



**Oklahoma Conference on Manufacturing
October 5, 2011
Oklahoma City, OK**

Good morning and thank you very much for inviting me to speak today.

For those of you that are not familiar with my organization, The Manufacturing Institute is the research and solutions affiliate of the National Association of Manufacturers. The Institute conducts research on a host of issues facing U.S. manufacturers and designs and implements solutions focused on building an educated and skilled workforce and accelerating innovation in manufacturing.

Over the past few months, manufacturing has enjoyed something of a national spotlight. Organizations all across Washington, from the White House and Congress to major think tanks and government agencies, have been discussing the manufacturing industry and what America must do to maintain and grow its manufacturing base.

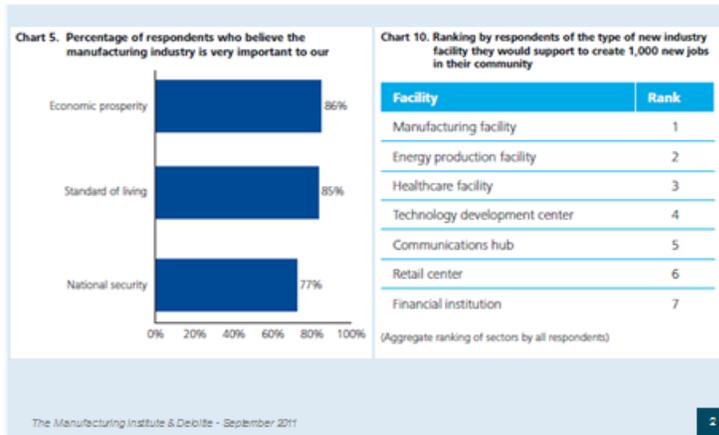
Manufacturing is certainly deserving of the recognition it is now receiving because it is an industry that is truly vital to our economic security. No other industry creates more value or has a higher multiplier effect, and this results in a 53 percent compensation premium for manufacturing workers nationwide with a similar premium here in Oklahoma.

Manufacturing is also the leader in generating wealth from overseas, contributing 57 percent of the total value of U.S. exports and an incredible 90 percent of Oklahoma's total exports. That is truly amazing considering only 8 percent of your state's workforce is in manufacturing.

Of course, manufacturing also plays a vital role in our national security, building the equipment, machines, and armor that equip and protect our servicemen and women. In fact, the last time I was in Oklahoma was to visit a manufacturer making the latest design of body armor that had been researched and developed at Oklahoma State.

[Public Perception Slide]

The Public Supports Manufacturing



The American public understands how important manufacturing is to our country. Each year we conduct a public perception survey to understand how Americans feel about our industry. Not only do they believe that manufacturing is critical to our economic and national security, but when given a choice of selecting any industry to create 1,000 jobs in their backyard, the number one choice is manufacturing.

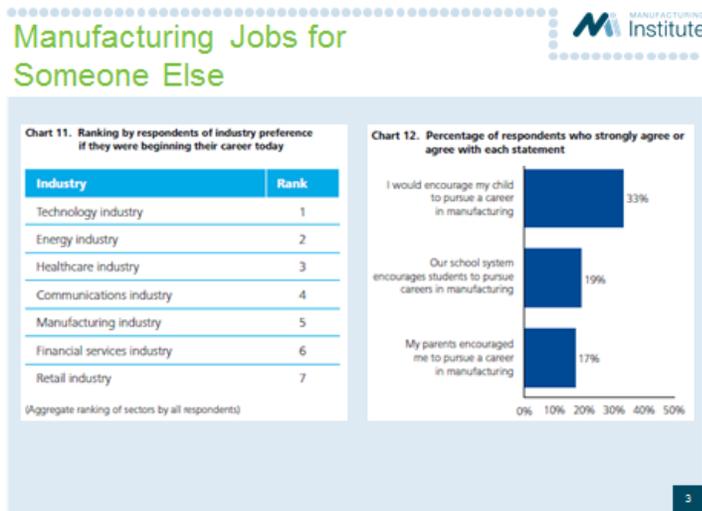
It is certainly nice to see manufacturing have the spotlight and I believe we are truly at the beginning of a renaissance of manufacturing in the United States. But six months worth of good stories does not undo 3 decades of negativity. The steady drumbeat of “manufacturing is dying” stories and reports caused real and lasting damage to the image of our industry.

