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# *Public Meeting*

of

## LEGISLATIVE MANUFACTURING CAUCUS

*“Overall briefing on the state of manufacturing in New Jersey,  
current challenges and opportunities”*

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**LOCATION:** Rogers Meeting Center  
Paterson, New Jersey

**DATE:** September 19, 2017  
10:30 a.m.

### **MEMBERS OF CAUCUS PRESENT:**

Senator Robert M. Gordon, Chair  
Senator Linda R. Greenstein  
Senator Nellie Pou  
Senator Ronald L. Rice  
Senator Steven V. Oroho  
Senator Robert W. Singer  
Assemblyman Nicholas Chiaravalloti  
Assemblyman Benjie E. Wimberly  
Assemblyman Andrew Zwicker  
Assemblyman Anthony M. Bucco  
Assemblywoman BettyLou DeCroce  
Assemblyman Declan J. O’Scanlon Jr.  
Assemblywoman Maria Rodriguez-Gregg



### **ALSO PRESENT:**

Mark J. Magyar  
*Caucus Aide*

Kevin J. Donahue  
Luke E. Wolff  
*Office of Legislative Services*

***Hearing Recorded and Transcribed by  
The Office of Legislative Services, Public Information Office,  
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submitted by

Legislative Manufacturing Caucus

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**SENATOR ROBERT M. GORDON (Co-Chair):** Good morning, everyone.

Welcome to this first meeting of the Legislative Manufacturing Caucus.

May I have a roll call, please?

MR. WOLFF (Caucus Aide): Senator Gordon.

SENATOR GORDON: Here.

MR. WOLFF: Senator Greenstein.

SENATOR GREENSTEIN: Here.

MR. WOLFF: Senator Pou.

SENATOR POU: Here.

MR. WOLFF: Senator Rice.

SENATOR RICE: Here.

MR. WOLFF: Senator Oroho.

SENATOR OROHO: Here.

MR. WOLFF: Senator Singer.

SENATOR SINGER: Here.

MR. WOLFF: Senator Kyrillos. (no response)

Assemblyman Zwicker.

ASSEMBLYMAN ZWICKER: Here.

MR. WOLFF: Assemblyman Wimberly. (no response)

Assemblyman Chiaravalloti.

ASSEMBLYMAN CHIARAVALLOTI: Here.

MR. WOLFF: Assemblyman Taliaferro. (no response)

Assemblyman O'Scanlon.

ASSEMBLYMAN O'SCANLON: Here.

MR. WOLFF: Assemblyman Bucco. (no response)

Assemblywoman Rodriguez-Gregg. (no response)

Assemblywoman DeCroce.

ASSEMBLYWOMAN DeCROCE: Here.

MR. WOLFF: You have a quorum.

SENATOR GORDON: Thank you; great.

Thank you very much.

Good morning, everyone, and welcome to this opening session of our Legislative Manufacturing Caucus.

We are delighted to begin this initiative here in Paterson, the birthplace of American manufacturing.

As those of you who were with us at the Paterson Museum this morning know, I have deep roots in Paterson. My family's yarn factory was located just a block from here, at 21 Market Street, and occupied a building that was once part of the Cooke Locomotive Works.

I'd like to take this opportunity to thank Jack DeStefano, the Director of the Paterson Museum; as well as my long-time friend, Bob Guarasci, who heads the New Jersey Community Development Corporation; and their staff, for their tremendous help in making the arrangements for this meeting.

I am glad to see so many of my colleagues here today, which is testimony to our bipartisan commitment to ensure that New Jersey's economic future is as proud and as strong as its past. Manufacturing has a big role to play in that future.

Manufacturing has clearly changed. The giant assembly lines and steel mills are gone, as are the Gordon Yarn Company and the

thousands of textile mills that once populated this city. But today in New Jersey we have over 10,000 firms engaged in increasingly advanced manufacturing that employ over 350,000 workers. The goal of this initiative is to help those businesses grow and succeed.

Senate President Sweeney's plan for a major bond issue to expand and equip county vocational technical schools is a critical component of that strategy. And I know from discussions with colleagues on both sides of the aisle that this concept has broad, bipartisan support.

When manufacturers cannot find the middle-skilled workers they need, and over 15,000 students are being turned away from vo-tech schools because there aren't enough seats, we know we have a problem. We need to work on a bipartisan basis to craft legislation that provides manufacturers, and all New Jersey employers, with middle-skilled workers who meet the demands of the 21st century.

A recent McKinsey Report, entitled *Reseeding the Garden State's Economy*, cited the mismatch of middle-skilled workers with the needs of employers as a critical drag on our future economic growth. And we need to make sure these students have a clear path from both vo-tech, to county college, to four-year schools like NJIT, Rutgers, and Stevens -- whose graduates have the highest job placement and earnings.

And there's a lot more we need to do in the Manufacturing Caucus, including ensuring that our incentive programs encourage emerging high-tech businesses, enhancing the linkages between manufacturers and university R & D, and making sure that we capitalize on the opportunity for manufacturing job growth at the end of the supply chain that our expanding logistics sector provides.

We certainly don't have all the answers. We are going to do a lot of listening, starting today and continuing at future hearings and conferences. This is an important effort, and I am looking forward to working together, on a bipartisan basis, to put forward a legislative package in December, and continue the following the year.

We are on a tight timeframe today. We are going to hear from our four speakers first; then I have set aside some time for an open discussion among Caucus members about our work plan and agenda, going forward.

But before we hear from Dr. Sebastian, I'd like to offer our Paterson representative here today, Senator Nellie Pou, the opportunity to welcome us to her city.

My good friend, Senator Pou, serves as Paterson's Business Administrator.

Senator Pou.

SENATOR POU: Thank you.

Thank you so very much, Senator Gordon.

First, let me just say thank you for giving me the opportunity to, once again, welcome everyone, welcome all of my colleagues -- both in the Assembly, as well as in the Senate -- to discuss a very important issue; but mostly to really learn from all of the speakers. This really gives us an opportunity to do that.

I do want to also take a moment to make reference to, and kind of toss -- reference what is up on the screen. It says, "New Jersey Manufacturing -- the Past, Present, and the Future." Well, you're certainly in the birthplace, as Senator Gordon has indicated -- that being here in the

City of Paterson. For all the members and everyone in our audience who had the opportunity to be part of the tour at the Paterson Museum, you really have gotten a flavor of what that past was in New Jersey, but right here in the City of Paterson. Not too far away -- only a block away -- you'll see the Great Falls of Paterson, New Jersey, something that all of us in New Jersey are very proud of; but certainly, as a native Patersonian, let me just say there is no greater, no prouder person in Paterson when I talk and think about that.

What you will see in terms of the future -- it's fenced; the Falls are fenced, but that's only for safety and protection, because there are some really wonderful new things that are going on with the amphitheater. So unfortunately, you're not going to really be able to get down there because construction is going on. But we ask you to come back, and welcome back, and come back into Paterson and see what the future really will hold.

Thank you, Senator Gordon, for giving me this opportunity. Any time I have an opportunity to welcome people to our great City of Paterson, it makes me not only proud to be able to do that, but to also talk and speak about our great city.

I want to just take a moment, as a personal privilege, Senator -- I just want to make mention. You recognized both Mr. Guarasci from the NJCDC here, who is hosting us here at this place -- in this fabulous location; and of course, we heard from Jack DeStefano, our Paterson Museum. We have one of our Councilmen here, also, in the audience -- Councilman Andre Sayegh from Paterson.

So as the home district, Senator, I just wanted to recognize one of our own Council members.

Thank you so very much, and welcome.

SENATOR GORDON: Great; thank you very much, Senator.

We have a number of presenters; but before I move to them, would any other member like to say a few words? (no response)

At this point, I'd like to get to our presentations; and I'd like to start by introducing Dr. Don Sebastian, Vice President of Research and Development at NJIT; and President and CEO of NJIT's New Jersey Innovation Institute, who will lay out the opportunities and challenges ahead.

And I know he has another commitment at Princeton later on, and will not be able to stay with us.

But we welcome you here today. Thank you.

**D A N I E L H. S E B A S T I A N, Ph.D.:** Thank you, Mr. Chairman; and thank you all, Caucus members, for devoting your time to this most important subject. It's something that I've advocated for and participated in trying to rebuild here in New Jersey for close to 30 years; maybe a bit more. And I can't think of a more timely, important topic for the economy of New Jersey.

I have a feeling these mikes are not going into the external. Is there a handheld you want me to use?

MR. MAGYAR (Caucus Aide): We need you-- Could you move the mike a little bit closer, maybe?

There we go; that's better, I think. I think this will help.

DR. SEBASTIAN: Or is this just not on? How is this? All right.

SENATOR GORDON: Perfect, yes.

DR. SEBASTIAN: So again, briefly -- thank you all for devoting your time to this important topic.

I'm sure I can't match what you saw across the street, but I do want to go through a little bit of the paths of manufacturing in New Jersey, with the important lessons that we drew from that. Because what they taught me when I was in school was that we study history not just to memorize the facts and figures, but to see if we can extract out of the circumstances and context of those times important lessons that we can use in our context. And I think that there are some important lessons to be learned.

I noted just before -- I think this was originally scheduled to start our discussions in August; and I noted on August 7 the Governor signed new legislation declaring -- officially now -- that New Jersey is the *Garden State*. I think you probably know, that's a slogan that really only started on license plates in the 1950s; some say it originated somewhere in the late 1800s. But there is another claim that I think is much more important, which really cleaves to the birthplace of U.S. manufacturing here in Paterson, New Jersey.

Delaware claims to be the *First State*; North Carolina is *First in Flight*; we have the *Land of Lincoln*. I think perhaps a more appropriate motto, that we should rethink, is to make ourselves known as the *Maker State*, because we truly are the birthplace of almost every important industrial sector in the United States and in the global economy.

And it all started in a very small way. You saw, briefly there, the press conference that Alexander and George Washington held as they were launching manufacturing here in New Jersey

It was a policy document; between rap sessions, Alexander was working hard on fiscal policy to guide the growth of a new nation. And he believed, very passionately, that we needed to be a maker nation. He placated his friends in the South, and said that agriculture will always be the driving element of our economy because of the vast space that we had. But he also recognized that, in the end, you can only get so much produce out of an acre of land. He may not have foreseen the advances in modern farm machinery that did a little better, but in the end he was right. And his belief was that manufacturing not only solved an important need as a nation -- that we can produce our own goods, we can provide our own defenses, we can even export and bring in wealth from other nations -- but that activity, then, on a per-square-foot basis, could ultimately generate more wealth than land.

And that created new opportunities, then, for those who were not in the landed gentry to grow and become prosperous. It created upward mobility; it created new job opportunities; it created immigration; it created a draw for people to come and populate this new nation, and work their way up through the system.

This is 1791; all those things are still important stories of the value of manufacturing.

And so he convinced Congress to put money in something called SUM -- the Society for Useful Manufacturers -- and they bought 700 acres. I wish I had been with you, because I don't want to repeat the stories you already heard. But it started on Paterson Falls, with the ambition of taking the cotton we produced in the South and making textiles.

And oh, what he wrought from there. Because what began as simple milling operations then, turned New Jersey into the garment making capital of the country -- supplying the whole nation. In nearby Newark, they took advantage of tanning supplies in the woods, and took tanning from a backyard farming operation to an industry that, by the early 1800s, was producing millions of shoes, equipping the United States.

And we still rode horses back then, and saddlery was pretty important, so they developed saddlery as another business. And hats; Stetson -- we all know it as the hat that won the West, and ultimately they built them or they manufactured them in Philadelphia. But the Stetsons were a family here in Orange, New Jersey. They learned the hat making trade right here. They had something called *No-Name Hat Company*. And he took ill, he went out West, and the rest is history, in terms of the 10-gallon hat.

And they began, then, to attract other followers. So we had Clark Threads coming from Scotland to set up in Newark; and Singer, when we began to automate the sewing process, set up one of the world's -- at that time, the world's largest production factories in Elizabeth.

So we had the migration from just milling operations, to a wide variety of finished article fabrication, to the development of the specialized machinery that then fed that operation. Well, now you have a whole other axis; because having gone from making milled goods, now you're making industrial machinery. And so we became the place that was the birthplace of the Rogers Locomotive Company. Or even before that, the Stevens family, sitting out there in Castle Point in Hoboken -- They set up the first rail line and had the first steam powered ferry service across the Hudson. It

wasn't quite commercial, and Fulton slipped in and got all the credit. But they came back and had the first screw- or prop-driven set up.

And so New Jersey was the place where those technologies began. And the Camden and Amboy railway that the Stevens family then created was the first licensed railway.

And we could go on and on. Peter Ballantine came to Newark and turned, again, brewing from a craft industry to a huge production that, at some point, became the fourth-largest brewery in the United States. And we know that many others followed, and now we have the antecedent in the Budweiser refinery in Newark.

It wasn't all just here in the North, either. We had unique sand in the South, and unique clay deposits, from which we then grew a global glass industry. And fine china -- we had the same kind of conditions that European producers were used to in England, and they set up shop down there from which we then had Lennox and many of the great glass industries.

Seth Boyden, a Newark inventor, first invented patent leather -- so that goes back to our saddlery story; and then malleable iron. Well, malleable iron means now we can take iron and it's not brittle cast and it becomes flexible. Now we can not only make the big boilers for steam engines, but also cabling. And now we have the Roebling family in Trenton, whose cabling produced, first, the Brooklyn Bridge; later, the George Washington Bridge and the Golden Gate Bridge.

And on and on. And you can tell I could and would talk about this forever, and then I'll be out of time.

The other industry in the corner there -- but it is significant to mention -- the chemical process industry also started here. (Indiscernible) supplied dyes. So on the Hudson River, the unique and rare woods -- exotic woods produced unusual dye colors; and turned those into synthetic dyes that fed the textile industry. It then went to using coal products. So we made a shift from relying on hydroelectric and water power to using coal and steam power. The industry didn't follow the source of the coal, it stayed here. We dug a Morris Canal to bring the coal into the eastern part of the state. We built rail systems then to bring it back and forth, and we used the Hudson River to bring raw materials in to be manufactured here.

That chemical industry then gave birth later on to the petroleum industry. As I said, this is a slide that I could talk about forever. But the other ones come even more, because in the late 1800s we went and flipped the switch to create a whole new set of industries -- new science finally being harnessed: the science of electricity and electric power. We all know the story of Thomas Edison; you may not know that before he was the Wizard of Menlo Park, he was the Wizard of Downtown Newark. So his first invention was the stock ticker tape; he invented it in the basement of a friend in Elizabeth, where he was hiding out after, I think, blowing up his telegrapher's job in the South. And he manufactured in three factories in Newark; the last of which, if you wish to hoist one in honor of Thomas, is now called the Edison Ale House, and it's right next to the Pru Arena. It was his third factory, and you can find pictures from the 1870s of people lining up to go in.

It's also where he got the idea of having R & D proximate to manufacturing; and that's an important lesson. So the second floor was his

skunk works -- his R & D lab -- in which he began to invent new and better processes.

He sold the ticker tape to Western Union, and bought the farm, and the rest is history -- wealth of inventions which then began to trickle into creating competitors and collaborators.

The founder of NJIT was originally a competitor. He was Edward Weston. he was running an electroplating business; he had created a generator as a substitute for batteries. He then began to experiment with light bulbs. He had an arc light, as opposed to the filament style that Edison had. His lights were actually on Roebling's bridge. So he had the first contract to light up the Brooklyn Bridge; and he was who was also lighting up Military Park in Newark.

This is, again, one of the traps I could spend forever, because I love all these stories.

We have Edison, who often would fall in love with his inventions and not see improvements. So the phonograph that he invented was a drum phonograph. And Eldridge Johnson, in Camden, thought there had to be better way. He was a machine manufacturer; he could make precision drive mechanisms. He learned about the gramophone -- a flat, plattered disc coming out of Germany. He adopted and adapted, and found that he could make a constant drive. So instead of warbling sound-- And he could manufacture those discs precisely and reproducibly, which Edison had a tough time doing with his wax cylinder.

That became the Victrola. You ever hear of RCA Victor? Nipper, the little dog who hears his master, was the Victrola logo for about 30 years before RCA then bought them out and started to put modern

electronics in, instead of mechanical drive systems. Tinker to Evers to Chance -- right? -- all of these connections.

The petrochemical industry -- it began with coal tar derivatives and processing. Vaseline -- Chesebrough found that workers in the oil fields were able to take this residue that was coming up -- this gunk -- and it was a good cure for burns and abrasions. And it became Vaseline, and he started manufacturing it in Perth Amboy.

This cluster, then, began to attract the attention of Rockefeller -- already a monopoly -- and he came and decided to set up operations of Standard Oil and headquarters in New Jersey. And why do you think? You would never guess this, so I have to tell you. Favorable tax policy. (laughter)

And from there grew the Standard Oil empire. That's a picture of the refinery in Bayway that opened up in the 1900s (referring to PowerPoint). It wasn't long thereafter they became divested into pieces; one of those pieces was Standard Oil of New Jersey. It began to sell its products under the trade name, the initials for Standard Oil, S.O; Esso. We know what happened to Esso; Esso became Exxon in our lifetime; and ultimately, then, acquired another one of the children of that divestiture, Mobil, which was Standard Oil Company of New York, Socony Mobil -- also refining here in South Jersey, and with our R & D facilities.

And on and on. The plastics industry grew with proximity to those materials; the pharmaceutical industry grew as a combination of petrochemicals and the migration from the city of places like Colgate, where pharmaceuticals and personal care products were more intermingled back then.

