank you for featuring our businesses.

Now, one of the things I noticed is it's Senator Thune and several women senators up here, and I wanted to ask you, Mr. DeJohn, first of all, what is Turner's Youth Force 2020 program doing to support women in these traditional jobs? As you know, women—one of the ways we can fill these jobs—25 percent of STEM workers—less than 25 percent women, and my colleagues have asked about the dirty, dark, and dangerous issue of the images people have for manufacturing from the past which aren't really real now. Could you address that?

Mr. DEJOHN. That's a very good question, Senator, and thank you for the opportunity. Turner is a company that has probably one of the most aggressive diversity programs of any of our competitors that I know of. We work very closely through 2020, but we also had the 50th anniversary of our minorities firm commitment just last year. Hilton Smith, who had started that, just retired last year, and that's continuing.

As we recruit for the positions of a professional engineer or architect or construction manager, our focus as a company is on a minimum requirement that we've posted upon ourselves for minorities and women of 35 percent, and almost every year, we've been able to exceed that. We typically bring in 400 recruits a year, and, recently, we've surpassed the 50 percent mark on women and minorities.

Senator KLOBUCHAR. Very good. Thank you. Thank you very much. That's impressive.

The other piece of this is apprenticeships. Senator Collins and I have introduced the American Apprenticeship Act to provide funding to states to create or expand their tuition assistance programs.

Mr. Neely, do you want to briefly—because I have one more question for Ms. Marks—address that with your experience with the youth apprenticeship program at Gulfstream? I just think it's a key to a lot of our issues to be able to have our students work in businesses and their parents see what those businesses are like.

Mr. NEELY. Senator, I think you're spot-on, because it addresses a number of the problems that we've been talking about all morn-

ing, and that is awareness. It lets the kids come in and see firsthand what the opportunities are like, to come in and see firsthand that advanced manufacturing is not dirty, dark, and dangerous. It's quite the opposite. It's very sophisticated and exciting, and it lets the parents be part of that.

And at the same time, addressing some of the earlier comments about the kids who maybe aren't convinced that they're capable of reaching that far, when you bring them in in high school in the way our high school apprenticeship program works—and I know it's consistent with many other companies, that we partner with the local high schools, take advantage of available government programs, so the kids are working with us 15 to 25 hours a week as part of their course work. So they are simultaneously earning high school credits; they're earning cash, $10 an hour from us, so they see the connection; and they get exposed to not just their particular area, but the other parts of the company that's part of the program so they can see for themselves. I think that's a wonderful tool.

Senator KLOBUCHAR. Thank you very much, and I just think we need to do everything we can on the state and Federal levels with our laws to make it easier, and that's something that's more complicated than people think.

Ms. Marks, last, I'm half Swiss, actually, and in the last few years, our Commerce Department signed a Memorandum of Understanding with Switzerland under the leadership of Secretary Pritzker to look at what those apprenticeship programs are like in Switzerland. Bühler, based in Minnesota, has actually decided to launch a Swiss style apprenticeship academy, a 3-year, paid-for program. They take classes at our Dunwoody College of Technology.

Siemens also has employees in our state. I want to thank you for that. You use a similar apprenticeship model. Could you talk about how this has helped with employee retention?

Ms. MARKS. Yes. Thank you for the question. It has been a great employee retention tool for our apprentices and for the people they're paired with who are teaching them real-time on the job. You know, we're all challenged by the workforce shifting over time. But what we find is both the apprentices and the people who are training them real-time are both really appreciating this and getting something out of this.

The apprentice demand that we're seeing—and this is in California, in Georgia, and newly in Alabama, as well as in North Carolina—is incredible once the word gets out. Recently, for our Charlotte facility, the high schools that we were recruiting at—270 students turned out.

Chad Robinson, one of our apprentices that I've gotten to know, who's in the middle of our program right now—top ten in his high school—got accepted to a 4-year mechanical engineering school and decided to become an apprentice at Siemens because he'd be debt-free, get an associate's degree, get paid for the job while he was doing this, and then potentially follow on if he wanted to. Siemens would even pay for his Bachelor's or even Master's if he wanted to continue on as an employee.

So it has been a great experience, and these people—they speak for us, and we're happy to share.

Senator KLOBUCHAR. Well, thank you. And, by the way, having a woman CEO is a great way to get women into this business as well. So thank you so much for what you do.

Thanks.

The CHAIRMAN. Thank you, Senator Klobuchar.

Senator Cortez Masto is up next.

STATEMENT OF HON. CATHERINE CORTEZ MASTO, U.S. SENATOR FROM NEVADA

Senator CORTEZ MASTO. Thank you, Mr. Chair. This is a fantastic panel on an important topic, I think we can all agree.

I am from the great state of Nevada and have been visited by our career and technical education programs, our workforce development groups, the community colleges, and so many incredible people here in Washington who are concerned about not only funding for their programs but continuing the programs for the very reasons that we're talking about today, the skills gap that we see.

A couple of things I want to follow up on that Senator Klobuchar started with. I'm all about tearing down barriers. I think we absolutely need to address this issue of skills gap and do whatever we can to prepare the workforce for the future. But there are barriers, and you are talking about some of them today, whether funding barriers, the gender and wage gap barrier that I want to touch on, the negative branding barriers that we see, also recruitment of teachers and educators, and lack of education among counselors and parents to really focus kids who might be more attuned to going into this field—the skilled field—during their time in school.

But let me start with the gender and wage gap barrier. That is a concern of mine, and according to our Census Bureau, women make up 40 percent of the workforce, but only 24 percent of STEM workers. And the U.S. Department of Commerce and Economics and Statistics Administration reported that, on average, women earned 14 percent less than men, even when controlling for a wide set of characteristics, such as education and age.

I'm curious—for Mr. DeJohn, Mr. Neely, and Ms. Marks—how you are addressing the issue of both the gender and wage gap with your companies?

Ms. MARKS. So we are looking for the most qualified workers everywhere in this country and employing them, which includes women and minorities, and we do not have a wage gap at Siemens in the U.S. to share with you. I will tell you we have a program that is trying to address this, the stigma part of this as well.

We founded a program with the Aspen Institute called the Siemens Technical Scholars, where we have now found 80 students and given them between $3,500 and $10,000 scholarships, of which many are women and minorities, who are pursuing STEM programs in two-year institutions and community colleges. But one of the important parts of their scholarship is that they spread the word, and they evangelize the importance of their jobs and these careers, be it in welding, mechatronics, any of the STEM fields where we need support to grow our business.

Senator CORTEZ MASTO. Thank you.

Mr. NEELY. From a Gulfstream standpoint, somewhat similar. We certainly have a very active diversity outreach. But, quite

frankly, one of the most effective tools to particularly attract women and minorities to these technical trades is the mentors and the role models they see that are already in the company. We're blessed to have people throughout the company in all roles that can serve as those role models, and that ties—I know I'm a bit repetitive in referring back to how important it is to get the elementary and high school and middle school kids in.

But when we can get those students in front of those role models that look like them and have the same overall perspective, that's the most powerful tool—that, you know what, you are absolutely qualified for these jobs, and it's a rewarding career. It works.

Senator CORTEZ MASTO. Thank you.

Mr. DEJOHN. I don't believe that within Turner, there is a gap within the salary range for men or women. I think we're very conscientious about that. And, as Mr. Neely just said, one of the things that we try to do is—not only do we recruit college graduates every year, but every year, we bring in hundreds of—I'll use the word, apprentices—to work and be paid during the summer.

And the reason I wanted to say I would use the word, apprentice—if I've noticed anything about the conversation today, we as a group have made a huge distinction of: you're an apprentice, and you can get a degree, and then you can get another degree. Well, an apprenticeship is a 4-year degree, and part of our problem as a group is it sounds as though we're demeaning it, and it shouldn't be demeaned.

If I walk a job site, and I see a gentleman who has spent seven, six, five years as an apprenticeship plumber and see what he's doing and know that he made a fraction of his salary for the first 4 years—he's earned it, and if we can, as a group, change the way we discuss people learning trades, you know, the vocational term, it's—there are demeaning things out there. So that's why I wanted to say that.

Senator CORTEZ MASTO. And thank you for bringing that up, because I think one area that we don't focus enough on—again sometimes a branding issue—is organized labor. Our carpenters' union, as you well know, has some of the best apprenticeship programs. Our organized labor in the state of Nevada have apprenticeship programs that provide that degree or certificate, that work with the private sector, and they are phenomenal, and we don't do enough to boost them and support what they're doing in their training and skills as well in their trade.

So thank you for those comments. I appreciate all of you here today. It's an important topic.

The CHAIRMAN. Thank you, Senator Cortez Masto.

I had Senator Inhofe, but Senator Markey has returned, so it'll be Senator Markey and then Senator Inhofe.

STATEMENT OF HON. EDWARD MARKEY,
U.S. SENATOR FROM MASSACHUSETTS

Senator MARKEY. Thank you, Mr. Chairman, very much.

Can we talk about community college for a second just to make sure that we kind of discuss this skills gap and what's going to be necessary in order to make it easier for the people who need these kinds of skills to get the education they need? Would one of you

or all of you be willing to talk about the whole concept of community college for free so that people could know that that is accessible to them?

Mr. Ratzenberger?

Mr. RATZENBERGER. Thank you. Once you get to community college, if you don't have the foundation of being fascinated by tools and building things, you're not going to do very well, if all of a sudden, here you are 18 years old or however the age is. But if you have the basics—don't forget, in former generations, before the invention of the video games and things that kept us indoors, it was anathema to our parents that we were inside on a sunny day, so they'd kick us out. They'd say, "Oh, get out of here. Go do something," and we were left to our own devices.

So we climbed trees, we rode bicycles, and, oh, climbing a tree, you learned that you didn't put a ladder on a tree with finishing nails, because those steps would pop out when you step on them. So you had a problem. Now you had to solve the problem. Your bicycle chain breaks. You've got a problem. You have to solve the problem. So, really, what we all did in our childhoods before the current generation is solve problems. We didn't know that. We were playing.

So now it's a whole different issue. If someone grows up and all they've done is play video games—and there's certainly an attraction to that, and parents think that, "Oh, well, they're indoors and it'll keep them safe." Well, they're also not letting the child blossom, as it were, or to learn skills that's going to sustain the kid later on in life.

Senator MARKEY. So let me just follow up on that. MassTLC—that's the largest technology association up in Massachusetts, and what it does is it works with kids, K through 12, to help kids get the skill set that they need. So here's what it does. It, one, leads an hour of coding seminars, introducing students to the basics of coding software; and, second, it mentors students on entrepreneurship and community engagement by assisting teams of teenagers develop mobile apps that improve society.

Two years ago, a team from Winchester High School developed an app that can detect whether someone is sober enough to safely drive, and that finished third in a global competition. What do you think about that as a model? Because so many kids, as you're saying, have this skill set. So many of the jobs are increasingly being created in that sector. What do you think about that as a model to ensure that in our schools and then outside the schools that we close the skills gap so that every kid has access to that digital skill set?

Mr. RATZENBERGER. The more programs we have that kids actually use their hands—it's the hand to mind. Actually, in 1809, a book was written by a fellow named Charles Ham—that was the title of the book, Hand to Mind—on how important it is for children to use their hands, and whether it's computers or building a doghouse, it really doesn't make that much difference, I don't really think.