Nowhere have the effects of that damage been greater than on the manufacturing workforce. American society used to greatly value and respect men who built things with their hands. At the turn of the last century, the greatest names in our country were either industrialists like Henry Ford and Andrew Carnegie or inventors like Thomas Edison and the Wright Brothers. These were the men parents aspired their children to be.

This continued through the 20th century as high school graduates sought work at the local factory and college graduates dreamed of becoming rocket scientists. That began to change in the 70s and 80s though as parents instead began to dream of their children as doctors or lawyers or bankers, and guidance counselors pushed students away from manufacturing careers and towards “college-appropriate” careers.

In most of our states, school systems responded to this shift in societal priorities and values by reducing or eliminating the once ubiquitous vocational programs available to high school students. Fewer and fewer students were learning the skills needed to enter manufacturing careers or experiencing the excitement and sense of accomplishment that comes from building and making things.

[2nd Public Perception Slide]



Unfortunately, this too is reflected in our public perception survey. Less than 20% of Americans said that their parents or their school system encouraged them to pursue a career in manufacturing. And when asked what industry they would choose if they could start their careers today, manufacturing was near the bottom.

Perhaps it is just a coincidence that as these changes occurred, a general malaise settled over public education in the U.S. High school drop out rates soared to over 30% of students. Graduates lacked the basic reading, writing, and mathematics skills needed in society. Enrollment in remediation courses at higher education increased, burdening higher education with a sort of “under preparation tax.” And employers noted a decline in the basic workplace requirements like punctuality and work ethic.

The cumulative effect of these shifts was to dramatically reduce the size and quality of the pipeline of workers entering manufacturing. Unfortunately, this could not have happened at a worse time for U.S. manufacturers.

Beginning in the late 1970s and early 1980s and accelerating after the collapse of the Soviet Union and the introduction of the internet, foreign manufacturers, particularly from East Asia, expanded and began to compete directly with U.S. firms. This began a difficult and very painful transformation of the U.S. manufacturing sector.

The manufacturing sector that emerged from that transformation was completely different from its predecessor. Computer controlled robots and machines now produced and moved goods. Clean suits were as common as hard hats. And workers were now responsible for the programming and maintenance of the machines. What had traditionally been a low-skill, routinized workplace was now a highly skilled, customized and integrated workplace.

Manufacturers were also under pressure to innovate. To remain competitive, they either had to regularly create and produce new products or find new and better ways of making their existing products. This added a creativity and critical thinking aspect to manufacturing jobs, further distinguishing traditional manufacturing from advanced manufacturing.

Not surprisingly, it was around this time that manufacturers began to report a skills gap. They were unable to find workers who were qualified to step in and contribute to their operations. This was a real threat because U.S. manufacturers were banking on their ability to produce high value goods and stay ahead of their competitors through innovation. Without a skilled workforce though, their innovation engine would grind to a halt.

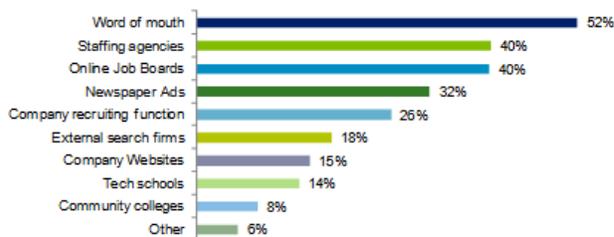
Now, to be fair, manufacturers were as much responsible for this situation as students, parents, and schools. During the leaning process, many companies cut their training budgets to a minimum, eliminating the traditional, months-long training program that new hires would enter. Few manufacturers had a choice in this regard though, because the cost of such programs was now prohibitive in the global economy.