Heavy machinery, telecommunications, medical device technology -- on and on and on. We had all of these. And so in a very short period of time, these wonderful inventors -- many of whom we still know because companies bear their name or the companies they created endure -- but over time, look what they attracted. So we began to form, in New Jersey -- well, not began; we formed, in New Jersey, these huge clusters. We all are in awe of Silicon Valley, the center of software and computing technology. Look what we had here: petrochemicals, pharmaceuticals, electricity, electronics, recording and broadcast, telecom, materials, appliances, food, beverage, medical technology, and even heavy machinery. Who would know that Ford's largest assembly plant -- when it was built in Mahwah, New Jersey -- was not only their largest, but *the* largest, I think, automotive assembly plant in the world. And they also had one in Edison, and they had just shut down the one that they had in Edgewater. And GM also had a major assembly plant in Linden and Rahway. All this stuff was happening. Think, then, the number of jobs. The Camden facility for RCA had something like 13,000 employees. The Edison Works, in its hay day, had 10,000 employees. On and on.

So there are some lessons that we can take from this. First, product and manufacturing innovation grew hand-in-hand. So the ability to make things faster, cheaper, better led to new ideas for things. You saw it emerge in the textile industry; new technologies for making things faster, and better, cheaper; or specializations, like the silk industry. Again that's a whole other detour; the story of how this became Silk City.

Boyden, with his invention of malleable steel -- that was really just to make better buckles for saddlery and harness work. But it then gave birth to all these other related industries.

A skilled workforce became fundamental. It's part of what attracted the 1880s-era investors in, as they knew that they could take ideas and activate them, and turn them into products very quickly. And also that concept began here -- Moses Combs started, really, the first trade school in Newark in the late 1700s, early 1800s, because he was concerned that he didn't have an adequate workforce to be turning out those millions of shoes. And so he created a free trade school.

A lesson that seems very difficult for people to grab onto -- R & D wants to be close to manufacturing. There are now studies that validate it; it's not just my opinion. Research and development is ultimately solving the problems of new products and processes. It's important to have physical proximity to those locations. Not co-located identically; but there's a reason why Bell Labs moved to New Jersey out of New York City. Why? Because Western Electric was a primary production plant right here in Kearny. And so there's a book about Bell Labs that talks about it being like a university with a factory in a basement. Well, it also had a real factory 15, 20 minutes -- arguably, on a good day; maybe a little bit longer on New Jersey roads -- to get to the real factory.

Exxon -- Esso research was in Linden, right on the refinery premises. And then when they expanded to the model of moving to suburbia, they went to Florham Park; they didn't go to Florida, they didn't go to California. On and on.

The pharmaceutical industry: When we made pharmaceuticals here, we also had the R & D facilities here. And as we believe that we can hold onto the high-end executive jobs and R & D jobs, what we're finding is that those R & Ds are starting to leech out and go. We look at what happened when Exxon moved its refinery operations out of New Jersey and consolidated everything down in the Gulf Coast. Very slowly, one at a time, corporate offices, research offices, Florham Park closed. First it moved to Fairfax, Virginia, because it was a Mobil facility. Guess where it is now? Houston, because that's where the big Baytown refinery is.

So the idea of clusters -- which is a modern concept -- is really not so modern. You go back and look at how I painted the picture; you see how we evolved. Clusters -- they were not just about the end product, textile manufacturers -- but the supply chain, the people who made the machinery, the people who made the thread that went into the material, that went into the garments. This whole idea is really a very important concept in building a regional economy. And we were doing it, and we were doing it fair-the-well when we were successful.

And as Hamilton had suggested, manufacturing became a huge element of creating prosperity in the middle class.

So those are lessons that I think are timeless.

Then something very sad happened. That picture -- our logos and the little icons represent the locations of manufacturing facilities and R & D facilities that were shuttered since 1975. And everyone has some hand in the blame, I imagine. Certainly, the leading element is business decisions to think short-term. This is about the time of the oil embargo. I was a young adult at the time; I remember painfully. And our response to the

embargo, and then the arrival of fuel-efficient cars from Japan and from Europe, was really to try to brand our way out of it. Ford took the Maverick -- remember the Ford Maverick? They put a boxy chassis on it; they called it a Grenada, which was the name of a real efficient Euro car that they were selling in Europe. But they just took the name and they said, "It looks like a Mercedes." They thought they could market their way out of coming up with a quality product. It didn't work.

And so the response to Japan and Europe arising from the ashes of World War II, and now having finally rebuilt their economies, was to downsize, right size, outsource. And in the process, we gave away too many of our core competencies, and we were left with companies that didn't really have the basis not only to make the things that they currently produced, but imagine the things of the future and produce the products of the future.

But in spite of that -- and we could also take some blame. We've created regulatory and tax policies and other things that have not been favorable. In fact, some might think that we actively wanted dirty manufacturing to go, but we're the Garden State. And so we were, in some respect, I think happy to accelerate the things that business was creating. But in spite of all that -- guess what? -- you quoted the statistic -- we still have more than 10,000 manufacturers here in New Jersey. We don't recognize them publicly because they're not the big brand names with the logos that I put out there. They're not the *terminal OEMs*, in the parlance of the trade. But they are the supply chain. And as I hope to argue as we go a little bit farther forward, supply chain is becoming a fundamental importance now to all of the OEMs.

So it's still here; we haven't lost them yet. It's not too late to turn this around. This is a fundamentally important sector, not only for all the reasons I said, but it's also a job generator in the private sector. They need services. The multiple -- when I started the MEP in 1996 -- was four jobs in the private sector for every job on the manufacturing floor. Now they're talking about maybe even six, because the high degree of automation in manufacturing, but still the need for services. We still need transportation and logistics. You need legal services, you need advertising services, you need admin and secretarial support. All of these things are there, but they have to serve someone. If there are no terminal companies-- And so this is an important thing to recognize -- that every time we lose a job, we're potentially losing four others.

And they still are in a great position, and we are in a great position, just because of our geographic location. We sit in the middle of the densest packed, highest -- largest market, commercial marketplace in the world, with, on a good day, great transportation access -- air, land, and sea. We need to be able to take advantage of it because it's the lifeblood of manufacturers.

We need to do more. After the banking collapse in 2007 and 2008, manufacturing actually led the United States economy out of the dumper. That's the blue line; I mean, you can see the growth, and it's been sustained since then. So the contribution to the GDP has continued to grow nationally.

The red line is New Jersey; not so good, both in terms of employment and in terms of contribution to the GDP.

And in fact, we're amongst only five states in the country that have failed to grow its manufacturing GDP in current time greater than it was 10 years ago. Connecticut, Louisiana, New Mexico, and Vermont are the other brethren we have on the wrong side of the ledger. And states that we think have been written off as Rust Belt states, like Michigan -- look at that: \$40 billion increase. Over 90 -- I think 94 percent of it is traded goods -- meaning the export goods. So they're making this stuff and they're getting other people's money coming in. This is not an internally traded sector. Ohio -- another state that people would have written off as a Rust Belt state.

Neighboring states -- New York and Pennsylvania -- they've all managed to figure it out.

Now, it's not that we've completely ignored it; I have to give credit where credit is due. This Administration began a concept of identifying clusters in the economy, and focusing on workforce development and other initiatives to grow clusters, one of which was advanced manufacturing. This is the DOL designations, the sort of subcategories that are deemed to be advanced manufacturing. So it's a good start to recognize that. I would say that there are a couple of things that we need to realize. Number one, really, all manufacturing is advanced manufacturing. Don't focus on the product; it's a process. And nobody can stay in business if they're doing it the way they did it 20 or 30 years ago.

It is not hand labor, and we are not losing our edge to China because they're paying 10 cents an hour to people who are working in sweat shop conditions. I've been there; I've seen their factories. I would like to repeat a story -- the first time I went there, they took me to a glass factory

where they were making the glass for solar panels. You can imagine; these are -- what? -- about three feet long, two feet wide? The process line was two abreast. So you had two strips of glass coming out of the furnaces, and it went over a little -- you know, it scored it, and went over little things. You got a *clink* every time a new sheet was dropping. *Clink...clink...right?* That's the pace. How many people do you think were working in that factory? Well, I'll tell you; there were six people in a control room. And as the colleague who was with me at the time -- he brought a delegation over from China last week. He'd like to repeat that story, and he said, "By the way, four of them were just jabbering with each other, and only two of them were really working."

A high degree of automation. It was not because it's inexpensive. The labor content now is so small that it really is not the discriminating factor, because transportation, and other issues of dealing with outsourcing halfway around the world, becomes a business complexity that is almost overwhelming. So more and more manufacturers are realizing the need to re-shore. And we need to be prepared for that, and be the most favored place for that to happen.

The other thing that is somewhat overlooked in this analysis is the whole idea of a supply chain. We talk about the pharmaceutical industry; clearly we want to. It's the last anchor tenant that has that sort of large-scale OEM visibility. But if we manufacture our pharmaceuticals in New Jersey again -- and I will tell you later why we can and should -- it's not just the drug manufacturers. It's the people who make the equipment, it's the people who make the raw materials, it's the whole supply chain, right? And so we need to think supply chains, and think about clusters --

industrial clusters and the supply chains below them -- and really orchestrating that to work together. We are potentially the best supply chain state. I think John may talk about that.

It is that 10,000 manufacturers really need to be aligned, sewn together, and take advantage of physical proximity -- as a much more productive way of bringing manufacturing back than shipping stuff back and forth all over the world until you get it to final assembly.

We talk a lot about employment in manufacturing; and employment is dropping. And so we take that as a leading indicator of an unhealthy segment. It's like having a temperature; if our employment numbers are dropping, it must be bad. Well, what this chart shows is, between what the State has deemed as *advanced manufacturing* and *non-manufacturing* sectors, yes, clearly manufacturing is dropping; but look at the contribution to GDP. So the productivity per worker is on the rise, and always has been, throughout this whole 25, 30 year decline of manufacturing. If I were a planner -- and I'm not, I'm just an engineer and an academic -- I'd want more of those companies. I'd be figuring out how to get 200,000 companies. So you would get the job increase, not by more employees in the same companies -- they're becoming efficient, they're using more automation, they're going to use less direct employment -- but I will want more of those companies, and I will want the companies to supply them.

And as we move to automation, we're going to need the companies that service automation, the people who program automation, the people who install it. So we shouldn't look at this as a process by which it's a shrinking employment base and a bad investment; but actually, a

highly productive-- This is, guess what? This is Hamilton's thesis. It's 1791 all over again. This is still an opportunity for great wealth to be generated, and opportunity by investing in the fact that we can continue to increase productivity in the manufacturing sector.

And I guess I will speak ill of some of the competition. We've touted New Jersey as a service-sector state; I've listened to it patiently for 25, 30 years. And we point to employment growth in the service sector like that, again, is the sign of a healthy patient. Well, look at the numbers. Where is it? It's not bankers, and brokers, and lawyers, oh my; that's not where the employment growth is -- even before the banking crash. The largest segments are in the lowest wage sectors in the state. They are also in categories that are not traded sectors. So education and healthcare; who's paying for that? We're all paying for that. Whether it's through taxes, or it's through our health insurance fees, or so on -- we pay for the teachers, we pay for the healthcare.

So it's not money that we're bringing from other states; it's our own money being spent on those services. It's also in vulnerable sectors like retail and tourism. What's going to happen to retail in 10 years? We're talking about trying to lure Amazon into the state, and Amazon is very quickly gobbling up the retail world because we're going to be doing it more and more on our iPhone 20, or whatever it is, in the future. I see it in my kids -- they don't go to a store.

And so what happens as we're focused on trying to build greater employment and growth in those sectors, when those are, in fact, sectors that, perhaps, are very much at risk?

So I don't want to be the harbinger of gloom and doom only; because the good news is, everything is going through a big change now, and in times of change it creates opportunity. And people go from the back of the pack to the front of the pack if they recognize the change and they seize it.

Big opportunity -- *Industry 4.0*. Have any of you heard that phrase used? It's a European phrase. When I first saw it, I said, "What does that mean -- 4.0?" They mean it's the fourth industrial revolution. Hmm; I know about steam power; I think some talk about Henry Ford and the automation and manufacturing lines as the second; I don't recall a third. Does anybody recall a third? They didn't teach me that in school.

Well, in Europe and the rest of the world, they talk about a third industrial revolution, which was the digitization of the workplace; CAD/CAM machines, and so on. But we were asleep at the switch; we had already given that all away.

But now they're talking about 4.0. Well, what does that mean? It means knowledge-driven, artificial intelligence, connecting the work floor to the marketplace.

Anybody remember Benetton? I don't think they're still around anymore, right? The whole -- with fancy-colored sweaters, and so on, in the malls. Their secret was real-time monitoring of sales volume back to the factory, making the colors that were selling. So instead of building for inventory, they were building for markets. Now, you put that on steroids, and you have an AI system that's connected to your supply chain, your suppliers, to the marketplace. And you're readjusting all of your conditions in real time -- much more efficient. That's the model, right? So

it's not just digital machines, but it's now a brain connected to digital machines. Again, perhaps fewer people on the shop floor; but guess what? There are still people who need to run that.

I was at a Stuttgart assembly factory for Mercedes Benz; I think the E Class. Someday-- I mean, I've seen them; I can tell you, I can't afford one. On that assembly line, every other car was completely different from the one before or after. They were all E Class, but some were sedans, some were coupes, some were taxicabs, some were the high-end Maybach exotic sports car; every one of them different. Mass customization -- which is the second bullet (referring to the PowerPoint) -- but all IT-driven. So every platform had a data package that went along with it and robotics that did the assembly. But guess what? There were still people. I didn't see them, but they were back in control rooms and they were monitoring the performance of the automation.

Mass customization -- another concept that people talk about, but now it's a practical reality. Henry Ford said you can have any color Model T you want, so long as it's black. (laughter) Honda came out in that 1975 era, and the Honda Civic came in red, white, and blue. But you could customize with dealer-added options. So you could put in air and so on. Well, now we've emerged to a point where mass customization is a process by which you can use mass production technologies. But like the Mercedes experiment that I described -- or operation, have every one customized for an individual. And some of this will be much better done near the consumer. And so instead of Amazon just using distribution houses here in New Jersey, what if they were also manufacturing houses? They were taking standard components and giving you the color you want, the

packaging you want, the size you want -- whatever it is that could be end-user modified. It's an important concept, and an opportunity to grow.

The middle one is huge, and huge for our anchor industry -- the biotech revolution. In the late 1800s we went through a revolution in medicine where we began to understand bacteria and viruses as the source of disease; so it wasn't snake oils, and leaches, and bloodletting. So there was a science base, but still largely observational. Medicine was still largely observational cause and effect.

We're now understanding the fundamentals of our growth, our composition, our behaviors, from our DNA outward; biochemical reactions that are driven by our genetics. Which then opens up opportunities to fix and cure that. You may have heard on *60 Minutes* -- maybe it was about a year ago, now -- they've taken a polio virus and they've modified it so it only attacks cancer brain cells. And what was supposed to be just a phase-one clinical trial with no expectations, was coming up with, like, this 80 percent cure rate. This is modifying the genetics of an organism to now make it a drug.

You've probably heard announcements in the last month or so -- T cells, CAR T cells -- Novartis and Celgene, both are being in the business of taking your immune cells, if you will, training them to understand and target only specific cancers; growing them, so now you have an army instead of a soldier; and putting them back into you. We're actually going to help them by creating a manufacturing center to develop those technologies from lab to scale, and training the people who are going to work in those things. It's just a whole new world, right? And when there's a whole new world, there are new opportunities.

Advance materials; nanomaterials. We've talked about nano for at least 10, 15 years. It's finally maturing. And so we have opportunities to think about structuring things at a molecular level that have special and unique properties, then go into the end goods and services that we use. And added manufacturing is another way of building things with completely new technologies.

And last, but not least -- supply chains are dead; innovation networks are the future. Supply chains would build a print, forward-design a car, and they would have everything designed, they would know the manufacturing process, and they would put the prints out to bid. The tier one suppliers would put prints out to bid to tier two, and put stuff out to tier 3. At some point, you have people making nuts, and bolts, and washers, and it all comes up to final assembly.

Well, nowadays, because American industry cut its head off with respect to manufacturing, it doesn't have the internal competencies in how to make things and materials. Steven Jobs told President Obama he couldn't make iPhones in America -- not because it was too expensive, but because the people in Shenzhen, China, were the only ones who had the competency to understand how to design and build -- or how to build his designs.

So how do we solve that? We solve that by figuring out how to collaborate to compete. And we're doing things to bring companies together so that we innovate on the front end. Our supply chain has the knowledge in manufacturing, they have the talent in materials, they have these ideas. And increasingly now, we need to create pathways for them to come together, because that's the future of how to build things. So instead

of a fixed supply chain where granddad before dad, and dad before me were the supplier of brake pads for GM-- And we had that business forever -- constantly rearranging, in different couples and permutations; always, in the end, connecting, potentially, the different products and market space on competency.

So the manufacturing from the past, to the present, to the future -- it rooted here because of natural resources. The power of the Great Falls; that was what impressed Hamilton. He had seen that in his journeys in the Revolutionary War. He hadn't gotten to Niagara Falls and so he saw this, and that was an important resource; and we leveraged that. And we had iron ore deposits; and we had -- the pure water of the Passaic was what attracted the breweries to set up in Newark; the sand and clay deposits in South Jersey.

But very quickly that began to morph into automation, and people who knew how to work with that. And so by the second phase, we were really looking at an abundant workforce as the primary driver for manufacturing.

And the future is brain power. Smart; it's not just bodies. Unskilled labor is an oxymoron; it's not going to exist anymore than non-advanced manufacturing is going to exist. So we really need to focus on securing our position. And the good news is, we have a great educational system; a highly trained workforce; the highest density of scientists and Ph.D. scientists and engineers, I think, in the world here in New Jersey. We need to be able to leverage that -- not just for R & D, but for production.

