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Remarks at the
Maryland STEM Festival 2017:
Blue Collar STEM Conference
November 6, 2017

Phil, thank you for the introduction. I want to thank you and everyone else who had a hand in organizing this great event.

There are too many people to name them all personally – but we really appreciate the way you're bringing attention to an incredibly important topic.

I also want to call out our corporate partner, Siemens, and its Energy Management team-members who are here. They've launched a new program called C-School.

They provide electrical engineering equipment to high schools so students can train on it in the classroom.

Tomorrow they'll meet with more than 60 students at the Maryland Independent Electrical Contractors site in Laurel. I want to thank them for their commitment to serving others.

The C-School effort is just one example of a number of efforts to focus attention on STEM here and across the country.

The Siemens Foundation has partnered with Advance CTE – based in Silver Spring – to invest in Maryland's efforts to promote the value and promise of career and technical education in local communities.

Together with Advance CTE, we want to develop a new generation of STEM technically skilled leaders.

I've had the pleasure of hearing directly from Maryland's K-12 leaders about this effort and I'm excited to see how Maryland will continue to innovate to attract new STEM CTE students in your high schools.

So again, thank you for this invitation and the opportunity to share a few thoughts with you.

I'm told that one of the primary motivations behind this conference was the impressive research on STEM opportunities by Dr. Victor McCrary, as well as a 2013 report by the Brookings Institution called "The Hidden STEM economy." That report by Brookings was a catalyst to our own STEM Middle-Skills Initiative.

Our initiative aims to prepare young adults in the U.S. for jobs in STEM fields that require less than a bachelor's degree, more than a high school diploma, and a strong technical skill set.

Over the last 10 years, our foundation has invested more than $100 million in STEM education and workforce development initiatives.

Long story short, we are all about STEM. And as many of you know, Siemens – which has more than 500 Maryland employees – is fueled by STEM talent.

Siemens is a manufacturer of machines ranging from locomotives and light rail cars to medical imaging equipment, micro grids, building technologies, and more.

Siemens has 60 U.S. manufacturing sites in the U.S. alone, but they're also on the leading edge of industrial software and the digital economy. They've developed an operating system – like you have in your smartphone – for the industrial world.

As more companies like Siemens reinvent themselves for the digital economy, most quality jobs will have one thing in common – and, that's STEM.

We expect that for a coder. We expect that for a software engineer or a cybersecurity expert.

But now we also need STEM for positions that we traditionally think of as more blue collar – like welders, technicians, and machinists. Most of these jobs now require a STEM background – as do most open jobs at Siemens.

All of these positions have something else in common in addition to STEM: they pay well. They provide an accessible entry point into the middle-class and they're limitless in terms of career and educational advancement. I'll focus more specifically on that in a little bit.

The point I want to make now is: despite those draws – significant salary and limitless opportunity – many employers struggle to fill these jobs with qualified applicants.

For Siemens, this struggle is a daily reality.

U.S. companies have a big problem and, as long as they do, so does our economy.

Now, as ominous as that sounds, our economy is not even close to being the big issue for us in this country today. What is really at stake here is the fundamental promise of America, that if you set your sights high and work hard and work smart, you can provide for yourself, your family and your community.

No matter what direction your politics happen to break, there's a consensus today that our social compact is fraying—maybe even torn.

We simply need to do more to strengthen our middle class and restore the promise of the American dream—it's a matter of fairness and it's a matter of our continued civility.

In recent years we've laid witness to data showing that the middle class is no longer a majority.

Instead there's been growth on the opposite ends of the spectrum – both rich and poor—but mostly poor, and that's not a sustainable reality for any democracy.

One study I found particularly striking studied income distribution in America between 1980 and 2014.

For a few decades prior to 1980, middle class and low incomes were consistently rising – and rising faster than those for the wealthy.

But after 1980 things started moving in a different direction. Household incomes flatlined and then started falling off with one notable exception: the very affluent.

In recent years, the income for this group has spiked directly upward, marking a sharp contrast to every other income group.

Now, the reasons behind this are pretty complex. There isn't a single or an easy explanation.

But the fact is that, for tens of millions of Americans, hard work simply doesn't pay as much as it used to. In recent decades our middle class economy has been thinned out by the rise of low-wage work.

In this part of Maryland, a family of our four needs to earn just over $50,000 annually to make it into the middle class.

If you're a low-wage worker, your salary doesn't even come close to getting you over that hump. Typically it's going to take at least two of these salaries for a family of four to squeeze into the middle class. And that just barely gets you there.

The good news is that there is a way forward that is achievable for many.
\We know employers are struggling to fill well paying STEM middle skill positions in fields like advanced manufacturing, information technology, energy and healthcare. STEM jobs are projected to grow at nearly double the rate of non-STEM occupations.

Many of these STEM technical positions require less than a four-year degree. Attending community college or completing an apprenticeship is a very smart pathway to get these jobs.

And when you switch over to the business point of view, it's also a smart decision to open up this pathway.

Just to give you an example, back in 2011, Siemens was getting ready to open up an advanced manufacturing site in Charlotte, North Carolina. They needed hundreds of new workers, but they had a hard time finding applicants with adequate STEM skills.

So, the first step for Siemens was that they simply trained workers themselves so they could open the new plant.

Then, they created an apprenticeship program for young people coming out of high school.