[Workforce Strategies Slide]

Manufacturers Need New Workforce Strategies



Top sources for new employees



Where manufacturers erred was in not transforming their hiring practices to respond to their overall business transformation. Today, the most common approach to filling positions is basically to ask a current employee if his brother-in-law is looking for a new job. And the second most common approach is to post an opening either on-line or with Manpower and hope for the best.

For the past decade or so, manufacturers have managed to get by with this approach through a combination of productivity enhancements, poaching from other manufacturers, and luck. At the higher end of the skills continuum, larger companies in advanced manufacturing, technology, and healthcare vie for limited numbers of H1B visas to import some talent. But manufacturers' ability to work around the skills gap has just about come to an end.

[Skills Gap Slide]

The Skills Gap in Manufacturing

- 82% of manufacturers report a moderate-to-serious skills gap in skilled production.
- 74% of manufacturers report that this skills gap has negatively impacted their company's ability to expand operations.
- 69% of manufacturers expect the skills shortage in skilled production to worsen in the next 3-5 years

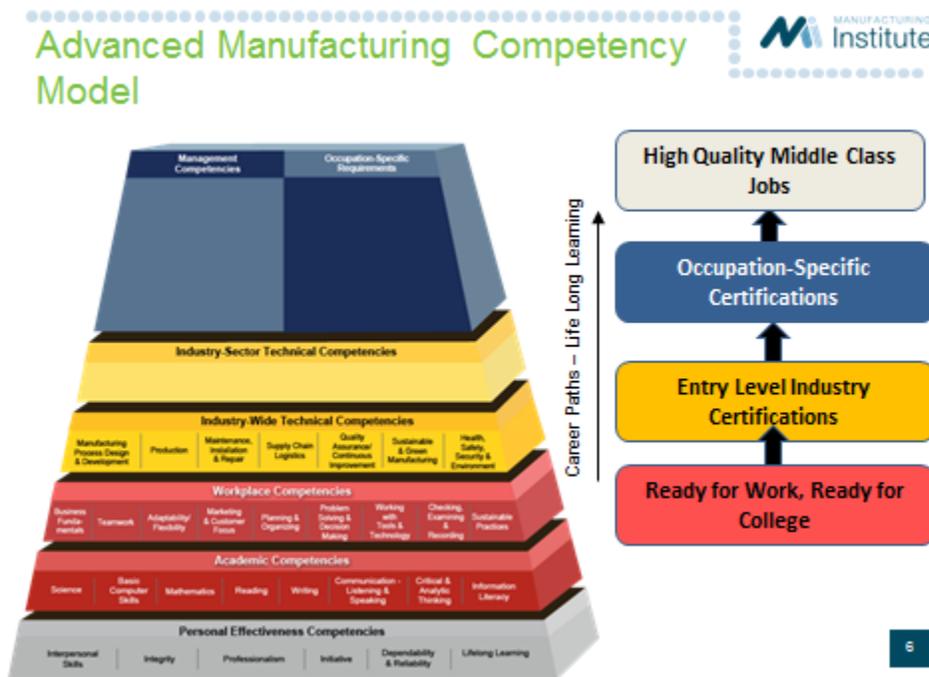
In a survey that the Institute just completed, over 80% of manufacturers reported a moderate-to-serious shortage in skilled production workers. 80%. Nearly 75% of manufacturers say that this shortage has negatively impacted their ability to expand, costing us an incredible number of jobs at a time when jobs are desperately needed. Perhaps most alarming though is that, because much of the current workforce is quickly approaching retirement, over two-thirds of manufacturers actually expect the situation to get worse in the next couple of years.

Those are some frightening results and make clear the threat that a lack of skilled workforce poses to manufacturers.

In response to this crisis, The Manufacturing Institute has developed and is implementing solutions that will position the U.S. to “grow our own” talent.

The core premise of our solution is that, in manufacturing, we have standards for every imaginable input and output. Whether it is the composition of steel, the tolerance of machines, or the failure rate of a part, manufacturers can give the details to three decimal points. So we created a system that allows manufacturers to be as rigorous in the standards they apply to their most important asset – human capital.