But the important part to me, also, especially when you're talking about computers and electronics—someone has to generate the electricity. So you go back to the coal miner conversation. Don't for-

get that someone's got to fix the diesel engine of the equipment that goes into the coal mine. So it's all one big weave. It's all one big tapestry. But anything that helps, helps.

Senator MARKEY. So in this Committee, you know, through our Chairman's leadership, what we do is we talk about disruptive technologies, autonomous vehicles, drones, augmented reality, as the society moves in a new direction in terms of where the jobs are going to be, and so many of them are going to require a digital skill set as well if they're going to be able to qualify for these jobs as they're moving forward.

We need to do what you're saying, but because of the massive incursion of disruptive technologies and the nature of work changes, we need to make sure that we kind of have a complementary strategy that could work, and I'm hoping that maybe out of all the conversations that we're having—and we thank all of you for being here—that we might be able to accomplish that goal.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Markey.

Senator Inhofe?

STATEMENT OF HON. JIM INHOFE,
U.S. SENATOR FROM OKLAHOMA

Senator INHOFE. Thank you, Mr. Chairman.

I'm glad I had a chance to visit with all of you when I first came in to let you know one of the problems we have with these musical chairs—going back and forth between two committees—both of them very significant and, actually, dealing with a very similar issue that we're doing today. I think some of you here are very familiar with the skilled workforce that we have in Oklahoma from our past. It's the home of a lot of companies that do the work, including NORDAM and Spirit Aerosystems.

In fact, Mr. Neely, I think they make the wing for your 760. I'm not sure.

But, nonetheless, they're very much involved. NORDAM and Spirit both work to ensure that we have skilled workers. I want to share with you a personal experience that I had. Many years ago, when I was in the state legislature, our Governor at that time was Dewey Bartlett. He and I—and I was in the State Senate—really kind of came up with the idea—we didn't have any technical schools in Oklahoma at that time—with the idea that a lot of parents were pushing their kids in one direction or another, completely forgetting about the fact that there's a lot of happiness and futures that can be made in technical training. So we actually started the very first tech school in the state of Oklahoma. So we go back to the beginning.

So through a STEM initiative and nonprofit called the Tulsa Night Flight, NORDAM has engaged children, students, and teachers to inspire them to work in STEM and to seek out the technical education needed to build airplanes. Spirit has built a strong relationship with Tulsa Tech to develop their curriculum, and they are in constant communication with each other to make sure they get the right ones.

So, Mr. Neely, as you develop relationships with technical colleges, what are some of the lessons learned? How did the faculty respond to your efforts?

Mr. NEELY. As I mentioned in my opening remarks, our workforce development strategy has evolved over time, and I think one of the key lessons learned as we've been through this process is that we should have earlier on done a lot better job of looking at the whole picture and not making the mistake we made of being a bit too siloed in looking at what manufacturing might need with a particular program within a technical college and what the aircraft maintenance side might have needed within either a different technical or a different area.

We allowed ourselves to be a little bit too splintered on the Gulfstream side, and then on the side of the—using Georgia as an example—the Technical College System of Georgia, which is the network of technical schools—I think they would say the same thing, that they made the mistake of letting themselves get a little bit too fractured as well.

However, as an improvement, what we've done to correct that is we stepped back both internally and with our colleagues at the Technical College System and the University System as well and said, "You know what? We need a more comprehensive, cross-functional approach."

So within Gulfstream, we formed a cross-functional team, of which I'm a part along with Human Resources and our manufacturing team and a number of others, including engineering, and identified the skill sets that we need both today and in the future, and then have worked collaboratively with the senior people at the Technical College System to understand—here are our needs today and tomorrow. What programs do you have currently, and then where we don't have programs that can address our needs, how can we work together and—and the working together part——

Senator INHOFE. One of the problems, though, you have is how are you going to determine what your needs—they're going through an educational process. It might be a two-year program. So it has to be difficult to know what are your needs going to be 2 years from now. I mean, just one administration change can totally change that.

Mr. NEELY. You mean, in terms of technology or in terms of future employees?

Senator INHOFE. Yes, in terms of what you are going to call upon for a trained worker 2 years from now. It would be difficult, I would think. My time is running out, and I want to get to Ms. Marks.

You have kind of a special situation in that you are so diversified. You work across multiple sectors ranging from oil and gas to energy, and these sectors are often the first to embrace new technologies and have huge investments in working, training, and retraining programs, including for veterans.

So how does a diverse company like yours, like Siemens, utilize on-the-job training, apprenticeships, to make sure that the knowledge is passed on from one group to another?

Ms. MARKS. Well, Senator, it's very important that the knowledge gets passed on, and we do it in a few ways. One is each of

our apprentices is matched up with someone to do on-the-job training, and they both take great care to do this, to mentor them, as well as to share the skill set, in addition. One thing we have done working very closely with four different community colleges, though, is put together a playbook so that everyone—and I'm happy to share this because it's been published——

Senator INHOFE. Now, when you say that, are you talking about your experience in Oklahoma, too?

Ms. MARKS. Well, our experience in Oklahoma where we have our Wind Service Center, and we do on-the-job training. We don't have any apprentices there.

Senator INHOFE. I see.

Mr. MARKS. But our apprentices are visible everywhere. They actually wear an apprentice badge, and it's actually on their work clothing, and they're proud of it, and that comes from the German model where it's actually viewed as value-add, and this is our next generation of the workforce. So we are trying to share lessons learned, and we're happy to share them with any company.

Senator INHOFE. Well, thank you very much.

The only regret I have, Mr. Chairman, is that my kids and grandkids are going to be so disappointed that I didn't have a question for Cliff.

Thank you.

[Laughter.]

The CHAIRMAN. Thank you, Senator Inhofe.

Senator Duckworth?

STATEMENT OF HON. TAMMY DUCKWORTH, U.S. SENATOR FROM ILLINOIS

Senator DUCKWORTH. Thank you, Mr. Chairman.

I'd like to discuss the value of community colleges in closing the skills gap. The first community college in the nation was established in Illinois in 1901. Joliet Township High School actually proposed an innovative solution to addressing the growing skills gap in 1901 that was occurring by going beyond traditional 4 years of high school and adding a fifth and sixth year of courses by partnering with the University of Chicago to get credit. So that was the first community college in the Nation.

It's amazing that today, we're talking about the same skills gap happening again. And, in fact, we see this, especially back in Illinois, and even in my old congressional district, where I had the largest concentration—one of the largest concentrations of tool and die manufacturers in the Nation is in Illinois. Time and again, when I talked to manufacturers, what they said to me over and over again was, "Our machinists are aging out. The average age for a machinist in our plants is in their 50s, late 50s, and we don't have the next generation ready to come in."

That's why companies like Northrop Grumman, for example, partnered with our local community college to fund students going through a two-year program in manufacturing arts with a scholarship, with an internship, and at the end of those 2 years, after the first year, Harper hired all seven of their initial group and are now funding nine, and this is spreading all across Illinois.

So I just wanted to talk a little bit about what community colleges can do to provide valuable job training related efforts, such as registered apprenticeships, on-the-job training opportunities, and paid internships for low-income students. It's why I partnered with Senator Franken to re-introduce the Community College to Career Fund Act that would create a competitive grant program that would fund more partnerships between industry and community colleges with the goal of making community college free for students coming out of high school.

Ms. Marks, I thank you for your testimony on the work that you're doing with community colleges, and I thank you for your work on hiring veterans, as you partner with the Chicago public high schools to offer engineering opportunities for real, viable jobs, and your partnerships also with UI Labs Digital Manufacturing and Design Innovation Institute. Whew, that's a mouthful!

In your opening statement, you highlighted several of Siemens' successful apprenticeship programs and included a copy of your playbook for other manufacturers in developing apprenticeship programs. Siemens is fortunate to have the resources to invest and develop these vital programs, but many small and medium size manufacturers and businesses do not. When I talked about that concentration of tool and die manufacturers in Illinois, they're all small and medium size businesses. Many of them are family run, mom-and-pop businesses.

What can we do to build on your success and help small and medium size manufacturers and businesses establish apprenticeship programs?

Ms. MARKS. Well, there are several things we can do, but one is that a lot of those tool and die manufacturers are part of our supply chain, and we do business locally, so we do business with them. Being in all 50 states, we have the opportunity to share lessons, and we think by having this playbook that you referenced, which we did work on collaboratively with Alcoa, Dow, the National Association of Manufacturers, and the Department of Labor—it is scalable, and it shows you how to partner with a community college.

We actually went in to the four community colleges in the four states we're in. We helped set the curriculum. We took people out of our facilities and our factories, and we helped share what would be needed in terms of technological skills and core educational analytic skills for these apprentices. So we believe that the playbook is scalable, whether you're a large company or a small, and we welcome the opportunity to share it.

Senator DUCKWORTH. Thank you. Oftentimes, you know, having served in the military for 23 years, people equate national strength with how many tanks and guns and helicopters we have in our arsenal, and, frankly, I find helicopters sexy, I've fired lots of guns, and ridden in tanks, so I'm there with them.

But people underestimate the value of our manufacturing sector as a part of our national strength. It is just as important to have a strong manufacturing sector as it is to have a large standing military. And, in fact, we wouldn't have that military with all that great equipment if it were not for innovative American manufacturing. So I thank you for what you're doing, especially with this closing of the skills gap, working with community colleges, because

I think that for so many of our kids across this country, they can't afford that four-year degree to start off with, and this is a great way to get started, not have debt, and then to go to work, and then say—you know, in a couple of years, these same kids are going to turn around and say, "Yes, I want to become a manager on the assembly line. I'm going to go get that B.S." So thank you very much.

Thank you, Mr. Chairman. I yield back.

The CHAIRMAN. Thank you, Senator Duckworth.

Senator Cantwell?

STATEMENT OF HON. MARIA CANTWELL,
U.S. SENATOR FROM WASHINGTON

Senator CANTWELL. Thank you, Mr. Chairman.

Thank you to the panelists for your testimony and good comments about how important this is. From the perspective of a variety of other areas, I know we've talked about some of them, obviously, manufacturing, in general, and infrastructure, but, obviously, housing, energy, cybersecurity, aviation—they're all sectors with major transformation happening, and they need to continue to upgrade and skill the workforce for tomorrow.

So one of the things that I'm interested in hearing about is how you think we could more aggressively incent that at the Federal level. One idea Senator Collins and I have put forth is tax incentives, which would be the first ever federally recognized incentive for apprentice. The reason why we've come to that conclusion is just that we saw so much gap after 2008 with people not knowing where to make their investment, not knowing what to skill themselves in, not knowing which jobs are going to be there and which aren't. The fact that the apprentice program hires and trains is a real benefit for the individual worker.

So I wanted to hear your thoughts on a Federal incentive for apprentice and whether you think that would be a good idea to help make up this gap.

Colonel CARTNEY. Senator, it may be good. I think the biggest thing that we're going to need to do to incentivize it is to really raise the public awareness. And so you could do an incentive—I think there is currently a program out there that's currently helping community colleges to set up apprenticeships.

But the biggest for us—the biggest thing dealing with student debt is that they get a good job when they're done. And I think no matter which program you target—and I think apprenticeships would be good because they are career focused—that you take an approach that people have some type of work commitment following their education.

Senator CANTWELL. Well, I think it would be pretty big news if the President of the United States, who had a show called "The Apprentice," would sign his first bill which would be a first ever federally-recognized apprentice program to incent people, because I think it would get a lot of attention.