And so that trips us on a number of policy issues. I'm not going to tell you how to do your business, but you know this is your

business; and they all end in *-tion: taxation, regulation, education, transportation, innovation, collaboration* -- I'm trying to keep up with Alexander Hamilton with the rap. (laughter)

So clearly, we have issues; not just with the level of taxation -- which everyone knows is high and has created a stigma of a bad business environment here in New Jersey -- but not reinvesting those tax resources into things that are producing it. In Germany, they have a system called the *Fraunhofers*. To some extent, my organization is an attempt to model their behaviors without one important ingredient: a sustained stream of Federal funding that comes in proportion to tax revenues from the industry sector that one of the Fraunhofers serves -- or 80 centers; they're all in different specialized technology areas. But for example, the sheet metal stamping -- Fraunhofer and the Technology University of Berlin would provide services to Mercedes, to BMW, to Porsche/Audi, and Opel. And if they do well, then there's more taxes paid by the automotive industry; that comes back to them as an increase in their base funding. So it's an investment in developing a technology base that everyone can share, as well as end consulting and services to work with them on a proprietary basis. We don't do that.

Regulation -- we all know that we've often used regulation as a club to make it difficult for manufacturers to stay here. We need to be able to fix that. Both of those are categories in which national rankings habitually cite New Jersey as last, second-to-last, or third-to-last in the country, with respect to these issues. And it's not just, again, the threshold of the regulation; but it's also the time to get to decisions. The Healthcare Institute of New Jersey, a number of years ago, did a study of the big

pharma industry about why they were siting their manufacturing and R & D facilities. And they picked an example of a company that chose Massachusetts over North Carolina. *Taxachusetts?* Why would you go there? Time certainty. They said because we know, in spite of what they were throwing at us in North Carolina, with utilities and subsidies, they didn't have a trained workforce and it was not time-certain to get to decisions on permitting. We knew that the processes were documented, and reliable, and efficient in Massachusetts, and that's why we chose that location.

We've talked about workforce. There's a graphic in a DOL publication that shows the demographics, from the 1990s to current time, of the manufacturing employee population. You know, 20 to 30, 30 to 40, 50 to 50 and up, to 60. It almost looks like our workforce has aged in place; that the people who were 40, 20 years ago, are the same people who are now 60 -- right? -- almost no infusion of people in the lower 20 to 30 category. That's a huge issue. Our manufacturing workforce is aging out, and we don't have the programs and the capacity-- And you'll hear from others that the number one cry coming from manufacturers is, "I can't find skilled talent to do my work."

Infrastructure. It's energy and transportation; but energy doesn't end in *tion*, so I had to leave it off. If we're going to have a supply chain model, we need to be able to move goods and services efficiently throughout this densely populated region. And it can't be choking in traffic; it can't be trucks that break down because potholes took them out. But to make it even worse-- I was at a presentation yesterday from the Director of the Pennsylvania Department of Transportation. He showed

the plan he's working on with Ohio and Michigan to have what they call *Smart Belt*, instead of *Rust Belt*. What's it all about? It's about creating the capability for automatically driven vehicles -- trucks, driverless trucks to be moving goods back and forth across that region seamlessly to drive the wheels of industry. And you already saw, in a previous slide, the growth in manufacturing in Ohio and Michigan; and even Pennsylvania was on that as well, right? And so they're already thinking about stuff. When's it going to happen? They say commercially available AVs in 2020. Well, what if it's 2030? It's still-- I mean, when you figure how long it takes off, and for us to plan and do things, the time is now. We should be in that action. I asked him, and New Jersey's not even in that conversation.

Bringing down the cost of utilities, electric power in particular -- another important driver in this automation era.

Manufacturers need help in innovation. There are small- to mid-size businesses that were left. So who is going to invent the manufacturing technology platforms in the future if we get the input and the feed from these people? That's what we're trying to do; my organization is really dedicated, trying to solve these problems. But, you know, we eat what we kill. We are trying to bootstrap up something which, as I suggested, other countries have done as a public-private partnership.

And finally, we need to find ways to foster collaboration between all these elements. If in fact we're going to make industry work, it's going to be around these industrial ecosystems; not just bringing in the top dogs, but finding ways to make all these pieces work together, both on the design end and on the production end.

Those are things in which government could play an active role, both with dollars and with policy. And I hope it gives you a little bit to think about as we go forward. Because if we don't, then we'll play a little Ebenezer Scrooge here; if we don't, I predict that we'll continue to see corporate R & D and headquarters migrate from the state, because the R & D is going to go where the action is -- both the talent and the manufacturing -- and over time, it's going to be important to be close to where the business is, and the corporate heads will go as well.

Our shipping operations -- this will no longer be an advantageous place to go. We spent all this time digging the canal or digging the channels to get to the deep-water port in Newark; we finally raised the Bayonne Bridge; but you already see the opportunity now -- Mercedes moved its operations to Atlanta. If all the action goes down South, how long before Norfolk, then, becomes a deep water port of the Eastern seaboard? If we extrapolate that rate of decline in manufacturing employment at 10,000 per year, with a leverage factor of 40,000 more in the private sector, what does that do to our economy?

And with a net-out migration of students -- it's been historic; worst in the country -- plus-30,000 students or more leave than come to New Jersey. Other states send more out than we do, but they bring in more than they send out -- like California.

We end up then, need I tell you, with an unsustainable state. Too few people employed, too few companies employed to provide the tax revenues to supply the rest of state services.

Ebenezer-- That's what could be. But maybe we see the light of day, and we recognize that OEMs are now increasingly trying re-shore

production. And they need help; they have to rebuild now -- manufacturing infrastructure -- and they're not going to do it as wholly-owned, right? We're not going to go back the Bell Lab, or to AT&T days, where they mined the copper to make the wires, invented the plastic to coat the wires, invented the snap plug to make it easier to plug the wires to the telephone, invented the plastic so the phone wouldn't break when you dropped it -- all to sell you long distance service. Vertical integration is not going to happen again.

And so we can take advantage of mobilizing our supply chain and connecting these large OEMs to be first in line when they want to bring business back to the United States.

This will attract equipment, instrumentation, and software companies because they want to be close to the action, right? Small companies can't be flying people all over -- back and forth across the United States or around the world for business. They need to be close to where the action is.

Our transportation/logistics, technical and professional services, and other service sectors will grow because the manufacturing sector will need their support. And if we do that, the manufacturing share of our GDP could rise to match what it already is in Alabama, and Indiana, and Kentucky, North Carolina, and Michigan -- creating another quarter-of-a-million direct jobs with 64 percent higher wages than the average; and with that leverage factor, a million or maybe more of indirect jobs in the New Jersey economy.

It's really -- for us, now, we're at a pivotal time where, if we don't act, it will be the gloom and doom. But I think we still have an

opportunity to do this. And if we do it -- to borrow a slogan from a bridge, the world will know us not just as Trenton Makes, but Jersey Makes. And I think that's a rich future for us all.

Thank you all for your time. (applause)

SENATOR GORDON: Thank you, very much, Dr. Sebastian, for an extraordinarily thought-provoking presentation that lays out where we've been and where we can go.

I took an optimistic read on this, particularly when you described the disruptive forces. Because those are opportunities I think we can take advantage of through sound public policy, which I hope will be the end product of this initiative.

I want to just note that we have just been joined by Assemblywoman Rodriguez-Gregg, who we welcome; and Assemblyman Anthony Bucco, Jr.

Dr. Sebastian has another commitment, and we don't want to keep him. But if there are--

DR. SEBASTIAN: But I'll stay for questions; and just--

SENATOR GORDON: If there are some questions--

Senator Rice.

SENATOR RICE: Yes, could we get a copy of the PowerPoint?

DR. SEBASTIAN: Yes; it's here, and--

SENATOR RICE: That's number one; yes.

DR. SEBASTIAN: --and it's yours to take and keep.

SENATOR RICE: Number two, what are your views on New Jersey Legislature's creating -- giving municipalities the ability -- having the resources to create manufacturing zones? Because that's something that

I've been interested in for a long time, because we're in Paterson; the Perth Amboy, the Camdens, the Mercer County, the Trenton, the Newark -- they were all manufacturing industries at one time or another. And we know the infrastructure is here. So what are your thoughts on that?

DR. SEBASTIAN: (off mike) Yes, yes, yes. Twenty years ago, I think that Congressman Menendez wanted to drive the port redevelopment; why? Because he thought that the import/export customization would, in fact, serve the subsidy for lost garment worker (indiscernible). To do it, we need to figure out how to move goods and services around. Until we can identify brownfields, abandoned industrial sites, and repurpose them for this next generation of manufacturing, I think this story has come true -- that we have abandoned industrial sites; and instead of paving them over or turning them into apartment complexes, after a very expensive mediation they can be adequately remediated and go back to being industrial sites. Well, we have to have the will to be an industrial state again.

SENATOR RICE: So, so, a quick question.

Your NJIT is in my city--

DR. SEBASTIAN: I think we are; yes, sir. (laughter)

SENATOR RICE: And so I need to, maybe, connect with you in the future. Is that possible? Is it okay? I don't have to go through the President?

SENATOR GORDON: He's not going anywhere. (laughter)

DR. SEBASTIAN: (off mike) (Indiscernible) be easy on us, Senator.

SENATOR RICE: Okay, all right. Thank you.

SENATOR GORDON: Assemblyman Zwicker.

ASSEMBLYMAN ZWICKER: Sure.

Thank you, Dr. Sebastian.

So you talked you about manufacturing clusters.

DR. SEBASTIAN: Yes.

ASSEMBLYMAN ZWICKER: Food, chemical, machinery, metal, and electronics -- sort of broadly defined. I'm wondering, as you go from past to present to future, and you looked at this carefully, how do you identify, for lack of a better term, *the low-hanging fruit*? You know, where is there real, tremendous opportunity?

You know, you talk about Amazon-- The whole country is going to compete for Amazon. But you laid out, very clearly, that New Jersey has the right location, it has the right workforce, it has the unbelievably good public school education, K through 16 -- so where do you turn first? What are the easy ones to go after?

DR. SEBASTIAN: (off mike) So I will tell you where I would put my money where my mouth is -- which are the industry verticals that are organized around NJI, a couple of them have strong potential manufacturing (indiscernible). The first is biotech. It's kind of like me being able to harness the ability to create the chemicals that the body normally creates; or organisms -- and engineer organisms. That's the future of that industry, and that's an opportunity where I will tell you we can take processes that used to fill acres -- you remember the Hoffman-LaRoche site; it's now being redeveloped.

SENATOR GORDON: Yes, a medical school now.

DR. SEBASTIAN: So that was a pharmaceutical factory -- and most of that could be done in a space this big through new technology -- continuous manufacturing technology. You don't need hundreds of gallons of tanks to store batches if you're actually producing your material continuously and shipping it out. So investments in things like that -- the Celgene therapy, which is a different type of technology. These are all things that don't take huge footprints, for which the future -- It's (indiscernible) already a player, who owns it, but you'd have to displace. So it's an opportunity to come in at the top of the curve. We see developing nations -- they don't string telephone wires and run on rail systems. They have SAP phones. They come in at the top of the top of the technology curve. This is one area we have a chance to come in at the top of the technology curve.

Another is use of the *Internet of Things* in daily life. So we've invested-- And Senator, I hope you'll be pleased to hear this -- we're working hard to make Newark a model demonstration city for the Internet of Things. It's nice to have talking thermostats, but how do we really take care of this ubiquitous presence of network, wireless, and sensors and make life better for everyone? Simple things like better organizing our access to mass transit, moderating the environment, street safety, efficient use of our energy systems, the ability to control our HVAC systems so we're not creating overload.

There are many, many ideas out there, but there's no place to try them out. We all remember the dot.com burst. Anybody remember -- what's it called? -- pets.com? It sounded like a great ideas, right? I have a slide with 10 company logos that were all stars of that era. There was

billions in investment lost because they were ideas that seemed clever; the founders had nice PowerPoint pitches and two-minute investor briefing pitches. But they were before their time; there was no way to test out and see: was there really a market? If it's a good idea, would anybody buy it, and could you make a business out of it?

I'm a chemical engineer; we scale things up, we build things on a small scale in a laboratory. And it's not just to make the size bigger, it's all the dynamics changes, heat changes, and stuff like that. Well, where do we experiment with the Internet of Things to know what will work and who will pay for it? Who's going to pay for an automated parking system -- which is possible? Who's paying for monitoring the water system, and the infrastructure to do it? Is it the power plant that's going to do it? Is it the municipality? That's who the vendors seem to think. They'll then be in the business of reselling those services. I think we have to find the place to kick the tires. So we are trying to say Newark is just the right size. It has the fiber optics infrastructure; it has the capacity. It's small enough and big enough. It has all the problems of any urban center, but it's small enough that you can begin to try these things out, and the experimental zone matches the jurisdiction of control. We can really see, *a)* does it work in a technical sense; *b)* does it make business sense, does it make dollars and cents?

So the Internet of Things then, and automation, right? So that hardware and the software then drives this continuous -- it's going to be continued growth of automation, and all that. I think it is another area that goes back, then, to our heritage, right? It's the biochemical-pharmaceutical thrust from the Rockefeller and Merck era, side by side in Rahway and

Linden; and the Edison-inspired, and Sarnoff-inspired electricity and electronics. And then we can see where it goes in medical devices-- I think those are the two-- I'm betting my organization on those two to start.

SENATOR GORDON: Assemblywoman Rodriguez-Gregg has a question.

ASSEMBLYWOMAN RODRIGUEZ-GREGG: So you touched on one thing-- Because, obviously, our tax problem isn't going to go away in New Jersey overnight. So one of the things that makes Massachusetts unique -- in that they have that booming biotech sector -- is the DEP. They had a massive overhaul and reform, which made them very desirable. What specifically-- I mean, can you-- I think when we have this panel, we want to think of real things that we can do as legislators to incentivize companies to come here. And obviously, you know, that's one thing that we would like to hear more on -- about what we can do in that arena to make us more attractive, in terms of having more certainty when it comes to permitting; being able to build, and that whole process.

And the other thing, too -- I know that he touched on having zones. One of the things that manufacturing companies look for -- it's not just specifically real estate, it's that ecosystem of transportation, skilled labor, and everything. One of the key components you talked about was skilled labor. What can we be doing to incentivize apprenticeships? I know you talked about Germany. Germany has a very unique system in how they train their workers for engineering, tech, everything. What could we be doing to incentivize workers -- and not just the county colleges and vo-techs; you know, the four-year colleges marrying, I guess, the private sector there in education.

DR. SEBASTIAN: (off mike) Wow. Well, those are excellent questions. They each are about a thesis in answer.

I say to the first one, let me defer to John and some of the others so they have their time. Because they can tell you what -- some of the firsthand experiences with manufacturers of some of the very specific things.

I think what the Lieutenant Governor did in creating the Business Action center is a very important first step. But we need to put that on steroids and then John, perhaps, can (indiscernible) something very specific in the short term.

In respect to education, there's a lot of discussion now going on about this very issue. I would say that it's a systemic problem. Our K through 12 education -- and I have one who just finished, and two who are still in it -- gives them no indication of professions. It's really an Ivy League education distilled down to a K through 12 level.

And so there's no connection to the outside world, and there are no alternative pathways for those who don't aspire to go to Princeton -- into an alternative.

And then we go up in our community college systems -- they're working harder. But a lot of what they're doing is the prep work -- we'll call them *general university requirements* -- for four-year programs; which is, again, the high school material on steroids, or the college level history, English, math, physics, chemistry. Again, not a career orientation track. And we're culprits, too -- the four-year schools.

So we need to think of how we can emulate the German system, but I don't think we have the ability to create a whole separate

structure. So we have to figure out how do we help high schools, even middle schools, community colleges, colleges -- stacked together (indiscernible) that are this vocational track. Like an elevator, you can get off at different levels and you can shop, and then you can continue to go up -- meaning, you don't have to go through it all at once. We look at education as, you do your middle school, you go to high school, and you go to college, and then you go to work. Sometimes you can get a master's or Ph.D., and then you go to work.

But the career tracking is one where -- maybe you leave and you go to work after you get a certification in a high school program. And then because your job requires you to have more responsibility and more knowledge, you come back and you get -- it's called *stacking the credits*. And I think this is something you need to work -- not only implement the concept, but then to create the programs; and it's important to do the programs in the infrastructure that we have.

For example, we're going to start a school of technology. We have an engineering and technology department. But we think that at the four-year level, there is this crying need now for this different type of education that is much more workforce-, job-oriented, and much less dependent on theory -- they coexist, but they are sort of different tracks. So it's emulating the German system, but without having a 60-year process of creating two completely different worlds -- but trying to do it, perhaps, in the same infrastructure. So with a very different heartbeat in terms of what we're delivering and how we're delivering.

SENATOR GORDON: Assemblywoman DeCroce.

ASSEMBLYWOMAN DeCROCE: Yes, thank you so much for today.

Last year I had the honor of traveling to China, and toured manufacturing companies and technology companies that are way far advanced than we are. It was very eye-opening. I had the pleasure of being with Assemblyman Gordon Johnson, and Senator Shirley Turner, and a few others. So it was an amazing adventure, to say the least.

But one thing that-- And I agree with everything that you have said here today. And one thing that I keep going back to -- when we were talking about Boston a little bit earlier -- is grassroots here in New Jersey. And when we talk about grassroots, it's getting all the way down to the municipalities and their master plans; and making them understand and leading them in the right direction of having areas that we can allow companies to come in, and build; and stop-- And we have to reform; we have to reform our regulations, our permitting processes, our DEP requirements.

I work in the real estate industry, and I had a company from Boston that came down here to New Jersey. And I sat with them; and they're looking at building additional assisted living facilities that the state is in needed of. But they were just taken back by all the layers of government, all the requirements, all the permitting, and everything that they had to go through -- which went into the cost of them trying to locate here.

So it is a problem in the manufacturing industry, whether it's the technology industry-- Let's talk about the automotive industry. You can take a look at my dad; 54 years ago -- he was a car dealer for 54 years.

He started with American Motors. And what happened to American Motors when Toyota and Honda came in? Because they couldn't work together, and everybody couldn't do it the right way, the company ended up merging with Chrysler, and we lost an American company.

So we tend to keep ourselves in that hole, and we need to come out of it. And I really appreciate your input, because the manufacturing industry and the technology industry here in New Jersey are going to take us in many, many directions, and grow. But I think, as a panel here -- reform of the DEP, and the licensing, and the requirements, and everything is a major step. Even with the Lieutenant Governor's Business Action Center, that has been an obstacle too.