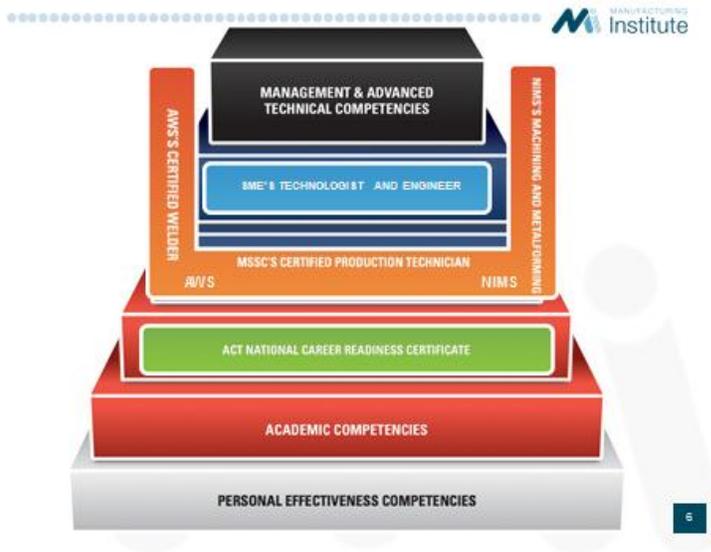
[Competency Model Slide]



We began building our solution by using the Advanced Manufacturing Competency Model, which was developed in the mid-2000s. This model, built by manufacturers, for manufacturers, is essentially a roadmap – of the skills needed by workers entering and then advancing in careers across the manufacturing economy.

To develop our solution, called the NAM-Endorsed Manufacturing Skills Certification System, we joined with several other leading industry groups to create a system of nationally portable, industry-recognized credentials. These credentials -- and the training required to obtain them -- certify that an individual possesses the basic skills required to work in any sector of the manufacturing industry.

[Pyramid Slide]

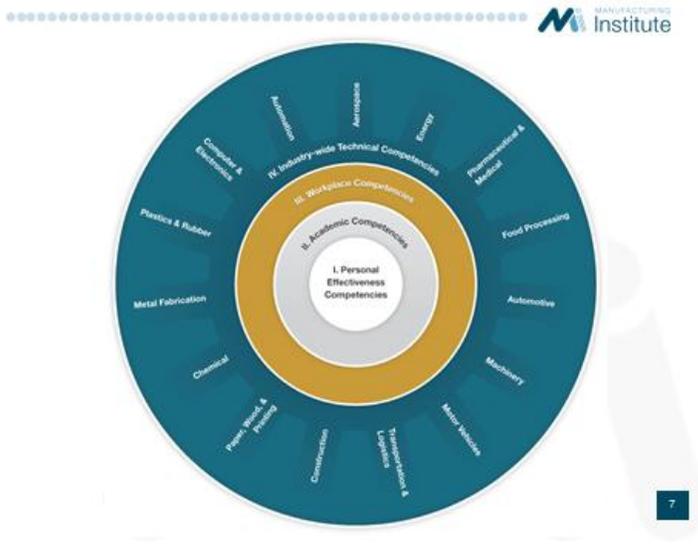


As you can see on this slide, our system can be envisioned as a pyramid of stackable skills certifications, with an initial focus on the skills required for entry-level jobs in manufacturing today:

- Personal effectiveness skills;
- Foundational academic competencies – for manufacturers, those are applied math, reading, locating and using information;
- General workplace competencies such as teamwork, problem-solving, and the fundamentals of business;
- And, the industry-wide technical skills related to basic manufacturing processes including production, logistics, machining, quality assurance, safety and health, and technology.

The foundational competencies in the first tiers are grounded in ACT's National Career Readiness Certificate. The workplace and technical competencies are covered by the Manufacturing Skill Standards Council's Certified Production Technician, the National Institute for Metalworking Skills' Machining and Metalforming certifications, and the American Welding Society's Certified Welder series. Finally, the Society of Manufacturing Engineers' Engineering Technologist certification caps our entry-level skills system, recognizing the infusion of technology into all manufacturing processes.