Ms. Marks, I've seen the European model on apprentice, and thank you to Siemens for bringing it home to the U.S. in ways that you articulated in your testimony that you're doing. But I think that what I've seen, at least in the Pacific Northwest, where we are growing and growing at a rapid pace, is that we need people to

make the commitment, and part of making that commitment is, as I said, taking the question marks away. Just getting people to be hired and trained takes away that. So our incentive investment, asking the manufacturers to do that by giving them incentive to do that, we thought would help speed up that process and the hiring.

Ms. MARKS. So our experience here in the U.S. has really shown us that the apprentice programs are best implemented locally, and that's where we focused, obviously, in our places where we have larger employment and where we have the need. But to us, there's a business imperative. So we've done this regardless of incentive, because we get quality employees out of this who are loyal and who spread the word about the program. To us, it's good business, and we're happy to share that with any other company who is interested.

But, again, we found that in each of the four community colleges, the curriculum has had to be different. A welder is very different from a mechanic. So we've worked with them, and every community college has been tremendously responsive. We've never run into any issue.

Senator CANTWELL. Thank you.

Mr. Neely, if I could, do you support making sure we get a functioning Export-Import Bank?

Mr. NEELY. Yes, ma'am.

Senator CANTWELL. Does that affect your business if we don't?

Mr. NEELY. It absolutely does. A direct connection to sales, period.

Senator CANTWELL. Pardon me?

Mr. NEELY. Direct connection to sales, period.

Senator CANTWELL. Well, we definitely need to get that board functioning.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Cantwell.

Senator Blumenthal?

STATEMENT OF HON. RICHARD BLUMENTHAL, U.S. SENATOR FROM CONNECTICUT

Senator BLUMENTHAL. Thanks very much, Mr. Chairman.

Thank you to the panel for being here. This is a really wonderful panel.

I want to begin by thanking Ms. Marks for the extraordinarily generous and important grant of manufacturing and design software that Siemens contributed to the Connecticut state colleges and universities—announced yesterday it's worth $315 million—just really amazing, and so thank you very much. We are very grateful to you in the state of Connecticut.

Mr. Neely, as you know, your parent company, General Dynamics, is also the owner of Electric Boat. We're proud to make the world's best submarines. In fact, it serves as the submarine capital of the world in Groton, Connecticut, where I have visited many, many times, and where, in fact, there will be hiring of about 14,000 people, and that will be within the next few years—14,000 people by 2030, but 2,000 by the end of this year.

They are building up, as you know, because we're making more submarines—two Virginia class a year, the Ohio replacement or

Columbia class—an extraordinary success story for the benefit of our Nation. We're also going to be hiring—Pratt and Whitney will be hiring thousands more employees because the F–35 is ramping up, and Sikorsky will be staying in the state, obviously not EB companies or General Dynamics, but we're very proud to be heavily invested in the defense industry. And it isn't only those corporations, it's also the supply chain.

Whenever I visit these companies, whether there are 25 employees or thousands, I say to them, "You are as important as the men and women in uniform," and two of my four children have served, one in the Marine Corps deployed to Afghanistan, and the other now currently serving as a Navy officer, and he is deployed, and that's why I have a blue star on my lapel.

But my view is that these employees, hardworking, dedicated, and loyal, are as important to building those weapons systems as any of the men and women who use them, because we couldn't do it without their skills. And, hopefully, their sons and daughters will be attracted to do the same kind of work and be trained to do that work. That's our challenge in Connecticut. How do we train them? How do we provide those skills and fill the jobs that exist now? And there are jobs. You go to the websites of these companies, and they have openings, but they can't find the right people to fill them.

We've talked, I know, in this hearing about skill training. I think the investment in skill training is second to none in its importance to the future of our nation.

Mr. Ratzenberger, I know you have a Connecticut connection as well—a home in Milford. I've seen you in Connecticut. I welcome you here. I'm wondering whether you see some opportunity for building a consensus, knowing of your skills in persuading and gaining awareness and attention—a consensus that we need to invest more heavily in this area.

Mr. RATZENBERGER. Absolutely. Anywhere I travel across the country, people come up to me because of my visibility and the Made in America show and different speeches I give around the country, and they all say the same thing, "Thank you, thank you, thank you for bringing light to this problem."

I met one fellow, specifically, at JFK airport. I was heading south, and we were talking. He said, "We thank you for all the work you do in manufacturing." I said, "Where are you off to?" He said, "I'm on the way to Argentina to hire welders." He needed 20 welders. He owns a company just outside of New York City, and the fact—I mean, it was extraordinary, the fact that he couldn't find one welder, and we're talking about the Connecticut, New Jersey, New York area. He had to fly to Argentina to hire 20 of them, and that's how desperate people are, especially in Connecticut, as you know.

Bullard-Havens in Bridgeport, Connecticut—Bridgeport at one time was the arsenal of democracy. We made everything. There wasn't a thing you could name that people in Bridgeport couldn't figure out how to make. I mean, you know, Thomas Edison invented the light bulb, but it was a fellow named Latimer in Bridgeport who invented the filament that actually made the light bulb practical, and the socket.

So that's how important manufacturing is and people that know how to make things. But when you take the funding away from the technical high schools, like Bullard-Havens or Pratt Institute in Milford, you're not going to have the people showing up. I really applaud the President for bringing back manufacturing, but what I'm afraid is going to bite us all at the end of the day is the fact that we haven't educated the people to operate the machines in those factories.

So I think that's A–1 on the list to put—you know, the state of Connecticut, especially—put funding back into those schools, because when you canceled shop classes all those 30 years ago, the dropout rate—instantly, 30 percent to 40 percent gone, because that's how many kids were dependent on those courses for their livelihoods, also coupled with the fact that 70 percent of all crimes committed in the United States are by high school dropouts.

So why not reinstate those programs? It doesn't cost a lot. We've got the space. I can help you, you know. I still know how to use tools.

Senator BLUMENTHAL. Well, we'll use the tools that you have now—not so much welding and pipefitting, but the skills of public awareness, and I would welcome an opportunity to continue your great work and partner with you.

My time has expired, but I want to thank, again, all the panelists. There's a report that will be coming out, which I will make sure you get. It's coming out today or tomorrow—the Connecticut Institute, the 21st Century, on the defense workforce, how Connecticut can promote growth and retention, and maybe we can work together on how to make sure that its goals and purposes are fulfilled.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Blumenthal.

Senator Johnson?

STATEMENT OF HON. RON JOHNSON,
U.S. SENATOR FROM WISCONSIN

Senator JOHNSON. Thank you, Mr. Chairman.

I want to thank all the witnesses for your testimony.

Mr. Ratzenberger, I really want to thank you for using your celebrity to champion this exact issue.

Before I did this crazy thing, becoming a U.S. Senator, I ran, operated, and owned a manufacturing plant for more than 30 years in Oshkosh, Wisconsin. We spent a lot of money on education. To me, the bigger problem is attitude. I've traveled around the state of Wisconsin for six years. My own experience as a manufacturer—there's not one manufacturing plant in Wisconsin that can hire enough people—plenty of jobs, good-paying jobs. I would say there are two reasons. One, we pay people not to work; and, two, we tell all our kids they've got to get a four-year degree, which implies somehow if you don't get a four-year degree, you're a lesser citizen.

So one of the things I was involved in before running for Senate was the Partners in Education Council of our school system. Our efforts were soft skills as well as—the last one was next step after high school. How can you provide students and their parents the

information on all of their options—four-year degree, 2-year degree, technical college, military service, or just entering the workforce.

A quick little story. A hundred times at those meetings, I said, "We have to stop denigrating the trades." I had made that statement 2 minutes earlier, and a very wonderful school administrator started talking about a child, a kid, a young man. We'll call him Billy. He said, you know, "Billy's struggling in school, you know. Let's face it. All Billy's ever going to be is a mechanic." Now, fortunately, we had the owner of Oshkosh Tire sitting at the table, and she said, "Hey, I need those mechanics," and the administrator says, "Oh, that's not what I meant." But, unfortunately, that's exactly what she meant, because we've been preaching this now for decades—you've got to get a four-year degree, which, again, implies that going into manufacturing, becoming a carpenter, a welder, a plumber—I can't do any of those things. We need those skills.

So I'm all aware of the fact that we have to fund the manual arts—the essential arts. We've got to shift that attitude first, that all work has value, and you have to build things. I love your testimony, the pride in being able to produce a nut and bolt at one-five thousandths of an inch. That's an accomplishment. It has gotten better. It's incredibly difficult. It's what makes America better.

I see no value in having American workers produce highly redundant products. The value comes in producing high quality products. So I just want to ask you how do we shift that attitude, and, by the way, do you agree with that?

Mr. RATZENBERGER. Oh, 100 percent, 100 percent. Earlier, we were talking about the media and the perception of the media, and I told a short story about a mother who didn't want her son to be a stone mason like his father because she was embarrassed. She didn't want the neighbors to think he was stupid. To me, it's extraordinary that people actually think like that, after coming from a background of people that worked with their hands. But there's a gallantry in it. There's honor in it, and these are the people that are essential, as you just mentioned.

Imagine if every truck driver pulled off to the side of the road for a couple of hours. We'd grind to a halt. Or the diesel mechanics—I know there are big truck companies that can't find diesel mechanics.

Senator JOHNSON. Or drivers.

Mr. RATZENBERGER. Right. Oh, they're desperate—every truck now you see, on the back it says, "Drivers wanted. Call this number." I had a nice boat with diesel engines, and I ended up selling it because when I'd go up and down the East Coast, it was tough to find a diesel mechanic. We're running out of them.

Senator JOHNSON. Senator Barrasso—I can't remember if it was his father or grandfather who laid cement, and they had these brass plates that they put in the cement because they were so proud of their work.

Mr. RATZENBERGER. That's right.

Senator JOHNSON. Where did we lose that? I want to quickly go to Colonel Cartney—I got involved in education because the President of our Catholic school system had been the President of Fox Valley Technical College—really kind of world-renowned, because he brought the TQM principles—Stan Spanbauer was his name. He

traveled around the world talking about how you engage in the President's Advisory Council, bringing businesses into education to align the skills that are required. This is what we're looking for in our manufacturing, in clerical skills, and in professional skills. What a concept, actually going into the workforce.

I think this is something we can do within our communities—the positive engagement of the business community into your local middle schools, grade schools, high schools—we have to change that attitude—into technical colleges, into colleges. We have to re-align those goals.

And, Mr. Ratzenberger, anything I can do to team up with you in your effort as you champion this—I fully understand this issue. I understand these attitudinal things, and it is your celebrity that can really highlight this and make a really big difference, because this does not require a Federal Government solution. This can be done on the ground. This can be done quickly.

We can change these attitudes around, because, as you said, when we took those skills out of high schools, all of a sudden, you have a 30 percent dropout rate, because the fact of the matter is not every kid should be going to college. There's a great book—if you haven't read it—Real Education by Charles Murray. I would highly recommend it.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator Johnson.

Well, this has been a great panel. Thank you all for your remarks and responses. The interaction has been great, and I do agree with everything that's been said about the need to re-image, because there is a sense of accomplishment that comes with doing things, making things, building things.

Senator Johnson can probably relate to this, too, but when I'm in my home state on weekends, during those seasons of the year when my lawn grows, and I mow my lawn, and I look at it and you feel pretty good. You feel like you've accomplished something, which is something that I think exceeds, in many of our day jobs here some days, the sense of accomplishment we have.