But also encouraging master plan reform here in the State of New Jersey to allow what needs to take place to take place; to make the municipalities understand mixed use, manufacturing use, industrial use; and how we can utilize that type of planning. And I think we need to assist the municipalities to help them along as well.

Thank you; thank you so much.

DR. SEBASTIAN: (off mike) Thank you; very well said. Nobody wants New Jersey to be the next Love Canal; no one wants to see industrial waste dumped into open sewers--

ASSEMBLYWOMAN DeCROCE: Right.

DR. SEBASTIAN: --and the air polluted. But that's not the only alternative. Manufacturing is taking place -- again, all over the country, not just all over the world -- in a way that's environmentally compatible.

ASSEMBLYWOMAN DeCROCE: Exactly.

DR. SEBASTIAN: And so we need to make sure that our regulations match the reality of what is achievable; and then that takes a careful review--

ASSEMBLYWOMAN DeCROCE: And that's--

DR. SEBASTIAN: --and a desire to do that.

Thank you all very much. Again, I'll stay as long as you have questions, because this is so important.

SENATOR GORDON: It looks like we have a couple more, and then we're going to let you go.

Senator Oroho.

SENATOR OROHO: Actually, just for Dr. Sebastian.

First of all, thank you very much.

We all talk about the assets; we talk about the location, the workforce, the education, the infrastructure. And I liked, also -- you bring in the idea of, we also have to worry-- It connects with economics; the price elasticity and demand. We have great assets, but it's where we overprice them to, then, you start to lose things. You start to lose the value of those assets.

So one of the things -- I was glad when you brought that up, because companies think in times of years; unfortunately, in the Legislature, sometimes I use to say, when I first got here, "We do long-range planning on a watch (laughter)," as opposed to companies that will do 5, 10, 15 years-type of planning. So I want to thank you.

But the whole idea of the economics of that -- that price is, you know-- And you pull up those -- the number two issues; the price is the

taxation and the regulation. And when you brought up the disrupters -- that's very true.

One quick story -- when I was working in my business career, I was down in Brazil talking to a finance director. She had three phones on her desk -- one for internal calls, one for international calls, and one for calls within the country, right? She actually had a phone for within the building.

And I said, "Where are all the wires" -- and you see, (indiscernible) down in Sao Paulo. And what she said -- she goes, "Satellites will get--" They knew; and this was 25, 30 years ago. "Satellites. When that happens, then we'll get--" Now, Brazil found other reasons why not to do very well, but anyway.

Thank you very much.

DR. SEBASTIAN: (off mike) Thank you.

And on the time scale -- not only do some companies think long-term, although not long enough, but there are countries that don't think long-term enough.

SENATOR OROHO: True.

DR. SEBASTIAN: We talked about China. If they're doing anything to be scared of, it's this kind of master planning. And then *China.com* is executing this master plan. So they have this sort of lockstep. (indiscernible). They're desperate to be innovative, but they have a system in which the blade of grass that sticks up is the first one to get cut. So it's not yet in their culture to be creative and to do the out-of-the-box things that have been the hallmark of Yankee ingenuity. We need to leverage that before it's too late.

SENATOR GORDON: One further question.

Senator Greenstein.

SENATOR GREENSTEIN: Thank you; thank you very much, Don. It's good to see you.

On the issue of infrastructure, what do you think are barriers? Is it funding? And how do we set priorities on that, if it is funding -- because we only have so much?

As you know, we just passed a Transportation Trust Fund; but that will only go so far, and we have so many needs. So how would you look at this to set priorities?

DR. SEBASTIAN: (off mike) So I don't have an answer; I have a question. We had-- President Bloom organized 6 to 10 construction industry CPOs last week to talk about critical infrastructure and how do we solve our problem. And I raised a question. I said, "The George Washington Bridge was built in 1927; they built it in four years, and it took four years of planning. Then the Golden Gate Bridge was a little bit after that -- also four years of planning, four years of construction." This was 80 years ago. The brand new Tappan Zee Bridge -- much touted as a victory, right? Twenty years of planning and still four years of construction. There has to be a better way to get efficiencies and economies in our construction industry to match what we've been able to do in the manufacturing industry. There's no reason -- not just that New Jersey's roads should be as expensive as they are, but that anywhere's should.

Henry Ford built 800 Model Ts a year in his heyday; we're putting out 17 million cars a year in the United States. On and on and on -- examples of which efficiencies and productivities were being gained, and were not gained.

They were complaining about regulation also -- the way in which projects are bid for first design, then separate for construction, leads to huge inefficiencies. Where the people who design it don't get to build it; the people who build it don't understand the design process. And you get what manufacturers learned 30 years ago--

SENATOR OROHO: Design-build.

SENATOR GORDON: Design-build.

SENATOR OROHO: Exactly right.

DR. SEBASTIAN: --that when you try to fix a problem at the end of production, it costs a thousand times more to fix it in the design phase.

So it's not just, where do we find more money; but what can we do to increase efficiencies in which we're spending it.

SENATOR GREENSTEIN: Thank you.

SENATOR GORDON: Senator Singer.

SENATOR SINGER: Yes; just-- You know, I was involved with the Biotechnology Council; we formulated it; I worked on the Biotech Task Force, as you know.

DR. SEBASTIAN: Yes.

SENATOR SINGER: A couple of concerns that have fallen apart. Number one is, there has to be a closer alignment of our State higher institutions with the biotech industry. They're always complaining, "We don't have -- you're not producing the right students for us."

Second of all, you know, we ended the Commission on Science and Technology; and Senator Gordon and I are going to be working on that. It was \$25 million a year to be competitive for incubator companies

coming out of our-- You know, we met with the Sarnoff Institute, and we talked about, "Why are your companies not locating -- that you generate -- locating in New Jersey? Why are they going to Pennsylvania; why are they going to other states?" And the answer is, "Capital monies. Others states are willing to invest with us; New Jersey is not." A big problem.

Also, getting siting and being able to work with things. They find that, too many times, they're blocked to do things in New Jersey.

And lastly, with that same aspect of how we develop with-- It's so key that EDA understands what the biotechnology industry is all about.

DR. SEBASTIAN: Yes.

SENATOR SINGER: It's not the same. And we had our educated at the time, and those people are gone. So we try to say to them, "Here you have a company that has dollars in the bank, but loses money for the first eight years, or five years. But they're still a good investment." You have to teach EDA to be able to loan the money and that, and the banks to loan the money.

So it's problematic, and something I think we've fallen away from and allowed. At one time, with our legislation, everybody looked at us and said, "Oh, what is New Jersey doing?" When you think about -- when the lead companies in biotechnology are in Wisconsin, not in New Jersey; and that our competition is in Pennsylvania, Connecticut, Massachusetts, New York, and the Port Authority -- and harnessing the money from the Port Authority, because it affects both states. New York is winning that battle; we're losing it.

DR. SEBASTIAN: (off mike) Amen, amen; I agree on all points. Again, there's a thesis in answering most of those.

The biotech is the one that we're committed to. We're starting a pilot scale manufacturing facility -- an experimental facility where these technologies can be evolved for both cell gene therapy and, another one, for continuous manufacturing. It should have been funded by a Federal award; that competition -- let's just say -- fell prey to politics, as were about a dozen others. But it didn't change the fact that one of the things that hurt us was lack of a State match. We scraped together \$4 million; but others states were coming in with \$10 million to \$20 million in State match. North Carolina--

SENATOR SINGER: The Franklin Fund; take a look at that.

DR. SEBASTIAN: --Massachusetts. So states that are investing heavily to take-- Because they recognize that biotech -- everybody wants it; everybody thinks that's the next Silicon Valley. And yet, we should have it, it's our birthright. And I think just because it's our birthright, we have the terminal companies that want to buy those companies. This is the right place to make it happen, but it's not going to happen just-- We're so used to these things happening out of the private sector because, throughout our lives, we had the most robust private sector in the country. We had all those companies -- all those logos I had up there, we grew up with them as household names. They're gone. We have to behave like the Carolinas did in the 1950s and 1960s, and reclaim what we once had. The good news is it's not all gone, so it's not a clean sheet where we have to start from scratch; we still have important pieces. And those 10,000 manufacturers are part of it.

SENATOR OROHO: A simple question: What comes up after biotech; what's next? (laughter) Where do we-- So we can be first.

I'm only kidding.

DR. SEBASTIAN: I don't think we're at botany; and I think everybody--

SENATOR SINGER: Maybe photonics, electronics?

DR. SEBASTIAN: --is on the biotech -- until laboratories scale up. So turning that into production is where we have an important chance to grab a niche.

I mentioned the Internet of Things. That also then gets into model electronics. Nano-scale electronics technology is the, sort of, hardware-side of the AI revolution. That's what is going to allow us to have inexpensive, almost invisible-sized sensors in computing technology; it was first out there in the cloud. And so grabbing that back -- which, by the way, we started here, didn't we, in Bell Labs; right?

SENATOR OROHO: Yes.

DR. SEBASTIAN: The semi-conductor industry didn't start in California; it started here.

SENATOR GORDON: Holmdel.

SENATOR OROHO: Right here.

Thank you, Doctor.

SENATOR GORDON: Thank you very much. (applause)

I know, Dr. Sebastian, we'll be drawing on you as this process evolves. And thank you very much for providing the foundation that you did today.

Our next presenter is John Kennedy, Executive Director of New Jersey Manufacturing Extension Program.

And all of us on the panel should have received his latest annual report on the state of manufacturing in New Jersey.

I should add that Mr. Kennedy had a good deal to do with the idea of creating a Legislative Manufacturing Caucus, so we thank him for that.

Please proceed.

**J O H N W. K E N N E D Y, Ph. D.:** Well, I was going to do it to some background music; but, you know, I decided against that. (laughter)

What I want to start with a little bit is, first of all, I love listening to Don Sebastian, because he gives such a background of where we were and where we can go.

Secondarily, I look back at my own life. Talk about pathways, you know? I used to come here with my father; my father worked for PSE&G, and he was an electric and gas inspector. So on weekends he would take me along with him, and I went into all these plants and facilities. Now they'd arrest him; but back then, that was normal.

Why is that important? Well, because that's pathways, and that's something that I'm going to talk a little bit about and go to.

First of all, I just want to tell you a little about about what NJMEP is, because I don't think a lot of people do know what we are. Many people think we're an association; we're not. You can work with us if your NACS code -- your National Code -- as a business says you manufacture. And when Don says about 10,000 -- we actually note 10,552, because industrial mechanical engineers are much more astute than chemical engineers. Ah, crap; he left. (laughter)

But it's very true when we talk about this thing. So NJMEP has been around for 21 years; we are part of a program that's national. The great thing about this program is that our mission is to support manufacturers and STEM companies in New Jersey. And that's critical because it isn't happening anywhere else. We have a staff of about 25 professionals, fulltime, who are out and about meeting with those 10,000-plus companies. We also have 70 New Jersey experts that we draw upon.

We're not given any money from anybody; we have to earn our money. Even though we have a cooperative agreement with the Federal government, we have to sell our services to earn down that. We did, for a couple of years, I believe, Senator Singer; you know, from the -- we got some State money, but that didn't last long and it's long gone.

So a program that was structured to be one-third, one-third, one-third -- one-third State, one-third Federal, one-third private sector -- doesn't have that. At the same time, we've thrived; we've thrived because we have a tremendous staff and we have the ability to go into companies and help them. We consult with them, we train them. You talk about training -- you know, in education in the last 13 years, we've done 16,000 days of training; 170,000 New Jerseyans.

So we're just a piece of the puzzle; so are the vo-technical schools, so are the county colleges, and then so on.

You know, Senator, you mentioned that we were instrumental in pushing towards this; and actually, it comes from Frank Robinson and myself having a conversation about two years ago. He told me that we used to have a manufacturing caucus in New Jersey, and then it went away. That's sort of sounded a little silly to me, but it went away. So we started

planning on how we could bring it back. And there were a couple of things, and you'll see some of it in the folder that we gave to you.

The Operation Outreach, where our Advisory Board -- made up of 100 percent manufacturers -- created a letter, and they talked about the things that were driving them crazy. And it wasn't a demanding letter; it was a letter to ask for a new conversation. And it was signed by over -- eventually, it was signed by almost 600 companies. The copy that you have is the 475 that were there at the State of the State events.

And then, with Frank's help and NJBIA's help, we created the State of the State events, where we had two. I know there were a couple of you that made it, which was great. But we had over 300 manufacturers; we had over 60 legislators; and we had a discussion about the industry and where we need to go.

So let's just take a look at some of the things to tie in a little bit differently than when Don came. And I'm not, obviously, going to read all of this because it doesn't really make sense to do that, and it is more insulting, usually, when somebody puts up a presentation and reads every slide to you. (laughter)

But one of the things that I want to talk to you about is that average annual compensation of \$90,000 a year. That comes from the National Association of Manufacturing, not from John Kennedy. That's a pretty good number. And did you know that -- you know, you talk about health benefits and education benefits. Most manufacturers, higher than any other industry, provide them.

Here are the sectors; and I took this -- we took this directly from the NJDOL. And if you look at it, manufacturing-- You know, those

are the firms, the employees, the dollar impacts in billions, and the average wage. Now, we don't separate life sciences; for some reason, the DOL does. I'm not really sure, because they manufacture, and they're critical to our industry.

STEM and technology -- not all of them are involved in manufacturing, but they're all involved in creating a higher level of work output from New Jersey. And many of them are doing CAD/CAN design, and so on.

TLD is transportation, logistics, and distribution. Why is that critical? That's the supply chain. And when we talk about supply chain, as Don said, it's evolving; but everything is about the supply chain. New Jersey is a supply chain state. So Assemblyman Zwicker, you made a comment, "What comes next?" and why-- It's important that we have all facets of that supply chain; and you'll see in a later slide that, where it comes together is because, you can't just do this in a vacuum; you can't have a Merck in a vacuum. There are a lot of pieces that go into that.

And look at that impact. To me, that's the manufacturing sector in New Jersey. It's a hell of a lot bigger than you thought it was.

I love tourism in New Jersey; it's really important. Being a Jersey boy my whole life, growing up and heading down to the Stone Pony was real important to me. But you know what? This is more important.

These are some of the things that we put together on the -- for the State of the State. The first one is looking at it by district. So what I wanted to show was that every district in the state has a manufacturing input; every single one. I think it's District 33 that has the lowest; I think there are 71 companies that we could earmark; 2,500 people. But thinking

about that times 4 -- that's fairly significant when you're talking about times 4. And that's the multiple that is critical.

At the bottom -- yes, it's 360,000 making \$90,000 a year in the state. But 1.8 million of us are tied in to the manufacturing industry in some way. Critical.

Here's the Federal layout -- and I did this because what you should know is that even though we're split, we have-- As a political operative, I make an excellent engineer. (laughter) You know, people ask me what party I believe in, and I say, "Bull Moose" (laughter) -- mainly because I like the logo. But we have Democrats, and Republicans, and Federal-- Every one of them vote and support MEP and manufacturing in New Jersey; every single one.

Here's the answer -- you know, a little bit with Assemblyman Zwicker -- here's some of the things that, when I talk about it, are some of the pieces that go together there, guys. You know, when we're talking about what we do, all of these components help make us a better, stronger state. Now, first of all, food is a little outlier, because food is regional; but it's growing in New Jersey, quite a bit. But all these other pieces -- that's part of the supply chain. So when you talk about a pharmaceutical manufacturing company, there's also machinery that they have to put together; that's critical. All of these pieces come to line up. And when -- Don, I know -- and Don and I talk a lot about this -- what he failed to mention was one of the programs and areas that we're working on quite a bit: DOD spending. There's a tremendous amount of DOD spending, and there are over 1,000 companies in New Jersey that do some sort of DOD manufacturing.

We get 51 cents on a dollar back from our tax money that goes to D.C.; 51 cents. We are last in the nation. And one of the reasons we're last in the nation is we haven't been able to build a cluster strong enough to attack. You look at Maryland; I can give you an organizational chart from Maryland, going after DOD work. They have about 15 people who work for Maryland, just doing that constantly. We have zero. We have a retired general who gives his time. But yet, we don't go after that. And you're talking about this high-end, high-level, high-paid, high-wage work.

Advanced manufacturing. I'm glad Don explained it the way he did, because I have no idea what the heck it is. I have four college degrees -- I don't know; I really don't. Because you go into manufacturing plants -- it's not *what* you make, it's *how* you make it. And the manufacturing company that I owned in Irvington -- that was all hand machined at one point in time; most of it, my partner who moved it to Harrison -- it's all CNC. CNC is that computerized numeric control machines. That's the way it's moved, that's the way it has evolved; and that's why it's so critical.

Sometimes I look at these things, and I take them and I wonder who's really looking at them. You quoted the McKinsey report, and it's excellent; there's Deloitte reports, and there are all sorts of others. There's an Upjohn report. The problem is, is that it really doesn't get down, because most of them don't understand the industries fully that they're talking about. So it's real easy to say, "Well, advanced manufacturing." Ask the next person who says that comment -- ask them to define it for you. You'll get different answers. So how can it be a great buzz word if you get different answers?

You know, this is one that interests me, because you can go into just about every manufacturing plant and they have some function of advanced manufacturing. And if I ask the people in this room, and probably on the panel, how many of you would say 3D printing; right? -- 3D printing, because we've heard about that; really, that's all the-- Guess what -- 99.9 percent of the companies don't use 3D printing yet. It doesn't work; it's a really cool technology, but it doesn't work. It doesn't. It's good for fast prototyping. You try putting out 10,000 pieces of metal because you have a business to run -- right? Will it evolve to that? Yes, eventually it will. But it's not there yet. But CNC work is. And those are the jobs that we cannot fill with people.

Interestingly enough, I do an annual survey where I ask, "What job can't you fill, and how many people do you need?" And in this year's, I only cite the first 24 hours. Peter and I, our Marketing Director -- we got it out on a Friday, because we had been really busy with State of the State and everything else. And we got it out, and I came in on Sunday morning and there were 840 responses on a weekend. And of those 840 responses, that led to people needing 5,005 people this year.