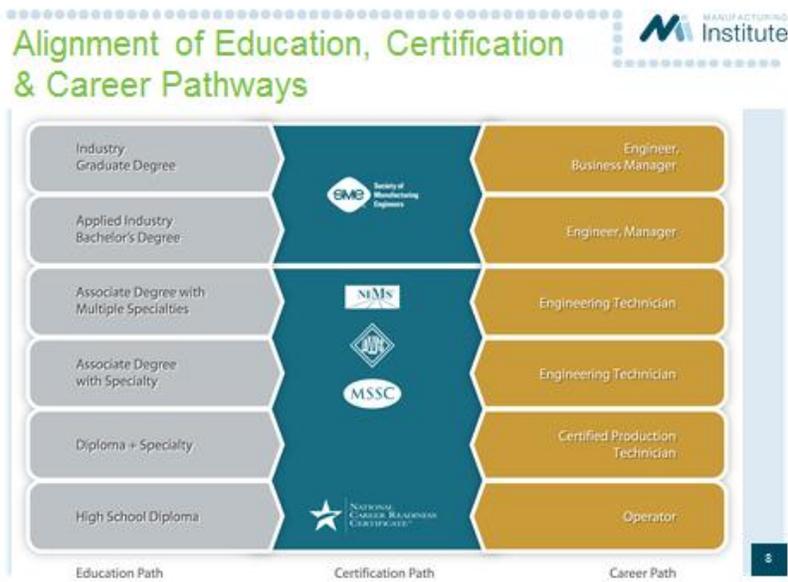
[Wheel Slide]



One of the key elements of our system is that it provides individuals with the right skills to work in any sector of manufacturing. This includes everything from life sciences to aerospace, food processing to automotive, and consumer products to energy.

Another important feature of our system is that (1) manufacturers are driving the education reform but (2) we are not asking manufacturers to pay for it. U.S. manufacturers already face a significant structural cost disadvantage in comparison to the rest of the world and we will not ask them to absorb the cost of dealing with the failures of our education system. Instead, we have found willing partners among the country's community and technical colleges.

[Pathway Slide]



Many community colleges already have manufacturing-related programs of study. For starters, we've asked that community colleges now incorporate the nationally portable, industry-recognized certifications into those programs so that manufacturers have a consistency in the quality of skills produced in each community college.

The work with these community colleges is now driving down to impact high school programs and up to the four-year colleges and universities. Our goal is to build an entire manufacturing talent supply chain.

I've brought two examples that illustrate this in action.

[Welding Pathway]

ALIGNING EDUCATION, CERTIFICATION AND CAREER PATHWAYS Example of the welding pathway at Lorain County Community College

EDUCATION PATHWAY	CERTIFICATION PATHWAY	CAREER PATHWAY	EMPLOYER JOB TITLE/ WAGE RANGE
MASTERS AND PhD			
BACHELOR OF SCIENCE / ENGINEERING DISCIPLINE • Ohio State University • Cleveland State University	<ul style="list-style-type: none"> • SME Engineering Technologist • AWS D1.1 Multiple Processes/CWI • ASME Section 9 / API 1104 • MSSC/CPT • NCRC 	<ul style="list-style-type: none"> • Welding Engineer • Welding Technologist \$35.68 / hour (17-2190)	<ul style="list-style-type: none"> • Automation Welding Mgr. • 10 – 15 years experience • \$30.00 to \$48.00 / hour
ASSOCIATE IN APPLIED STEM/SCIENCE • 66 Credit Hours / Two Years Full Time • 23 Courses • Day / Evening Curriculum	<ul style="list-style-type: none"> • AWS D1.1 Multiple Processes • ASME Section 9 / API 1104 • MSSC/CPT • NCRC 	<ul style="list-style-type: none"> • Welding Technician • Manufacturing Engineering Technician \$22.84 / hour (17-3026)	<ul style="list-style-type: none"> • Welder / Fabricator • 5 – 10 years experience • \$18.00 to \$22.00 / hour
STEM DIPLOMA PROGRAM • 37 Credit Hours / One Year Full Time • 14 Courses • Day/ Evening Curriculum	<ul style="list-style-type: none"> • AWS D1.1 Multiple Processes • MSSC Safety • NCRC 	<ul style="list-style-type: none"> • Welder (Entry Level) • Welder/Cutter/Welder/ Brazer \$15.84 / hour (51-4120)	<ul style="list-style-type: none"> • Welder MIG/Repair • 3 – 5 years experience • \$13.00 to \$16.00 / hour
STEM CERTIFICATE PROGRAM • 19 Credit Hours / One Year Part Time • 8 Courses	<ul style="list-style-type: none"> • AWS D1.1 Multiple Processes • NCRC 	<ul style="list-style-type: none"> • Welder (Entry Level) \$15.84 / hour (51-4120)	<ul style="list-style-type: none"> • MIG Welder/ Entry Level • 0 experience • \$10.00 / hour
National Career Readiness Certificate Personal Effectiveness * Academic Competencies Workplace Competencies			
Applied STEM (High School) Dual Enrollment - Career Academy - Youth Development Programs	Out of School/Low Skill Youth/Adults WIA/Career Centers - ESL/VEISL - GED/ABE "Bridge" and Foundation Programs	Skilled Adults Retraining / Lay Offs - Continuing Education Company Specific Apprenticeship	