But it is an important part, and it's almost kind of a lost part of our culture, and I think we need to restore its importance, not only because of how it shapes the attitudes and the values that our young people have, but also how it's going to be essential in the economy of the future. We've got to have those skill sets. So everything that you've said today adds resonance to this issue and helps us focus better on the things that we need to do. I just want to thank you for everything you all are doing in this field.

I want to ask one last question, and it pertains a little bit to discussions that we're going to be having here in the near future with regard to infrastructure, and it's for you, Mr. DeJohn. It has to do with maybe discussing the effect that the skills gap has on the construction industry, specifically, in regard to how the skills gap affects the cost of construction projects, including infrastructure projects?

Mr. DEJOHN. Thank you for asking that question, Senator, because it is a huge concern to us as a company. As the infrastructure is starting to be put in place, and your retrofits of your bridges and dams, everything that you're reading about that's failing, with-

out the skilled labor to know what has to be done, what we start to realize is increased costs from the subcontractor community, whereby the skilled labor is not in enough quantity to be able to support the amount of work that's coming out. So that's going to drive the prices up, but it will also slow down certain projects from even getting started.

And then the last thing is without the skilled labor to suffice and fill all the positions, the amount of oversight and inspection that you have to put in to make sure that it's going in correctly—because somebody says, "Well, I'm an electrician." Well, we want to test how an electrician is. Go open a cabinet and look at how the wires are run. If it looks like spaghetti, you'd better get another electrician.

The same thing is going to happen with welders on bridges. It's not where the inspection is so easy that someone can walk over and look at it—yes, that's fine. You have to have certain buckets where you go underneath and look at it. It's a huge concern for us. As the largest builder in the country, it's not just buildings. The infrastructure side of everything that's going on has led to such a deterioration.

You saw what happened to the dam in California during the heavy rains. They're lucky it didn't collapse, and to try to repair that, you know, that takes skilled labor that knows how to operate equipment on that type of an incline. Is that something that a mother says, "Oh, I don't want my son to learn how to do that. He may save a city some day." It sure would be nice if somebody started to think that way. It really would.

The CHAIRMAN. Thank you.

We'll keep the hearing record open—Senator Blumenthal?

Senator BLUMENTHAL. One last quick question. Thank you, Mr. Chairman, for Mr. DeJohn following up on that remark.

And thank you for being here from Connecticut and doing such great work for us in Connecticut. Turner Construction is known nationwide, but most especially in Connecticut for the great work you've done on our roads and bridges and the vast variety of projects.

Mr. Ratzenberger mentioned the welders that he saw being recruited in Argentina, and maybe you could give us more specifically the skill sets—are they welders, engineers, designers, pipefitters—if you could give us those specific skills that you think we should be training people to do?

Mr. DEJOHN. One of the facts that Mr. Ratzenberger and I both put out—and there was a little bit of a difference—was the average age of the worker today. He was in the 50s. I was at 46. The reason our numbers were different was, as part of the construction community, we have a large amount of labor, just, you know, the people that go in, set up the project, set up the cleaning, remove the dumpsters. When you take that group out, which is typically the youngest group because they're in a lesser skilled group, the number of the average age goes into the 50s, and that's across the board.

When 2004 to 2007 was a boom time, many people that got into the trades were someone that had not been skilled in it. When the economy started to fail in 2007–2008, not only did those people

leave, but it stopped people from going into the trades, and now you've got retirement on top of it. It's an across the board area that we need to concentrate on.

It goes back to the issue Senator Johnson brought up about pride. If you walk right down the street, the Willard Hotel—when they reopened it, I was in Washington, D.C., working for PADC. The mosaic floor leading down Peacock Alley—take a good look at it. You will see someone's initials tapped in, because that's the way they were paid. That building was renovated. That floor is still there. It's a pride. People had pride then. If we're going to do anything today, it's to allow people to know that going into the trades is a proud thing to do.

John said, "Look, I put a roof up." Well, I grew up in a community—or in a family of tile marble and terrazzo setters in upstate New York, and I can still drive by buildings today and say, "My father worked on that. I pushed a wheelbarrow in there." If you can help us in any way do that, it would be tremendous.

Senator BLUMENTHAL. Thank you. That's really powerful. Thank you.

The CHAIRMAN. Yes. Here, here.

Again, we'll keep the hearing record open for two weeks, and if Members have additional questions they want to submit for the record, if you could, get those responses back to us as quickly as possible.

And, again, thank you. Thank you to all of you for being here today and for all that you've added to this discussion and conversation. It's an issue that we need to be having more of a public discussion about and things that we can be doing to not only change attitudes and perceptions, but also provide incentives for people to enter into these fields that are going to be so necessary, not only in the present but in the future.

With that, this hearing is adjourned. Thanks.

[Whereupon, at 12:03 p.m., the hearing was adjourned.]

A P P E N D I X

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. DEAN HELLER TO RORY DEJOHN

Question. In this Committee, we've looked at emerging technologies like the Internet of Things (IOT) and Artificial Intelligence.

These technologies are going to change the needs of different industries.

As these technologies advance and become more widely adopted, are you thinking now about how this will change the employee skills needed for your industry?

Answer. We are always thinking about how to meet the next challenge, for ourselves and for our clients. As emerging technologies continue to drive changes in our industry, we must do everything we can to stay abreast of those changes and to harness the advantages they provide. This means training our people and creating opportunities for them to seek training throughout their careers—we are strong believers in continuous learning. It also means recruiting college graduates and other new hires who come out of engineering programs—or other academic/trade disciplines—comfortable with the latest technology tools.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MAGGIE HASSAN TO RORY DEJOHN

Question 1. New Hampshire receives $6 million from the U.S. Department of Labor under the Workforce Innovation and Opportunity Act (WIOA). As you likely know, the President's budget blueprint proposes cutting 21 percent of the Department of Labor's budget and states that the budget, "Decreases Federal support for job training and employment service formula grants, shifting more responsibility for funding these services to States, localities, and employers." One thing these funds go toward is workforce training and education in high-demand fields, including WorkReadyNH which is a collaboration between state agencies to ensure our workers have both basic skills and softskills when entering or re-entering the workforce. With the health care sector projected to increase by 14 percent between 2016 and 2021, and the IT sector with a projected growth of 15 percent over the same period, job training and education opportunities in these sectors, and others will be essential. What do these proposed cuts mean to the ability of companies like yours to find the workforce they need?

Answer. A skilled, well-trained workforce is necessary for maintaining and building competitive advantage. The public sector and private sector have always collaborated and must continue to collaborate in providing training opportunities to people interested in improving their skills.

Question 2. What I hear most from business leaders in New Hampshire is that they do not have access to a skilled workforce. With the lowest unemployment rate in the country at 2.7 percent—it is essential to not only work with dislocated workers, but to support individuals in re-joining the labor market and train individuals who are underemployed. Organizations, like Families in Transition NH, have had a lot of success lifting individuals out of poverty by providing wrap-around supports, like affordable housing options, child care, job-training and case management. As we talk about the importance of supporting and improving job training programs, do you think it is important to provide wrap-around services? Have you seen the impact of these kinds of programs in your work?

Answer. As our industry is experiencing a growing need for labor, we have looked beyond our traditional methods of recruiting. This has led us, and others, to seek people wanting to make a transition from low-skilled occupations to careers in construction. In addition, we participate in efforts and programs that offer a helping hand to people making other transitions—from the military as well as from communities where people feel stuck and do not see a path toward the opportunities to advance. Whatever the specific transition is, we find these people often do need some extra support and encouragement to successfully make that transition.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. CATHERINE CORTEZ MASTO TO RORY DEJOHN

Question. The biggest request for support that I hear from technical education institutions and educators is for additional funding to expand and adapt programs to fit the needs of the industries, and reach more students. Unfortunately, however, this Administration has proposed numerous cuts to the budget that support such programs. What do you think the Federal Government can do to more effectively support the expansion of programs that train our students in technical fields?

Answer. There certainly is a need for more students to benefit from attending technical high schools. The Federal Government, educators and parents can all be a positive influence by encouraging an allocation of education resources necessary to support the needs our students and industry.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. DEAN HELLER TO COLONEL MICHAEL CARTNEY

Question. Nevada has developed great programs for meeting our state-specific skills gap. But we can't guarantee that students will move toward these fields.

How do we encourage students to pursue fields—like autonomous vehicles, energy storage, and cybersecurity—that will help states like Nevada close their own skills gaps?

Answer. Thank you for your question. Attracting students, both traditional and non-traditional is really at the core of our workforce skills gap dilemma. Generally, there are three areas of focus that must be addressed: (1) the community must value the occupation, (2) the education has to be achievable, and (3) there has to be a quantifiable return on investment for the student.

How a community values an occupation is a perception that needs to be addressed by industry as well as education. Often, the first step is exposure to prospective students and the families, of the career and its benefits. We are not going to attract students to the energy storage industry if they do not even know what it is. Industry plays a key role in imaging, and often re-imaging, their industry. Most work environments have evolved significantly in the past 30 years, but someone not in that industry will be unaware of the changes if someone is not out proactively informing the community. National campaigns, such as General Electric's recent series of commercials, can be strong influences in getting potential students interested in technical careers, and thus technical education. This past year, the voters of South Dakota, with overwhelming support for industry, passed a constitutional amendment recognizing post-secondary technical education as the third form of education in our state. If industries and educational communities together raise the awareness of an occupation's value, it will make those seeking and entering that occupation feel valued.

Once the community values the occupation, potential employees must see the path to that occupation as achievable. Achievable must go well passed superb colleges like your Great Basin College providing industry aligned technical programming. It means the training, education, and ultimately good paying positions are readily available, and potential employees (students) believe the pathway before them is within their reach. A good college education requires work, but Lake Area Technical Institute has found that confidence in themselves and valuing the occupation are better indicators of student success than high school GPAs.

Before anyone walks a path, they must believe it is a journey worth taking. And, although there is significant merit to the self-growth aspects of higher education, at the end of the day, for many Americans, it boils down to the return on investment—in the terms of finances. If someone off the street can start at the same salary and position as someone with a college certificate or two-year degree, then there is no motivation for an individual to seek the education. The bottom line is we must increase the return or change the investment. In order for an occupation requiring college level technical skills to be successful, the industry must value the education in the terms of salary and position—or it can value it by lowering the monetary investment from the student. I dislike the phrase "Free community college," college costs someone something. But for hundreds of South Dakotas, there is a way to get a college degree for limited monetary investment, as long as you are willing to commit to working in SD, and possibly committing to work for a specific company.

Other references:

I have worked with Great Basin College in the past as part of the Western Interstate Compact on Higher Education (WICHE). My staff and I are always willing to share best practices and talk through specific issues at any time with your edu-

cational, industry, or government stakeholders on this topic. We can be reached through *www.lakeareatech.edu.*

The Aspen Prize for Community College Excellence. *http://highered.aspeninstitute.org/aspen-prize/* is also a great source. With seven years of experience in examining community colleges across the country for best practices, the Aspen Prize organization can point you to colleagues experienced in a number of topics.