Now, you would think that when you talk about manufacturing that it's only somebody who is running a machine, right? That's manufacturing; that's a manufacturing business. Well, the number one is technical sales; they can't fill technical sales jobs. If you can't sell it, there's no reason to build it.

Engineer is in the top five; cost accountant is in the top five. Because remember, these are businesses. And of course, CNC machinists, programmers, welders -- all of these things are important to these industries.

And I was at an event yesterday where they were talking about things -- I think I saw you there, Tony -- and the one thing that I-- And I went up and I asked the guy from McKinsey; he was speaking about it. And he said, "Skilled positions, semi-skilled positions, and non-skilled." I said, "What makes somebody a *skilled position*?" "A college degree."

Try hiring somebody who has a Humanities degree to work in a manufacturing company. It's not exactly the skill set they're looking at.

So that's why, when we look at this stuff, there's a lot of skewing to it. And I love what Don said, because you shouldn't look at your career as, "At 18, I have to go to college," at 22, "I have to get a job." How many of you are in the same careers that you started at age 22? I'm not. You know, I wanted to be an engineer and a manufacturer. And it took me years to get there, you know? But my first dream job -- I wanted to play for the Yankees. (laughter) I did get drafted out of college; but that was by Detroit, so that didn't really help me. (laughter)

Life sciences cluster. Why is this important? It's critical to New Jersey. And the program that Don mentioned, where we went after-- And we were on their team, and Rutgers was as well, and so was Stevens -- we went after and we lost out to Delaware. And we were told that it was a political choice. Okay, fair enough; not fair, but fair enough. But the difference is, as he said, we fought for \$4 million of support to create an instate -- a leader, a center of excellence in New Jersey. And we fought to get \$4 million. Massachusetts has invested \$150 million over the last three years in these institutes. If you look at any -- and this hurts me, because that's where the Red Sox are -- if you look at any state that we compare tremendously to, it's Massachusetts -- in size, in education, in home values.

All of these things. And yet, they're willing to invest in an industry; we're not. And we wonder why we lose some of these things.

I did want to show you this, because again, when you talk about these clusters and things -- when you talk about life science, it's not just drug companies; it's just not pharmaceuticals. Medical device companies are critical, and they're working very hard in New Jersey, quite a few of them. And when Don put up the -- I'm going to steal that from him one day so he can't put those -- the companies that left. They're gone; I can't change that. But the 10,552 -- I want them there. I want you looking at companies like Amneal, and Tris Pharma, and Triangle Manufacturing, and Marotta Control and, someday, Shock Tech -- because we're getting them from New York state. So you have to look at these industries as a whole.

Logistics, right? It's real important. I think we're at a perfect place to go. But we're right; if there's no other thing here except for trucks coming through, then what's the value in the long run? I'm all for getting Amazon, but, you know, are we set up and are we ready to have these companies here? The answer is "no."

Don mentioned something about -- talking about, you know, his kids coming through. And I'll tell you, because I've worked a lot over the years with Boys Scouts and other programs -- we're not educating our kids as well as we think we are. They're not coming out with mathematics and English skills that make them able to compete. It doesn't mean the kids are-- The kids are smart as hell. We're not educating them.

Ann Barr -- you're here. A lot of the county college work is remedial, correct, that comes in? And there's a problem with that, because

we should be using our county colleges to advance us and to bring them to the next level.

I put this slide up because this is how -- this is the thing that really tweaked me; and when I sold my businesses, the reason why I came to MEP. Because every project we do in New Jersey, we are rated and surveyed by a third party. So when I look at our impacts, these are not impacts from NJMEP; these are impacts from a third party. And these are the impacts that we've had since the year 2000. By the end of the year, I expect us to jump over 30,000 jobs. We are, for the last seven quarters, the number one MEP in the country. There are 51 of us -- Puerto Rico as well. And yet we don't take advantage of what we have.

You're going to hear from Judy Savage on the vo-techs. I think it's important that we invest and grow with these vo-techs. Ann Barr is here from the County College Consortium (*sic*); that's all wonderful. Don Sebastian. But we don't run these things like businesses. We don't oversee the program. You asked about apprenticeships. There is no investment in apprenticeships.

Every program that we have requires companies to hire people. That sounds wonderful in the real world, but it's not real world. You guys who have been in business understand that companies don't hire people because they're trained; they're hired because they need them. And we have to figure this out.

But if we have 840 companies that have 5,005 needs in the next year, I'll bet you they didn't fill half of those jobs.

One of the things I put in there, and I discussed with Senator Gordon, is a program that we developed looking at a variety of different

states and how they do it better than we do. And believe me, being a New Jerseyan, I hate to say somebody is doing something better than we do, you know? I'm actually proud of being here, growing up here. I have had the same phone number my whole life. I lived in Madison when it was blue collar. (laughter) Not anymore.

But part of that is talking about how we need to have a structure so that it works -- a business structure so that we enhance what the county colleges are doing; we enhance what the vo-technical schools are doing; and we tie things together so that the industry is eventually paying for these things. They don't want to pay for them now because they don't trust in what's coming out. If you ask manufacturers, they will tell you that they cannot bring in people because they don't have basic math skills and they don't have basic English skills. And this isn't talking about inner city.

I had a young man who was one of my Eagle Scouts, a National Merit Scholar. I got him a summer job. A friend of mine called me up and said, "John, I have to fire Raj." I said, "Why is that? He's one of the brightest kids I know." "He can't do math without a calculator or a cell phone." You know, when you're on a plant floor, you have to think. And as proud as I am that I just read that we're number two in the country in high school graduation rates, that's not true in Newark, or Paterson, or Trenton, or Asbury Park, Atlantic City. Are the kids dumber there? No. They don't have pathways; and that's the point that I want to leave you with today -- is that pathways are important.

When I was a teenager, my father died suddenly and I was an angry young man. Now, we didn't have much money; my mother was a checker. I don't know how she kept our house; I really don't. That's why

she's my hero. But the point of the story is, I had my mother; and I had two Scout leaders who gave a damn about me, and talked to me about pathways and pushed me towards pathways. And luckily I could play baseball; and I had three jobs. And I graduated college for the first time with 11 cents left to my name, literally. I still have that bank -- the First Agricultural Bank of North Adams. And I have it-- He went to Williams.

SENATOR OROHO: Yes. (laughter)

DR. SEBASTIAN: And you know, and I have that framed, because I made it. It didn't matter what I had; I made it.

But what I really made was, I had a pathway. I had people who were mentoring me.

I spoke down in Trenton, not too long, to a group of My Brothers Keepers program, which I thought was wonderful down there. And I had kids coming up to me; one kid won a State Science medal. And he said, "Hey, Mr. K., I can pump gas or work at Starbucks without a high school diploma. What's the big deal?" Here's a kid who won the State Science Medal. And I thought he was kidding; he wasn't, because he saw no pathway.

We have to provide pathways -- and we have to provide them. And I believe that this industry -- manufacturing and STEM -- is that pathway to a better life. Yes, I'm biased. But from that 11 cents, I owned two successful businesses; a manufacturing company and an engineering company. And I was able to make something that my mother, my father, and those two Scout leaders could be proud of.

These are the important factors. So that's where I'll leave you, except for a little bit of -- Manufacturing Day. See, Lenore? So she won't

get mad at me; because that's our event that's coming up-- Last year we had one person from the Assembly show; so we do hope that-- Of course, you were voting on the tax for the -- the gas tax. So we'll forgive you there, but that's it. (laughter)

Thank you. (applause)

SENATOR GORDON: Thank you very much, Mr. Kennedy, for adding to the intellectual foundation of this effort.

And I will say that I believe that we are going to work with you to provide a panel to participate in Manufacturing Day on October 6. And that's something that we'll want to talk about.

DR. KENNEDY: You have to work with our CFO, Lenore. She's the boss of Manufacturing Day.

SENATOR GORDON: Okay.

DR. KENNEDY: So if I say anything, she'll rough me up in the parking lot.

SENATOR GORDON: Does anyone have any questions for Mr. Kennedy.

Assemblyman Bucco.

I'm going to excuse myself for a few minutes, and turn it over to my co-pilot here.

SENATOR OROHO: Sure.

ASSEMBLYMAN BUCCO: Thank you, Chairman.

John, thank you. It was a great presentation.

We've spoken many times.

I guess -- it seems to me that we're at a crossroads here in New Jersey. You know, we know that we're not competitive because of the taxes,

energy costs, regulation. So at some point, the State -- it was probably when I first joined the Legislature in 2010 -- pivoted to the incentive programs. You know, the New Jersey Economic Opportunity Act, one and two, which I helped prime sponsor with Assemblyman -- oh, God, now I forget his-- He's no longer with us.

UNIDENTIFIED MEMBER OF COMMITTEE: Are you losing your memory? (laughter)

ASSEMBLYMAN BUCCO: Yes. Coutinho. And that was supposed to be the savior.

But when you look at what's happening around us -- is other states that have lower taxes, lower energy costs, are now offering the same incentive programs. So where do we go? I mean, you know, we don't have the revenues right now to support the programs. You know, we have, seems to me, a difference in philosophy sometimes. Some feel -- some favor raising taxes is the answer to producing more revenue. And others look to try to lower the taxes and get a handle on energy costs. But all that comes at a price.

So it seems to me like we're in a Catch-22 here. Where do we go?

DR. KENNEDY: Well, I think there's a big answer to a lot of those questions. If you think about-- There are a couple of things you have to look at. A lot of those EDA programs and stuff -- they are geographically barred. So I'll give you an example. Kent Bicycle in Parsippany; they've been in New Jersey since their foundation back, I believe, in the 1940s. And they were in Newark, but they moved to Parsippany because that's where the family moved, and so on.

They outsource to China. And when they wanted to re-shore, they came to New Jersey and they said, “We want to re-shore our plant in New Jersey. This is where we’re from.” Well, then you have to move to Trenton, Newark, etc., and so forth. “Okay.” They re-shored to South Carolina. Their headquarters are still here, but there are 350 jobs.

I’ll give you another example: OPEX. You have probably never heard of them, but they have close to 1,000 employees down in Moorestown; a phenomenally high-tech material handling company. And I see somebody scribbling down a note -- I’ll introduce you to the President, he’s a friend of mine for a long time. This is a company that is net-zero energy. They put out solar and wind; and they built a softball field and a soccer field for the community. So what happened to them? Well, they wanted to expand. Again, New Jersey came in and told them, “We’re not going to give you anything. You’re not going to leave anyway.” Which is true -- they didn’t want to leave the state; but there are 125 jobs now in Louisville, Kentucky, that are doing all their high-tech welding. Wow; that’s good thinking.

The point being, Tony, is that we have to look at all the pieces of it. You know, I’ll be quite honest with you. I don’t mind paying most taxes; I really don’t. I know that it’s paying for my roads; I know that it’s paying for my schools and so on. And I think most of us who use common sense look at it that way. But at the end of the day, we have to figure out something, and we have to stop putting so many connections and regulations on every single one. You know, you can’t tell a company that has 25 people that, in order to get this grant to train your people, you have to hire 5 more. You know what they say? “See ya. I’m not going to do it.”

So what did they do? They did what I did when I owned my company. I ran overtime. I couldn't find people; I couldn't get programs; I couldn't get the schools to work with me. I ran overtime. So my 42 machinists made about \$110,000 a year. Good money for them; but I could have hired a whole other second crew and expanded my business. It wasn't worth it.

These are decisions that are being made, and that's what's happening.

You talk about DEP. You know, most manufacturers, they live here. They don't want to damage where they live. But they want a response in a reasonable amount of time. If Walmart comes to you and says, "Look, we want to buy *X* amount of your equipment, but you have to be ready to go within three to six months," and they can't get an answer from DEP for six months -- guess what? And what that company will probably do is farm it out to some company outside of New Jersey.

SENATOR OROHO: One of the things that manufacturers look at all the time -- that's cycle time. How long of a time to get something accomplished and done, and how they take time out of the process. And unfortunately, that's something that I think that we all have to look at. Because they do it all of the time.

DR. KENNEDY: Well, it's called *Lean Six Sigma*.

SENATOR OROHO: Exactly right.

DR. KENNEDY: And *leaning out* doesn't mean you're leaning out and removing jobs. It means you're driving out waste, so all your employees are at the top production.

We actually did a program for the State -- for the DEP and for DOL. It didn't take.

SENATOR OROHO: We have a couple more; Assemblyman, and then Senator Rice, and--

ASSEMBLYMAN CHIARAVALLOTI: Okay; thank you, Senator.

First of all, on your discussion on pathways -- I commend you. As a father of three, a coach on multiple teams, and a Cub Scout leader, we need to offer pathways to our children and to the children of New Jersey. And it's important. Representing a 100 percent urban district, it is frustrating and sometimes disappointing when you run into that child who doesn't see the pathway. So I commend you for being there for others.

I have a question, though. I want to focus in a little bit on the supply chain, because it seems to be a recurring theme in the material we've received in the first two presentations.

I think -- and I don't want to put words in your mouth, so if I misunderstood let's figure it out -- you talked about the TLD sector, and you talked about not being prepared or being ready. I want to, sort of, drill down-- We've been doing a lot of public investment in the Port, right? I represent Bayonne and Jersey City; we're doing a lot of public investment in the Port, Transportation Trust Fund, rail lines. How do we go to the next step? How do we -- how aren't we prepared, and what should we be preparing for? From a government perspective, what could we be investing in -- just some ideas?

DR. KENNEDY: (off mike) Well, if you think about it, there's a lot of-- As Don mentioned too, there are a lot of certification programs.

We get involved with them, the county colleges get involved with them, the vo-techs get involved with them. TLD -- there's training that you go through. Again, this isn't some guy lifting boxes anymore. You know, go to one of my favorite places, FedEx down at Newark Airport. It's a project that I put in 20-odd years ago; it's their first automated system. There are not a lot of people there moving boxes, but there are a hell of a lot of people there maintaining that equipment, and keeping it going, and technically looking--

So we need to have those abilities to train people in these certifications. There's no money for that, there's no support for that; and that's a difficult effort to make.

ASSEMBLYMAN CHIARAVALLOTI: So, John, this ties directly into the skills gap; that's what we're talking about. I mean, because if you go visit Ports America, or Maher Terminals, or any of the ports, they are sort of sitting in a control tower maneuvering equipment. But when we're talking about growth in that industry, our focus is on the technology side, and the skills gap that exists.

DR. KENNEDY: (off mike) Yes; and the people on the floor of manufacturing plants and distribution facilities -- a lot of them are highly trained and highly skilled; even if they're happy to be moving a forklift today, you know, because there are so many areas to do that.

But think about a pathway that you can create for somebody when they go and get a job, and then they can come back, and then they can decide to and be able to go further with their education, and jump back into county college. You know, wow; that's a great opportunity.

I just had one of my Scouts go through that. Everybody picked on Kenny (Indiscernible), you know, because he wanted to be a welder. Well, Kenny's making about \$120,000 a year, as a 24-year-old. And now he wants to go back to CCM -- the County College of Morris -- and get a Management degree.

SENATOR OROHO: I think we're going to want to get into-- Because probably Judy wants to talk about that a little bit.

But maybe we can wrap with Senator Rice; and then Assemblywoman DeCrocce; and then we'll get to Judy.

SENATOR RICE: I'm going to pass, because John and I will be talking.

SENATOR OROHO: Okay.

SENATOR RICE: Because I'm really into it, and my interests would be some of the recommendations you make. Because a lot of people talk to us in Committee, and we listen; then we do what we want to do. And I'm going to be the person who says we're not going to do what we want to do; we're going to listen to the people who have been involved with this stuff -- to give us the balance that we need.

SENATOR OROHO: That makes sense. Thank you, Senator.  
(laughter)

Assemblywoman; and then Senator Greenstein; and then we'll move to Judy.

ASSEMBLYWOMAN DeCROCE: Yes, and the Assemblyman was talking about the ports. And it definitely is an issue, and it's been an issue that I've been working on with the county colleges and the International Longshoremen for a year now. And part of the problem is

that certifications that are needed are very specific, and each position within that port needs to have a certain kind of training.

So we need a workforce development program that can be housed in its own facility.

The County College of Morris and the County College Association -- we've been talking to and we've been meeting with the County College of Morris and the International Longshoremen on the very issue. And we do have a pilot program that we will be starting. Now, the County College of Morris can provide the certification program that they need within the port. And the reason why they are the main component of it -- and Judy will be talking about this -- is because of the degree that goes with the certification; because they require that. If it's, say, Lincoln Technology (*sic*), they can give a certification; but it's not equal to the County College of Morris, and it's not going to work.

They need the certification from the colleges.

Now, they don't need it, necessarily, from a four-year college; but they need it from a two-year college. So it is defining the programs and breaking it down to the requirements of the individual jobs needed within the port. And also the fact that in the County College of Morris, there's enough space but you have the regular college programs -- classes going on. So space is a problem. So I know that the County College of Morris is currently looking at a free-standing workforce development program that is separate; and that's key in all of this. And I think it's a very good model to be looked at -- what's taken place and how this is going to play out in the manufacturing industry.

So that's something that I've been working with, like I said, over -- going on almost two years. And every certification position is almost individual for certain areas. You just can't go into the International Longshoremen and say, "Well, we'll do the training." No; there may be seven different categories that they need.

So the program at the County College of Morris has to define different categories, and then they have to have the ability to certify them. And some of the things we were talking about -- and I'll put this out there -- is train the trainer. So then the CEUs that are required after that, to keep that certification going, can take place because the County College of Morris can give these certifications to train the trainer within the facilities.

So the ports are very key in all of this because of the changing technology that is taking place at the ports on a regular, yearly basis.

So I hope that--

DR. KENNEDY: Now, here's a question for you, though.

Now, I live in Essex County, and my kid wants to go to this program at CCM. Is he going to get penalized?

ASSEMBLYWOMAN DeCROCE: No.

DR. KENNEDY: Because that's what happens right now.