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Key Links

The first is a welding pathway from one of our colleges in Ohio. The left column shows the progression of postsecondary education steps from certificate through associates and bachelor's degrees up to Masters and PhD. We then show the corresponding industry certification that will be earned at each step in the middle column and the resulting careers paths, job titles, and salaries that come with each new level of skills.

[Alamo Pathway]

ALIGNING EDUCATION, CERTIFICATION, AND CAREER PATHWAYS ADVANCED TECHNOLOGY MANUFACTURING ACADEMIES AT THE ALAMO COLLEGES

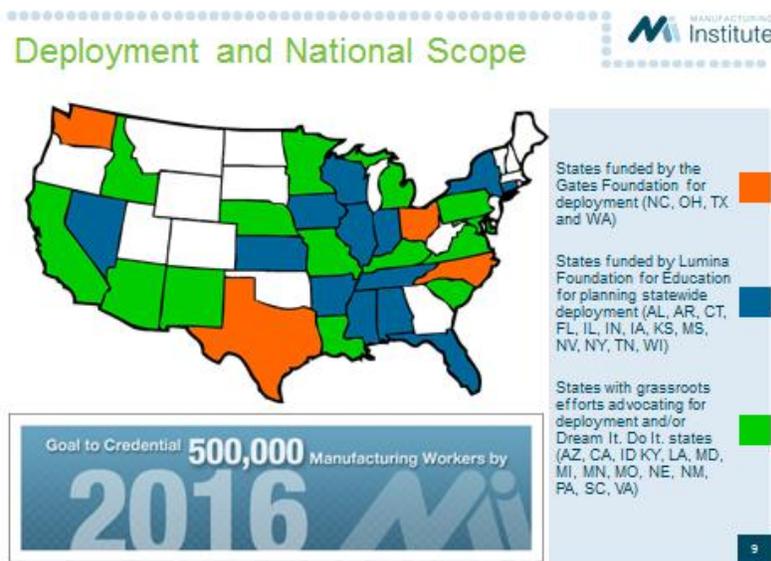
EDUCATION PATHWAY	CERTIFICATION PATHWAY	CAREER PATHWAY
BACHELOR OF APPLIED ARTS & SCIENCE / ENGINEERING DISCIPLINE (*Potential path not currently articulated) • Texas State, UTSA, St. Mary's University*	<ul style="list-style-type: none"> • SME 	<ul style="list-style-type: none"> • Plant Engineer • Mechanical Engineer • Management 500k - \$140k (11-3051, 17-2141)
ASSOCIATE IN APPLIED SCIENCE: Manufacturing Operations Technician CNC Manufacturing Technician • 63-69 hours/2 years full time • 21 courses • Day/evening curriculum	<ul style="list-style-type: none"> • AWS Certified Welder D.1.1 • MSSC Maintenance Awareness • MSSC Manufacturing Practices • MSSC Quality Practices and Measurement • MSSC Safety • Career Readiness Certificate 	<ul style="list-style-type: none"> • CNC Technician • Manufacturing/Maintenance Technician • Production workers/assemblers \$21k - \$24k (51-4010, 51-2092, 51-2051,)
High School Year 2 • CNC Tool Operator Certificate or Manufacturing Operations Maint. Assistant • Dual Enrollment • 6 courses/17 credit hours	<ul style="list-style-type: none"> • MSSC Manufacturing Practices • MSSC Maintenance Awareness • Career Readiness Certificate 	<ul style="list-style-type: none"> • Entry level operators • Maintenance helpers • Team Assemblers \$17k - \$24k (51-2092, 51-2031)
High School Year 1 • Dual enrollment • Marketable Skills Certificate-Machining • 5 courses/14 credit hours	<ul style="list-style-type: none"> • MSSC Quality Practices & Measurement • MSSC Safety • Career Readiness Certificate 	<ul style="list-style-type: none"> • Maintenance Helper \$17k - \$40k (49-9098)
National Career Readiness Certificate Personal Effectiveness * Academic Competencies Workplace Competencies		
Applied STEM (High School) Dual Enrollment - Career Academy - Youth Development Programs	Out of School/Low Skill Youth/Adults WIA/Career Centers - ESL/VEISL - GED/ABE "Bridge" and Foundation Programs	Skilled Adults Retraining/Lay Offs - Continuing Education Company Specific Apprenticeship