The program was inspired by Siemens' German roots.
Germany is famous for training people through its dual education system. Every year, close to a million students participate.

They get both classroom and on-the-job training.

They get a clear pathway to higher education.

And, in the end, they get a quality job.

In fact, the dual system is generally cited as the chief contributor to Germany's low youth unemployment rate and its leadership in advanced industries.

And Siemens is now proving how lessons learned from its apprenticeship model can be adapted to the U.S. market.

Siemens recently expanded its advanced manufacturing apprenticeship program to 8 states.

Each state has a community college partner. And returning to my point about being well paid, every apprentice, after they graduate, receives a guaranteed job with Siemens at a starting salary of around $55,000 a year.

Keep in mind, too – they're in their early 20s still.
They're making a higher starting salary than the average four-year liberal arts graduate is. And they still have their whole career and education ahead of them.

What I want to do now is leave you with three thoughts I hope can add value to the goals of this conference.

The first is, whenever you can, insist on critical thought on the robots argument.

I still see economic forecasts that have low-wage jobs continuing to set the pace for U.S. job growth. And when I read the explanation – it's usually that robots, or automation, are coming for all middle-class jobs.

This is a challenging view because it obscures the real, more positive trend. That is, automation isn't eliminating jobs; the real impact is that it's ***changing*** them. And middle skills, in particular, are responsive to this change. Yes, they're technical – but they're also more knowledge-based and provide clear advancement opportunities.

Consider Angel Alvarez.

Angel is a participant in our Siemens Technical Scholars program at the Aspen Institute. He attends Brazosport College in Texas. They offer both two- and four-year programs. And Angel is part of the instrumentation program.

Angel said when he was interviewed: "We do a lot of hands-on learning, but we also do a lot of theory. I want to be the technician who knows how to work with his hands, but also knows how to use his mind."

And that is the key to success in today's digital economy – and what STEM technical training is all about. Get smart and stay smart to keep ahead of the inevitable changes that define a high tech society.

As Tom Friedman writes: "You have to walk faster than the escalator, meaning you need to work harder, regularly reinvent yourself, obtain some form of post-secondary education and make sure you're engaged in lifelong learning—then you can be in the middle class.

Second, for as much as I've talked about the great opportunities in STEM middle-skills, until now I haven't mentioned a significant barrier we have to overcome: That's the lingering stigma attached to what many call vocational training, or what is now called career technical education – CTE.

To get a sense of how we could break this stigma down, we partnered with Advance CTE to survey students and parents to understand what messages are most effective in attracting them to CTE.

We found the most critical selling point for CTE is emphasizing the opportunity to find a career you can be passionate about.

Over 90 percent of students and parents surveyed said this was the most important element to them, even above a well-paying career.

That passion for the job reminds me of another one of our Siemens technical scholars – Chelsea Hartshorn.

Chelsea aspired to be the first person in her family to get a college degree. Tuition costs and raising two sons put this dream on hold – but as she struggled to find herself professionally, she saw a different route: She joined the electrical trade program at Central New Mexico Community College.

Chelsea liked the idea of earning more than $50,000 annually and exerting some influence in a male-dominated trade.

But there was something else: Chelsea has a passion for renewable energy and helping other young women find similar opportunities.

And after she becomes a journeywoman electrician, she hopes to open her own business specializing in green energy solutions.

She regularly meets with local girl scouts, mentoring the next generation of female leaders.

Young people want to know they can be successful financially *and* they want to know they can make a difference.

We also learned that students are looking for people to provide them with clear direction and encourage them down the right path. The data told us that students and parents are still looking to their guidance counselors in making these decisions.

That was a light bulb moment for us and Advance CTE.
Now we're starting a new cycle of work focused on arming guidance counselors with the facts about CTE and the right messages to communicate with students about its value.

We'll also have the opportunity to work with a new cohort of states, who will have the opportunity to learn from the great work done here in Maryland as a Phase I participant in this work.

How we talk about technical training, about middle skills, about STEM – all of that really matters.

So, I encourage you to take a look at the research from Advance CTE and talk to your leaders here in Maryland who participated in this project to better understand which words and messaging work best here at home.

If you build it they will come…but only if you market the hell out of it.

That leads me to my final point.

Through this focus on STEM, we have an opportunity to strengthen our middle class, to strengthen our social compact, and ultimately, to strengthen our businesses.

That said, there is no magic legislative proposal.

There is no training program that can singlehandedly make every single connection that needs to be made. There is no branding effort that can convince everyone who could benefit from STEM to choose this path.

All of these pieces need to come together.

And more importantly, all the different stakeholders – and Marylanders as a whole – need to come together, like they're coming together today.

To young people, never think that STEM jobs aren't achievable or aren't for you. Understand that the pathway is available, and where it can lead you.

To educators, forge new connections with industry leaders.

And industry leaders, recognize this remarkable opportunity you have to grow your business and contribute to your communities.

You know, I was really pleased that Governor Hogan was able to sign legislation in the spring that, among other things, offered tax credit for businesses that pursue job training or apprenticeships. That's a great step forward.

But for industry, it also means one thing: the ball is in your court.
Tax credits are a great incentive.

But the greatest incentive of all is knowing you're making an investment in your human capital.

You're not waiting for the workforce you need to materialize; you're being proactive.

You're engaged with educators and building a STEM workforce from the ground up.

Thank you all very much.

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