ASSEMBLYWOMAN DeCROCE: That's why the piece of legislation that is being developed -- and hopefully this Committee can be part of that and bring in a better piece of legislation -- can do it. Because not for anything, the County College of Morris had educational monies available that they had to turn down last year, for certification programs, that they could have utilized. It was \$400,000.

So look, I represent Morris County, I represent Passaic, and I represent Essex County. So I have a broad-based concern there. So they're monies that we shouldn't be turning down, and we could develop a workforce development program and building that could be a public-private partnership as well. Because many of these industries, like the Longshoremens, do have funding there for training, but they're having problems getting the facilities that can actually do the training for them.

So what a county college can do is go mobile to the sites themselves. But, you know, this is all developing questions; this is part of what Judy will talk about, I'm sure, with the County College of Morris and this Caucus, to bring about those changes that we need to -- and be able to use the monies that we have for students who can't afford to do it themselves, and for the industry as a whole.

DR. KENNEDY: These are some of the things that we've talked about. But you will see that there are issues that exist. There's something called the Talent Development Centers that the State--

ASSEMBLYWOMAN DeCROCE: Yes; transfer credits--

DR. KENNEDY: They don't work.

ASSEMBLYWOMAN DeCROCE: --and everything else.

DR. KENNEDY: But they don't work. Why? Because it's a struggle for a county college, or somebody, to be statewide. So you need somebody to program management; you need somebody to work with this because-- I got a call that Bergen County College was going to close down a CNC program, and they're not going to do anything with it because they can't fill the seats. I know we can find other kids to fill those seats.

ASSEMBLYWOMAN DeCROCE: Right; and that's the--

DR. KENNEDY: But you can't do that because those kids, who don't have the money to begin with, are now being penalized because they're going across county lines. And then it's competition, and then we don't-- So there are a lot of things there that we--

SENATOR GORDON: It sounds like something we can deal with.

ASSEMBLYWOMAN DeCROCE: Right; exactly.

SENATOR GORDON: I know Senator Greenstein has a question, and then we'll move on.

SENATOR GREENSTEIN: John, I just wanted to ask you, can you talk a little bit about the middle-skilled worker that's come out of these recent reports? What is that exactly, and why is that important here?

DR. KENNEDY: (off mike) To be honest with you, I don't know. That's one of the questions that I've had. I went down, when I was down in D.C., I met with people from Deloitte, because they talk about it. I grabbed a guy at the event yesterday from McKinsey, because I don't know exactly where we go with some of these things. How do we designate somebody who's a *middle-skilled worker*?

And that's part of the issue, because if you're talking about apprentice or growth into jobs, you are talking about somebody who starts as an apprenticeship and moves to a journeyman; becomes a master. And, you know, there's a muddling of some of that. And I think we have to define that better.

SENATOR GREENSTEIN: Does McKinsey-- I don't think they defined it in their report -- in that McKinsey Report.

DR. KENNEDY: No, they didn't. And that's why I asked the guy, and he said, "Well, highly skilled, that's college." I said, "Yes, but it depends on if it applies." You know, I'm an engineer; you're not going to make me an accountant. That was my CFO I just smiled at. (laughter)

Because we think on different -- we were trained differently. And that's part of my problem -- is what are we talking about here; so where we can go? Because right now we need the flow in; next, we'll need how do we move people up so that there's more flow in.

SENATOR GREENSTEIN: That sounds like an important area for us to look at, I think.

SENATOR GORDON: Senator Pou.

SENATOR POU: I just -- I want to make a quick comment, or a question.

I think one of your materials that you've provided to us in the packet talks about the urban geographic concentration; and some of the very specific training and efforts that you're trying to focus on some of those particular, younger adults who are currently underserved by a number of different things, whether it's an educational process, or it could be any one of the other factors.

And I say that because I'm thinking -- I was listening to the Assemblywoman talk about CCM; and your question -- does that mean that your child, if he was at all interested, would be able to enter and be eligible to go to CCM. And I now immediately thought of a Paterson student, for example, or a Paterson young person, whose challenge would be a number of things: accessibility, in terms of transportation, because his or her inability to get to the Community of College of Morris, for example; or the

mobility -- having that accessibility; to have that kind of infrastructure in place to make sure to get that individual there.

But also, the financial wherewithal -- and I think you've pointed that out; you've made comments about the affordability for a number of different opportunities.

So I'm just wondering how can we, as a Legislature, be able to move and create those opportunities in a larger and more rapid approach? Because I know that you're talking about the northern and middle sections of New Jersey; and I know that, along the line, there are some future phases. But not-- And I'm focusing on your wording about -- in the program, it says, "The *next* phase" -- not the *first* phase, I might add -- talks about places like Camden, Jersey City, and Paterson, and Asbury Park.

So for those large urban communities -- Paterson being the third-largest city in the State of New Jersey; having a significant, I would say, double digit in terms of the unemployment rate -- let's talk in terms of their educational challenges that come along with that; as well as their income level places all of those challenges to a statewide concern and effort, because as goes Paterson, so does all of the surrounding communities and everything else.

DR. KENNEDY: Well, I agree with you.

SENATOR POU: What do we do to help to remedy those issues?

DR. KENNEDY: Well, that pro-action network that we developed -- I spent a lot of time looking at other states and what they do, and what they do well, and what they don't do well. And what we do really well here is we have a tremendous educational program system, but we

don't work well together sometimes. And we need to have some structure that allows us to do that.

To be honest with you, that was asked, by the Lieutenant Governor, for me to provide; so that they could look at it -- whether it could be fundable. And to be honest with you, we don't get anything at this point in time when we're trying to do this stuff. You know, we work with -- especially with Ann Barr's team -- you know, the 19 county colleges.

So it would be wonderful to take it on across the state. But I also believe you have to take something on in bite-sized pieces. You have to prove that it works; and then when you prove it works-- We don't have -- we're trying to develop a collection of who provides what. Judy provides me with all that their schools can do. Ann Barr tries to give me feedback. But we don't have a full, if you will, manual of what we provide -- what each school provides, how we get involved, where can you go. So if somebody calls us, you know, how do we connect them properly?

You talked about Lincoln Tech, a Ho-Ho-Kus school down in Paterson, which does a tremendous job. You know, all of these are pieces of the puzzle. We don't use the pieces of the puzzle; because of the money and the way it's allotted, sometimes you have county colleges competing against other county colleges. And you know what? They're all good; they really are. But we have to figure some of this out.

And you know what? It's going to take some investment, and I don't have any control over that. But that's how that report came to be.

SENATOR POU: Thank you, thank you.

SENATOR GORDON: Okay, I'd like to move along now.

Mr. Kennedy, thank you very much. (applause)

One of the areas I think you can be very helpful in, is based on your research on others states.

John, I was just saying that one of the areas I think in which you could make a great contribution is sharing your knowledge of what works in other states. Because as I've said before, there is no reason to reinvent wheel when we can adopt something that's working somewhere else. So we're going to continue working with you on that, and we thank you very much.

At this point I want to ask Judy Savage to come forward.

She is the Executive Director of--

I'm sorry; Senator Rice.

SENATOR RICE: Yes, just right quickly.

For John -- John--

Mr. Chairman, I think that he said something that we should be looking at regardless of how we go with this. It's that we need to pull all that resource information together. That should be a State mandate. We should have somebody in the State who has to collect it. I mean, it's like when I went to get a list of black elected officials. There is no official list of black elected officials. The State knows I'm elected; they don't know that I'm black. There is no list of women. I'm being honest about it. And for us to be in the area we're in, in 2017, and not to have a data collection section on the kinds of things we need-- Because that's what's going to drive the stuff that we do -- it's going to be the data and the resource pieces.

So that is something that I think you should put down, and we should have staff start to work on now, even if I have to do it by legislation.

SENATOR GORDON: Good idea; thank you.

Let me turn now to Judy Savage. She is Executive Director of New Jersey Council of County Vocational Technical Schools. And she is going to speak, in part, about the need for the proposed bond issue, and about the critical coordination needed between vo-techs, county colleges, and four-year schools.

Ms. Savage.

**JUDY SAVAGE:** Good morning.

Thank you very much, Senator Gordon, members of the Caucus. It's really a great pleasure for me to be here today. And thank you for the opportunity to speak.

I was sitting here, and I was sort of reflecting on the fact that I have been doing this work for a very, very long time; it's, like, 17 years with the county vocational schools, and a long time before that in various other aspects of public education and working with the Legislature.

So speaking to a legislative committee is not new to me; but I think this is the first time that I've ever spoken to a legislative committee where the focus is really business and economics, as opposed to the focus on education policy, and the State budget, and those sorts of things.

So that is refreshing; and it's really a nice fit, because preparing the workforce and meeting the needs of the State economy is really a key mission of New Jersey's county vocational schools. And we are very, very excited about the increasing focus on manufacturing in our state; and really, we applaud the Senate President, Senator Gordon, and all of you for making this a major priority.

I'm going to thank, in advance, John Kennedy for handing off to me the issue of career pathways, because I do want to speak to that a little bit.

And Senator Greenstein, I promise you I am also going to talk a little bit about that issue of middle skills. I have some initial ideas of what it is and how it works with county vocational schools.

You're really off to a great start today, and I think you heard a lot of things from two experts in the field of manufacturing that really touched on so many critical issues that you're going to need to look at.

From my perspective, wearing that education hat, I think one of the most critical -- if not *the* most critical -- is around workforce for expanding the manufacturing industry at, sort of, all levels of the sector.

We all hear the story. It's in these research reports, it's in John's surveys, it's in every ongoing conversation that any of us has with manufacturers. There are well-paying jobs in this state that are going begging because employers can't find the right people to fill them.

Employers -- they are struggling to fill these jobs and, perhaps, that is partially because, as a state and as a nation, we have all bought into this idea that college is the ticket; it's the only ticket to the middle class life, to a well-paying job, to a successful career. And that intense focus on preparing all students for success in a four-year college has, perhaps, taken our focus away from other kinds of opportunities.

So Senator Gordon, you referenced the McKinsey report, and I think they were really spot-on in highlighting this workforce issue, and preparing students for other types of jobs that may not require the four-year

degree, as literally a critical economic strategy for New Jersey. They pointed to that as one of the things that New Jersey needs to do.

And there are many studies -- both that and nationally -- that look at some of these types of jobs that need something more than your basic high school education. You need technical skills; you need some advanced training; you need a credential; perhaps you need a two-year degree. But these are not jobs that a four-year, liberal arts degree will prepare you for.

Where are these jobs? Certainly, they're in manufacturing. We heard a lot about transportation, distribution, and logistics -- lots of jobs there; information technology; health care -- health care is exploding with technical jobs that you don't need to be -- you don't need a medical degree, or a Bachelor of Science in Nursing.

Construction -- another field that is coming back here in New Jersey; increasingly high tech. And, you know, I think there are many more emerging growth areas.

So one of the things that, you know, I really want to talk about today is the need to expand opportunities for career and technical education as a way to fill that skills gap; and how our county vocational schools can fill the role of preparing to these kinds of needs; and doing so not just as individual entities, but part of the conversation that we just had -- in collaboration with the county colleges, which they already work closely with; in collaboration with our four-year institutions, particularly institutions like NJIT, and Stevens, and others that are very focused on preparing students for the workforce.

And in addition to thinking about the young people, our institutions -- community colleges and the others -- also do a lot of work in preparing adults who either didn't go to college or who are unemployed in the workforce, sort of retraining them to get back to work.

So on the issue of career pathways, I think it's really important to begin this conversation with everybody understanding that career and technical education -- or *CTE*, which is really, sort of, the new name for vocational technical education; we answer to all of the above -- it has changed dramatically in the last 20 or 25 years. Our schools, and really all kinds of career and technical schools throughout the country, have recognized how much jobs are changing, how much the economy is changing, and our programs have had to change along with that.

For all these types of jobs, students need a pretty strong academic foundation. You need basic math skills; you need basic literacy skills. You cannot fix today's high-tech cars if you can't find your way through a technical manual. So students need a strong academic foundation to succeed.

And our programs today -- 20 to 25 years ago, a student went to the county vocational school because they weren't college material, and they needed to get a job. The county vocational school did a very good job of preparing them for a specific type of job.

Today, our programs have really broadened out, to a large degree, to recognize that we need to prepare students for a career pathway, not just one job.

I can give you a lot of examples of different experiences I had. But I'm thinking back to a visit a few years ago to the Green Energy

Academy at Bloomfield Tech in Essex County. And we walked around with some people from PSE&G, and from NJIT, and community colleges, and looked at what these kids were doing. And there was this young man there, and he explained to all these visiting adults, very articulately, about how this solar panel that he was working on -- how he put it together, what it's going to do. And somebody said, "Well, what's your goal from this program?" And he said, in all earnestness, "Well, I want to install solar panels. I'm going to become a solar installer." And every adult looked at each other and said, "Well, he may think that now, as a sophomore. But he's probably going to end up going to NJIT, because that kid is super bright, and he's just learning about the many options that are available to him." So I think that's important to recognize.

It's also important to recognize that preparing students for a job and a career involves much more than just the technical skills. It's communication, it's teamwork, it's problem-solving -- all these things are integral to preparing students for success in all kinds of careers. And these are things that employers put at the top of their wish list for future employees. And you need these skills whether you're fixing cars, programming computers, working as part of -- as a technician on a health care team, or anything else.

The other thing that programs at our county vocational schools include as part of this preparation for a career pathway is some kind of work-based learning experience. When we all grew up, most of us had jobs after school. My first job -- I worked at the Doughnut Basket on Route 10 in Livingston. I put the jelly and the cream in the doughnuts, and learned that when you say you're going to be there at 6, you have to be there at 6,

by hook or by crook; and so many other lessons. But kids are involved in a lot of other things today; they play sports. There aren't as many jobs for them, so they don't necessarily have those kinds of work experiences.

When students come to a county vocational school, we do our best to make sure that all of them have some kind of work-based learning experience; whether that's going out on co-op in senior year, having an internship, going on site visits, mentoring -- all those kinds of things.

So nationally, and in New Jersey, career and technical education -- sort of a different way of high school -- is really gaining steam. And the demand for these programs in New Jersey is particularly intense.

Enrollment in county vocational schools in New Jersey is up about 34 percent since 2000. Yet even with that kind of growth, thousands of students are being turned away every year. It varies by county; it varies by program. But based on our last survey of our members, on a statewide average we had about 2.4 applicants for every seat in a county vocational school. About 27,000 students applied for 2016-2017; and about 15,000 were turned away, pretty much because of lack of space. They were applying for programs that were full and at capacity.

Why is there such high demand? I think there are a lot of reasons; but first and foremost, I think that students and parents are starting to wake up to the idea of a career-focused education as a real value-added proposition for students. You can go to high school, you can meet all your graduation requirements, you can be prepared for college; but you can also get a whole lot more out of it.

Students who graduate from a county vocational school -- they can go into the workforce in entry level in most kinds of things. As we go

down the road in this conversation, I hope that you will, at some point, have the chance to hear from some students who are in manufacturing programs, and they will tell you that they work with employers and that they've been offered jobs already.

But they also have the option to finish up an associate's degree. They're going to have a jumpstart on that; they are going to have advanced credits. So maybe in another year, they can get their associate's degree and then go into the workforce. Or maybe they see themselves further down that career pathway, and they take what they've learned and they finish their associate's degree, and then they seamlessly transition into NJIT or another four-year institution for specialized study. It ends up -- they end up doing it faster and for less money than it would have cost if they graduated from high school and then went to college, and said, "Hmm. What am I going to do? What do I want to major in?"

It's really -- you know, the beautiful thing -- it just gives these young people a multitude of opportunities that they otherwise might not have. And it's all aligned with the needs of the workplace and their ability to get a job.

So when you look at that kind of demand and that kind of experience for students, at the same time you hear employers saying, "We can't find people" for all types of jobs, it seems like the time is right to seriously consider expanding the system that can prepare more students for those kinds of careers -- with a particular focus on those that can be launched with a credential or a two-year degree. That doesn't close off opportunities to any students to go onto a four-year degree, or go onto

graduate school, or anything else. But we think -- we agree that that is a good place to focus.

And I think at the same time, while there is plenty of demand, I think we need to do more to educate students and parents about these types of careers. Because, truth be told, there is still a stigma. There was a great report that Harvard Graduate School of Education did, in 2011, called *Pathways to Prosperity*. And even six years later, it's still sort of this seminal report on changing education to be more career-focused. And one of the great quotes from that report is that, "Across the nation, there are lots of people who value vocational technical education as important -- but for somebody else's kid." A lot of parents still feel, "Well, I want my child to go to a four-year college or university."

But I think a large bit of that is that they don't really understand: What is the career pathway in manufacturing, what kinds of health care jobs are available to a student who doesn't want to go to medical school? What can you do in IT if you don't want a theoretical degree in computer science, but you like to put things together; you like to network computers; you like to program; you like to play with apps? There are all kinds of opportunities that are out there.

And, you know, expanding access to these kinds of CTE programs is going to open up a lot of economic opportunity to a lot of young people who are coming out of high school, unfocused and kind of lost. There are too many students who go all the way through high school and they just don't really know what their next step is going to be.

So we need to strengthen that system; and that, too, is a multi-faceted approach.

I think one of the keys to all of this is collaboration among all the education entities, of course; but also collaboration with employers. And I thank John for, kind of, getting at this.

Career and technical education programs are built on partnerships with employers. Our schools don't know what the future of manufacturing is; although we did bring in Don Sebastian about a year ago to talk to our schools that were looking to know what's coming down the road about the Internet of Things. And more recently, just this summer, we brought in a bunch of industry experts from the logistics industry -- somebody from the Port, somebody from UPS, somebody from FedEx, and from Rutgers -- to talk about that industry, and where it's going, and what are these future jobs, and what do (*sic*) students know and be able to do.

But we recognized that, while a statewide association can bring in some good speakers, every one of our county vocational schools works with literally hundreds of employers to advise them on content curriculum, certifications, and future directions for their career programs. That's really a critical part.