Finally, in his book *What Excellent Community Colleges Do,* Joshua S. Wyner draws on the insights and evidence gained in administering the inaugural Aspen Prize for Community College Excellence. This book identifies four domains of excellence—degree completion, equity, student learning, and labor market success—and describes in rich detail the policies and practices that have allowed some community colleges to succeed in these domains. By starting with a holistic definition of excellence, measuring success against that definition, and then identifying practices and policies that align with high levels of student success, Joshua seeks provides a body of knowledge about improving student success in community colleges.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TODD YOUNG TO COLONEL MICHAEL CARTNEY

Question 1. Colonel Cartney, thank you for taking the time to be here today. I am intrigued in the successes you have seen at your institution. Similarly, I have seen the same dynamic in my home state of Indiana. The shortage of much-needed skills requires a stable pipeline, which many programs at community colleges and our high schools serve to address this issue. Over the past few years, the demand for a skilled workforce has led to increased participation in career and technical education programs. In 2013, over 2,000 high school students were enrolled in some type of CTE coursework in Indiana. In 2014, over 3,000 graduating seniors earned an industry credential, which is an increase of 48 percent from 2012. Even more impressive, 8,603 students earned college credits and saved collectively four million dollars for Hoosier families. What are some ways to expand the growth we have seen in career and technical education? What tools can we provide for our students, their teachers, and the local businesses in our communities to scale up programs that are working?

Answer. Thank you for your questions. As the U.S. Air Force saw fit to sponsor my master's degree work at Purdue University, I know first-hand the top notch higher educational system in Indiana! The Hoosier state can be proud of their educational system. First let's discuss influencing the career and technical education participation in the K12 system. Your state has a strong start on growing CTE, but like South Dakota, it only eases a still looming technically skilled workforce demand.

The short answer would be continuing what you are doing! Continuing to increase your growth would likely mean: earlier exposure, broader engagement, and richer experiences on the K12 side. Allowing industry representatives into classrooms to teach pertinent lessons that include exposure to the career fields, encouraging industry involvement in expanding and enhancing your existing CTE offerings, industry summer camps, career days, exposure to post-secondary career programs through online and on-campus experiences, and then coupling those experiences with a robust CTE dual credit partnership with your state colleges.

At the post-secondary level attracting students, both traditional and non-traditional is really at the core of our workforce skills gap dilemma. Generally, there are three areas of focus that must be addressed: (1) the community must value the occupation, (2) the education has to be achievable, and (3) there has to be a quantifiable return on investment for the student.

How a community values an occupation is a perception that needs to be addressed by industry as well as education. Often, the first step is exposure to prospective students and the families, of the career and its benefits. We are not going to attract students to precision machining if they do not even know what it is. Industry plays a key role in imaging, and often re-imaging, their industry. Most work environments have evolved significantly in the past 30 years, but someone not in that industry will be unaware of the changes if someone is not out proactively informing the community. National campaigns, such as General Electric's recent series of commercials, can be strong influences for getting potential students interested in technical careers, and thus technical education. This past year, the voters of South Dakota, with overwhelming support for industry, passed a constitutional amendment recognizing post-secondary technical education as the third form of education in our state. If industries and educational communities together raise the awareness of an occupation's value, it will make those seeking and entering that occupation feel valued.

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Before anyone walks a path, they must believe it is a journey worth taking. And, although there is significant merit to the self-growth aspects of higher education, at the end of the day, for many Americans, it boils down to the return on investment—in the terms of finances. If someone off the street can start at the same salary and position as someone with a college certificate or two-year degree, then there is no motivation for an individual to seek the education. The bottom line is we must increase the return or change the investment. In order for an occupation requiring college level technical skills to be successful, the industry must value the education in the terms of salary and position—or it can value it by lowering the monetary investment from the student. I hesitate on the phrase "Free community college," college costs someone something. But for hundreds of South Dakotas, there is a way to get a college degree for limited personal monetary investment, as long as you are willing to commit to working in SD, and possibly committing to work for a specific company.

What are some tools you can add to key stakeholder tool bags? The top of the list has to be industry partners. Indiana Industries have a vested interest in your CTE programs and educational offerings. Work with them on identifying and understanding the key role they play in student success. On both the K12 and post-secondary sides industry partners serve as student mentors, advising and consulting on curriculum, and helping provide support structures for students who need one. The formation of industry sector cabals to support programs in high school and post-secondary is key to increasing participation.

Other needed shifts are in our Federal and State approaches to providing higher education in support of employment. There is inherent value in higher education and for many that inherent value, self-growth, and discovery is the justification for seeking higher education. But for millions of Americans, the reason they seek higher education is to better their lives and the lives of the families. Their goal is to achieve the American dream. For them, it is education with a purpose, it is about getting a better job, not just a degree. But, the current system does not serve them well. Requiring someone to get all of their education before they seek employment does not work for millions. Yet all of our systems, processes, and funding seem to be centered around this culture and in this paradigm. This is something that we need to exam and change. We must align our educational and occupational careers, and find ways to meld our financial aid, scholarships, and support systems to enable this.

As one significant component to enable this, Lake Area Tech redefined success as placement, not graduation. With prospective students, we talk about what they want to be, not what degree are they seeking. Redefining success as placed (employed or continuing their education), and making graduation (completion) a step along their journey affects not only the faculty and staff of the institution, but also students, parents, and industry need a different perspective on their education.. At the institutional level, the first step was formally changing our mission statement to *"Lake Area Technical Institute: superior, comprehensive technical education that changes lives and launches careers"* to focus this initiative. This subtle adjustment changes the whole conversation and focus with potential and current students. Rather than discussing degrees, which is an abstract concept to many new students, you are discussing what they want to be, what they want their future to be, and then laying out a path for them to get there. Instead of discussing "where can you go with a particular degree," you are discussing which degrees can get you to where you want to go. Things become immediately more relevant. Going to class, doing homework, and passing tests—it's not just about completing a course, but rather, it's about learning what you need to know to be what you want to be! This subtle but sweeping change gives higher education the purpose our prospective students are looking for.

Other references:

My staff and I are always willing to share best practices and talk through specific issues at any time with your educational, industry, or government stakeholders on this topic. We can be reached through *www.lakeareatech.edu.*

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Question 2. Colonel Cartney, rural and urban areas often have unique workforce needs specific to their environment. Urban areas may have more job opportunities while rural areas have less openings and rely heavily on a few employers. I see this dynamic across my home state of Indiana, and partnerships in more rural communities—like in Clark County—become vital to the health of the community. However, urban communities may need a slightly different approach. What are some ways we can address the diverse workforce needs of rural and urban areas?

Answer. You are 100 percent correct, while there is commonality in many aspects of serving an urban versus rural population, there are also marked differences. Rural individuals and businesses are likely to be location bound, meaning they cannot just pick and move to wherever the college is. In the Urban environment with low unemployment, the likelihood business will hire a student away from pursuing their education is much higher. For these two main issues, LATI has developed our "Learn Where You Earn" methodology and established Business Partners Specialists. In our rural environment, LATI has seen the necessity to move to the online environment. However, hands-on technical education/training at a distance can be problematic. *Learn where you earn* is a set of tactics we employ to use a mix of online academics and onsite (either on campus or at an industry partner's facility) in hybrid models to take education to our students. The business partner specialists are the key to partnering with industry to bridge the distance and resources gaps to support our students. They are fully versed in a variety of ways businesses can help students be successful, and fully versed on the return on investment for the business in supporting education. My staff and I are always willing to share best practices and talk through specific issues at any time with your educational, industry, or government stakeholders on this topic. We can be reached through *www.lakeareatech.edu.*

Lake Area Technical Institute publishes our graduate recruitment playbooks. These playbooks outline ideas for communities and businesses to attract graduates. In both environments, it is not just about the job for the newest generations entering our workforce—and the play books outline thoughts for how to capitalize on your strengths. But, there are exceptional colleges across the Nation doing great things in career and technical education. Centers of Excellence in Career and Technical Education could serve as catalysts and advocates for best practices in the technical education realm. Although at the core they deliver the same broad service, "HIRE" education is a different focus and mindset than the traditional higher education system. For many, this change will not happen quickly.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. TAMMY BALDWIN TO COLONEL MICHAEL CARTNEY

Question 1. Wisconsin is one of the Nation's top states for manufacturing (a "middle-skill" industry). As I travel around the state meeting manufacturers, the skills gap has been a frequent topic of conversation. While the conversation often turns to training and recruiting, for a state with 3.7 percent unemployment, I hear concerns that the problem is larger than just "skills" but about finding the workers in the region at all. This problem has been dubbed, 'the body gap' and it is one of the first things Wisconsin manufacturers tell me about when we meet. Colonel Cartney, as you know this problem puts tremendous stress on schools like yours to supply talent. In Wisconsin, our technical college system addresses this by conducting 'boot camps' in critical skill areas. What is the most effective approach you have seen to address these skill and "body" shortages in your region and how can they be replicated nationally?

Answer. Thank you for the questions. You are 100 percent correct, once you have optimized your K12 to technical careers pipeline and upskilled those available, you

need to recruit new workforce members into the region. The number one change in recent years has been that the focus for recruiting people is not just on the job and compensation. Lake Area Tech publishes two key "playbooks", one for industry and one for communities, which outline tools and techniques for industries and communities to market their WOW factor to attract workers.

Second, the Build Dakota concept of paying for a student's education in exchange for a workforce commit in South Dakota seems have promise. By targeting some of the scholarships out of state, we are able to grow our workforce. This approach is also common for the U.S. Military, where, for example, a full ride through one of our Academies or an ROTC scholarship includes a commitment to military service.

One commonly overlooked aspect is if your servicing higher education organization sees provide programming focused on your local workforce needs as a core mission. Your local higher education needs to be "community or industry facing," meaning they view the community and local industry as key stakeholders. Often, higher education organization are "state, accreditation, or funding" facing, meaning they are most responsive to those entities. A community or industry facing organization sets it goals, success indicators, and measures so they are responsive to the community and local industry needs. A leading objective at LATI is to align our educational tracks with SD industry needs and make sure there are jobs for our graduates in high-demand workforce areas in South Dakota. Many educational systems do not even consider post-graduate employment when counselling their students, or when establishing programs of study. When that happens, there is even a larger gap between workforce needs and the skilled graduates. Our relationship with industry partners is a crucial component to the success Lake Area Tech has realized in graduate placement and helping to fill the workforce gap.

The vast majority of our students obtain their education on campus. However, we recognize that may not work for non-traditional or location-bound students, including those interested in fields with a high workforce demand. In our rural environment, LATI has seen the necessity to move to the online environment. However, hands-on technical education/training at a distance can be problematic. Learn where you earn is a set of tactics we employ to use a mix of online academics and onsite (either on campus or at an industry partner's facility) in hybrid models to take education to our students. Our business partner specialists are the key to partnering with industry to bridge the distance and resources gaps to support our students. They are fully versed in a variety of ways businesses can help students be successful, and fully versed on the return on investment for the business in supporting education.

Another successful step Lake Area Tech has taken to help fill the body gap is working together with industry partners. One example of involving industry is advisory board participation. Each one of our programs is overseen by an advisory board comprised of faculty and industry members who help ensure our graduates meet the needs of industry. Their vital input helps keep our programs up-to-date on what is happening in the real world regarding workforce needs and trends. On the other hand, industry members learn more about LATI by participating in advisory boards (and other LATI leadership boards) and use that information to educate other people in industry about our programs. It's a win-win situation.

Other successes include: using state grant funding, Watertown's economic development arm is able to offer funds for relocation expenses; the state has marketing plans to attract native South Dakotans "back to their roots," and we broadly market that South Dakota is one of the best places in the Nation to Live, Work, and Learn!

Finally, the use of technology to ease workforce demands, often by shifting the type of skilled individually needed must be examined. For example, maybe I cannot find enough people with the motor skills to be welders, but I have people I can train to examine welds done by a robot. So I implement an automated solution to lay the welds and add the welding inspector position.