While Ohio has been concentrating on the postsecondary pathways, Texas chose to work toward pathways between high school and postsecondary education. In this model, the last two years of high school result in both industry certifications and college credits, which condenses those final years of high school and first years of college and allows students to progress on a defined education pathway aligned to a career. And like Ohio, each step is mapped to the corresponding job, career, and salary in the manufacturing sector.

The reason why these pathway descriptions are so important is that students can now clearly see the connection between school, jobs, and money and make informed decisions about how long they should stay in school. And by integrating these courses into for-credit programs, students can easily leave school for the workforce and when they decide to return, they can pick-up right where they left off and take the next step up the education and career ladder.

So, where are we today?

[Map Slide]



With some seed funding from the Gates and Lumina Foundations, we have created strategic leadership teams in 17 states across the U.S. with the expectation of establishing seamless manufacturing education pathways from the basic skills in high school through the production skills in community colleges to the engineering skills in universities, with job opportunities each step of the way. Another 14 states are working with us on student recruitment activities or taking steps to align their schools and curricula with our industry certifications.

This summer, we received a huge assist from none other than the President of the United States. At an event at Northern Virginia Community College, President Obama fully endorsed the Manufacturing Skills Certification System and pledged to help us achieve our goal of half a million certified workers in the next five years.

You'll notice that Oklahoma has not been "colored-in" on our map. I hope that is about to change. I know you have done a lot of work on career pathways in your schools and our partners from ACT and NIMS have a strong presence in your state. And there is clearly a strong manufacturing base. Now is our opportunity to build the supply of skilled workers so many of you desperately need.

But we need your help. Manufacturers need to start using skill certifications in their hiring process. This means recognizing and preferring credentials in your job posting and telling your high schools and community colleges that you want graduates who have industry certifications.

Fortunately, we are just a week away from releasing a new product that will help you find workers with the right skills.

[Pipeline Slide]



In partnership with a company called Futures, we have created an online tool that we're calling the U.S. Manufacturing Pipeline. It will provide the information for individuals to learn about careers available in advanced manufacturing, locate the schools and programs that teach the right skills, and find available jobs at manufacturers in every region of the country.

And for manufacturers, it will be the place to find the certified, skilled workers that you need to close the skills gap and expand your operations.

I'm certainly excited about this and believe we are very close to a National Talent Solution for manufacturing. Our manufacturers need the skilled workforce to compete. Our citizens need good jobs. And our country needs manufacturing for this to be another great American century.

Thank you for the opportunity to join you today and I hope to be working with many of you in the months to come.