So let me just talk a little bit about the process that we've, sort of, gone through with manufacturing so far. And I feel like we're really in our infancy.

Back in 2012, our statewide organization -- we were starting to hear a lot about manufacturing, and I reached out to John's predecessor at NJMEP, Bob Loderstedt. And we started a conversation with the MEP, the newly named Advanced Manufacturing Talent Network, and NJBIA. We had them come in and talk to our county vocational schools about emerging needs in the industry.

I think, at that time, we had one full-fledged manufacturing program here in Passaic County; we had a few fledgling machine shops that were kind of dying on the vine and not really attracting students into those programs.

And I could talk for 40 minutes about the incremental progress, but I'm going to fast forward to this month, September.

The eleventh county vocational school manufacturing program just opened in Monmouth County, in partnership with Festo Didactic. So we went from one to eleven. And I gave you a handout that you can look at that just -- a little bit of information about each of those programs. And we put that together for MEP and other partners a while ago, including who an employer can call if they want to partner, if they want to hire. When we do that, we give everybody a contact.

Each one of these programs was created in partnership with employers, in partnership with two-year and four-year colleges. And in fact, some of them are located on the campus of the county college, maximizing the use of equipment that was already in place or space that was available; and giving students a better opportunity to get dual credit for these experiences. Morris County, Bergen County, Somerset County -- that's how new programs there have been organized. And it's working really, really well, and it shows some of the things that we can do if we all work together to create these sort of seamless career pathways, so that a student starts in high school, finishes through community college, and then goes on.

How do we pull all of this together? It took a lot of hard work, a lot of sustained dialogue. NJBIA pulled together a group; and I know

Mike is going to talk about this. We met monthly for years, just to get to know each other and figure out what everybody needed.

The Legislature helped. If you remember, in 2014, with the leadership of Speaker Prieto, the Senate President, and lots of bipartisan support, you passed a package to provide some limited expansion of vocational schools in facilities that already existed, and to really increased the focus on career readiness. One of the things in there was a small grant program that the Legislature has funded each of those years; and some small grants -- \$300,000, \$600,000 -- got people to the table, got them talking, got them thinking about how can we do something together that's going to help meet this need.

And I think it also shows, sort of, a can-do and entrepreneurial spirit at the county vocational schools that, when there's a need, when there's an opportunity, when there are resources, we will find the right partners, pull it together, and create a program in very short order. All these new programs, since 2012 -- five years; we didn't plan these for 20 years. These partnership grants were issued during the year for a program to start the following September, so we had to get it up and running quickly. And county vocational schools can do that.

We really applaud the Caucus for putting the idea on the table for a major investment to expand career and technical education in New Jersey. The time is right. And we think it makes sense to do this at the county level, where the investment can be shared throughout the county; where students from throughout the county can have access to the expensive equipment, to the specialized programs.

We are extremely excited about the prospect of this Bond Act so that our schools can really begin to plan and execute for the next 10 to 15 years. We have launched a statewide needs assessment, at the request of the Legislature, so that we can come back to you with, sort of, a data-driven estimate of what we think the needs are. So we've asked all our school leaders to identify their current and their future needs in their counties -- to talk to employers, to look at economic projections, talk to county officials, talk to their college folks, and identify the things that they need to do. We asked them to look at emerging areas -- things like manufacturing, global logistics, health care technology, and cybersecurity. And we also asked them to look at some of their existing programs and think about what they're going to need for the next 10 to 15 years. For example, automotive technology. Yes, our auto shops are computer-driven and they're meeting the current needs. But we need to start thinking about things like electronic vehicles, and self-driving vehicles, and what is going to be needed to keep those kinds of technology programs up to speed for the future.

So we're working on that now; it's in the field. We've asked them to turn it around very quickly. And I'm very hopeful that by the time you have your next meeting, we'll be able to give you some specific information on that.

So with that, I just want to thank you for the opportunity to speak today, and say that we are very much looking forward to an extended conversation with you about the needs of vocational schools. And I hope that, as this progresses, we can also, maybe, talk about some of the educational policy-type changes that will also be needed to support this investment.

So, thank you. (applause)

SENATOR GORDON: Thank you, Ms. Savage.

I will point out that this really has been -- it may not seem that way -- but this really has been an *hors d'oeuvre* when it comes to vocational education. Because our next session we are planning to hold at a school of vocational education, to really get into a little bit more detail on the issues.

But at this point, we have some questions.

Senator Rice.

SENATOR RICE: And I have a question about-- I wanted-- For the Committee -- the Caucus, I think, Mr. Chairman, you need to, at some point in time, bring in the Commissioner of Labor and his people to talk to us. Because what Judy is talking about, and John -- most legislators from New Jersey are not even aware; we don't know everything. But the Workforce Investment Act was changed by the Obama Administration to the Workforce Investment Opportunity Act. And one of the major mandates in there -- there is a lot of funding going to be coming out, and some has been out, in testing -- is actually geared toward this whole CTE thing. And there are actually mandates -- kind of implied and written in that changed at the Federal government -- that place some mandates for these community colleges and four-year institutions as it relates to pathways, if you will; and the relationship with corporate America and the business industries, and how we should be looking to the future, and how we should be building these workforces.

But most of our members don't know; so what they're going to do in the Legislature is hear some lobbying group or special interest saying what the needs are, and we're going to draft legislation accordingly. I think

we need to be brought up to speed on the stuff. Assemblyman Ben Wimberly and I, you know, we sit on SETC -- the State Education Training Commission. And the State had to actually put a whole new program in place that recently was approved by the Federal government.

So to you, I would suggest that you bring them-- I know, as Co-Chair of the Joint Committee on Economic Justice and Equal Employment, we intend to bring them in to talk about the *justice* part of it.

I also want to say I chair the National Black Caucus State Legislature; in fact, Wednesday I'll be in Washington for the Labor and Workforce Development Committee; this is a national push. And we're so far behind on competing, because we aren't doing the things that John was talking about and the things that Judy is indicating -- because we don't know. We spend too much time in New Jersey on politics, and not policy and substantive issues. And that's a fact.

So if you could, maybe, make a request to bring those folks in; I'd appreciate it.

SENATOR GORDON: Okay; thank you, thank you very much, Senator.

Any other questions?

Assemblywoman.

ASSEMBLYWOMAN RODRIGUEZ-GREGG: I have a question.

So I went to this one apprenticeship summit in D.C. And one of the things they talked about -- you know, they have people from vo-techs, county colleges, everything. And one of the bigger focuses was-- You know, yes, we want to do these things and create these partnerships now,

and focus on better training. But when we talk about creating that, or putting it in young mind's heads -- that, you know, there's an opportunity in manufacturing, there are other opportunities besides a four-year degree -- what they said they realized they have to do is start earlier. Start sooner than high school, start in 8th grade, start in elementary school -- especially when it comes to the math component. Several people mentioned about young men and women being behind in math; and basic shop math is something that's not the norm, and it makes it difficult for a lot of these people to transition to manufacturing.

But, you know, it also -- they seem to say that the programs that they have -- when they try and focus on young people and trying to go younger -- are heavily focused on young men, as well. Studies show that young women perform better at computational math in grade school than men; and then studies show that we're even -- that there is no gender difference in high school. But it seems that a lot of programs that are manufacturing -- where they go into schools and try and promote -- are heavily focused on young men. And we've even seen it here today, when everybody kept mentioning *Cub Scouts* and not *Girl Scouts*; you know, not other programs that are -- there are young women who may perform very well, and may be interested in these careers as well.

So, I mean, what can we be doing to, maybe, promote or-- Should we be focusing on education; focusing on our curriculum in math at a younger age? What can we be doing to, kind of, promote the interest among all genders instead of just one? Because it, also, is still predominantly men.

MS. SAVAGE: I agree. There are a lot of questions in there, so I'll focus on a few of them.

I mean, I think you're absolutely right -- that more outreach earlier, and to both girls and boys, is important; it's essential. And I think that most kids don't know that much about manufacturing and what it's all about. At some point, you will probably get to hear about a program that NJIT leads through the State, out of the Talent Network, called *Dream It. Do It.* And they really are trying to do some very cool things like that in middle schools, in high schools -- just about getting kids to see that manufacturing is cool. It's about making stuff, and kids like to make stuff. So it's not about a dirty factory floor. So I'm not the expert on that program, but I think there are things like that.

I will say that I hope you'll get to come and visit a couple of the vocational school programs. And they are attracting young women into those programs. So that, for us, is exciting.

I really don't have an answer for you on the math piece. I mean, New Jersey has raised standards for math incredibly over the past couple of years. I don't think that the students are there yet; and you know, we could get into a whole, very long debate about whether the PARCC assessment is a good thing or a bad thing and whether that's appropriate.

But I don't think that one of the problems is that students aren't being given the right math at a young enough age. It's probably going to take a while to catch up to what the standards are.

So, I mean, I hope that answers some of your questions. But I think, absolutely, that there's lots of room for more outreach to all kinds of

kids, in all kinds of settings -- from elementary and middle school, to vocational schools and regular high schools -- to educate them about manufacturing and all kinds of careers, and get them started.

ASSEMBLYWOMAN RODRIGUEZ-GREGG: So a lot of these manufacturing companies -- and not just manufacturing; we're talking about IT, everything; because, you know, there's coding and all of those programs -- are they doing stuff that we're not aware of that -- or, you know, locally, like with colleges that we could be taking advantage of? You know, can we start to have more of a conversation about, maybe, some of the resources or some of the things that they're doing to promote their company; to promote interest in what they do to have, you know, young people come along?

I mean, there's one state where they were having Diesel Day, and they would go into-- There was a legislator who didn't even know that they were doing this in their own community; that they would go into the elementary schools or the grade schools and have students come in and learn about diesel engines. You know, there's-- We did a partnership where we did coding with our county college. But there are so many-- We did that, but then, apparently, there are companies that are willing to come in and do that, and we don't know about it.

So, I mean, I think it has to go with-- We talk about our-- There was a bill a long time ago, and then there was a push for legislation to have a one-stop shop, in terms of our infrastructure, our ecosystem, all the programs that we have; just like they have The CAVE at Rowan, and all of that stuff. So that, you know, businesses that wanted to come and were

looking at New Jersey understood all their resources. But it would be helpful to know what your resources are too--

MS. SAVAGE: Right.

ASSEMBLYWOMAN RODRIGUEZ-GREGG: --and what we could take advantage of to create that mutual partnership.

MS. SAVAGE: Well, I think there are lots of companies and industries that are doing lots of things, including the manufacturing industry, which has a whole series of events in October aimed at school and college students. But I think you're absolutely right that there's no one-stop shop for it; there's no coordination. And maybe there's a better way to manage all of that, that would be helpful both to schools, to students, and to industry -- that they could have a one-stop shop to get connected with schools. Because everybody is scurrying around trying to do similar things, and it's not coordinated. So I think that's a great idea.

SENATOR GORDON: Good.

Senator Singer, did you have a comment?

SENATOR SINGER: Just one brief comment.

I think we also have to take a look at, really, the guidance counselors in the high school area and what -- number one. And not to be disparaging about it, but many of them have never worked in the private sector for 25 years; or have never, ever in their life. And that's number one -- is a problem.

And number two, is the fact is that the selling of vocational education in high schools throughout the state, as you know, is looked down on in many areas. You know, they have to leave their regular high school and go there; and then they have to come back to the high school for

their sports. And they take two classes-- I mean, we make it difficult for the student.

And lastly, we leave the one key factor out of this entire thing: the parents. Parents have to understand the potential of their children and where they should want to see them go. And part of that goes back to-- I heard a comment before, "There aren't enough summer jobs." Wrong, wrong, wrong. There are not enough takers of the summer jobs.

I cannot tell you-- I have four kids, but I have two who are in college right now. I can't tell you how many young people don't work during the summer because their parents say it's okay; and how many high school kids don't work during the summer because parents say it's okay. It is not-- And by the way, all of you have to come down and take a look at why places like Great Adventure bring people in from other countries -- because they can't find help; and why the Shore brings people down people from other countries -- because they can't find help; and how many times people have said to me, "I can't get enough help at a Wawa" -- or a Quick Chek, or anywhere else like that -- "because young people don't come in and apply for it."

So I think there's also a whole different thinking that we have to talk about at the high school level, preparing young people for what their future is.

And one last thing, and then I'll shut up. (laughter)

You know, my kids in college see what's happening now. When it's too hard, kids just change their majors. And that's why, when they come on my desk -- like every Senator and Assembly people here -- we see people with majors in Poetry, majors in Archeology. You say to them,

“Okay, you want to be an archeologist?” “No.” A major in Spanish; “You want to teach Spanish?” “No.” “Well, that’s a great secondary, but you’re majoring in Spanish, and you’re not going to teach it, what do you want to do? Why wasn’t your major in Business, with a secondary in Spanish?”

They are just clueless; and they just go through that entire period of time and say, “What do I do; I have a four-year degree in something that is not usable in the workplace.”

MS. SAVAGE: All good points; thank you.

SENATOR GORDON: Okay; let’s move along.

Thank you very much, Ms. Savage.

Our final speaker is Michael Wallace, Director of Employment and Labor Policy at the New Jersey Business and Industry Association.

And I need to say that the NJBIA has been very much of a partner in developing this initiative; and we’ve done a lot of planning with them. And we appreciate your being here today.

Thank you.

**M I C H A E L W A L L A C E:** Thank you, Senator and members of the Caucus.

And I know Melanie Willoughby, our Chief Government Affairs Officer, has worked very hard with the Senate President and Senator Gordon to launch this Caucus. So on behalf of all of us, thank you, Caucus members, for agreeing to sit on this Caucus and do this very important work.

NJBIA has been advocating for manufacturing for years, many years. That’s because manufacturing is in our roots. We started over 100 years ago as the New Jersey Manufacturers Association. A century later, we

have grown to become the nation's largest statewide employer association, representing many different industries; but manufacturing is still a vital part of our DNA.

At one time, about half the jobs in this state were in manufacturing industries including textiles, automobiles, and telecommunications. These jobs didn't require a four-year education, and they paid well enough to provide a middle-class way of life for hundreds of thousands of New Jersey workers.

Although New Jersey manufacturing today is no longer the powerhouse it was decades ago in terms of its percentage share of the workforce, it remains a \$44.5 billion industry. Many of these jobs, that employ 6 percent of New Jersey's workforce, are advanced manufacturing positions at businesses in the science, technology, engineering, and mathematics fields. These smaller companies require highly skilled employees who can operate the automated machines in high-tech production facilities.

While applicants don't necessarily need a four-year bachelor's degree, they do need advanced training, technical know-how, and nationally recognized industry credentials to do the work -- and many companies are having difficulty filling these middle-skilled positions.

Four years ago, NJBIA surveyed manufacturing companies and found out 70 percent were struggling to find workers with the skills needed for the increasingly high-tech production positions available. That's why NJBIA created a Manufacturing Coalition to bring together key stakeholders to successfully deliver additional and improved training programs that provide the skilled workforce that advanced manufacturing

demands.

The Coalition includes NJMEP, NJ Council of Vocational-Technical Schools, NJIT, NJII, The New Jersey Community College Consortium for Workforce and Economic Development, and the New Jersey Council of County Colleges. Our State government partners on the Coalition include the New Jersey Department of Labor and Workforce Development, New Jersey Department of Education, the Secretary of Higher Education, and the New Jersey Department of Labor -- which I had mentioned previously.

This collaboration led to the creation of the County Vocational-Technical School Grant Program to spur new career programs hosted by colleges, high schools, and other partners in existing facilities. The program has been funded by a \$3 million appropriation in Fiscal Years 2015 and 2016; \$1 million in Fiscal Year 2017; and \$3 million in the current budget.

New programs launched in conjunction with NJBIA, the County College Consortium, and the New Jersey Department of Labor include training for fabricated metal/CNC machining, mechatronics, welding, and production technology. Mobile training labs have been fitted with CNC machines and mechatronics training equipment. Graduates of these programs earn both hands-on experience and nationally recognized credentials.

We have had many successes in growing career and technical programs, county college programs, and programs at four-year institutions. However, the shortage of skilled manufacturing workers still persists, so more must be done.

That's why NJBIA has and will continue to work very closely with the Manufacturing Caucus. This Caucus is one that NJBIA has long-advocated for; it is important to look at all the issues that impact the growth of manufacturing in this state, and develop an action plan to help ensure that there are workers with the necessary skills to fill those middle-skilled jobs.

There are many different ways that this can be done: expanding apprenticeship opportunities, certification programs, and expanding the capacity of our career and technology schools. Expanding the CTE programs into comprehensive high schools should also be a component of the plan.

Our other efforts on behalf of workforce development include working with the State Education and Training Commission -- the SETC -- in its mission to increase the number of working-age adults who earn more than a high school diploma, with either a college degree, a certificate, or industry-valued credential. This initiative -- that is officially being rolled out today by the Secretary of Higher Education and the Commissioner of Labor -- is called *65 by '25: Many Paths, One Future*.

In conclusion, NJBIA is eager to work with the Manufacturing Caucus to help shine the light on this important industry, and to develop the career pathways and talent pipelines needed to strengthen New Jersey's manufacturing industry.

SENATOR GORDON: Thank you; thank you, Michael.  
(applause)

And I want to, just once again, thank NJBIA for your very significant role in getting this initiative underway, and working with all of us in planning it; Melanie Willoughby, in particular.

Do we have any questions for Michael? Questions or comments?

Assemblyman.

ASSEMBLYMAN ZWICKER: So you talked about apprenticeship programs very briefly; and that has come up several times during the course of the day. And research shows that an apprenticeship program can make a tremendous difference in terms of taking a young person and getting them into a high-quality, high-paying job. And it crosses lots of different boundaries, including gender boundaries as well.

So I'd like to get your thoughts and comments on expansion of apprenticeship programs and, specifically, I'm wanting your thoughts on where that expansion -- where's the best place to go with that? Is that something that should come out of the private sector, or is that something that should come out of, perhaps, the public sector? Is that a partnership? But serve your thoughts on how we can expand, for all students in New Jersey, on an apprenticeship program across all sectors.