Other references:

My staff and I are always willing to share best practices and talk through specific issues at any time with your educational, industry, or government stakeholders on this topic. We can be reached through *www.lakeareatech.edu.*

The Aspen Prize for Community College Excellence, on which Siemens USA is a major sponsor and advocate, is also an excellent source for best practices. *http://highered.aspeninstitute.org/aspen-prize/* is also a great source. With seven years of experience in examining community colleges across the country for best practices, the Aspen Prize organization can point you to colleagues experienced in a number of topics.

Finally, in his book What Excellent Community Colleges Do, Joshua S. Wyner draws on the insights and evidence gained in administering the inaugural Aspen

Prize for Community College Excellence. This book identifies four domains of excellence—degree completion, equity, student learning, and labor market success—and describes in rich detail the policies and practices that have allowed some community colleges to succeed in these domains. By starting with a holistic definition of excellence, measuring success against that definition, and then identifying practices and policies that align with high levels of student success, Joshua seeks to provide a body of knowledge about improving student success in community colleges.

Question 2. I am very pleased to see the bipartisan support for workforce training and career and technical education on display at this hearing today. Coming from Wisconsin, I have long been a supporter of apprenticeship and vocational training programs. The nation's first apprenticeship law was passed there in 1911. The same year the Legislature established the state's vocational school system to provide instruction to new apprentices. That system, now known as the Wisconsin Technical Colleges System served as a model for the Nation. As the Co-Chair of the Senate's CTE Caucus, (and a STEM-educated worker myself) I have introduced legislation called America's College Promise to provide free resident tuition for two years of community and technical college. I've also introduced legislation to allow students enrolled in short-term CTE programs to qualify for student loans. Colonel Cartney, as an educator, how often do you encounter students who are unaware of CTE opportunities or unable to afford them? Do you believe waiving tuition and broadening the applicability of student loans could help solve the skills gap issues we've discussed today by improving access to CTE?

Answer. Unfortunately, we frequently encounter students who are unaware of CTE opportunities and/or are unable to afford tuition. In some cases, not being aware of the CTE opportunities is not the fault of the student at all. In South Dakota, we know that some high school graduates have never been exposed to Career and Technical education in their K–12 experience. This is due to a number of factors including cuts in funding, graduation requirements, and a greater emphasis on four-year college attendance. Also contributing to this problem is the emphasis on 'having to attend' a four-year college by parents, students, and high school counsellors is also an issue. (Incidentally, high school counsellors and teachers are almost exclusively four-year degree holders who are helping our youth plan their futures.) The opinion of many is that students need to continue their post-high school education at a four-year college to make something of themselves. The benefits of technical education that enables a career AND allows for continued education are being overlooked by those subscribing to that attitude.

At Lake Area Tech, we address this very issue with focused strategies. We believe getting potential students (even at a very young age) on campus is an important first step in educating them on everything a technical education has to offer. Throughout the year, we invite grade school, middle school, and high school students to Lake Area Tech for activities that combine having fun and being educated. Third graders tour select programs during our annual 3rd Grade College for a Day, sixth graders are invited annually for Ag Day at the Farm, eighth graders attend the annual Men/Women in Science Day, sophomores participate in Equity Day, juniors attend Junior Tech Day, and seniors attend Senior Tech Day. In all cases, either teachers, parents, and/or school counselors are along and gain valuable knowledge of our programs of interest.

We also hold school district in-services for local K–12 teachers and counselors on campus. This offers them first-hand knowledge of our facilities and familiarizes them with faculty and services. Dual credit classes are also held on-campus for area high schoolers, providing yet another opportunity for exposure and education. The program is highly successful. Last semester we provided more than 1,000 credit hours to high school students.

We put our fair share of miles on the road, too. Our admissions representatives travel extensively throughout the regions visiting high schools and participating in college and career fairs to talk to students about careers in technical education. These visits are valuable as they not only focus on educating the students, but just as importantly, the school counselors and teachers.

At Lake Area Tech, students who are unable to afford the cost of technical education have options. Recognizing cost as one of the biggest factors to attracting as well as retaining students, Lake Area Tech strives to make college affordable and minimize the financial barriers. LATI offers low-cost on-campus child care and works with students to qualify for state childcare assistance. By providing cafeteria services in-house and at-cost, we offer nutritious, affordable meals. Our bookstore also operates at a target margin of less than 10 percent. Bolstered by campus initiatives, instructors work diligently to keep costs of text books, tools, and technology in check while ensuring students have access to high-quality equipment needed to succeed. Over 65 percent of courses use the learning management system to provide

resources to students compared to a 60 percent national average; therefore, reducing the overall cost of materials.

Also, LATI developed a Prior Learning and Work Experience Model to assess the training experiences of veterans and students previously employed in the field to identify accelerated graduation paths. This enables students to accelerate degree completion time and save on the overall cost of their degree. Remarkably, even though technical education is more expensive than traditional forms of education, the last calculated default rate at Lake Area Tech, 6.1 percent, is nearly one-half the national average, 11.3 percent, on student loans.

We are fortunate that, at the state level, the South Dakota Office of Economic Development has funded over $1 million in equipment to LATI annually to expand access to the latest technology without increasing the cost to students. The state also matched the $25 million private donation from T. Denny Sanford to create the Build Dakota Scholarship fund. LATI expanded the reach of the full-ride scholarships through the Stretch the Million program with over 20 partners initially pledging $175,000–$200,000. Beyond the Build Dakota Scholarship program, our LATI foundation is instrumental in expanding access to college through scholarships. Last year, the foundation awarded over 400 scholarships exceeding $390,000. Additional efforts to keep college affordable include participation in the national Free Application Week, Financial Aid Workshops, Financial Aid Literacy Program, and credit for corporate education and prior learning.

Finally, South Dakota's Technical Institutes have partnered with industry, communities, and state government to take on our skills gap head on. Over 300 businesses work with Lake Area Tech's faculty and students to provide a coherent and relevant educational experience that support our state's workforce demands. These businesses consult and oversee curriculum, provide internships and on-the-job experience for students, provide industry standard training aides and equipment for the students to learn with, mentor our students, and most importantly they hire our students—in short, they are heavily invested in their pipeline.

Regarding waiving tuition and broadening the applicability of student loans: Thank you for the question. The Build Dakota concept of paying for a student's education in exchange for a workforce commit in South Dakota could be mirrored at the national level. I hesitate on phrases like waiving tuition and "free community college," because college costs someone something. But for hundreds of South Dakotans, there is a way to get a college degree for limited monetary investment (as mentioned above), as long as you are willing to commit to working in SD, and possibly committing to work for a specific company.

This approach is also common for the U.S. Military, where, for example, a full ride through one of our Academies or an ROTC scholarship includes a commitment to military service. By tying financial aid to employment commitment in corresponding occupations, you would not only target your investment in a more meaningful way, but you would also provide the means for student to repay their student debt. You could also examine tax credits for both employers and employees who work in the field of their education (*e.g.,* make their student loan payments tax deductible).

Finally, what can be done at the Federal level to support Technical Education? Technical education is expensive, and institutional funding from the Federal Government is vital. However, Federal financial aid for students is also crucial, and is often the turning factor in whether someone even seeks higher education. However, the financial aid system can be extremely hard to navigate and use if you do not go from high school to college. One example would be we need to change the rules for Federal financial aid to allow someone leaving a four-year school, after absorbing 2 or 3 years of Federal PELL and loans, to go to a technical school and still have the 2 or 3 years of financial aid support required to get a technical degree or retrain. This law was changed approximately 4 years ago. Other innovative ideas could include tax incentives for employers who allow their employees time to accomplish their education, tax credit to working graduates for paying their student loans back, and easing the access to educational benefits due to our nations veterans'.

My staff and I are always willing to share best practices and talk through specific issues at any time with your educational, industry, or government stakeholders on this topic. We can be reached through www.lakeareatech.edu.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MAGGIE HASSAN TO COLONEL MICHAEL CARTNEY

Question 1. New Hampshire receives $6 million from the U.S. Department of Labor under the Workforce Innovation and Opportunity Act (WIOA). As you likely know, the President's budget blueprint proposes cutting 21 percent of the Depart-

ment of Labor's budget and states that the budget, "Decreases Federal support for job training and employment service formula grants, shifting more responsibility for funding these services to States, localities, and employers." One thing these funds go toward is workforce training and education in high-demand fields, including WorkReadyNH which is a collaboration between state agencies to ensure our workers have both basic skills and softskills when entering or re-entering the workforce. With the health care sector projected to increase by 14 percent between 2016 and 2021, and the IT sector with a projected growth of 15 percent over the same period, job training and education opportunities in these sectors, and others will be essential. What do these proposed cuts mean to the ability of companies like yours to find the workforce they need?

Answer. Thank you for the questions. Since the programs in question are overseen by our Department of Labor and Regulation, I turned to them for assistance in this reponse. What I learned is the following programs provide about $6.6M of an estimated $17.6M in Federal funding of workforce programs for South Dakota. A 20 percent reduction would represent approximately $1.3M cut. In FY16, they assisted 6470 individuals, so a reduction would impact SD's workforce training and education in high-demand fields.

Workforce Innovation and Opportunity Act (WIOA) Adult: WIOA is an employment and training program designed to provide services that will increase skills for adults through education and job training programs so they may overcome barriers to employment.

Individuals served in FY16 = 5,775

WIOA Dislocated/Rapid Response: WIOA Dislocated provides training and career services to people who have been laid off and seeks to train people for occupations where there is a high demand for workers such as welders, accountants, teachers, and more.

Individuals served in FY16 = 205

WIOA Youth: WIOA Youth provides a systematic and coordinated approach to career services to people between the ages of 14 and 24 who are low income and have barriers to employment by offering assistance in completing education and providing work experiences and training.

Individuals served in FY16 = 344

WIOA Statewide Allocation: States are allowed to use a portion of WIOA to meet the unique needs of their employment programs. South Dakota uses this funding for Dakota Roots activities, National Career Readiness Certificate activities, and grant monitoring activities.

WIOA Administration: Funding used for administering the various WIOA programs.

Disability Employment Initiative: The Workforce Training division assists in providing job search techniques and basic employment skills to individuals with disabilities over the age of 18 and seeking employment.

Individuals served in FY16 = 63

Trade Act Assistance (TAA): TAA assists workers who have lost their jobs as a result of foreign competition by providing training opportunities for displaced workers.

Individuals served in FY16 = 83

TAA Administration: Funding used for administering the TAA program.

TAA Case Management: DLR local office staff assists employers with obtaining certification for the TAA program so former employees may apply for TAA training benefits.

Question 2. What I hear most from business leaders in New Hampshire is that they do not have access to a skilled workforce. With the lowest unemployment rate in the country at 2.7 percent—it is essential to not only work with dislocated workers, but to support individuals in re-joining the labor market and train individuals who are underemployed. Organizations, like Families in Transition NH, have had a lot of success lifting individuals out of poverty by providing wrap-around supports, like affordable housing options, child care, job-training and case management. As we talk about the importance of supporting and improving job training programs, do you think it is important to provide wrap-around services? Have you seen the impact of these kinds of programs in your work?

Answer. Thank you for the questions. Since the programs in question are overseen by our Department of Labor and Regulation, I requested their support in drafting an answer. In short, the answer to your question is yes. With a 2.8 percent seasonally adjusted unemployment rate in February 2017, most South Dakotans looking for work are in need of support services to succeed. Many times they do not have only one barrier to employment; they have several barriers preventing them from becoming employed.

