Written Statement of Judy Marks
CEO, Siemens USA

U.S. Senate Committee on Commerce, Science and Transportation

"Closing the Skills Gap and Boosting U.S. Competitiveness"

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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.

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 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.

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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

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