MR. WALLACE: I think it's all of the above, Assemblyman.

I think there needs to be education on the private sector side, in that apprenticeships are not only for union workers; and that most, if not all, private sector workers could be and are eligible to get into the apprenticeship program. So education is -- education and promotion of apprenticeship programs is the first step, I believe.

ASSEMBLYMAN ZWICKER: Thank you.

SENATOR GORDON: Any other questions or comments? (no response)

Thank you very much, Michael, for your presentation.

I do want to, as we wrap here -- I want to point out that in addition to holding hearings around the state -- at which we'll hear from manufacturers and other experts to learn of what the needs are, as we move towards developing recommendations for policy changes -- I'm hoping that we can participate in other opportunities to learn what's going on in the marketplace. And we have, as you see here -- we've been advised that there will be a number of meetings of manufacturers around the state, one on October 6 that the MEP is sponsoring in Bridgewater. They have invited us to provide some representatives for a panel discussion. I'm told it's at 10:00 a.m. on October 6, and so I'm looking for volunteers for those who would be willing to participate in that. And that will be another opportunity to get some information from the marketplace.

We also have a second one on Thursday, October 12. This is sponsored by the Commerce and Industry Association. They are holding this at the Anheuser-Busch facility in Newark. We'll be getting more information on that again--

ASSEMBLYWOMAN DeCROCE: What date was that?

SENATOR GORDON: --looking for--

ASSEMBLYMAN BUCCO: October 12.

SENATOR GORDON: It's October 12, Thursday, at the Anheuser-Busch facility in Newark.

ASSEMBLYMAN BUCCO: Not because it's the brewery, but I've already volunteered for October 12; Commerce and Industry had said something to me.

SENATOR GORDON: Okay; great. Very good.

And we'll be in touch with all the members about this.

At this point -- because I really would like this enterprise to be a collaboration -- I'd be interested in hearing from the other members of this Caucus. First of all, what you think; any kind of conclusions you've drawn from this session; any other comments you'd like to share. But also, I'd like to hear your thoughts on topics that we should focus on, the direction which we should go. In the interests of keeping the momentum going, we've decided to do the next session on vocational education at a vo-tech school, and the county college needs.

But beyond that, we have, at this point, a blank slate. I know there are subjects like improving the partnership between manufacturers and academia, in terms of training the workforce; but also doing the R&D to support manufacturing.

I think this is an opportunity to take a fresh look at our State incentive programs. You know, we've spent the last 10 years focusing a great deal on job retention, as opposed to job creation; and our resources have been going towards the larger, more mature businesses. And the McKinsey people will say the jobs are created in the smaller, younger companies. Maybe we need to take a fresh look at that.

So I'd just like to open it up to the Caucus.

Assemblywoman.

ASSEMBLYWOMAN DeCROCE: First, thank you very much, Senator, for having me on this caucus. And I thank everyone for being here today.

The first thing I'd like to address to Senator Pou was her question pertaining to, kind of, the pilot program that I'm working on with the International Longshoremen. And it is a pilot; it is a pilot to show that it can work with all the different certifications that are needed out of one industry, and how you can work with a county college.

County College of Morris has a Workforce Development Program; so that's how we work it, with full discussion on areas like Paterson, and Newark, and Essex County -- down in the Port, being able to employ individuals in the Port area. And we can go into greater detail because, certainly, the International Longshoremen know that -- they do know that this is taking place, and I'm sure that they would love to come in and be a part, and address all that -- as to their thoughts and what they need. Because that is a very important part of the economic growth of New Jersey -- is our ports. So all those discussions took place; this was just a pilot. It wasn't just focused on CCM, so I want to make that clear.

You know, there is -- New Jersey is a manufacturing state. In my district alone, I have 621 manufacturing companies in District 26. So I would hope that, at some point, in our district area or the vocational school -- Morris County Vocational School -- we could hold a meeting, because we could bring a lot of manufacturing companies in to talk with us.

One thing I'm just going to say to all of us, as legislative members, is this is a bipartisan panel; and we are all here. I know I've been working, as I had told the Senator, for two years on this issue. But this is

not unique just to me. I am here because I want to be a bigger part of the picture and share that with my colleagues, on my side of the aisle and the other side of the aisle. Because that is the only way we're going to come up with a good, good discussion, and come to a resolution as to how we grow the State of New Jersey. Because that's what we're elected here to do.

So I am going to be very open with everything that I have been afforded in my research. I have an intern -- I'm just going to tell you this -- who I'm very proud of, because she's a West Point graduate. She's receiving her degree out of Columbia; she's a Captain in the Army. She interned with me all summer, and we worked in depth, and in all these meetings she participated in. Columbia and the Army have agreed -- because when she's done, she's going to be teaching at West Point -- that she can stay in my office and work on this very issue. And she's been texting me -- if you've seen my phone going, she knows I'm here and she's in class -- and she's been texting because she's so encouraged by it. And I am going to have her here, because she's definitely an asset to all of us. And these are the kinds of individuals we need to invite into our discussion.

So I thank you; I thank all of you because this is for the betterment of New Jersey; and this board should be inclusive of each other to accomplish what we're here to do. And I thank you for having me be a part of this.

SENATOR GORDON: Thank you.

SENATOR POU: Thank you.

SENATOR GORDON: Senator Rice.

SENATOR RICE: Yes; thank you, Mr. Chairman.

A couple of suggestions, in terms of what we can do as we move forward.

I don't know if anyone is here from the Department of Higher Education, Labor, and also the Department of Education. I think that one of the things we should do is to make certain that they have a representative here who can take good notes as to what these discussions are all about. So as they look at what they're already doing -- because they may be moving in one direction; and we might go in another one, at the end of the day, when we get this information.

The other thing is that I know the Joint Committee on the Public Schools is going to have some conversations -- I just haven't told them yet -- on the -- and I think the Education Commissioner should have the same conversation -- on how do we appoint county colleges board members. And the reason I'm raising that-- If you really look at the Workforce Investment Opportunity Act, there's a lot of conversation and direction to make certain that, if we are going to be looking at what we're doing today, versus what we're going to be doing tomorrow-- Because the business community knows where those changes are going to take place long-term, then we should be structuring curricula based on that need within our communities and our state.

And traditionally-- Essex County is a mess right now with their college. But the board members are appointed by the County Exec, and it's just too political. We have all kinds of issues; then we lose accreditation, and we should be helping kids.

And so my point is, is that we don't want to take anything from local control, but we need to look at who's on these boards. And every

board should have some quality representation, I believe, from corporate America; or at least from, maybe, some of these other organizations.

So we might have some discussion on that; but take the politics out of it. There is always going to be politics in any appointments, but we need to make sure there's a focus on curriculum, and student needs, and the needs of the working community. Because everything I read -- and I just finished reading some stuff I have to do some resolutions for, for my national group -- is we keep talking about this workforce that's not available. And we look at New Jersey -- we're really behind on needs. And so we're never going to attract the kind of industries that we need in New Jersey -- even though we have the infrastructure -- if we don't look at some of the things that we've talked about, in terms of regulation and all of that. I get that. But we're not going to attract it either if we don't recognize, in New Jersey, that our workforce is just not prepared. And a lot of it's not prepared -- I'm being honest about it -- because of our politics. And we don't like to say that as legislators of these committees; but I want to press to keep (indiscernible) how politics is hurting our growth in these young people. And Paterson is a good example, Newark is a good example, Camden is a good example, Jersey City is a good example; Garfield and the rest of them that have never been taken over. But it is our politics. It's taking money from the system that should be going back to the kinds of things that industry is looking for.

So that's my suggestions, based on a lot more years of experience in the Legislature than you guys have, and you ladies have, okay? (laughter)

SENATOR GORDON: Anyone else?

By the way, I failed to recognize Assemblyman Benjie Wimberly when he arrived--

SENATOR OROHO: Because you traded him to the other side. (laughter)

SENATOR GORDON: Thirty-fifth District; I apologize for that.

Assemblyman.

ASSEMBLYMAN BUCCO: Chairman, you were absolutely right when you spoke about the incentive programs. I think that the Committee would do itself a great benefit if we had an opportunity to review the existing programs -- where those programs are being applied, so we can find out, around the state, where most of the areas are receiving most of the benefit. And maybe have somebody from the EDA to review the programs and do an analysis as to where we think we may need to make some adjustments.

Because I do agree; I think that many of the programs aren't available to the small business community. Many of the programs aren't available to various regions of the state. And I think that those things need to be looked at and adjusted in order to continue to attract business. You know, those programs are now going on eight years old. So I do think it's time to look at that.

And I agree, again, that I think the whole link between our community colleges and the manufacturing field needs to be addressed so that we can try to guide these students in the right direction. And I think that this is a great opportunity, because secondary education, higher education is -- the costs are astronomical. And to the extent that the

community colleges can provide a direction and provide a cost-effective means for them to get a great education and find a job, is a benefit all around.

And I think the final issue -- and I don't know how we address this, but -- I think the overall affordability in New Jersey somehow needs to be in this mix. Because we can come up with all kinds of incentive programs, but the bottom line is the minute that we are successful in those incentive programs, other states around us are going to duplicate. And if we can't be competitive in the tax area, in the energy area, you know, we're just not going to be able to attract these businesses. Because they'll get the same incentive program or a better one from another state, and their workforce will put more money in their pockets at the end of the day. And with the combination of those two incentives, they will not choose New Jersey.

SENATOR GORDON: Okay; thank you.

Anyone else?

Assemblyman Chiaravalloti.

ASSEMBLYMAN CHIARAVALLOTI: Senator, thank you for chairing the Committee.

I don't need the mike; I'm going to be very brief.

I agree with what my colleagues have outlined, especially on the education, the workforce, and doing a comprehensive review of not only New Jersey's programs that currently exist, but also the best practices from the outside.

One area that struck me in the McKinsey report, though -- and I'm intrigued by it -- are the numbers on incubators and business accelerators. Because our numbers are so woefully low that they, sort of,

stand out as outliers. So I would love some testimony or some information to be able to drill down, to have a better understanding on why that exists.

Thank you, sir.

SENATOR GORDON: Okay, thank you. Excellent idea.

Assemblyman.

ASSEMBLYMAN ZWICKER: Thank you, Mr. Chairman.

Actually, my comment was very similar, which is: When you look at job growth -- manufacturing job growth, I want to remind us of something that Dr. Sebastian said very early on. He had a bullet point that pointed out the relationship with R&D driving manufacturing.

And so we're talking a lot about our students today, who are so critically important. But I think you're right; whether it's incubators, whether it's barriers for ideas coming out of all of our research universities-- Because it seems to me that the other piece is long-term: How do we not just compete in drawing companies here -- how do we grow companies within New Jersey?

So we talk about competing for Amazon. I say we flip it: How can we make the next Amazon come out of one of our research universities; and that will drive manufacturing. And you mentioned that in your comments, Mr. Chairman. But I think that's something, longer term, we have to look at -- and that's the type of incubator zones, affordability; I mean, there are lots of things around that. But that's something that I think this Caucus could focus on; and really has some important things to do.

SENATOR GORDON: Assemblywoman Rodriguez-Gregg.

ASSEMBLYWOMAN RODRIGUEZ-GREGG: I don't need the microphone. I think that we all know that I'm loud. (laughter) You're welcome.

No, all I was going to say was that I think that we all realize on this panel that this is going to have to require a holistic solution -- that there are a lot of sectors that we have to look at. And thank you for everyone coming and testifying today; we look forward to more testimony in the future. But it really is something that is truly holistic in New Jersey. And, hopefully, the ideas that come out of here, we keep in mind that we want to -- and kind of along the lines of what Assemblyman Zwicker said -- we want to continue to grow innovation, and grow these sectors, and grow manufacturing; and not create legislation that may, in the long term, get in the way and inhibit their growth.

So, thank you again.

SENATOR GORDON: Assemblyman Wimberly.

ASSEMBLYMAN WIMBERLY: Well, I know I'm a little late; I'm sure my Senator already welcomed everybody to Paterson. (laughter) If you haven't visited Great Falls, come out and see the most beautiful site here in the State of New Jersey, if not in the United States.

But just listening -- I tell you, the one thing that I would like to hear when we visit a vo-tech -- I'm a Passaic County Tech graduate -- is to hear from the students at the high school and the higher education levels about their position on manufacturing. And I know in our area there is no shortage of young people wanting to work. Our young people in the City of Paterson work. I don't care if they have to take a dollar bus to get somewhere; they work local. So the opportunities for internships and

summer jobs, or something -- I would like to hear from our young people like what would they like to do, what's going to benefit them.

SENATOR GORDON: Good point.

ASSEMBLYMAN WIMBERLY: And particularly -- the Senator said that our young people in college -- to give them the right direction. Because I always tell people, four years in college and you don't get that real opportunity of co-oping or interning to set yourselves up; to set yourselves up for graduate school or for a job opportunity makes college somewhat in vain, you know? So I think we have to direct them into the right way -- not only just to attend college or attend vocational school, but to set a path for a career that is meaningful to them and something that they want to do.

So just, once again, welcome to Paterson; and it's great having you guys here.

SENATOR GORDON: Thank you very much.

Anyone else?

SENATOR RICE: Mr. Chairman, can I make one other comment?

SENATOR GORDON: Senator Rice.

SENATOR RICE: As usual, I probably have to be the conscience of this Caucus, like I have to be in the Senate. Because no one is going to talk about African Americans, but those of us who are African American. It doesn't mean people don't want to talk about it; they don't think about it.

And we need to take a look at the manufacturing industry -- which I've been very much concerned about -- because I know that inner

city kids, as opposed to our rural communities, can do those kinds of jobs -- the kinds of things that we grew up on.

But I also know we have the infrastructure in place to enhance the industries we have, and to, hopefully, attract others if we do it right.

The problem is, is that the people who live in those cities are predominately, as it stands now, African Americans and other ethnic minority groups. It's going to be important that someone constantly reminds us of what the statistics -- the numbers look like, as it relates to black folks and other ethnic minorities, as it relates to STEM -- and it's really bad -- as compared to others. Because if you don't look at that then we'll never raise the question, "Why is it?" If we don't raise the question, "Why is it?" we're never going to correct it, which means that we still aren't going to get those jobs. And to be quite frank about it, as I tell the trade unions -- at least Senator Sweeney and them -- I'm tired of keep saying, "I'm fighting for labor;" and then when they build up my city, I don't see folks of color working. So it's like, "Why are we doing all of this?"

And so we're going to have to keep being real about it; not from a racial perspective, but to say, "How are we're doing with African Americans, other ethnic minorities. How are we doing with the women in industry?" Because I think John mentioned, we need to flow them in, and then we can figure out how to move them up, okay?

And so I don't expect that to be my sole role; I would like to think that folks who don't come from my ethnicity will raise those questions so I can stop being the one to raise them all the time, so folks can stop thinking that some of us are racists, when we're not racist. But if we don't identify the problem -- if we don't say *seniors* when we mean seniors;

and we don't say *black* when we mean *black*, or say *Irish* meaning they are *Irish* -- then where do we go?

So I just need to raise that for the record, since I know we're being transcribed; or at least-- We'll be getting transcripts, right?

UNIDENTIFIED MEMBER OF CAUCUS: Yes.

SENATOR RICE: So I just want to make sure that's clear, and I have no shame in my game.

SENATOR GORDON: Thank you very much.

Senator Greenstein.

SENATOR GREENSTEIN: Thank you.

You know, in the very short time that I've been involved in this -- about a year ago or so, even less; I went to one of the, I think, Manufacturing Days from the MEP, this Committee -- I've really learned a lot.

First of all, I had absolutely no idea that manufacturing was still alive in New Jersey as much as it is; the numbers of companies, for example. I'd always heard manufacturing was dead, it's gone offshore. It has completely morphed; it has a different definition now, and it's very interactive with other fields. That was also very interesting to me -- whether it's infrastructure, education -- everything is very much tied together to the future of New Jersey. So that was enlightening.

I'm also, in light of that vocational education -- I had no idea there were shortages; I mean, that was news to me. So if it's news to me, it's probably going to be news to many New Jerseyans. And I think what we need to do is educate New Jerseyans on this as part of our mission, and to begin to work toward the future. But I have a feeling a lot of people may

have misconceptions about this, and it will be great for us to be able to get all of this information out.

Thanks.

SENATOR GORDON: Okay; great. Thank you.

Anyone else? (no response)

Well, listen, at this point, the hour is starting to get late.

I want to, first of all, thank my colleagues for participating in this. I think this is a pretty impressive Committee, actually -- a lot of great talent here, and great ideas -- all interested in working, in a bipartisan manner, to address these problems.

I think we have a great opportunity at this point in time. Just a few months before a new Administration takes office, we have an opportunity, here, in this Committee, this Caucus, to do a lot of analysis. And I think a lot of the analysis, actually, has been done; that's the good news. But an opportunity to, perhaps, collect it all and repackage it, and transform it into policy recommendations; which in turn can be transformed into pieces of legislation that can address the needs that we're going to learn about.

And as I said in the beginning, I'm hoping that this process is more of a listening exercise. There are people out there in the marketplace who are dealing with these problems every day; and I'm hoping we'll take this Committee around the state -- north and south, east and west -- to hear from the people who are living with these problems.

I'm going to ask staff to summarize, perhaps in bullet-point form, some of the key findings and comments that were made today so that we can review it.

I'll want to be in touch with all of you to hear of any other ideas that may occur to you about where we should be focusing in the weeks ahead.

I want to close by thanking the New Jersey Community Development Corporation again for hosting this; Bob Guarasci, who has really done so much for this city. It shows what one passionate person can do -- he puts an organization together with other passionate people.

And I want to thank everyone who attended today and participated -- and particularly, our presenters.

As a reward for our Caucus members, I want to tell you that lunch is available downstairs, for those who want to partake.

And with that, I will call this meeting adjourned.

Thank you very much. (applause)

**(MEETING CONCLUDED)**