To support individuals who may need training, one of the resources South Dakota uses is the Workforce Innovation and Opportunity Act (WIOA) Title I program. Eligible adults and dislocated workers are case managed and can utilize Title I for retraining (tuition and book assistance or on-the-job training (OJT)) with some wrap-around services being provided. Assistance includes, but is not limited to: child care, transportation costs, car repairs, housing, work attire, and medical expenses related to the training and/or job. Such expenses may otherwise deter them from completing training.

South Dakota has seen success in the training programs it has available. Some of that success has come from not only additional training at technical institutes, but also with OJTs for individuals who may not be able to return to school, but need immediate employment.

Real life successes of support services are found in four testimonials at: *https://www.youtube.com/watch?v=ieeazt43SGo.* (There are also separate vignettes on our YouTube page of each.)

DLR's PY15 WIOA Annual Report also shows many success stories: *http://dlr.sd.gov/workforce_services/wioa/documents/wioa_annual_report_2015.pdf*

I want to acknowledge Dawn Dovre's assistance in the development of these two responses. Dawn is with the SD DLR.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. CATHERINE CORTEZ MASTO TO COLONEL MICHAEL CARTNEY

Question 1. One of the largest barriers of expanding technical education program is the recruitment of teachers. What strategies does Lake Area Technical Institute use to recruit educators? What can be done in order to better incentivize teachers to move from industry to education?

Answer. Thank you for the questions. Recruiting and retaining qualified instructors at Lake Area Tech is at the very core of our mission and student success. Without a remarkable group of instructors, our students would not be effectively prepared for a satisfying career the workforce.

One basic question for career and technical education programming is do you hire a teacher and provide the relevant industry experience, or do you hire someone from industry, and teach them how to be an instructor? Lake Area Tech hires industry experienced personnel and employed an extensive development and mentoring program to ensure high quality educational experiences, Doing so does place the college in direct competition with industry for those key people.

Fortunately, the South Dakota Legislature, through a bi-partisan legislative effort, put in place an Instructor Salary Industry Adjustment program. Codified in the 2016 legislative session, a half penny sales tax enables South Dakota's technical institutes to offer compensation competitive with industry on a per day basis.

Recruiting remains a challenge for us at times since the caliber of instructors we look for is high. By the nature of our mission, we are also seeking those individuals in industries where they are in extremely high demand. Despite these challenges, we have had success with our recruitment efforts, but not all colleges have fared so well. Across the Nation there is a notable shortage of people entering the teaching profession. Taking the next step of convincing people to move from a successful industry career to teaching at a technology college requires a close relationship with industry, and innovative solutions.

Some innovations we have tried or seen used include: (1) industry partners who have key people teach as part of the employment, (2) industry partners stepping forward to provide funding so colleges can pay competitive salaries, and (3) industry partnership where personnel teach ¾ of the year but return to the employer for the remainder of the year—giving them full time employment and compensation.

Finally, what can be done at the Federal level to support Technical Education? Technical education is expensive, and institutional funding from the Federal Government is vital. However, Federal financial aid for students is also crucial, and is often the turning factor in whether someone even seeks higher education. However, the financial aid system can be extremely hard to navigate and use if you do not go from high school to college. One example would be we need to change the rules

for Federal financial aid to allow someone leaving a four-year school, after absorbing 2 or 3 years of Federal PELL and loans, to go to a technical school and still have the 2 or 3 years of financial aid support required to get a technical degree or retrain. This law was changed approximately 4 years ago. Other innovative ideas could include tax incentives for employers who allow their employees time to accomplish their education, tax credit to working graduates for paying their student loans back, and easing the access to educational benefits due to our nations veterans'.

Question 2. Another important gap that exists in the technical education arena is the lack of education, and understanding, among counselors and parents about the opportunities, careers, and educational training that exists for technical and vocational fields. What steps can be taken to eliminate these gaps, and how can we better provide information about the technical opportunities that exist for students to counselors, parents, and the students themselves?

Answer. You are 100 percent correct. How a community values an occupation is a perception that needs to be addressed by industry as well as education. Often, the first step is exposure to prospective students and the families, of the career and its benefits. We are not going to attract students to the high demand industries if they do not even know what they are. Industry plays a key role in imaging, and often re-imaging, their industry. Many parents do not realize how most work environments have evolved significantly in the past 30 years, but someone not in that industry will be unaware of the changes if someone is not out proactively informing the community. National campaigns, such as General Electric's recent series of commercials, can be strong influences in getting potential students interested in technical careers, and thus technical education. If industries and educational communities together raise the awareness of an occupation's value, it will make those seeking and entering that occupation feel valued.

High school counsellors play a crucial role in guiding students, and parents, through career options. But in most states, K12 counsellors are required to have a four-year degree, therefore their perspective is often towards their own experiences. Nationally there is a shortage of counsellors in the K12 system, so those available spend the majority of their time dealing with mental health issues of the students. Lake Area Tech has encouraged school systems to opening their doors to industry and technical colleges by allowing our instructors and industry representatives to teach science lessons and other classes related to their occupations. South Dakota's Department of Education has deployed a system called SDMyLife across our entire K12 spectrum. SDMyLife is an online program assisting students with navigating the career development process. SDMyLife's goal is to help students better understand themselves and how their interest, skills, and knowledge relate to real-world academic and career opportunities. Additionally, SDMyLife provides ways for colleges and industries to provide information and engage students interested in specific career paths.

With the shortage of counsellors, Lake Area Tech emphasizes our K14 approach to education and uses several approaches to expose students to technical careers. We seek every opportunity to advocate for and engage in career oriented discussions with the public.

Our staff does an incredible job reaching out to them as early as third grade. We believe that getting potential students on campus is an important first step in educating them on everything our technical college has to offer. Throughout the year, we invite grade school, middle school, and high school students to Lake Area Tech for activities that combine having fun and being educated. Third graders tour select programs during our annual 3rd Grade College for a Day, sixth graders are invited annually for Ag Day at the Farm, eighth graders attend the annual Men/Women in Science Day, sophomores participate in Equity Day, juniors attend Junior Tech Day, and seniors attend Senior Tech Day. In all cases, either teachers, parents, and/or school counselors are along and gain valuable knowledge of our programs of interest.

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Dual credit classes are also held on-campus for area high schoolers, providing yet another opportunity for exposure and education. The program is highly success. Last semester we provided more than 1,000 credit hours to high school students.

We put our fair share of miles on, too. Our admissions representatives travel extensively throughout the regions visiting high schools and participating in college and career fairs. These visits are valuable as they not only focus on educating the students, but just as importantly, the school counselors and teachers.

In addition to personal, face-to-face educational encounters, we market our successful graduation, retention, and placement rates through focused marketing ef-

forts including billboards, TV commercials, radio ads, Internet ads, and mass mailings. These efforts promote top of mind awareness to potential students, parents, industry members, and community members.

Lake Area Tech is always willing to share best practices and talk through specific issues at any time with your educational, industry, or government stakeholders on this topic. We can be reached through *www.lakeareatech.edu.*

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. TAMMY BALDWIN TO JOHN J. NEELY III

Question. President Trump has promised to bring manufacturing jobs back to the U.S., but his budget proposal would defund the Manufacturing Extension Partnership (MEP), which has been instrumental in enhancing the success of Wisconsin's small to midsize manufacturers. According to the Center for American Progress (CAP), eliminating Federal funding for MEP would cost Wisconsin 846 jobs and would cost the United States 41,190 jobs. The President's budget would also eliminate funding for the Economic Development Administration, which supports development in economically distressed areas of the United States. In 2015, fiscal investments by EDA were over $2.9 million in Wisconsin and over $213 million in the United States. I'd like to address this question to the two witnesses from manufacturing firms, Mr. Neely and Ms. Marks: I'm concerned that the President's budget is breaking the promises he made to our Nation's manufacturers and tilting the playing field further against them. How will the elimination of the MEP program impact your companies and their suppliers, many of whom are small and medium enterprises?

Answer. Gulfstream recognizes that the Manufacturing Extension Partnership (MEP) has been a valuable resource for small and mid-size businesses. As a public-private partnership that receives approximately one-third of its funding from the Federal Government, and the balance from a combination of state/local governments, private enterprises and client fees, the loss of Federal funding likely will provide challenges. Similarly, the U.S. Department of Commerce's Economic Development Administration (EDA) has provided grants and other assistance for U.S. businesses, and the de-funding of EDA would provide an additional challenge.

Gulfstream's experience, however, is that governments in Wisconsin and the other states in which we do business have become significantly more committed over the last several years to supporting workforce development and economic development. As discussed several times in this hearing, for example, many states have highly effective programs available to small and mid-size companies through various state agencies and in particular technical colleges. Wisconsin's Department of Workforce Development, and job training grants available through Wisconsin's state government, certainly illustrate this point.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MAGGIE HASSAN TO JOHN J. NEELY III

Question 1. New Hampshire receives $6 million from the U.S. Department of Labor under the Workforce Innovation and Opportunity Act (WIOA). As you likely know, the President's budget blueprint proposes cutting 21 percent of the Department of Labor's budget and states that the budget, "Decreases Federal support for job training and employment service formula grants, shifting more responsibility for funding these services to states, localities, and employers." One thing these funds go toward is workforce training and education in high-demand fields, including WorkReadyNH which is a collaboration between state agencies to ensure our workers have both basic skills and softskills when entering or re-entering the workforce. With the health care sector projected to increase by 14 percent between 2016 and 2021, and the IT sector with a projected growth of 15 percent over the same period, job training and education opportunities in these sectors, and others will be essential. What do these proposed cuts mean to the ability of companies like yours to find the workforce they need?

Answer. Workforce Innovation and Opportunity Act (WIOA) funding has helped support a number of programs in the states in which Gulfstream does business. As noted in response to other questions, however, an offset to a decrease in WIOA funding is the increased understanding on the part of state governments concerning the need for, and return on investment from, state-funded workforce development programs. This increased understanding at the state level is having a corresponding, positive impact on state funding. For example, we certainly have been impressed by the quality of training provided by states' technical college systems.

Question 2. What I hear most from business leaders in New Hampshire is that they do not have access to a skilled workforce. With the lowest unemployment rate in the country at 2.7 percent—it is essential to not only work with dislocated workers, but to support individuals in re-joining the labor market and train individuals who are underemployed. Organizations, like Families in Transition NH, have had a lot of success lifting individuals out of poverty by providing wrap-around supports, like affordable housing options, child care, job-training and case management. As we talk about the importance of supporting and improving job training programs, do you think it is important to provide wrap-around services? Have you seen the impact of these kinds of programs in your work?

Answer. Gulfstream, indeed, has seen the value of resources through which individuals can obtain re-training, whether to move from older to newer technologies, across industries or simply to address basic underemployment. Wrap-around services, like child care and transportation from home to training (at technical colleges, for example) and work, are important in making job-training opportunities a practical reality rather than simply a theoretical opportunity.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. CATHERINE CORTEZ MASTO TO JOHN J. NEELY III

Question. How successful do you think our public schools are with ensuring that students are exposed to fields involving technical skills throughout their education?

Answer. Over the past several years, we've seen a shift in the K–12 environment to include technical job training and opportunities as viable career gateways for students. Not everyone is ideally suited for a four-year degree, so it's important to explore and explain alternative career paths. As noted in my opening remarks, the good news is that we are seeing this happen. In every state in which Gulfstream does business, the state and local leaders understand this concept and are making great strides to expand it. As an example, we have seen a significant increase in the number of high schools with sophisticated technical curricula and equipment dedicated to training for technical trade skills.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. TAMMY BALDWIN TO JUDITH MARKS

Question. President Trump has promised to bring manufacturing jobs back to the U.S., but his budget proposal would defund the Manufacturing Extension Partnership (MEP), which has been instrumental in enhancing the success of Wisconsin's small to midsize manufacturers. According to the Center for American Progress (CAP), eliminating Federal funding for MEP would cost Wisconsin 846 jobs and would cost the United States 41,190 jobs. The President's budget would also eliminate funding for the Economic Development Administration, which supports development in economically distressed areas of the United States. In 2015, fiscal investments by EDA were over $2.9 million in Wisconsin and over $213 million in the United States. I'd like to address this question to the two witnesses from manufacturing firms, Mr. Neely and Ms. Marks: I'm concerned that the President's budget is breaking the promises he made to our Nation's manufacturers and tilting the playing field further against them. How will the elimination of the MEP program impact your companies and their suppliers, many of whom are small and medium enterprises?

Answer. Siemens has historically partnered with MEPs in the past on identifying critical workforce needs for manufacturers and teaching others about the value of manufacturing through national manufacturing day. We understand the value of these partnerships that focus on supporting manufacturers at a local level and believe that thoughtful consideration about the future of these MEPs is necessary. Please know that we are available to provide guidance to your office about this important topic.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MAGGIE HASSAN TO JUDITH MARKS

Question 1. Last year, Siemens Foundation funded a technical assistance grant through the National Governors Association to assist states, including New Hampshire, in scaling work-based learning opportunities to better prepare youth for middle-skill STEM careers. With labor market experts estimating that by 2020, the middle-skill labor force will account for 65 percent of all jobs, these are important

initiatives to meet workforce demands. Some examples of Work-Based Leaning are Career and Technical Education Programs, internship opportunities, apprenticeship and even job shadowing and mentorship. These opportunities help to ensure that our young people are better prepared for the workforce by learning through actual work experience. In NH, a team working on this effort has set a goal for every student to have access to a work-based learning opportunity by 2020. Ms. Marks, Siemens has led the way in providing these types of opportunities and has funded efforts to expand them around the country. What advice do you have for other companies looking to do the same and how do you think the Federal Government can better incentivize corporate actors to play a larger role in building our STEM workforce?

Answer. As a leader in industry and workforce development, Siemens' experiences speak to the challenges that employers face developing talent pipelines in the United States. Whether looking for skilled workers to fill internal positions, hearing similar concerns from its customers across the country and industry sectors, or addressing broader societal needs for youth employment and educational attainment through its philanthropic efforts, Siemens' experiences offer clear lessons for leaders who want to eliminate barriers for employers. Let me highlight some of those lessons, how Siemens is supporting scalability, and ideas on how the government can assist the private sector in addressing skill challenges.

Supporting Industry-centric Training and Partnerships with Community Colleges

Programs across Siemens businesses, including Siemens Cooperates with Education, Siemens Mechatronic Systems Certification Program, and the Global Opportunities PLM Academic Program, invest in developing a skilled labor market for customer communities across the country by providing curriculum, software and train-the-trainer instruction. From a philanthropic perspective, the Siemens Foundation is advancing excellence in community colleges, the major provider of technical skills training in the U.S., by supporting the Aspen Prize for Community College Excellence. Each of these projects advances industry-centric training and work in partnership with public sector education leaders and institutions in K–12, community colleges, and workforce systems.

Scaling Apprenticeships and Work-based Learning

Siemens is dedicated to expanding registered apprenticeships and other high-quality work-based learning models in the U.S. because we have witnessed and benefitted from those models throughout our history in Germany. In 2015, Siemens partnered with Dow, Alcoa, and the National Association of Manufacturers to publish the first "how-to guide," called the Playbook, for manufacturers interested in adopting the apprenticeship model. Siemens is committed to sharing the value of apprenticeships with other employers in the U.S. As a company, Siemens participates in a public-private partnership in the American Apprenticeship Initiative (AAI), the largest Federal investment ever made to expand apprenticeships in the U.S. The Siemens Foundation is also working with AAI and the National Governors Association's (NGA) Center for Best Practices to help all AAI partners succeed. The Foundation is advancing thought leadership on apprenticeships in the U.S. by sponsoring the first ever national conference on apprenticeships—Apprenticeship Forward. The Foundation is also advancing work-based learning by working through the NGA with top state leadership to embed effective models in state education systems.

Expanding Awareness about Quality STEM Skilled Careers

Across its business and philanthropic efforts, Siemens is addressing a stigma sometimes associated with middle-skill, technical or skilled careers, or the educational pathways necessary for these jobs. The Siemens Foundation, in partnership with the Aspen Institute, promotes the substantial economic opportunities available through STEM middle-skill jobs through the stories of Siemens Technical Scholars, outstanding community college students and graduates pursuing STEM technical careers. Through a partnership with Advance CTE, the Foundation is identifying and disseminating best practices for messaging that attracts students and parents to try career technical education during the high school experience. Through stories like that of Hope Johnson, Siemens is promoting the value of registered apprenticeships to peers.

Policy Ideas

Through these experiences and more, Siemens has learned much about the challenges many face in finding workers with the right skills. The following recommendations may be useful in addressing those challenges by government:

- Identify and support quality community colleges interested in integrating academic and industry-centric education that meet labor market demand and employer talent needs; support students pursuing these educational pathways through student aid;
- Expand registered apprenticeship programs to more industries, employers, community colleges and high schools;
- Develop a vibrant ecosystem of public and private partners to make it easier to replicate registered apprenticeships;
- Incentivize employers to use registered apprenticeship programs for their talent needs and support their implementation requirements;
- Promote the value of family-supporting careers obtained through two year degrees, industry certifications or by completing a registered apprenticeship

Question 2. New Hampshire receives $6 million from the U.S. Department of Labor under the Workforce Innovation and Opportunity Act (WIOA). As you likely know, the President's budget blueprint proposes cutting 21 percent of the Department of Labor's budget and states that the budget, "Decreases Federal support for job training and employment service formula grants, shifting more responsibility for funding these services to states, localities, and employers." One thing these funds go toward is workforce training and education in high-demand fields, including WorkReadyNH which is a collaboration between state agencies to ensure our workers have both basic skills and softskills when entering or re-entering the workforce. With the health care sector projected to increase by 14 percent between 2016 and 2021, and the IT sector with a projected growth of 15 percent over the same period, job training and education opportunities in these sectors, and others will be essential. What do these proposed cuts mean to the ability of companies like yours to find the workforce they need?

Answer. As you may know, Siemens has been a large supporter of policies that support public and private partnerships at the state and local level helping make strategic investment decisions for workforce developments like Workforce Innovation and Opportunity Act (WIOA) as a company and through our associations. It is important that government leaders at all levels support this work through funding and supportive policies. We stand at the ready to provide guidance as this debate progresses.

Question 3. What I hear most from business leaders in New Hampshire is that they do not have access to a skilled workforce. With the lowest unemployment rate in the country at 2.7 percent—it is essential to not only work with dislocated workers, but to support individuals in re-joining the labor market and train individuals who are underemployed. Organizations, like Families in Transition NH, have had a lot of success lifting individuals out of poverty by providing wrap-around supports, like affordable housing options, child care, job-training and case management. As we talk about the importance of supporting and improving job training programs, do you think it is important to provide wrap-around services? Have you seen the impact of these kinds of programs in your work?

Answer. Allow me address the question from the training perspective and focused on advanced manufacturing, as that is the area where we have experience. First let me reiterate what I said in my testimony, and that is that at Siemens we pride ourselves on conducting business locally, especially here in the United States. At our core, we are a company that combines innovation with social responsibility. We believe our mission extends beyond our customers, our employees, and our shareholders. We believe we must also deliver lasting value to the communities we serve. We believe it is important to deliver this value through our commitment to helping the U.S. establish a new era of advanced manufacturing, central to which are our efforts to build a skilled workforce. The skill requirements, admittedly, have become much more rigorous, and Siemens has both a business need and a responsibility to help workers acquire these new, advanced skills. Therefore, Siemens' workforce development efforts are addressing the jobs of today as well as tomorrow. Our strategy is focused on workers at all stages of their careers, from new entrants into the workforce to dislocated workers seeking to re-enter, to current employees in need of reskilling. We call this industrial reskilling.

As an example, Siemens is a strong supporter of hiring Veterans. In fact, since 2011, Siemens has hired over 2,500 veterans. Continuing our strong support for hiring veterans, we recently committed to hiring a minimum of 300 U.S. military veterans per year for the next three years, providing them with additional skills training to make them successful at performing roles at Siemens' various U.S. facilities. We also invest approximately $50 million annually for the training and continuing education of our own U.S. workforce. Additionally, we are helping to build a new

ecosystem of public and private sector partnerships that forge pathways to 21st century manufacturing skills and to economic security.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. CATHERINE CORTEZ MASTO TO JUDITH MARKS

Question. According to the Census Bureau's American Community Survey, women make up 48 percent of the workforce, but only 24 percent of STEM workers. What do you see as the largest barriers for women interested in pursuing STEM education or careers? What steps do you think we should be taking to eliminate these barriers?

Answer. At Siemens, we are working hard to bring awareness, confidence and skills to girls and women in the field of STEM. We do this through Siemens USA and through our Siemens Foundation. Let me share with you two specific examples; one that shows our work in K–12 and another that focuses on "middle skills".

The first is what we used to call Siemens Science Day that I referenced during my testimony. We now call it Siemens STEM Day (www.siemensstemday.com) and it provides tools for students from their first experiences with problem solving, experimentation, and the scientific method, all the way through to an advanced understanding of STEM principles. This online platform enables parents and teachers to engage students (K–12) in STEM through tools, resources, and hands-on activities. The materials emphasize the importance of STEM through standards-aligned, fun and engaging hands-on classroom activities and videos designed to support the development of students' ability to investigate, question and understand how the world works within STEM principles. We believe this helps to increase both interest and confidence for girls in the STEM field.

A second example is the Siemens Foundation's STEM Middle-Skill Initiatives. "Middle-skill" jobs are essential to the United States' economic growth and provide promising career opportunities. In order to help close the opportunity gap for young adults in STEM middle-skill careers, the Siemens Foundation launched a workforce development program, leveraging the experience and expertise of Siemens as an industry leader and pioneer in workforce development. One of their projects with the Aspen Institute's College Excellence Program, Siemens Technical Scholars, identifies outstanding young adults overcoming barriers and achieving success in excellent two year STEM programs at community colleges in advanced manufacturing, energy, health care and information technology. Many of these students serve as the voice and face of the economic opportunities available in STEM technical careers in videos we share to educate their peers about these opportunities and the postsecondary education and training options available to achieve them. This past year, I was honored to meet a young woman from New Mexico name Chelsea Hartshorn who was named a Siemens Technical Scholar. Not only is she a terrific student and a wonderful mother to two young boys, but Chelsea has become a leader in her community educating other women about the opportunities available in careers like the one she's pursuing in solar panel installation by proudly sharing her story. Chelsea is just one of many outstanding young women we have met through the Siemens Technical Scholars program. Having them tell their stories to other young women is a powerful tool to encourage more women to step confidently into STEM careers.

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